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Liberty Utilities
(EnergyNorth Natural Gas) Corp.
d/b/a Liberty Utilities

Least Cost Integrated Resource Plan

DG 17-____

October 2, 2017

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I. INTRODUCTION

This filing presents the 2017 Least Cost Integrated Resource Plan (“2017 IRP,” “LCIRP,” or “Plan”) for Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a/ Liberty Utilities (hereinafter referred to as “EnergyNorth” or the “Company”), for the planning years 2017/2018 through 2021/2022 (the “Forecast Period”).¹ The Plan details EnergyNorth’s resource planning process and presents the Company’s resource strategies based on its current forecast of customer requirements and expected market conditions. The Company submits this LCIRP for review by the New Hampshire Public Utilities Commission (the “Commission”) pursuant to Order No. 25,762 (Feb. 9, 2015) (the “2013 IRP Order”) and the requirements of RSA 378:38 and 378:39. EnergyNorth requests the Commission’s approval of its LCIRP that sets forth a resource plan to meet its expected customer requirements using currently accepted planning processes, standards, and methods.

A. Company Background

EnergyNorth is a local distribution company (“LDC”) that provides natural gas service to approximately 91,000 residential, commercial, and industrial customers in thirty-three cities and towns in New Hampshire. In Order No. 25,370 (May 30, 2012), the Commission approved the transfer of ownership of EnergyNorth to Liberty Energy Utilities (New Hampshire) Corp. The majority of EnergyNorth’s customer base is comprised of residential heating customers having heat-sensitive demand. The remainder of EnergyNorth’s customers are small and medium-size commercial and industrial (“C&I”) loads, as well as some larger industrial customers.

In general, there are two categories of customers with respect to portfolio planning: those customers for whom EnergyNorth must plan and acquire capacity (i.e., sales and capacity-assigned), and those who receive delivered supplies from competitive suppliers (i.e., capacity-exempt transportation). EnergyNorth’s C&I customers have the option of purchasing supply from a competitive supplier and receiving transportation-only service from EnergyNorth pursuant to the Company’s unbundled tariff options. The terms and conditions applicable to transportation-only service specify EnergyNorth’s obligation to assign capacity to portions of the transportation customer loads. EnergyNorth’s resource planning process appropriately reflects its obligation to assign capacity and maintain reliability in conjunction with its unbundled service offerings. Certain transportation-only customers have capacity-exempt status for whom the Company is not responsible for obtaining supply or capacity resources to meet their demand.

To provide capacity for its sales service and capacity-assigned transportation customers, the Company has developed a gas supply portfolio with various assets and contracts. EnergyNorth’s current resource portfolio is comprised of long- and short-haul transportation capacity, storage capacity and associated transportation capacity, and on-system peak-shaving facilities. Nearly all of EnergyNorth’s upstream long- and short-haul transportation capacity and underground storage is ultimately delivered to the Company via Tennessee Gas Pipeline (“Tennessee” or “TGP”) with the exception of 1,000 dekatherms (“Dth”)/day of pipeline capacity which is delivered via the Portland Natural Gas Transmission System (“PNGTS”) to serve the city of Berlin. EnergyNorth’s peaking supplies include on-system liquid propane

¹ A gas supply planning year or “split-year” is defined as the twelve-month period beginning November 1 and ending October 31.

gas and liquefied natural gas (“LNG”) facilities located in Manchester, Concord, Nashua, and Tilton, New Hampshire, and an additional “satellite” propane facility in Amherst.²

B. Organization of the 2017 IRP Filing

The 2017 IRP filing is organized as follows:

- Section II provides a summary of the Company’s resource planning process and an overview of the results;
- Section III discusses the Company’s econometric demand forecasting methodology and provides detailed results for each customer segment, summarizes the adjustments for the Company’s energy efficiency programs and other out-of-model adjustments, and discusses the allocation of the monthly forecast to a daily basis, which facilitates supply and capacity analysis. This section also provides a comparison of the 2017 IRP forecast results to the 2013 IRP results;
- Section IV provides details on the Company’s approach to developing the various planning standards;
- Section V discusses the Company’s supply resource portfolio and the adequacy of the portfolio in terms of meeting forecast requirements under the Base Case and various growth and weather scenarios; and
- Section VI provides a summary of the Commission’s directives outlined in the 2013 IRP Order and the actions taken by the Company to ensure compliance with those directives, consistent with the requirements of RSA 378:38 and 378:39.

Additional information to support the 2017 IRP is provided in the following Appendices:

- Appendix 1. Detailed Regression Results
- Appendix 2. Energy Efficiency
- Appendix 3. Description of the Daily Regression Analysis
- Appendix 4. Description of the Monte Carlo Analysis
- Appendix 5. Existing Supply Resource Portfolio
- Appendix 6. SENDOUT® Results

² The satellite propane facility in Amherst is used solely for storage.

II. OVERVIEW OF RESOURCE REQUIREMENTS

EnergyNorth's resource planning process begins with the establishment of appropriate goals and objectives. The primary goal of EnergyNorth's planning process is to acquire and manage resources that provide reliable service under various demand scenarios while focusing on a best-cost resource portfolio for its customers. A best-cost portfolio appropriately balances costs with EnergyNorth's planning objectives, which are to maintain reliability and supply security, provide contract flexibility, and promote the acquisition of viable resources. Pursuit of a best-cost portfolio allows EnergyNorth to provide its customers with reliable service at the lowest reasonable cost.

As discussed in detail in Section III, the first step of the resource planning process is the development of a five-year demand forecast for the Company's service territory for which the Company must plan ("Planning Load"). The Company's Planning Load includes demand from firm sales customers and capacity-assigned transportation customers (i.e., firm transportation customers that are not exempt from capacity assignment requirements, as specified in the Company's Terms and Conditions, Section 11.0). The Planning Load requirements are derived from econometric demand forecast models developed for four customer segments: residential heating; residential non-heating; C&I heating; and C&I non-heating. In addition, certain out-of-model adjustments were included in the forecast to reflect the Company's increasing sales and marketing efforts, and its expansion into new service territories.³ The Company's Planning Load requirements are adjusted to account for demand reductions expected to be achieved through the implementation of its energy efficiency programs.

Over the Forecast Period, the Company's Planning Load is expected to increase in demand. The Planning Load forecast is driven by increases in the residential heating and C&I heating and non-heating demand. As discussed in Section III.A.13 below, residential heating volumes are forecast to increase at a compound annual growth rate ("CAGR")⁴ of 2.3 percent between 2017/2018 and 2021/2022, and the C&I heating and non-heating volumes are forecast to increase at a CAGR of 3.5 percent and 1.5 percent, respectively, over the same period.⁵ Residential non-heating volumes are forecast to decline at a CAGR of 3.2 percent.

As discussed in Section IV, the Company has prepared forecasts of Planning Load requirements under a Base Case scenario and under a range of weather and growth scenarios. The weather scenarios analyzed include (1) Normal Year, (2) Design Year, and (3) Design Day. The growth scenarios include (1) Base Case, (2) Low Growth, and (3) High Growth.

The final step of the planning process is the review and evaluation of the Company's current supply resource portfolio using the SENDOUT® portfolio optimization model. As discussed in Section V, the Company outlines its strategy for a long-term resource portfolio that enhances the reliability, diversity, and flexibility of the portfolio, which better positions the Company to meet expected demand at the best cost for its customers.

EnergyNorth's LCIRP provides a complete description of the Company's planning processes which it has employed, and continues to employ, enabling the Commission to adequately review the Plan and to come

³ Forecast demand associated with Innovative Natural Gas, LLC ("iNATGAS"), a reseller of compressed natural gas, was also included as an out-of-model adjustment. However, the demand from iNATGAS is currently expected to be minimal and does not have a significant effect on the demand forecast.

⁴ The CAGR is calculated as $((\text{Value}_{\text{Year}n} / \text{Value}_{\text{Year}1})^{1/n}) - 1$.

⁵ Including out-of-model adjustments.

to a full understanding of the methods used in practice and the results reached by applying those methods to current circumstances. The Plan also demonstrates that EnergyNorth's planning standards are appropriate and that the resource strategies described herein are in the best interests of its customers and result in a reliable, best-cost, long-range supply and capacity portfolio to meet the Company's forecasted Planning Load.

Important aspects of EnergyNorth's Plan are that it incorporates flexibility and reflects expected future conditions. Thus, it is a dynamic document in the sense that it continues to be refined as needed to reasonably respond to the changing requirements of EnergyNorth's customers and market conditions.

A. Current Resource Planning Environment

Market and regulatory restructuring of wholesale and retail natural gas markets over the last few decades have increased the complexity associated with acquiring and managing a best-cost resource portfolio. Virtually every aspect of LDC portfolio management has been transformed by regulatory and market changes. In the broadest of terms, the very markets in which LDCs such as EnergyNorth participate, the types of products and services that are bought and sold, and the manner in which these transactions are completed are vastly different today than 30 years ago. Market transformation has brought about many new opportunities and risks for all market participants, including LDCs, which must continue to reliably meet the supply requirements of their customers.

Natural gas markets continue on a course of broad restructuring that began with the initial deregulation of most wellhead supply prices in 1978 by an act of Congress. Through a series of physical infrastructure, financial market, regulatory, and technological advances, the manner in which gas supplies are traded and delivered to end-use customers has changed entirely. The result is a dynamic and competitive marketplace that is capable of delivering greater value to customers, but also increases the complexity of resource planning.

Today, wholesale natural gas commodity markets are no longer price-regulated and the delivery of supplies to LDC city-gate stations is unbundled from supply and storage services. Large volumes of gas are traded at many different pooling points along the interstate pipeline transmission system at transparent prices. LDCs and many end-users purchase supplies directly from marketing entities under flexible contract terms.

Prior to these changes, LDCs purchased all supplies from a limited number of pipelines serving their market area. To a large degree, LDCs relied on Federal Energy Regulatory Commission ("FERC") oversight to ensure that the bundled supplies were reliable and reasonably-priced. During that period, LDC markets demonstrated remarkable stability from year-to-year, minimizing the market risks associated with the long-term contracts required by pipeline providers.

Restructuring of retail markets significantly impacted EnergyNorth's planning process as C&I customers availed themselves of opportunities to purchase supply from competitive suppliers pursuant to firm transportation options available under EnergyNorth's tariff. As of July 31, 2017, approximately 2,600 C&I customers purchased supply from competitive suppliers.

These changes in natural gas markets have brought greater competition and customer choice, but they have also introduced considerable uncertainty in the resource planning process. In particular, the LDC's continuing role to plan for and acquire firm capacity resources for C&I customers complicates the manner in which it forecasts customer demand and designs its resource portfolio. Even with the introduction of

competition from marketers, the LDC remains responsible for ensuring overall reliability on its distribution system, and must be prepared to address any situation whereby one or more of its firm customers may be without gas supply for any reason.

EnergyNorth must continue to plan in a manner that ensures adequate and reliable supply so that its distribution system is not impaired by, or the Company can mitigate the effects of, an upstream disruption or a failure to deliver natural gas on a critical day. Natural gas flows on EnergyNorth's system and through the meters of every customer on its system, regardless of whether that customer buys its commodity from EnergyNorth or someone else.

There are several recent gas supply and market trends that will affect the New England market in general, and New Hampshire in particular. The dwindling off-shore natural gas supplies from Nova Scotia reduce the supply options available to the Company, whereas the significant increase in domestic natural gas production and reserves provides opportunities for LDCs. However, the complexity and lead-time required to construct incremental pipeline capacity will significantly influence how and where those supplies are delivered. Finally, the changing focus of regional imported LNG facility owners will impact gas supply strategy and decisions.

B. EnergyNorth's Planning Process

EnergyNorth's long-term process of planning for and meeting customer load requirements involves the coordination of a number of activities including demand forecasting, long-term resource planning, gas supply management, gas distribution, and energy efficiency. The majority of these activities are centralized within the Company's Energy Procurement Group, which provides the Company's Gas Load Forecasting, Gas Supply Planning, Portfolio Optimization, and Scheduling functions, and also includes the Customer Choice Team, which is responsible for managing the Supplier Service program. The Energy Procurement Group coordinates closely with the Gas Control Department, which is responsible for gas deliveries across the EnergyNorth distribution system in New Hampshire, and the Energy Efficiency Team, which is responsible for the design, implementation, and management of the Company-sponsored energy efficiency programs. Among the responsibilities of the Energy Procurement Group are to project the resource requirements of the EnergyNorth system and to assemble a best-cost portfolio of reliable resources to meet those requirements. The forecast of resource requirements consists of two steps: (1) the preparation of forecasts of long-term trends in customer requirements under normal weather conditions ("Normal Year"); and (2) the preparation of forecasts of customer requirements under defined (i.e., Design Day and Design Year) weather conditions. Assembling the best-cost portfolio is also a two-step process involving: (1) the procurement of a sufficient and appropriate portfolio of resources to meet the various sendout requirements resulting from the demand forecasting process; and (2) the economic dispatch of those volumes given available resources. The Company's resource portfolio provides a range of flexibility in making these economic dispatch determinations in the course of the day-to-day management of the portfolio.

EnergyNorth's short-term forecasting and gas supply planning activities are coordinated through its local Energy Procurement and Gas Control groups. Each day, Gas Control provides Energy Procurement with projected sendout requirements that are developed based on the results of a load forecasting process. Energy Procurement determines the availability, reliability, and pricing information necessary to satisfy the predicted customer loads taking into account both currently available projections of weather and prices as well as the possibility of design-forward weather conditions for the remainder of the heating season (design-forward planning). Energy Procurement and Gas Control then establish a daily "Game Plan" that matches available resources with sendout requirements for the EnergyNorth system. The

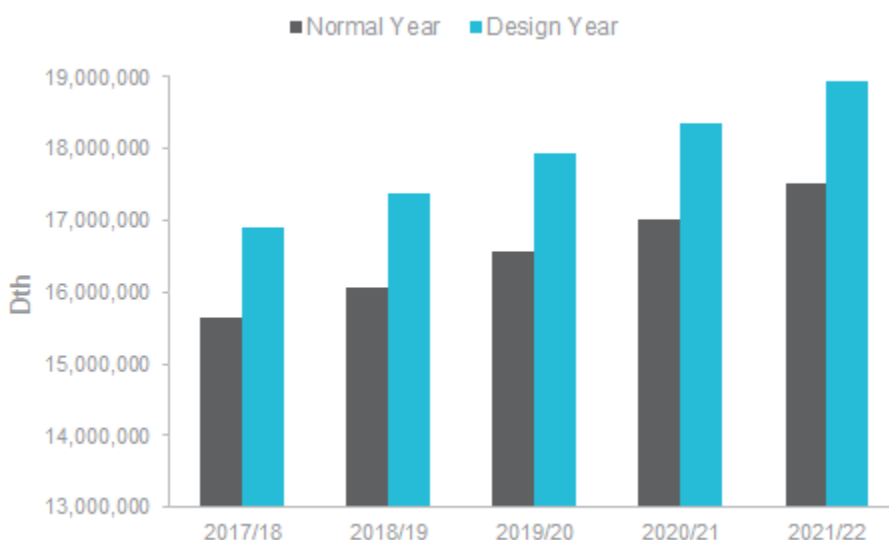
Game Plan is designed to balance the demand requirements of the system for the current gas day with scheduled supply volumes and also to project a seven-day supply/demand balance.

As described in Section III, the Company's long-term planning process is based on a comprehensive methodology for forecasting customer load requirements using an econometric analysis to determine growth expected for residential heating, residential non-heating, C&I heating, and C&I non-heating customer segments. Two out-of-model adjustments were made to the econometric forecast to account for additional demand that is not reflected in the historical data. Those adjustments were related to: (1) expected increases in the number of customers in the Company's existing service territory related to increasing sales and marketing efforts; and (2) estimates of the number of customers in new service territories in which the Company is expanding.

The results of the Company's forecasting methodology indicate that, over the Forecast Period, demand is forecast to grow by an average of nearly 475,000 Dth per year, or at a CAGR of 2.9 percent under normal weather conditions.

The Company developed two additional planning standards to ensure that: (1) its resource portfolio maintains sufficient supply deliverability to meet customer requirements on the coldest planning day ("Design Day"); and (2) it maintains sufficient supplies under contract and in storage (consisting of underground storage, LNG, and propane) to meet its customers' requirements over the coldest planning year ("Design Year"). The Design Year and Design Day planning standards are based on a Monte Carlo statistical analysis to establish a reasonable level of reliability for firm customers. As a result of this analysis, the Company defined a Design Year at 6,869 heating degree days ("HDD") and a Design Day at 71 HDDs. Combining the results of the design planning standards definition and the load forecasting process, the Company is projecting Design Year sendout to increase over the Forecast Period by an average of approximately 508,000 Dth per year, or at a CAGR of 2.9 percent, and Design Day sendout to increase by an annual average of approximately 4,275 Dth/day, or at a CAGR of 2.6 percent.

Figure 1: Planning Load



After the forecast of customer requirements is determined, the Company then designs a resource portfolio to meet forecast demand requirements in a reliable and best-cost manner. To that end, the

Company uses the SENDOUT® model to determine the adequacy of the existing and potential portfolio in meeting the forecast requirements and to identify any shortfalls during the Forecast Period. By using the SENDOUT® model, the Company can determine the best-cost, economic dispatch of its existing resources while taking into account the contractual and operating constraints, and can identify the need for, and type of, additional resources during the Forecast Period, if any. In the context of this report, EnergyNorth has reflected the rollover of all existing capacity resources for which the Company has the Right of First Refusal ("ROFR") or a rollover right that requires renewal during the five-year planning horizon of the Plan. These long-term contracts have provided competitively-priced services and offer important supply diversity benefits to the Company's portfolio. To evaluate the flexibility and adequacy of the resource portfolio under a range of potential conditions, the portfolio is assessed under Base Case, Normal Year, and Design Year conditions. The results of the Company's SENDOUT® analyses demonstrates that the resource plan, with the addition of incremental capacity resources, is sufficient to meet Base Case Design Year load requirements throughout the Forecast Period.

The next step in the planning process is to test the adequacy of the portfolio by evaluating how it would perform under High and Low Growth demand scenarios. The High and Low Growth demand scenarios were developed by adjusting the annual growth rate that resulted from its Base Case forecast upward or downward by one percentage point in each year of the Forecast Period. The Company's resource plan shows that the portfolio, with the addition of incremental gas supply resources, is adequate under design conditions in all years of the Forecast Period in both growth scenarios.

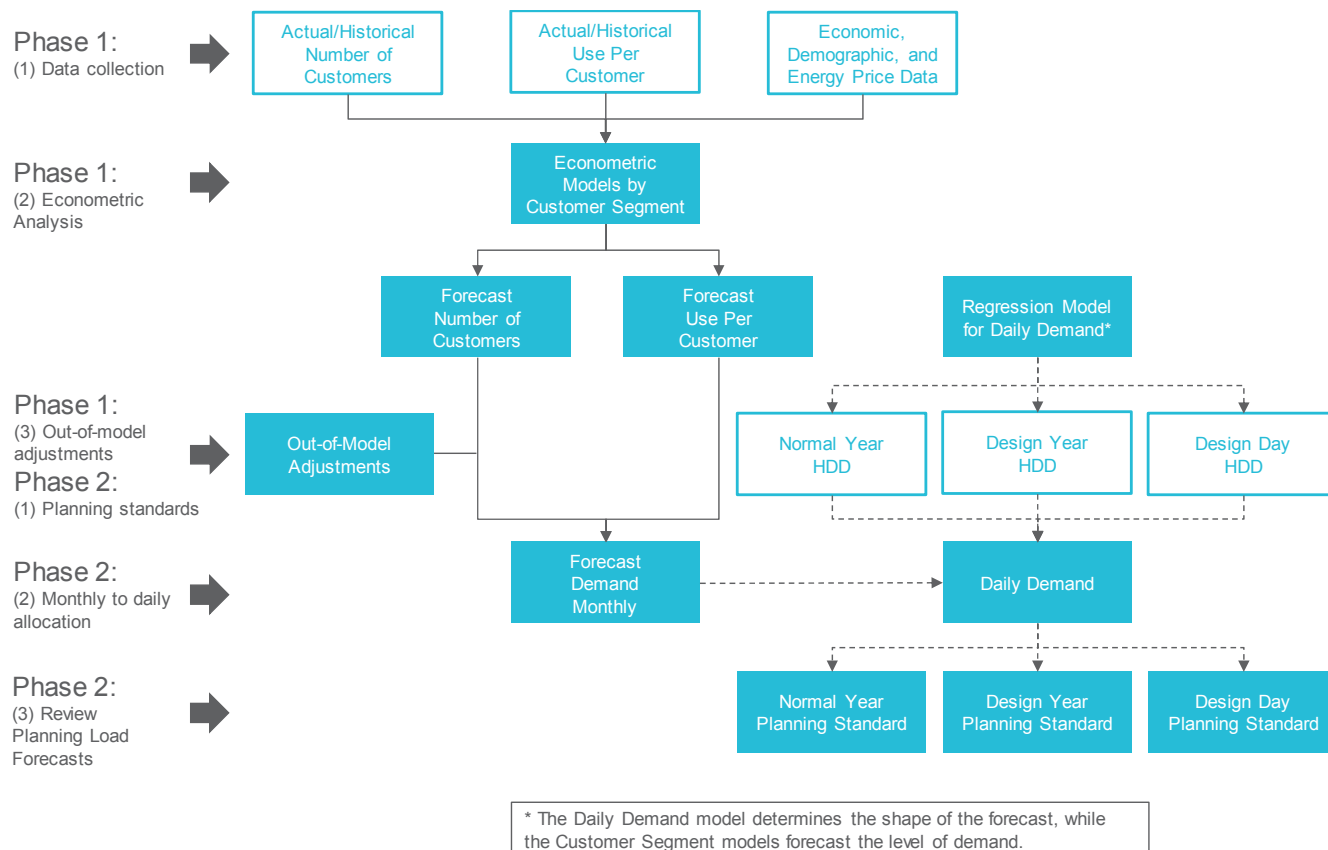
The Company notes that when making renewal, replacement, or incremental capacity decisions, it will employ the planning, supply, and capacity acquisition methods approved under this Plan to further ensure that the decision-making process used is reasonable and appropriate, and that the decision is based on the best information available to EnergyNorth, at the time it is made. Further, EnergyNorth's planning process will reflect the Company's objective of achieving a best-cost portfolio, where resource decisions appropriately balance cost considerations with those related to supply security, contract flexibility, and supply viability.

III. DEMAND FORECAST

The Company's overall demand forecasting methodology used in this 2017 IRP is similar to the methodology used in the 2013 IRP, which was accepted by the Commission in the 2013 IRP Order. The Company's demand forecasting methodology supports its supply planning goals of ensuring that its resource portfolio maintains sufficient supply deliverability to meet customer requirements on the Design Day; and it maintains sufficient supplies under contract and in storage (underground storage, LNG, and propane) to meet its customers' requirements during a Design Year.

The Company develops its customer requirements forecast from econometric models of historical billing data, which is available by month and rate class. The Company's demand forecast was developed in two phases: (1) econometric analysis was utilized to forecast levels of natural gas demand for the Company's service territory; and (2) a daily demand allocation was prepared to estimate daily results under various weather scenarios for supply planning purposes. That process is outlined in Figure 2, below.

Figure 2: Demand Forecast Methodology



As discussed in Section III.A.1, the first step in developing the econometric forecast was to collect and review the appropriate data for use in the modeling process. The Company collected monthly billing data, weather data, economic and demographic data, and energy pricing data. The data was then reviewed for reasonableness to ensure that the demand forecast was based on appropriate and reliable data.

As discussed in Sections III.A.2 through III.A.9, all econometric models were developed using regression analyses, proper and appropriate economic theory, and sound statistical practices and procedures.⁶ Econometric models by customer segment were developed to forecast the number of customers, use per customer, and volumes.

As discussed in Section III.A.11, the results of the econometric model forecast were augmented by certain out-of-model adjustments that were not captured in the historical relationship used in the econometric models due to EnergyNorth's increased sales and marketing efforts and expansion into new service territories. The monthly volumetric results of the demand forecast (i.e., econometric models plus out-of-model adjustments) were reduced by energy efficiency savings to determine the Company's net monthly demand requirements (see Sections III.A.12 and III.A.13).

The Company modeled its resources and requirements under various weather conditions, including Normal Year, Design Year, and Design Day. The Design Year standard, in conjunction with the Design Day standard, established the weather conditions that informed the amount of firm volume that the Company must plan for to maintain reliable service (see Section IV).

Once the planning standards were determined, the Company then translated the monthly demand forecast (which is lagged in time due to the Company's monthly billing cycle schedule) into a demand forecast of unlagged daily resource requirements at the Company's city-gates. This translation (i.e., allocating the monthly volumes to daily volumes) involves adjustments for unaccounted for gas and unbilled sales (see Section III.B).

The resulting daily demand forecast was then reviewed for reasonableness. That forecast represents the Company's Planning Load on a daily basis (see Section III.B.4) and is used as an input into the SENDOUT® model to determine the adequacy for the resource portfolio.

A. Phase 1 – Econometric Models for Demand Forecast

The purpose of the customer segment forecasts⁷ is to develop long-term projections of Planning Load based on forecast changes in economic and demographic conditions in the Company's service territory. To develop the forecasts, the Company's 17 rate classes were combined into four customer segments for sales and capacity-assigned transportation customers: residential heating, residential non-heating, C&I heating and C&I non-heating; and two customer segments for capacity-exempt customers (C&I heating and C&I non-heating). See Table 1.

The Company used monthly customer billing data (volume and number of customers) for the period August 2010 through April 2017 to define the dependent variables in its econometric modeling to ensure that the most reliable, consistent, and robust data was used in the models.

These sales and transportation categories were chosen since the Company maintains provider-of-last-resort responsibility for the sales and capacity-assigned transportation customers and, by including the

⁶ All regression analyses for the customer segment models were conducted using the SAS software package.

⁷ All forecasts represent firm demand only (i.e., firm sales and capacity-assigned, and capacity-exempt transportation) and exclude interruptible and special contract demand.

capacity-exempt customers, total retail volumes can be correlated with total natural gas flow into the Company's distribution system.

Appropriate causal drivers were tested in the development of each of the forecast models and each potential causal variable was tested and reviewed to develop models, which were robust, accurate, and consistent with economic theory. In addition, and consistent with the Company's 2013 IRP forecast methodology, each of the econometric models was tested for autocorrelation, heteroskedasticity, goodness of fit, significant values of the 'F' and 't' statistics, and multicollinearity.

1. Description of Variables

a. Customer Segment Data

The Company relied on monthly billing data by customer segment (volumes and customers) for the period from August 2010 through April 2017. As discussed above, the Company's 17 rate classes were combined, as illustrated below, to four customer segments for sales and capacity-assigned transportation customers and two customer segments for capacity-exempt customers.⁸

Table 1: Customer Segments

Customer Segment	Rate Classes
Residential Non-Heating	R-1
Residential Heating	R-3, R-4
C&I Heating ⁹	G-41, G-42, G-43, G-41T, G-42T, G-43T
C&I Non-Heating ¹⁰	G-51, G-52, G-53, G-54, G-51T, G-52T, G-53T, G-54T
C&I Heating Capacity-Exempt	G-41T, G-42T, G-43T
C&I Non-Heating Capacity-Exempt	G-51T, G-52T, G-53T, G-54T

The monthly customer data served as the dependent variable for the sales and capacity-assigned transportation customer models, and the monthly use per customer (i.e., volumes divided by number of customers) served as the dependent variable for the use per customer models.

In addition, monthly usage data was relied on for capacity-exempt transportation customers. This usage data was aggregated by customer segment and served as the dependent variable in the capacity-exempt econometric models.¹¹

⁸ The Company does not have any residential transportation customers.

⁹ The C&I Heating customer segment includes C&I heating sales and capacity-assigned transportation customers.

¹⁰ The C&I Non-Heating customer segment includes C&I non-heating sales and capacity-assigned transportation customers.

¹¹ The Company did not develop separate number of customers and use per customer models for the capacity-exempt customer segments because there are a limited number of capacity-exempt customers.

b. Weather Variable

HDDs and billing degree days (“BDD”)¹² were used in the customer segment models to account for the effect of weather on customer usage. The HDD and BDD data used to develop the weather-related variables were measured at the Manchester, New Hampshire weather station (“KMHT”), and provided for the period January 1977 through April 2017.¹³ The KMHT weather station was selected because it is close to the center of the Company's service territory, on a load-weighted basis.

c. Economic and Demographic Variables

Similar to the approach in the 2013 IRP, economic and demographic variables specific to Belknap, Coos, Hillsborough, Merrimack, and Rockingham counties were purchased from Moody's Analytics. The economic and demographic variables for each of the counties were combined to arrive at an estimate that represents the Company's service territory. Lag variables of between one and three months were developed for each of the economic and demographic variables listed in Table 2, below. In addition, Table 2 includes energy price variables developed and tested in the modeling process.

Table 2: Independent Variables

Series	Description	Variable	Source
FHHOLDA	Total Households, (Ths., SA)	HH	Moody's
FPOPA	Total Population, (Ths., SA)	POP	Moody's
FNMA	Total Net Migration, (Ths., SAAR)	NMA	Moody's
FGDP\$A	Gross Product: Total, (Mil. Chained 2000\$)	GDPR	Moody's
FYHHMEDA	Income: Median Household, (\$, SAAR)	INC	Moody's
FYPA	Income: Total Personal, (Mil. \$, SAAR)	PI	Moody's
FYPCPIA	Income: Per Capita, (2005 \$, SAAR)	PIP	Moody's
FYPDPIA	Income: Disposable Personal, (Mil. \$, SAAR)	PID	Moody's
FLBFA	Household Survey: Total Labor Force, (Ths., SA)	LBF	Moody's
FLBEA	Household Survey: Total Employed, (Ths., SA)	EMP	Moody's
FLBUA	Household Survey: Total Unemployed, (Ths., SA)	UEM	Moody's
FLBRA	Household Survey: Unemployment Rate, (% , SA)	UER	Moody's
FHSTA	Housing Starts: Total, (#, SAAR)	HST	Moody's
FHST1A	Housing starts: Single-family privately owned, (# of units, SAAR)	HSS	Moody's
FHSTMFA	Housing starts: Multi-family privately owned, (# of units, SAAR)	HSM	Moody's
FHPNRA	Permits: Residential - Total, (# of units, SAAR)	HPT	Moody's
FHPN1A	Permits: Residential - Single-Family, (# of units, SAAR)	HPS	Moody's
FHPNMA	Permits: Residential - Multifamily, (# of units, SAAR)	HPM	Moody's
FHX1MEDA	Median Existing Home Sales Price, (Ths., SA)	XHP	Moody's
FHXAFFA	Affordability Index - Single-family Housing, (Index)	HID	Moody's
FHX1A	Existing Home Sales, (Ths., SA)	XHS	Moody's

¹² Billing degree days are similar to HDDs; however, they account for the lag that occurs because billing cycles are spread throughout the month.

¹³ Weather data was provided by EnergyNorth's weather service vendor Telvent.

Series	Description	Variable	Source
FHSTKA	Housing stock: Total, (Ths., SA)	HTT	Moody's
FHSTK1A	Housing stock: Single-family, (Ths., SA)	HSF	Moody's
FHSTKMFA	Housing stock: Multi-family, (Ths., SA)	HMF	Moody's
FHSTKOTA	Housing Stock: Other, (Ths.)	HOT	Moody's
FRTFSA	Total Retail Sales, (Mil \$, SAAR)	RSL	Moody's
FETA	Employment: Total nonfarm, (Ths., SA)	EE	Moody's
FERMA	Employment: Natural Resources & Mining, (Ths.)	ERMA	Moody's
FE23A	Employment: Construction, (Ths.)	ECON	Moody's
FEMFA	Employment: Manufacturing, (Ths., SA)	EMFA	Moody's
FETLA	Employment: Trade, Transportation, & Utilities, (Ths.)	ETLA	Moody's
FE51A	Employment: Information, (Ths.)	EINF	Moody's
FEFIA	Employment: Financial Activities, (Ths., SA)	EFIA	Moody's
FEPSA	Employment: Professional & Business Services, (Ths.)	EPSA	Moody's
FEEHA	Employment: Education & Health Services, (Ths.)	EEHA	Moody's
FELHA	Employment: Leisure & Hospitality, (Ths.)	ELHA	Moody's
FE81A	Employment: Other Services (except Public Administration), (Ths.)	EOTH	Moody's
FEGVA	Employment: Government, (Ths., SA)	EGVA	Moody's
FEGVFA	Employment: Federal government, (Ths.)	EGVF	Moody's
FEGVSA	Employment: State government, (Ths.)	EGVS	Moody's
FEGVLA	Employment: Local government, (Ths.)	EGVL	Moody's
FGDP	Gross Product: Total, (Mil. \$)	GDP	Moody's
FCPIU.US	CPI: Urban Consumer - All Items, (Index, 1982-84=100, SA)	CPI	Moody's
FNMDA	Net migration - Domestic, (Ths.)	NMDA	Moody's
FNMIA	Net migration - International, (Ths.)	NMIA	Moody's
FBIRTHA	Births, (Ths.)	BIR	Moody's
FDEATHA	Deaths, (Ths.)	DIE	Moody's
FYPEWSA	Income: Earnings - Wage & Salary, (Mil. \$)	WSA	Moody's
FEOFFA	Employment: Office-using Industries, (Ths.)	EOFF	Moody's
FEZTECA	Employment: High Technology Industries, (Ths.)	EZTE	Moody's
FRMOSDA	Mortgage Originations: 1-4 unit Total transaction, (Bil. \$)	MOD	Moody's
FRMOSNA	Mortgage Originations: 1-4 unit Total transaction, (Ths.)	MON	Moody's
EPH	Employed per household (EE / HH)	EPH	Moody's
HHSIZE	Household size (POP / HH)	HHSIZE	Moody's
	Natural Gas Price delivered to Residential	NGPRCR	EIA
	Natural Gas Price delivered to Commercial	NGPRCC	EIA
	Natural Gas Price delivered to Industrial	NGPRCI	EIA
	Heating Oil Price for all (\$/Dth)	OILPRC	EIA
	Heating Oil Price delivered to Residential (\$/Dth)	OILPRCR	EIA
	Heating Oil Price delivered to Commercial (\$/Dth)	OILPRCC	EIA
	Heating Oil Price delivered to Industrial (\$/Dth)	OILPRCI	EIA
	Natural Gas / Oil Price Ratio – Residential	GORR	EIA

Series	Description	Variable	Source
	Natural Gas / Oil Price Ratio – Commercial	GORC	EIA
	Natural Gas / Oil Price Ratio – Industrial	GORI	EIA
Note: Independent variables as provided by Moody's Analytics. The "Series" represents Moody's abbreviation for the data series, and "Variable" represents the variable term the Company used in its models. "SA" is seasonally adjusted and "SAAR" is seasonally adjusted annual rate.			

d. Natural Gas Price Variable

Historical natural gas prices were developed using data from the U.S. Department of Energy/Energy Information Administration ("EIA"), which was available at the monthly level for New Hampshire. Table 3 below details the specific data series obtained from EIA.

Table 3: EIA Historical Natural Gas Prices¹⁴

Variable Name	Data Availability	Region
Price of Natural Gas Delivered to Residential Consumers	January 1989 to February 2017	New Hampshire
Price of Natural Gas Delivered to Commercial Consumers	January 1989 to February 2017	New Hampshire
Price of Natural Gas Delivered to Industrial Consumers	January 2001 to February 2017	New Hampshire

Forecasted natural gas prices were developed using EIA's Short-Term Energy Outlook ("STEO")¹⁵ and Annual Energy Outlook ("AEO").¹⁶ The STEO forecasts monthly natural gas prices for the New England region over the upcoming two years (i.e., January 2017 through December 2018). To develop the forecast of natural gas prices from March 2017 through December 2018,¹⁷ the growth rates for the New England region from the STEO were applied to the historical New Hampshire natural gas prices. Specifically, the year-over-year percentage change for each month in the STEO natural gas price forecast for the residential, commercial, and industrial customers were applied to the historical New Hampshire natural gas prices for each respective customer segment. For example, to develop the forecast of the residential natural gas price in November 2017, the growth rate from the STEO for the period from November 2016 to November 2017 (i.e., the year-over-year growth rate) was applied to the historical residential natural gas price in November 2016.

The AEO forecasts annual natural gas prices for residential, commercial, and industrial customers for the New England region. To develop a forecast of monthly natural gas prices for New Hampshire for the January 2019 to October 2022 period, the annual growth rates for the New England region from the AEO were applied to the New Hampshire natural gas prices. The annual percentage changes in the forecast for residential natural gas prices were used to develop the residential natural gas prices starting in January 2019. Similarly, the annual percentage changes for commercial natural gas prices were applied

¹⁴ U.S. Department of Energy/Energy Information Administration, Natural Gas Prices, released April 2017.

¹⁵ U.S. Department of Energy/Energy Information Administration, Short-Term Energy Outlook, released April 2017.

¹⁶ U.S. Department of Energy/Energy Information Administration, Annual Energy Outlook, released January 5, 2017.

¹⁷ As noted in Table 3, historical natural gas prices were available through February 2017.

to the commercial natural gas prices, and the annual percentage changes in industrial natural gas prices were applied to industrial natural gas prices. Those annual growth rates were applied to the previous year's natural gas prices in each month. For example, the residential natural gas price in July 2019 is equal to the July 2018 residential natural gas price adjusted by the annual growth rate between 2018 and 2019 from the AEO. Similarly, the residential natural gas price in August 2019 is equal to the August 2018 residential natural gas price adjusted by the same growth rate. That methodology was used to develop the forecast between January 2019 and the end of the Forecast Period.

Table 4, below, generally describes the data used to develop the natural gas prices relied on in the 2017 IRP.

Table 4: Summary of Natural Gas Prices

Data Source	Data Period	Region
EIA	August 2010 – February 2017	New Hampshire
EIA STEO	March 2017 – December 2018	New England
EIA AEO	January 2019 – October 2022	New England

2. Summary of Customer Segment Forecasts

For the 2016/2017 split-year, the residential heating customer segment comprised approximately 42 percent of firm sendout,¹⁸ C&I heating and C&I non-heating segment volumes represented approximately 44 percent and 13 percent, respectively, while the residential non-heating segment accounted for less than 0.5 percent of firm sendout.

A summary of the results of the Company's regression analysis for each customer segment are discussed in the following sections. All results are based on the split-year November through October. Detailed results of the regression analysis for each customer segment forecast are provided in Appendix 1.

3. Residential Heating

a. Number of Customers

Based on the econometric model developed, the number of customers for the residential heating customer segment is forecasted to increase over the Forecast Period. The forecast equation for the number of residential heating customers includes an autoregressive ("AR") term, a trend variable, and a variable for total households lagged one month, as well as monthly dummy variables. The R² of the model is 0.999 and the independent variables are significant at the 95-percent level. The model results in the following forecast of residential heating customers:

¹⁸ Calculated as the volumes associated with sales and capacity-assigned transportation customers.

Table 5: Residential Heating Customer Forecast

Split-Year	Avg. # of Customers
2017/18	77,675
2018/19	78,814
2019/20	79,927
2020/21	81,020
2021/22	82,117
CAGR (2017/18-2021/22)	1.4%

b. Use Per Customer

Over the Forecast Period, the residential heating use per customer is forecasted to slightly decrease. The forecast equation for residential heating use per customer includes AR terms, variables for the price of natural gas lagged one month, weather, and monthly dummy variables. The R^2 of the model is 0.994 and the independent variables are significant at the 95-percent level. The model results in the following forecast of annual residential heating use per customer:

Table 6: Residential Heating Use Per Customer Forecast (Dth/Customer)

Split-Year	Use Per Customer
2017/18	77.6
2018/19	77.3
2019/20	77.2
2020/21	77.0
2021/22	76.8
CAGR (2017/18-2021/22)	-0.2%

c. Total Customer Segment

The monthly residential heating customer forecast was multiplied by the monthly use per customer forecast to determine the monthly demand forecast, which was then aggregated to an annual basis. Those results are shown in Table 7, below. Residential heating demand is expected to increase by over 280,000 Dth over the Forecast Period, or at a CAGR of 1.2 percent.

Table 7: Residential Heating Demand Forecast (Dth)

Split-Year	Demand
2017/18	6,025,297
2018/19	6,088,685
2019/20	6,167,810
2020/21	6,234,702
2021/22	6,308,336
CAGR (2017/18-2021/22)	1.2%

4. Residential Non-Heating

a. Number of Customers

The number of residential non-heating customers is forecasted to decline over the Forecast Period. The forecast equation for the number of residential non-heating customers includes AR terms, a variable for total households, and a trend variable. The R^2 of the model is 0.999 and the independent variables are significant at the 95-percent level. The model results in the following forecast of residential non-heating customers:

Table 8: Residential Non-Heating Customer Forecast

Split-Year	Avg. # of Customers
2017/18	2,913
2018/19	2,843
2019/20	2,765
2020/21	2,678
2021/22	2,595
CAGR (2017/18-2021/22)	-2.8%

b. Use Per Customer

Residential non-heating use per customer is forecasted to slightly decrease over the Forecast Period. The forecast equation for residential non-heating use per customer includes AR terms and variables for the price of natural gas lagged two months and weather. The R^2 of the model is 0.953 and the independent variables are significant at the 95-percent level. The model results in the following forecast of residential non-heating use per customer:

Table 9: Residential Non-Heating Use Per Customer Forecast (Dth/Customer)

Split-Year	Use Per Customer
2017/18	23.2
2018/19	23.2
2019/20	23.1
2020/21	23.0
2021/22	22.9
CAGR (2017/18-2021/22)	-0.3%

c. Total Customer Segment

The monthly residential non-heating customer forecast was multiplied by the monthly use per customer forecast to determine the monthly demand forecast, which was then aggregated to an annual basis. Those results are shown in Table 10, below. Residential non-heating demand is expected to decrease by approximately 8,200 Dth during the Forecast Period, or at a negative CAGR of 3.2 percent.

Table 10: Residential Non-Heating Demand Forecast (Dth)

Split-Year	Demand
2017/18	67,566
2018/19	65,884
2019/20	63,797
2020/21	61,501
2021/22	59,377
CAGR (2017/18-2021/22)	-3.2%

5. Total Residential Demand Forecast

Total residential volumes are forecasted to increase at a CAGR of 1.1 percent, or by almost 275,000 Dth, over the Forecast Period. Although residential non-heating demand is forecasted to continue to decrease, that segment comprises a small fraction of total residential customer usage (i.e., approximately 1.1 percent in 2016/2017). As a result, the effect of decreasing volumes associated with the residential non-heating customers is minimal compared to the forecast increase in residential heating demand.

Table 11: Total Residential Econometric Demand Forecast (Dth)¹⁹

Split-Year	Residential Heating	Residential Non-Heating	Total Residential Planning Load
2017/18	6,025,297	67,566	6,092,863
2018/19	6,088,685	65,884	6,154,569
2019/20	6,167,810	63,797	6,231,607
2020/21	6,234,702	61,501	6,296,203
2021/22	6,308,336	59,377	6,367,712
CAGR (2017/18-2021/22)	1.2%	-3.2%	1.1%

6. Commercial and Industrial Heating

a. Number of Customers

The number of C&I heating sales and capacity-assigned transportation customers is forecasted to increase over the Forecast Period. The forecast equation for the number of C&I heating customers includes AR terms, total nonfarm employment, and a trend variable and monthly dummy variables. The R^2 of the model is 0.940 and the independent variables are significant at the 95-percent level. The model results in the following forecast of C&I heating customers:

¹⁹ Forecasts are prior to the inclusion of energy efficiency and out-of-model adjustments.

Table 12: C&I Heating Customer Forecast

Split-Year	Avg. # of Customers
2017/18	10,451
2018/19	10,617
2019/20	10,764
2020/21	10,868
2021/22	11,019
CAGR (2017/18-2021/22)	1.3%

b. Use Per Customer

The C&I heating use per customer is forecasted to decrease slightly over the Forecast Period. The forecast equation for C&I heating use per customer includes an AR term and a variable for weather, as well as monthly dummy variables. The R^2 of the model is 0.982 and the independent variables are significant at the 95-percent level. The model results in the following forecast of C&I heating use per customer:

Table 13: C&I Heating Use Per Customer Forecast (Dth/Customer)

Split-Year	Use Per Customer
2017/18	597.3
2018/19	596.5
2019/20	596.6
2020/21	596.6
2021/22	596.0
CAGR (2017/18-2021/22)	-0.1%

c. Total Customer Segment

The monthly C&I heating customer forecast was multiplied by the monthly use per customer forecast to determine the monthly demand forecast, which was then aggregated to an annual basis. Those results are shown in Table 14, below. Specifically, C&I heating sales and capacity-assigned transportation demand is expected to increase by approximately 325,000 Dth over the Forecast Period, or at a CAGR of 1.3 percent.

Table 14: C&I Heating Demand Forecast (Dth)

Split-Year	Demand
2017/18	6,241,917
2018/19	6,332,305
2019/20	6,422,114
2020/21	6,483,987
2021/22	6,567,644
CAGR (2017/18-2021/22)	1.3%

7. Commercial and Industrial Non-Heating

a. Number of Customers

The number of C&I non-heating sales and capacity-assigned transportation customers is forecasted to increase over the Forecast Period. The forecast equation for the number of C&I non-heating customers includes AR terms, variables for retail sales, and the price of oil lagged two months, and monthly dummy variables. The R^2 of the model is 0.755 and the independent variables are significant at the 95-percent level.²⁰ The model results in the following forecast of C&I non-heating customers:

Table 15: C&I Non-Heating Customer Forecast

Split-Year	Avg. # of Customers
2017/18	1,635
2018/19	1,654
2019/20	1,668
2020/21	1,681
2021/22	1,696
CAGR (2017/18-2021/22)	0.9%

b. Use Per Customer

Over the Forecast Period, use per customer by the C&I non-heating segment is forecasted to decline. The forecast equation for C&I non-heating use per customer includes AR terms and a variable for weather lagged one month. The R^2 of the model is 0.964 and the independent variables are significant at the 95-percent level. The model results in the following forecast of C&I non-heating use per customer:

Table 16: C&I Non-Heating Use Per Customer Forecast (Dth/Customer)

Split-Year	Use Per Customer
2017/18	1,213.8
2018/19	1,196.6
2019/20	1,176.8
2020/21	1,155.3
2021/22	1,133.8
CAGR (2017/18-2021/22)	-1.7%

c. Total Customer Segment

The monthly C&I non-heating customer forecast was multiplied by the monthly use per customer forecast to determine the monthly demand forecast, which was then aggregated to an annual basis. Those results are shown in Table 17, below. C&I non-heating sales and capacity-assigned transportation demand is expected to decrease by 61,700 Dth over the Forecast Period, or at a negative CAGR of 0.8 percent.

²⁰ One AR term was included in the model that was not significant at the 95-percent level. However, the variable was necessary to correct for autocorrelation, and was significant at the 89-percent confidence level.

Table 17: C&I Non-Heating Demand Forecast (Dth)

Split-Year	Demand
2017/18	1,984,088
2018/19	1,979,256
2019/20	1,963,304
2020/21	1,942,080
2021/22	1,922,388
CAGR (2017/18-2021/22)	-0.8%

8. Total Commercial and Industrial Demand Forecast

As shown in Table 18 below, the CAGR for the total demand forecasted for C&I sales and capacity-assigned transportation customers over the Forecast Period is 0.8 percent,²¹ resulting in an increase of almost 265,000 Dth of load. The increase in the total C&I sales and capacity-assigned transportation demand forecast is driven by an increase in the C&I heating customer segment.

Table 18: Total C&I Demand Forecast (Dth)²²

Split-Year	C&I Heating	C&I Non-Heating	Total C&I Demand
2017/18	6,241,917	1,984,088	8,226,004
2018/19	6,332,305	1,979,256	8,311,560
2019/20	6,422,114	1,963,304	8,385,418
2020/21	6,483,987	1,942,080	8,426,068
2021/22	6,567,644	1,922,388	8,490,032
CAGR (2017/18-2021/22)	1.3%	-0.8%	0.8%

9. Total Commercial and Industrial Capacity-Exempt Demand Forecast

The C&I capacity-exempt forecasts were used to calculate total system sendout as part of the monthly-to-daily demand forecast allocation process. Natural gas demand by the C&I heating capacity-exempt customer segment is forecasted to remain relatively flat over the Forecast Period. The forecast equation for C&I heating capacity-exempt volume includes a variable for weather, as well as total employment. The R^2 of the model is 0.976 and the independent variables are significant at the 95-percent level.

Natural gas demand by the C&I non-heating capacity-exempt customer segment is forecasted to decrease over the Forecast Period. The forecast equation for C&I non-heating capacity-exempt volume includes an AR term, and variables for the natural gas price and total labor force. The R^2 of the model is 0.989 and the independent variables are significant at the 95-percent level.

The results of those models are shown in Table 19, below.

²¹ That growth rate is prior to the inclusion of energy efficiency and out-of-model adjustments.

²² The results do not include capacity-exempt demand and are prior to adjustments for energy efficiency and out-of-model adjustments.

Table 19: C&I Capacity-Exempt Demand Forecast (Dth)

Split-Year	C&I Heating Capacity-Exempt	C&I Non-Heating Capacity-Exempt
2017/18	650,425	2,129,266
2018/19	650,256	2,091,249
2019/20	650,005	2,024,348
2020/21	649,582	2,010,390
2021/22	650,614	2,019,638
CAGR (2017/18-2021/22)	0.0%	-1.3%

10. Total Econometric Demand Forecast

As shown in Table 20 below, the CAGR for the total econometric demand forecast for sales and capacity-assigned transportation customers over the Forecast Period is 0.9 percent,²³ resulting in an increase of almost 540,000 Dth of load.

Table 20: Total Econometric Demand Forecast (Dth)²⁴

Split-Year	Residential Heating	Residential Non-Heating	C&I Heating	C&I Non-Heating	Total Econometric Demand Forecast
2017/18	6,025,297	67,566	6,241,917	1,984,088	14,318,868
2018/19	6,088,685	65,884	6,332,305	1,979,256	14,466,129
2019/20	6,167,810	63,797	6,422,114	1,963,304	14,617,025
2020/21	6,234,702	61,501	6,483,987	1,942,080	14,722,271
2021/22	6,308,336	59,377	6,567,644	1,922,388	14,857,744
CAGR (2017/18-2021/22)	1.2%	-3.2%	1.3%	-0.8%	0.9%

11. Out-of-Model Adjustments

Two out-of-model adjustments were made to the econometric forecast to account for additional growth that is not reflected in the historical billing data. Those out-of-model adjustments were related to: (1) expected increases in the number of customers in the Company's existing service territory related to

²³ That growth rate is prior to the inclusion of energy efficiency and out-of-model adjustments.

²⁴ The results are prior to energy efficiency and out-of-model adjustments, and do not include unaccounted for gas and unbilled sales, which are discussed in Phase 2 (i.e., Section III.B below).

increasing sales and marketing efforts; and (2) estimates of the number of customers in new service territories in which the Company is expanding.²⁵

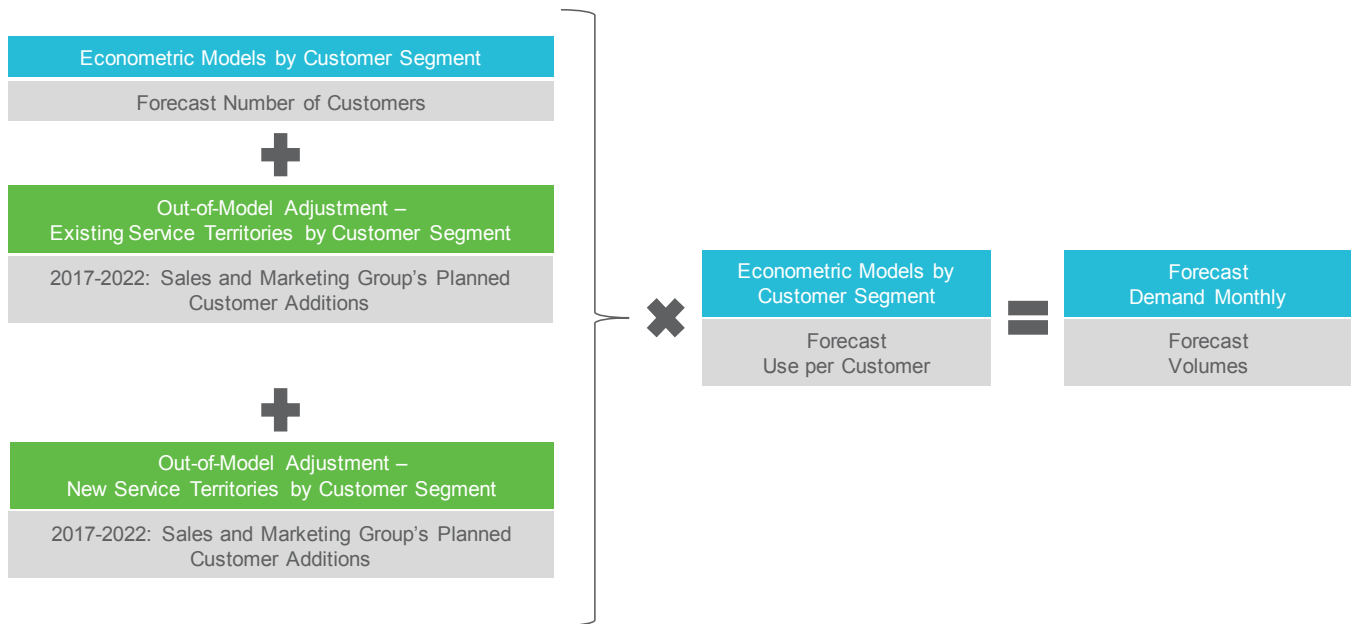
With respect to the existing service territory, EnergyNorth's Sales and Marketing Group provided annual six-year estimates of customer additions by rate class (2017 through 2022), which were aggregated to the customer segment level. The Company recently expanded its sales and marketing efforts and expects to continue to do so throughout the Forecast Period. Because the Company's sales and marketing programs are expected to continue to expand throughout the Forecast Period, the effect of those programs is not fully captured in the historical billing data, and, as such, is not reflected in the econometric forecast.

To properly reflect the expected increase in customer additions, the annual customer growth associated with the econometric forecast was compared to the annual customer addition estimates from EnergyNorth's Sales and Marketing Group by customer segment over the Forecast Period. Where the annual sales and marketing estimates for a customer segment were higher than the econometric forecast customer additions, the customer additions of the econometric forecast were adjusted by the difference between the sales and marketing estimates and the econometric forecast. For the customer segments in which the Sales and Marketing Group does not expect to add customers (e.g., residential non-heating) or years in which the econometric forecast of customer additions was equal to or above the estimated customer additions for a customer segment, the econometric forecast was relied on with no adjustment. The use per customer associated with the additional customers was assumed to be equal to the use per customer resulting from the econometric models for the respective customer segments.

EnergyNorth is in the process of expanding into new service territories in New Hampshire. EnergyNorth's Sales and Marketing Group provided annual six-year estimates of customer additions by rate class (2017 through 2022) for the new service territories, which were aggregated to the customer segment level. The additional customers associated with those new service territories are not reflected in the historical billing data (or the econometric forecast), so it was necessary to rely on an out-of-model adjustment. To determine forecast volumes, the use per customer associated with the customers in the new service territories was assumed to be equal to the use per customer resulting from the econometric models for the respective customer segments.

Figure 3 below summarizes the out-of-model adjustments to the results of the econometric models in the Base Case demand forecast.

²⁵ An out-of-model adjustment was developed to account for the iNATGAS demand requirements based on the recently amended special contract approved by the Commission in Order No. 26,002 (April 6, 2017) and the actual/historical usage of iNATGAS since commencing service on December 1, 2016. Specifically, a regression model was developed to estimate monthly load (i.e., volume) requirements for iNATGAS based on actual daily usage data from December 2016 through July 2017. However, the demand from iNATGAS is not currently expected to have a significant effect on the demand forecast.

Figure 3: Base Case Demand Forecast

12. Energy Efficiency

The demand forecast including out-of-model adjustments was reduced by energy efficiency savings to determine the Company's net demand requirements. A detailed description of the various energy efficiency programs, and savings associated with those programs is provided in Appendix 2. Table 21 below summarizes the Company's current energy efficiency goals, used as a decrement to EnergyNorth's demand forecast.

Table 21: Calendar Year Goals (Dth)

Year	Residential	C&I
2017	34,584	88,970
2018	39,079	90,993
2019	39,586	98,494
2020	42,663	104,266

Because the forecast for energy efficiency only extends through 2020, the Company assumed the percentage of residential energy efficiency volumes relative to residential firm demand continued to be equivalent to the 2020 levels through the end of the Forecast Period (i.e., 2022). The same assumption was made for energy efficiency volumes for C&I customers. The resulting calendar year energy efficiency deductions to the demand forecast are presented in Table 22 below.

Table 22: Calendar Year Energy Efficiency

Year	Residential		C&I	
	Energy Efficiency / Demand	Energy Efficiency (Dth)	Energy Efficiency / Demand	Energy Efficiency (Dth)
2017	0.57%	34,584	0.82%	88,970
2018	0.61%	39,079	0.79%	90,993
2019	0.61%	39,586	0.84%	98,494
2020	0.64%	42,663	0.87%	104,266
2021	0.64%	43,732	0.87%	106,989
2022	0.64%	44,845	0.87%	109,954

The monthly demand forecasts for the residential and C&I customer segments were multiplied by the percentages in Table 22 in each respective year to calculate the deduction to the demand forecast due to energy efficiency. Although the percentage is held constant, the amount of energy efficiency volume grows over the Forecast Period, thus the Company has assumed incremental savings in each year.

13. Demand Forecast Results

The results of the demand forecast after adjusting for the out-of-model adjustments and energy efficiency are provided in Tables 23 and 24 below.

Table 23: Demand Forecast Results by Customer Segment Including Out-of-Model Adjustments (Dth)²⁶

Split-Year	Residential Heating	Residential Non-Heating	C&I Heating	C&I Non-Heating	Econometric Forecast Including Out-of-Model Adjustments
2017/18	6,302,382	67,566	6,669,794	2,102,341	15,142,084
2018/19	6,426,952	65,884	6,870,710	2,119,393	15,482,939
2019/20	6,568,083	63,797	7,106,575	2,146,804	15,885,260
2020/21	6,732,604	61,501	7,374,664	2,191,680	16,360,449
2021/22	6,908,215	59,377	7,655,379	2,227,547	16,850,517
CAGR (2017/18-2021/22)	2.3%	-3.2%	3.5%	1.5%	2.7%

²⁶ Results are prior to energy efficiency and do not include unaccounted for gas and unbilled sales, which are discussed in Phase 2 (i.e., Section III.B below).

Table 24: Demand Forecast Results (Dth)²⁷

Split-Year	Econometric Forecast Including Out-of-Model Adjustments	Energy Efficiency	Demand Net of Energy Efficiency
2017/18	15,142,084	107,908	15,034,176
2018/19	15,482,939	114,101	15,368,838
2019/20	15,885,260	122,256	15,763,003
2020/21	16,360,449	126,928	16,233,521
2021/22	16,850,517	130,799	16,719,718
CAGR (2017/18-2021/22)	2.7%	4.9%	2.7%

B. Phase 2 - Translation of Demand Forecast into Customer Requirements

In the second phase of EnergyNorth's forecasting methodology, the Company translated its monthly demand forecast into monthly customer requirements, unaffected by billing cycle lag. This translation required the Company to account for the difference between gas delivered to its city-gates and gas metered at its customers' burner tips. This translation required adding to the demand forecast an amount of supply which represents unaccounted for gas, and then accounting for the billing lag. Once these adjustments were completed the monthly customer requirements are allocated into daily demand values.

1. Unaccounted For Gas

Unaccounted for gas is the difference between the total system sendout as measured at the gate-station and the volumes recorded at customer meters in the Company's billing system.²⁸

To calculate unaccounted for gas over the Forecast Period, an average percentage was calculated by dividing the eight-year (September 2009 through August 2017) sum of unaccounted for gas (total system sendout) by the eight-year sum of accounted for gas (billing data). The eight-year average of 2.03 percent was applied to the demand forecast on a monthly basis. Those volumes represent additional volumes not accounted for in the customer segment forecasts, but for which the Company must plan.

2. Unbilled Sales

To align the demand forecast with the supply forecast, a model of the lag in billing customers was developed based on the underlying historical and future meter reading schedule. The model was used to determine the lag-induced difference between the gas deliveries as metered at the city-gate and the gas deliveries as metered at customers' burner tips.

²⁷ Results are prior to unaccounted for gas and unbilled sales, which are discussed in Phase 2 (i.e., Section III.B below).

²⁸ There are a variety of factors that contribute to unaccounted for gas. Those factors include: system loss, metering variances, theft of service, purging during construction activities, and third-party damages.

The Company calculated the unbilled volumes by taking the difference between the historical monthly sendout figures and the historical billed sales figures (including unaccounted for gas). Next, the Company calculated a linear regression model of the unbilled volumes versus the difference between actual monthly HDDs and monthly BDDs over the period from September 2009 through August 2016. Since unbilled volumes are a function of timing of delivery versus meter reading, the resulting regression equation was specified with a zero intercept, with the theory being that the differences between sendout and actual billed sales tend to zero over time, with only minor differences caused by the year-to-year adaptation of the Company's billing schedule to the actual calendar.

The normalized unbilled volumes were estimated by calculating the difference between monthly normal BDDs and monthly normal calendar HDDs, and multiplying the result by the coefficient of the regression model described above. The results of that analysis were added to the normal forecast billing volumes for the Forecast Period to determine the forecast of normal monthly volumes to be delivered to the city-gates.

3. Monthly to Daily Allocation Model

The next step in Phase 2 of the Company's demand forecasting process was to determine EnergyNorth's Normal Year and Design Year forecasts of daily customer requirements over the Forecast Period for resource planning purposes. The Company used a regression equation of daily sendout versus daily temperature for the most recent twelve months to allocate its monthly normal forecast customer requirements to daily normal customer requirements. To perform its regression analysis, the Company used version 3.3.3 of the R statistical software package.²⁹ A detailed description of that analysis is provided in Appendix 3.

The Normal Year and Design Year weather patterns were applied to the daily regression model to calculate the daily shape of the Normal Year and Design Year total sendout demand forecasts ("Base Year").³⁰ The monthly forecast including unaccounted for gas and unbilled sales was then allocated to a daily basis using the daily shape of the Base Year.

Applying those models resulted in daily Planning Load forecasts based on Normal Year and Design Year weather, including the effects of energy efficiency, unaccounted for gas, and unbilled sales on a billing cycle and gas year basis.

4. Total Planning Load Results

The results of the Company's Planning Load requirements are illustrated in Table 25 below. The total Planning Load demand is forecast to increase over the Forecast Period by almost 1.9 million Dth, or at a CAGR of 2.9 percent.

²⁹ "R is a language and environment for statistical computing and graphics. It is a GNU project which is similar to the S language and environment which was developed at Bell Laboratories (formerly AT&T, now Lucent Technologies). R can be considered as a different implementation of S. There are some important differences, but much code written for S runs unaltered under R.

R is available as Free Software under the terms of the Free Software Foundation's GNU General Public License in source code form. It compiles and runs on a wide variety of UNIX platforms and similar systems (including FreeBSD and Linux), Windows and MacOS." See, <https://www.r-project.org/about.html>.

³⁰ See Section IV below for a description of the development of the Normal Year and Design Year weather patterns.

Table 25: Normal Year Planning Load Forecast (Dth)

Split-Year	Total Planning Load
2017/18	15,634,082
2018/19	16,075,247
2019/20	16,575,525
2020/21	17,000,558
2021/22	17,527,589
CAGR (2017/18-2021/22)	2.9%

C. Comparison of Demand Forecast to 2013 IRP

As illustrated in Table 26 below, the Company's total Planning Load in 2017/2018 is higher in the 2017 IRP than in the 2013 IRP (the only overlapping year of the two forecasts). The CAGR over the Forecast Period in the 2017 IRP is also somewhat higher than in the 2013 IRP.

Table 26: Comparison of Planning Load (Dth)

Split-Year	2013 IRP (DG 13-313) – Total Planning Load	2017 IRP – Total Planning Load
2013/14	12,849,714	--
2014/15	13,162,317	--
2015/16	13,532,759	--
2016/17	13,822,754	--
2017/18	14,136,177	15,634,082
2018/19	--	16,075,247
2019/20	--	16,575,525
2020/21	--	17,000,558
2021/22	--	17,527,589
CAGR (2013/14-2017/18)	2.4%	--
CAGR (2017/18-2021/22)	--	2.9%

IV. PLANNING STANDARDS

A. Normal Year Planning Standard

To establish the Normal Year's daily HDD data, the average annual number of HDDs was calculated for the KMHT weather station for the 30 years from January 1987 through December 2016, resulting in an average of 6,325 HDD. A Normal Year was then developed by replacing the thirty-year average months with actual months in the dataset that were similar to the average HDD and standard deviation for each month. This step was taken to avoid an artificially smooth Normal Year that does not reflect the day-to-day variation in HDDs. The Normal Year HDDs are summarized by month in Table 27.

Table 27: Normal Year HDD

Month	HDD
January	1,226
February	1,086
March	891
April	517
May	228
June	54
July	6
August	11
September	115
October	421
November	708
December	1,060
Total	6,325

B. Design Year and Design Day Planning Standards

1. Methodology

The Design Year standard, in conjunction with the Design Day standard, establishes the weather conditions that inform the amount of firm volume that the Company must plan for to maintain reliable service, but is expected to occur infrequently. The Design Year and the Design Day Planning Loads were calculated by using a Monte Carlo analysis based on average daily temperature as the dependent variable and HDD as the independent variable for its regression analysis.

For its Monte Carlo analysis, the Company used temperature data from the KMHT weather station for the period January 1, 1979 through December 31, 2016. The Company's Monte Carlo analysis, which is described in more detail in Appendix 4, is similar to the analysis in its 2013 IRP.

2. Determination of Design Year and Design Day Planning Standards

The Design Day standard is based on the statistical distribution of the coldest day of each calendar year, while the Design Year standard is based on the statistical distribution of the total HDDs in each calendar

year. The Company based its planning standards on its Monte Carlo analysis, using a Design Day and Design Year of the mean results plus two standard deviations. The Company's Design Day is defined as 4.27 minus two times 5.33, or negative 6.39 °F. Converting to HDD yields a Design Day of approximately 71.4 HDD.

The Company's Design Year is defined as approximately 6,314 plus two times approximately 277 HDD, or 6,869 HDD.

Once the annual Design Year was determined the monthly shape was then calculated. First, the Design Year summer (i.e., the months of May through October) was assumed to be the same as the Normal Year. Next, for each winter month (i.e., November through April), the standard deviation of monthly HDDs over the most recent 30 years was calculated, and the resulting standard deviations were summed. An adjustment factor was calculated by dividing the difference in the total Design Year winter HDDs and the Normal Year winter HDDs by the sum of the standard deviations. The monthly standard deviations multiplied by the adjustment factor were then added to the Normal Year monthly HDDs to arrive at the monthly values of the Design Year. Table 28 displays the monthly Design Year HDD.

Table 28: Design Year HDD

Month	HDD
January	1,350
February	1,155
March	980
April	574
May	228
June	54
July	6
August	11
September	115
October	421
November	786
December	1,186
Total	6,869

A process similar to the one used to develop the daily shape of the Normal Year was used to develop the daily shape of the Design Year. The monthly HDDs and standard deviations were compared to actual historical months to select representative months that reflect daily variability in weather. Each representative month was calibrated so that the total HDDs in the month equaled the calculated values shown in Table 28.

The resulting Design Year Planning Load is provided in Table 29.

Table 29: Design Year Planning Load Forecast (Dth)

Split-Year	Total Planning Load
2017/18	16,901,795
2018/19	17,376,013
2019/20	17,944,792
2020/21	18,367,180
2021/22	18,933,736
CAGR (2017/18-2021/22)	2.9%

The resulting Design Day Planning Load is provided in Table 30.

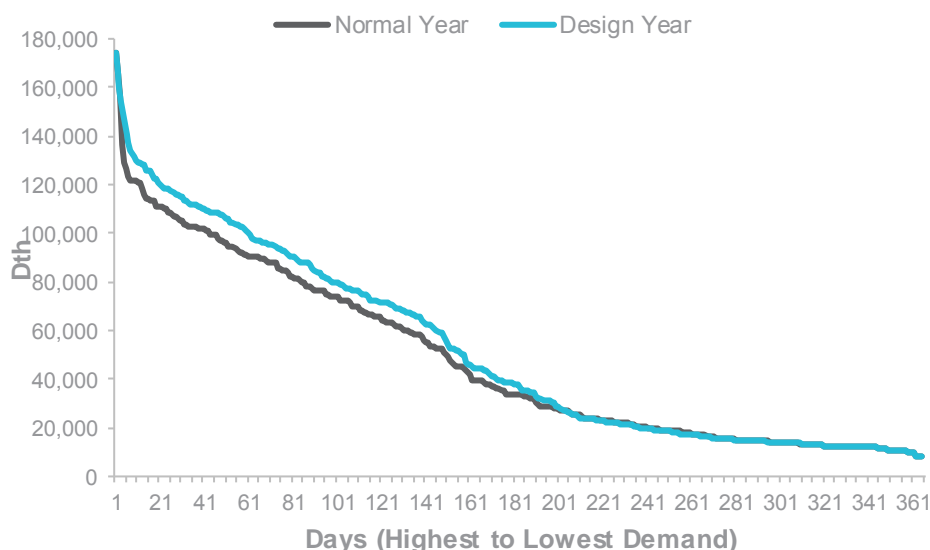
Table 30: Design Day Planning Load Forecast (Dth)

Split-Year	Total Planning Load
2017/18	156,822
2018/19	160,989
2019/20	164,640
2020/21	168,934
2021/22	173,917
CAGR (2017/18-2021/22)	2.6%

C. Summary of Planning Load Forecasts

The load duration curves for the Normal Year and Design Year planning scenarios are illustrated in Figure 4.

Figure 4: Daily Planning Load – Load Duration Curves (2021/2022)



The demand associated with each planning standard (i.e., Normal Year, Design Year, and Design Day) is provided in Table 31 below.

D. High and Low Growth Scenarios

The High and Low Growth scenarios were developed to determine the adequacy of the Company's supply portfolio under a range of demand scenarios.

1. High Growth Scenario

To generate the High Growth demand forecast, the Company added 1.0 percent per annum growth to its Base Case growth rate. That is, the growth rate in the High Growth forecast in each year is 1.0 percent above the growth rate of the Base Case forecast. The Normal Year High Growth forecast resulted in an average per annum growth in demand of over 650,000 Dth per year, or approximately 179,000 Dth per year higher than the Base Case, with a CAGR of 3.9 percent compared to the Base Case CAGR of 2.9 percent. The results of the High Growth Planning Load forecast are presented in Table 32 below.

2. Low Growth Scenario

To generate the Low Growth demand forecast, the Company subtracted 1.0 percent per annum growth from its Base Case growth rate. That is, the growth rate in the Low Growth forecast in each year is 1.0 percent below the growth rate of the Base Case forecast. The Normal Year Low Growth forecast resulted in an average per annum growth in demand of over 302,000 Dth per year, or almost 171,000 Dth per year lower than the Base Case, with CAGR of 1.9 percent compared to the Base Case CAGR of 2.9 percent. The results of the Low Growth Planning Load forecast are presented in Table 33 below.

E. Demand Forecast Results

The final Base Case, High Growth, and Low Growth Planning Load forecasts are presented in Tables 31 through 33. These forecast results are utilized to determine the Company's resource adequacy, as discussed in Section V.

Table 31: Summary of Base Case Planning Load Forecasts (Dth)

Split-Year	Normal Year	Design Year	Design Day
2017/18	15,634,082	16,901,795	156,822
2018/19	16,075,247	17,376,013	160,989
2019/20	16,575,525	17,944,792	164,640
2020/21	17,000,558	18,367,180	168,934
2021/22	17,527,589	18,933,736	173,917
CAGR (2017/18-2021/22)	2.9%	2.9%	2.6%

Table 32: Summary of High Growth Planning Load Forecasts (Dth)

Split-Year	Normal Year	Design Year	Design Day
2017/18	15,782,889	17,062,548	158,314
2018/19	16,386,082	17,711,902	164,101
2019/20	17,059,895	18,468,795	169,448
2020/21	17,667,947	19,088,204	175,565
2021/22	18,392,347	19,867,884	182,498
CAGR (2017/18-2021/22)	3.9%	3.9%	3.6%

Table 33: Summary of Low Growth Planning Load Forecasts (Dth)

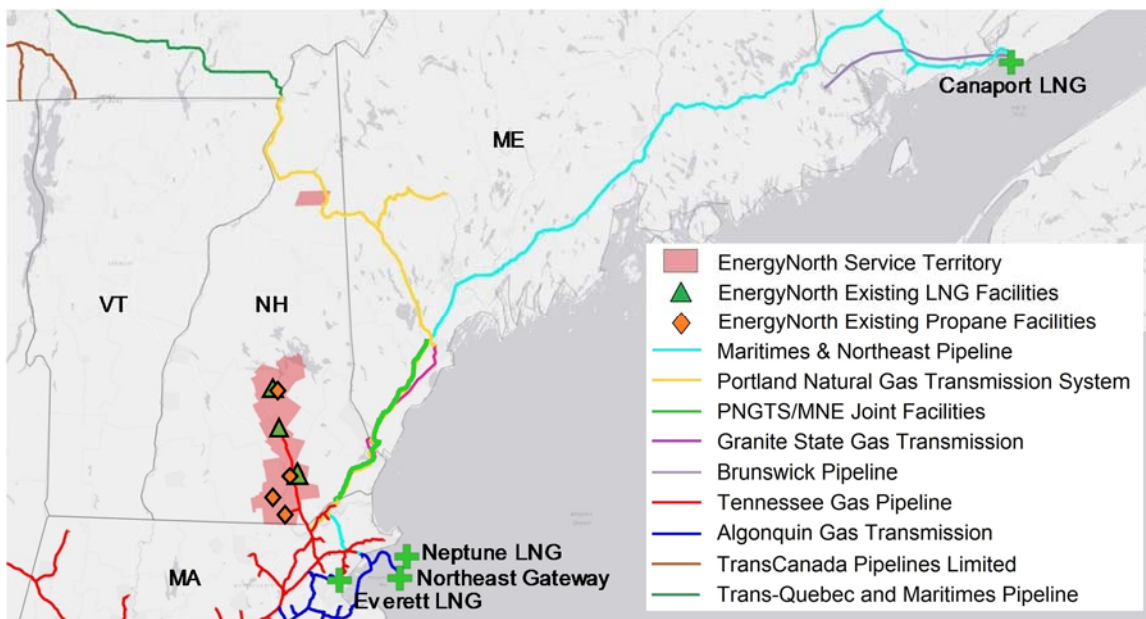
Split-Year	Normal Year	Design Year	Design Day
2017/18	15,485,275	16,741,042	155,331
2018/19	15,767,388	17,043,339	157,907
2019/20	16,100,412	17,430,795	159,924
2020/21	16,352,258	17,666,776	162,492
2021/22	16,695,668	18,035,060	165,662
CAGR (2017/18-2021/22)	1.9%	1.9%	1.6%

V. ASSESSMENT OF RESOURCE PORTFOLIO

A. Introduction

As discussed above, EnergyNorth currently provides natural gas service to customers in thirty-three cities and towns in southern and central New Hampshire and the city of Berlin. As illustrated in Figure 5 below, the EnergyNorth service territory is served exclusively by TGP's Concord Lateral except for the city of Berlin, which is served by PNGTS.

Figure 5: Liberty Utilities Service Territory and Infrastructure Map



With respect to upstream capacity, EnergyNorth has firm transportation contracts on TGP (106,833 Dth/day) and PNGTS (1,000 Dth/day) to provide a total daily deliverability of 107,833 Dth/day to its city-gate stations from three natural gas supply sources (i.e., Canadian supply, domestic supply from production and market area regions, and underground storage in Pennsylvania and New York).

In addition to the upstream capacity contracts, the Company owns three LNG facilities and four propane facilities. The three LNG facilities are located in Concord, Manchester, and Tilton, and have a combined operational vaporization and storage capacity of approximately 12,600 Dth. Three of EnergyNorth's propane facilities, located in Manchester, Nashua, and Tilton, are directly connected to the Company's distribution system with a fourth "satellite" propane facility in Amherst, which is used solely for storage. The propane facilities have a combined design vaporization rate of approximately 34,600 Dth/day and storage capacity of approximately 134,485 Dth.

In total, the Company has Design Day resources of approximately 155,033 Dth/day, which are comprised of upstream transportation contracts and on-system LNG and propane facilities.

As detailed below, and in addition to this Introduction, the Assessment of Supply Resource Portfolio section addresses three general areas regarding EnergyNorth's supply resource portfolio: a review of the Company's current resource portfolio, a description of the Company's resource planning process with an overview of the market factors influencing the Company's resource strategy and future portfolio

decisions, and an evaluation of the adequacy of the resource portfolio to meet the projected Planning Load requirements under various weather and growth scenarios.

B. Current Supply Resource Portfolio

As discussed in detail below, EnergyNorth's existing supply resource portfolio is comprised of the following types of resources: (1) long-haul and short-haul transportation; (2) underground storage services; (3) peaking resources; and (4) gas supply contracts. Appendix 5 provides a schematic of the Company's transportation and underground storage contracts effective November 1, 2017, and a table listing and description of these contracts.

1. Pipeline Transportation

EnergyNorth has capacity entitlements on multiple upstream pipelines that provide access to various supply sources that afford the Company a level of operational flexibility to ensure the best-cost and reliable delivery of gas supplies to its customers. The Company's pipeline capacity contracts fall into four primary categories. First, the Company has contract entitlements to long-haul capacity on Tennessee that are used to transport gas from traditional production areas (e.g., Gulf of Mexico) to the Company's New Hampshire city-gates. The long-haul transportation capacity also is used to transport gas supplies to underground storage facilities in Pennsylvania and New York in which the Company has contracted for service. By using long-haul capacity to for both deliveries to the city-gate and to fill storage, the Company uses these resources at a higher load factor.

Second, the Company has contract entitlements to short-haul capacity on Tennessee that is used to transport gas supplies from underground storage facilities in Pennsylvania and New York to the Company's city-gates. These short-haul capacity entitlements have an option to transport non-storage supplies (i.e., natural gas production from the Marcellus and Utica shale plays) to the Company's city-gates when that capacity is not being used to transport underground storage supplies.

Third, EnergyNorth has contracted for pipeline capacity entitlements to deliver natural gas supplies from certain interconnections with the TransCanada PipeLines Limited ("TCPL") Mainline, which include the following. The Company has contracted for pipeline capacity on Union Gas Limited ("Union Gas"), TCPL Mainline, Iroquois Gas Transmission System ("Iroquois"), and Tennessee to deliver gas supplies from the Dawn Hub to the Company's city-gates. The Company has contracted for pipeline capacity on Tennessee from Niagara, an interconnection with the TCPL Mainline, to the Company's city-gates. EnergyNorth has a contract for capacity on PNGTS from East Hereford, an interconnection with the TCPL Mainline,³¹ to the Company's city-gates. Finally, the Company has short-haul contracts to transport gas supplies from Dracut, Massachusetts, where Tennessee connects to the PNGTS/MNE Joint Facilities, to the Company's city-gates.

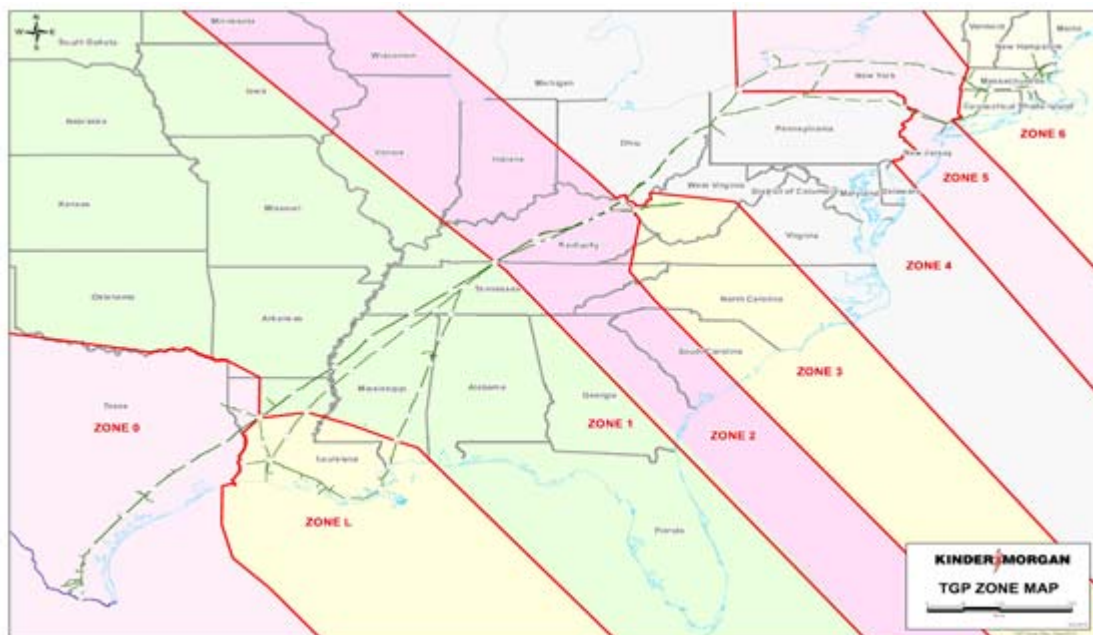
The Company's long-haul and short-haul transportation contracts are described in more detail below:

- Union Gas: The Company has contract entitlements of up to 4,092 Dth/day of capacity from the Dawn Hub to an interconnection with the TCPL Mainline, with an expiration date of October 31, 2022.

³¹ Please note, the TCPL Mainline connects to the Trans-Québec and Maritimes Pipeline ("TQM"), which is jointly owned by TCPL and Gaz Métro, and the TQM system connects to PNGTS at the Québec/New Hampshire border at East Hereford.

- TCPL Mainline: EnergyNorth has contract entitlements of up to 4,047 Dth/day of firm transportation service on the TCPL Mainline to the interconnection with Iroquois at Waddington. This contract expires on October 31, 2022.
- Iroquois: The Company has contract entitlements of up to 4,047 Dth/day of firm transportation service on Iroquois. Canadian supplies are transported from the Canadian/New York border at Waddington, New York (i.e., an interconnection with the TCPL Mainline) to the Tennessee interconnect at Wright, New York. The transportation contract with Iroquois expires on November 1, 2022.
- PNGTS: The Company has contract entitlements of up to 1,000 Dth/day of firm transportation service on PNGTS from East Hereford (i.e., an interconnection with TCPL Mainline) to the Company's city-gate in Berlin, New Hampshire. This contract expires on October 31, 2019.
- Tennessee: In the traditional production area (e.g., Gulf Coast, Texas and Louisiana), the Tennessee system splits into three legs: the 100 leg, the 800 leg, and the 500 leg. In addition to the supply legs, the Tennessee system is divided into six market zones, from Zone 0 and Zone 1 in Texas and Louisiana to Zone 6 in New England. See Figure 6 for a map showing Tennessee Zone locations. EnergyNorth currently has capacity entitlements of 106,833 Dth/day on the Tennessee system to its New Hampshire city-gates, which are comprised of the following:
 - Contract entitlements from Zone 0 and Zone 1 of up to 21,596 Dth/day to the Company's city-gates in New Hampshire located in Zone 6, with an expiration date of October 31, 2020;
 - Contract entitlements for transport of up to 28,115 Dth/day from the storage area in Zone 4 and Zone 5 to the Company's city-gates, with an expiration date of October 31, 2020;
 - Contract entitlements from the interconnect with the TCPL Mainline at Niagara in Zone 5 of up to 3,122 Dth/day to the Company's city-gates, with an expiration date of October 31, 2020;
 - Contract entitlements from the interconnect with Iroquois at Wright, New York in Zone 5 of up to 4,000 Dth/day to the Company's city-gates, with an expiration date of November 30, 2021;
 - Contract entitlements of up to 20,000 Dth/day from Dracut, Massachusetts located in Zone 6 to the Company's city-gates, with an expiration date of October 31, 2020; and
 - Contract entitlements of up to 30,000 Dth/day from Dracut, Massachusetts located in Zone 6 to the Company's city-gates, with an expiration date of October 31, 2029.

Figure 6: Map of Tennessee Zone Locations



2. Underground Storage Resources

The Company's underground storage contracts provide EnergyNorth with the ability to meet winter-season loads while avoiding the expense of adding 365-day long-haul transportation capacity. These contracts enable the Company to store approximately 2.5 million Dth of gas. These underground storage supplies allow EnergyNorth to serve certain winter period requirements with gas injected during the off-peak period and to manage short-term fluctuations in demand during the winter period. It is the Company's practice to have storage inventories approximately 95 percent full as of November 1st of each year, thus leaving approximately 5 percent of the storage capacity available for balancing purposes.

The Company contracts with the following underground storage providers:

- Tennessee: EnergyNorth has contract entitlements that provide 1,560,391 Dth of storage capacity, a withdrawal rate of up to 21,844 Dth/day, and an injection rate of 10,403 Dth/day. This contract with Tennessee expires on October 31, 2020.
- Dominion Transmission, Incorporated ("Dominion"): EnergyNorth has contract entitlements that provide 102,700 Dth of storage capacity, a withdrawal rate of up to 934 Dth/day, and an injection rate of 571 Dth/day. This contract with Dominion expires on March 31, 2021.
- Honeoye Storage Corporation ("Honeoye"): EnergyNorth has contract entitlements that provide 245,280 Dth of storage capacity, a withdrawal rate of up to 1,957 Dth/day, and an injection rate of 1,168 Dth/day. This contract with Honeoye expires on March 31, 2020.
- National Fuel Supply Corporation ("National Fuel"): Under rate schedule FSS, EnergyNorth has contract entitlements that provide 670,800 Dth of storage capacity, a withdrawal rate of up to 6,098 Dth/day, and an injection rate of 4,472 Dth/day. Along with this storage service, the

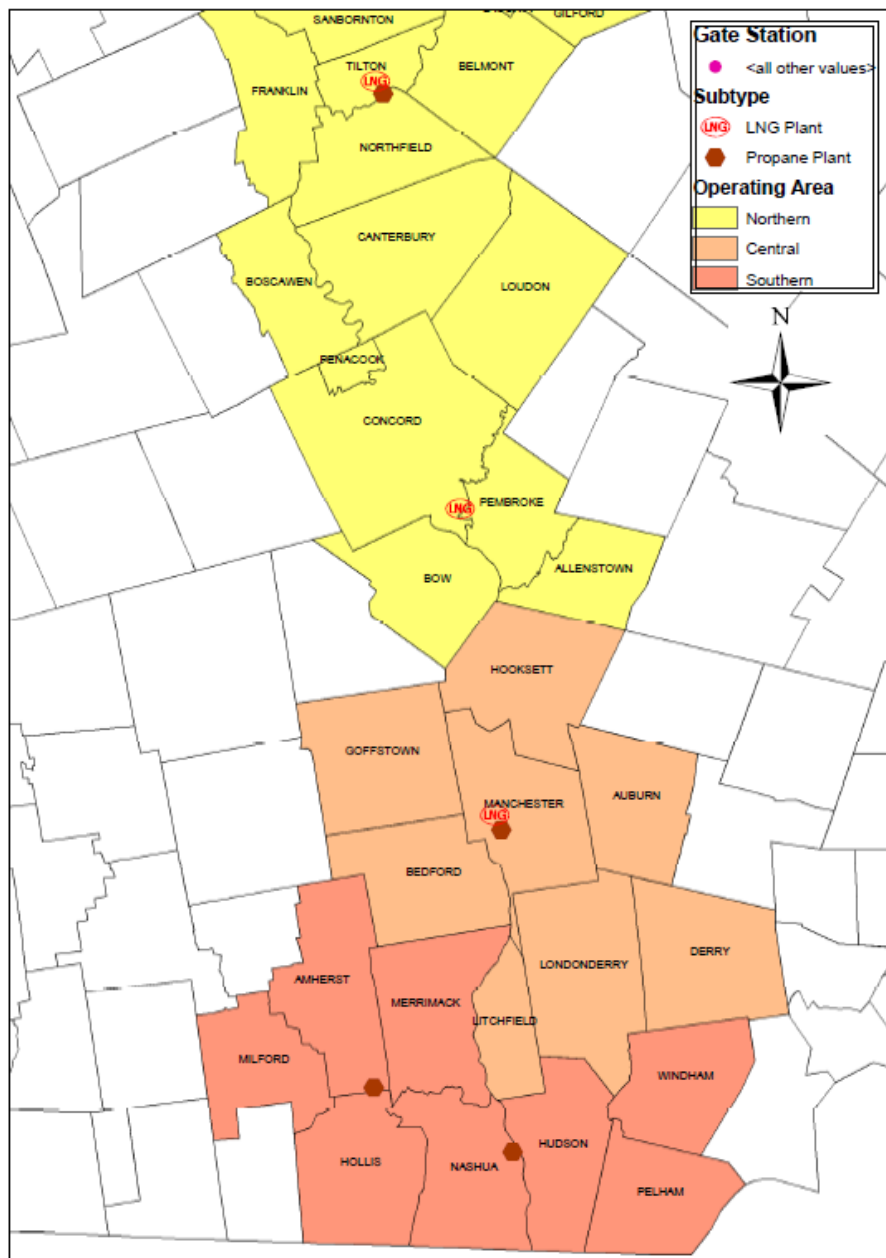
Company also contracts for 365-day firm transportation under rate schedule FST to transport supply to and from the storage field. These contracts with National Fuel expire on March 31, 2019.

3. Supplemental Peaking Resources

In addition to interstate pipeline and underground storage resources, EnergyNorth utilizes on-system peaking supplies to meet its Design Day and Design Year requirements. Peaking supplies are an important component of the EnergyNorth resource mix because these supplies provide the Company with the ability to respond to fluctuations in weather, economics, and other factors driving the Company's sendout requirements. As discussed above, EnergyNorth's peaking supplies include on-system propane facilities located in Nashua, Manchester, and Tilton that are directly connected to the Company's distribution system, and a fourth "satellite" propane facility in Amherst. The Company's propane facilities have a combined vaporization rate of approximately 34,600 Dth/day and storage capacity of approximately 134,485 Dth. The Company's three LNG facilities have a daily operational vaporization capability and storage capacity of 12,600 Dth. The Company's peaking resources provide approximately 30 percent of the gas supplies on the Design Day by contributing 47,200 Dth of supply, with the propane and LNG facilities representing approximately 75 percent and 25 percent, respectively, of the peaking supply.

It is the Company's practice to have its on-system propane and LNG facilities full as of November 1st of each year. EnergyNorth's on-system peaking facilities are distributed strategically across its service territory, which enhances service reliability and provides a source of supply for the entire distribution system. Figure 7 shows the locations of these peaking facilities. Because these resources can be brought on-line quickly, the on-system propane and LNG facilities can be used to meet hourly fluctuations in demand, maintain deliveries to customers, and balance pressures across portions of the distribution system during periods of high demand. These peaking resources are the supplies that must be available throughout the winter period to ensure reliability of service to customers when the Company has exhausted its available pipeline supplies.

Figure 7: Map of EnergyNorth's Supplemental On-System Peaking Facilities



Pursuant to N.H. Code Admin. Rule Puc 506.03, the Company must maintain adequate LNG and propane storage levels throughout the winter period. Thus, the availability of LNG and propane gas to refill the Company's local storage tanks throughout the winter season is a necessity. The Company's contract with ENGIE for combination liquid/vapor service is the primary source of LNG refill throughout the winter season. The Company contracts for annual trucking services for the transportation of its LNG and propane supply contracts to its facilities with various carriers that it selects through a comprehensive RFP process on a year-to-year basis.

4. Gas Commodity

The Company contracts for quantities of gas to ensure sufficient supply to reliably meet design weather conditions and to account for daily and seasonal load variations. The Company's supply resource portfolio contains a variety of transportation contracts utilized to transport baseload and swing supplies, as well as underground storage and related transportation contracts – all with varying degrees of flexibility with respect to such features as no-notice requirements and nomination changes. These no-notice contracts allow for nominations to be made throughout the day up until the last hour of the gas day, allowing the Company the ability to balance system load.

Supply contract durations are generally limited to a maximum term of one seasonal period. Baseload volumes are mainly one-month in duration, augmented with daily firm spot purchases allowing for the ability to respond to fluctuations in demand and maintain planned storage inventory targets. In the winter, the Company typically uses storage as the primary swing supply, however, since storage alone cannot account for all possible conditions, transportation capacity is often left open allowing for the flexibility to meet changing conditions (e.g., demand, weather, operational, storage inventory level, and/or price).

The Company's gas supply contracts are priced at various locations at market-based prices for both monthly and daily purchases. The Company uses North American Energy Standards Board ("NAESB") form standard contracts, which have been established with over one-hundred qualified and reliable gas suppliers.

5. Changes to Resource Portfolio Since 2013 IRP

Since EnergyNorth's 2013 IRP, the mix of firm pipeline transportation and storage contracts and on-system peaking resources in the Company's resource portfolio have not changed.

C. Resource Planning Process

As part of EnergyNorth's resource planning process, the Company evaluates the existing supply resource portfolio in relation to the firm Planning Load requirements developed in Section IV above. Based on a review of the incremental demand requirements compared to its portfolio of existing supply resources, the Company makes a determination of resource need. If incremental resources are required, the Company will identify the resources available to meet the incremental demand requirements and procure a resource, or mix of resources, which achieves a reliable, best-cost supply resource portfolio for its customers. In evaluating the resource options, the Company analyzes both price and non-price factors. Examples of non-price factors include reliability, flexibility, viability, and diversity of supply source. Next, the Company looks at its currently available resources and determines if there are any "decision points" with respect to any of its contracts, such as expiration dates or options to increase or decrease volumes. If so, the Company determines whether to renew those supplies or replace them with an available alternative. Finally, the Company analyzes its portfolio of expected resources against a range of weather scenarios to determine if those resources are sufficient to reliably meet firm Planning Load requirements.

As discussed in detail below, a number of important resource decisions must be made during the Forecast Period. Several upstream pipeline capacity contracts require notice of renewal or termination up to one year in advance. Analysis of renewal or replacement of specific expiring resources, as well as the acquisition of an incremental resource, if required, must take place early in the planning process for EnergyNorth to appropriately evaluate all alternatives. The overarching objective of the Company's gas supply resource portfolio, and the planning process used to develop that portfolio, is to meet projected

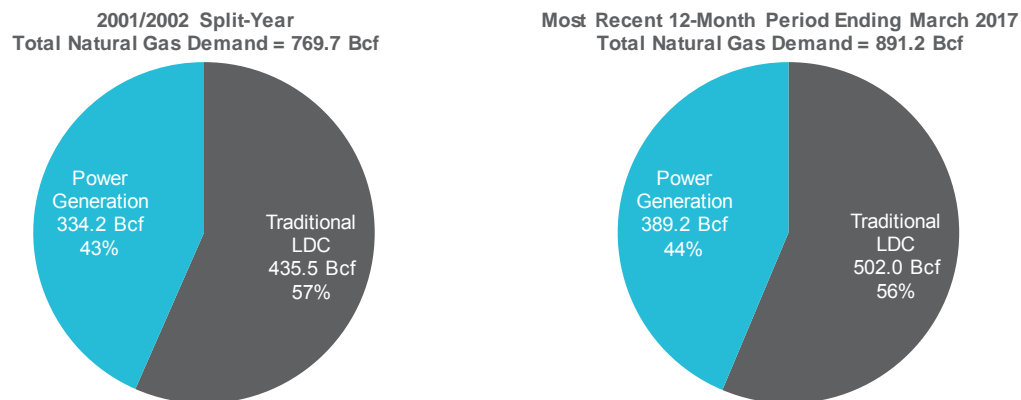
demand requirements in a reliable manner at the best cost. Given the inherent uncertainty in forecasting (e.g., changing market conditions, adapting to federal and state policy and regulatory priorities, and responding to gas supply and pipeline projects), the Company, as part of its planning and evaluation process, values asset and portfolio flexibility.

The Company is actively involved in the natural gas marketplace ranging from conducting request for proposals for natural gas supply and/or asset management arrangements, to monitoring and participating in FERC-related activities, to reviewing trade and industry information. As a result of this market activity, there are several natural gas demand and supply trends that the Company is continuously monitoring. As these market conditions change and evolve, the Company's supply resource portfolio needs to have the flexibility to adapt to these new market conditions, while maintaining reliability. Prior to the discussion of the Company's specific supply resource plans, a broader review of the regional natural gas market issues will provide necessary context and background information. Specifically, EnergyNorth's gas supply planning is influenced by, and addresses, the regional trends in natural gas demand and supply, some of which are discussed below.

1. Regional Natural Gas Demand and Supply Dynamics

From a demand perspective, the New England region has experienced significant growth in natural gas consumption over the past fifteen years. As illustrated by Figure 8, the total annual natural gas demand for the New England region has grown from 770 Bcf to 890 Bcf, an increase of almost 16 percent with both the LDC and power generation segments experiencing significant increases in natural gas consumption.

Figure 8: Annual Natural Gas Consumption by Sector³²



Focusing on the winter season, the New England region has seen an increase in natural gas consumption of 23 percent, growing from 374 Bcf in the winter of 2001/2002 to almost 460 Bcf in the winter of 2016/2017. Stated differently, the winter demand for natural gas in New England has grown by 86 Bcf over the past fifteen years, which is approximately 570,000 Dth/d of incremental natural gas demand.

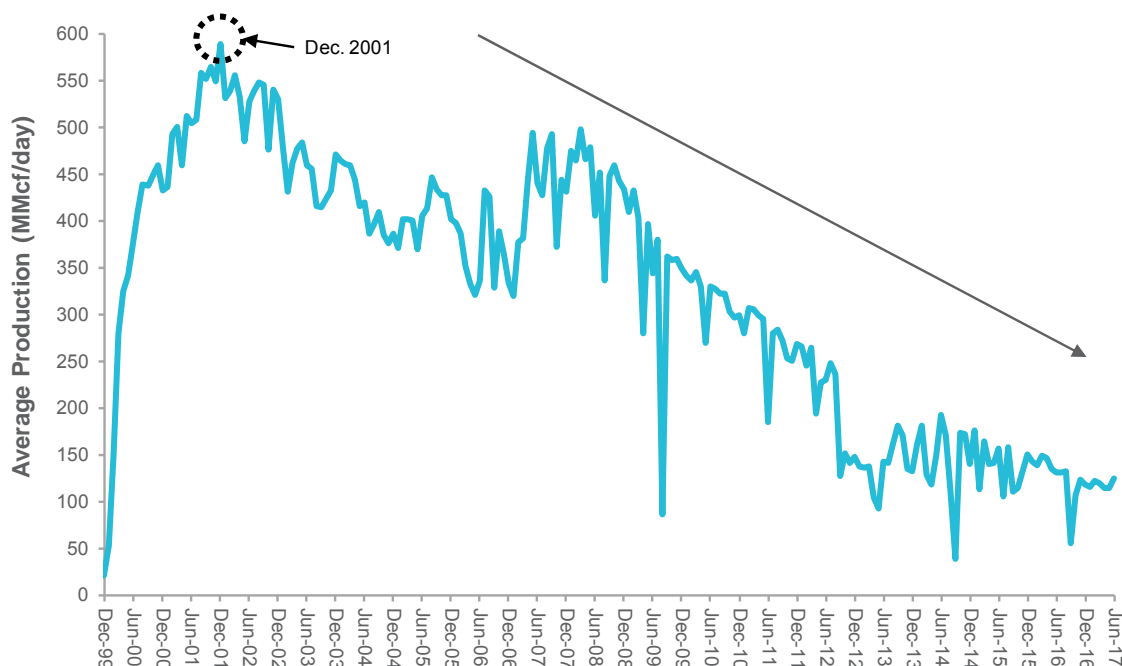
³² Source: U.S. Energy Information Administration, Natural Gas Consumption by End Use for Massachusetts, Connecticut, Rhode Island, New Hampshire, Vermont and Maine, release date May 31, 2017. Data for certain months in 2016 and 2017 are based on estimates.

From a gas supply perspective, the New England region has various supply and transportation trends including: (1) dwindling natural gas supplies from off-shore Nova Scotia, which have been a major source of supply for the region; (2) significant increases in domestic natural gas production and reserves estimates, which is supporting certain infrastructure development; (3) more complexity and time needed to construct incremental pipeline capacity into the region; and (4) seasonality of imported LNG. Each of these gas supply trends is discussed below.

The New England market has access to natural gas resources from off-shore Nova Scotia via the MNE system, which extends from Goldboro, Nova Scotia through New Brunswick to a point at the Canada-U.S. border near Baileyville, Maine (i.e., MNE-Canada), and continues through Maine and New Hampshire into Massachusetts (i.e., MNE-US). The natural gas supplies from off-shore Nova Scotia are comprised of the Sable Offshore Energy Project (“SOEP”) and Deep Panuke Offshore Gas Development Project (“Deep Panuke”).

SOEP, which has been producing natural gas since late 1999, has been in a steady decline since 2009. As illustrated in Figure 9 below, average daily production from SOEP was approximately 120 MMcf/day this past winter (i.e., winter 2016/17), which is an 80 percent decrease from its peak production in December 2001 of nearly 600 MMcf/day.³³

Figure 9: Average Daily SOEP Production³⁴



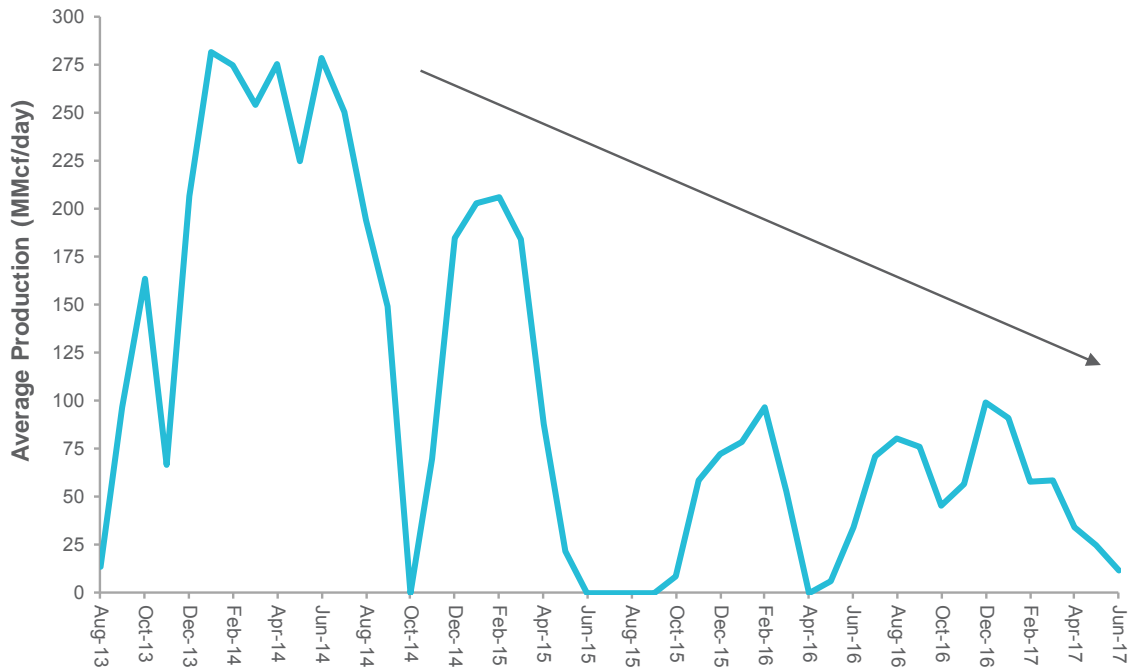
Natural gas production from Deep Panuke, which began in the summer of 2013, was expected to augment the natural gas supplies from SOEP. However, Deep Panuke production has fallen short of

³³ Source: Canada-Nova Scotia Offshore Petroleum Board, Sable Monthly Production Reports, access date July 31, 2017.

³⁴ Source: Canada-Nova Scotia Offshore Petroleum Board, Sable Monthly Production Reports, access date July 31, 2017.

expectations. Since inception, natural gas production from Deep Panuke has been variable, with daily production averaging less than 100 MMcf/day since April 2015,³⁵ which is only one-third of the expected production level of 300 MMcf/day.³⁶ The average daily natural gas production from Deep Panuke is illustrated in Figure 10 below.

Figure 10: Average Daily Deep Panuke Production³⁷



Since natural gas supplies from off-shore Nova Scotia are also used to serve demand in the Canadian Maritimes (i.e., Nova Scotia and New Brunswick), the decline in production from SOEP and Deep Panuke has resulted in little, if any, natural gas supplies available for the New England market. In addition, decommissioning activity has started with respect to the SOEP and Deep Panuke facilities, which will likely result in limited to no natural gas supplies from off-shore Nova Scotia by 2020.

In stark contrast to the decline in natural gas production from off-shore Nova Scotia, there has been a significant increase in domestic natural gas production resulting in a decline in natural gas prices in supply areas. As illustrated in Figure 11 below, total annual natural gas production has increased from approximately 55 Bcf/day in 2008 to approximately 72 Bcf/day in 2016.³⁸ Over that same time period, the Henry Hub spot price decreased from an annual average of \$8.86/MMBtu to \$2.52/MMBtu.³⁹

³⁵ Source: Canada-Nova Scotia Offshore Petroleum Board, Deep Panuke Monthly Production Reports, access date July 31, 2017.

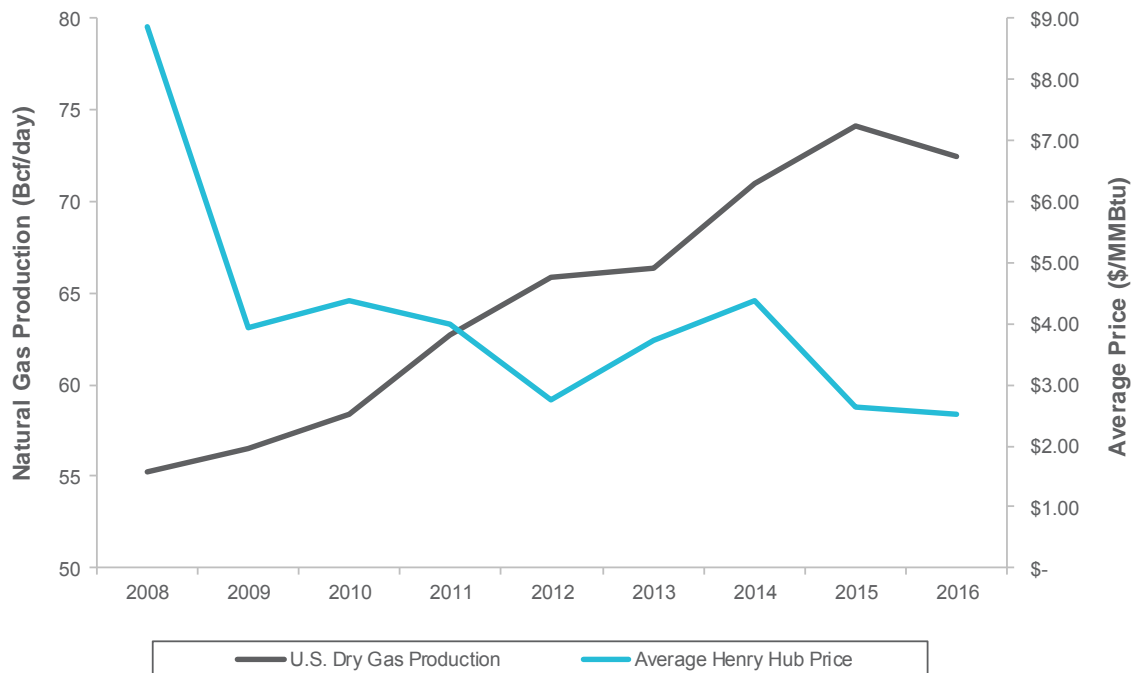
³⁶ Source: Nova Scotian Department of Energy; The Future of Natural Gas Supply for Nova Scotia. Prepared by ICF Consulting Canada, Inc., March 2013, at 35.

³⁷ Source: Canada-Nova Scotia Offshore Petroleum Board, Deep Panuke Monthly Production Reports, access date July 31, 2017.

³⁸ Source: U.S. Energy Information Administration, Natural Gas Dry Production, release date May 31, 2017.

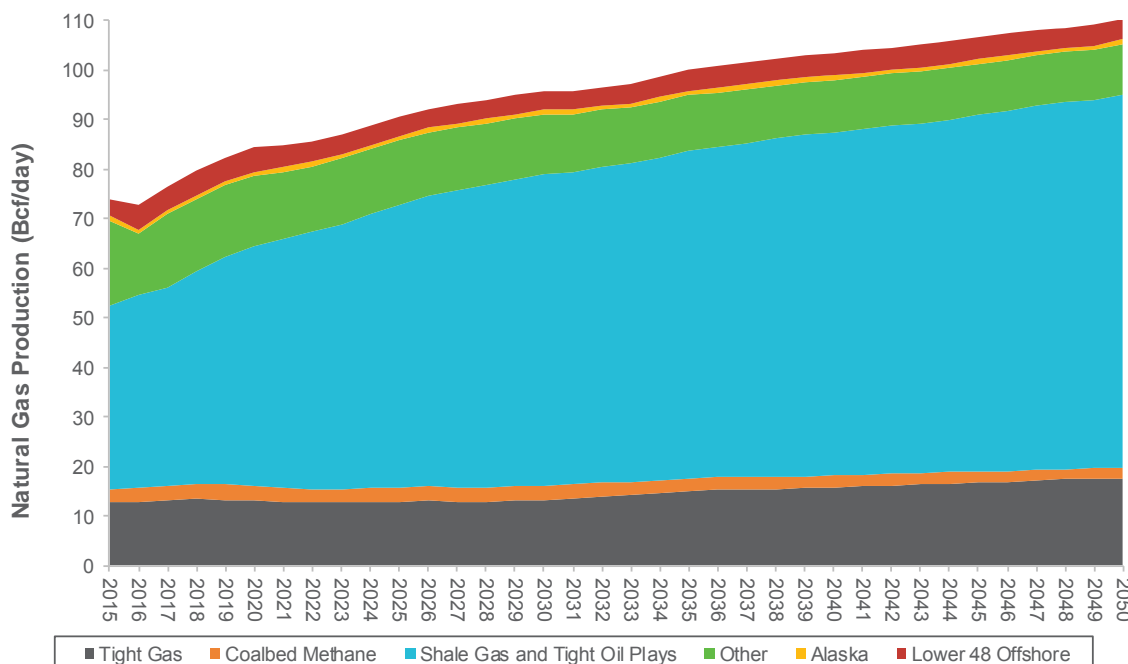
³⁹ Source: S&P Global Market Intelligence.

Figure 11: Henry Hub Pricing and U.S. Domestic Natural Gas Production⁴⁰



The increase in natural gas production is expected to be sustainable given recent forecasts of natural gas production. Specifically, the latest EIA AEO shows that total domestic natural gas production will reach approximately 110 Bcf/day by 2050. As illustrated in Figure 12 below, the EIA expects that most of the growth in natural gas production will be driven by an increase in shale gas production.

⁴⁰ Sources: U.S. Energy Information Administration, Natural Gas Spot and Futures Prices (NYMEX), release date June 7, 2017; and U.S. Energy Information Administration, Natural Gas Dry Production, release date May 31, 2017.

Figure 12: EIA U.S. Natural Gas Production Forecast⁴¹

The expected increases in natural gas production are supported by an increase in the estimate of natural gas resources. The EIA provides an annual estimate of Proved Reserves of natural gas, which are defined as “the estimated quantities which analysis of geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.” The EIA has increased its estimate of the total Proved Reserves in the U.S. by 46 percent from approximately 211 Tcf in 2006 to approximately 308 Tcf in its most recent 2015 estimate.⁴²

Although the increase in natural gas production and expected life of natural gas resources has resulted in new natural gas infrastructure for New England, most of that incremental volume is targeted for southern New England. The shippers on certain recent projects (i.e., the Algonquin Incremental Market, TGP Connecticut Expansion, and Atlantic Bridge projects) are LDCs and end-users predominantly located in the southern New England area. These three projects, if completed, will increase the total pipeline capacity into the New England region by approximately 550,000 Dth/day, with 85 percent of the total incremental capacity contracted by project shippers located in southern New England.

While certain projects for additional pipeline capacity have been placed in service or are under construction, there is significant complexity and increasing lead time required for development of incremental pipeline capacity projects into the New England region. Most recently, two major projects proposed to deliver incremental natural gas supplies to the New England region have been suspended or cancelled. Given the complexity and long lead time needed to develop large incremental interstate

⁴¹ Source: U.S. Energy Information Administration, Annual Energy Outlook 2017, Table 14. Oil and Gas Supply, release date January 5, 2017.

⁴² Source: U.S. Energy Information Administration, Dry Natural Gas Proved Reserves as of 12/31 (Summary), release date December 14, 2016.

pipeline capacity projects, LDCs may need to increase their reliance on existing infrastructure that require limited facilities for expansion and invest in on-system resources that address each LDC's unique circumstances.

Finally, as illustrated in Figure 5 above, the New England region has access to several LNG importation facilities, including ENGIE's Distrigas LNG facility in Everett, Massachusetts, two off-shore LNG facilities near Cape Ann, Massachusetts (i.e., Excelerate Energy's Northeast Gateway Deepwater Port and ENGIE's Neptune LNG facility),⁴³ and the Canaport LNG facility, which is owned as a partnership between Repsol (75 percent) and Irving Oil (25 percent).⁴⁴ While the New England region continues to import LNG, there has been a trend in the U.S. as a whole for developing LNG export facilities. In fact, most of the LNG importation facilities in the U.S. have not been actively importing LNG cargoes over the past few years, and seven of the eleven existing U.S. LNG import terminals are in various stages of developing LNG export capability.⁴⁵

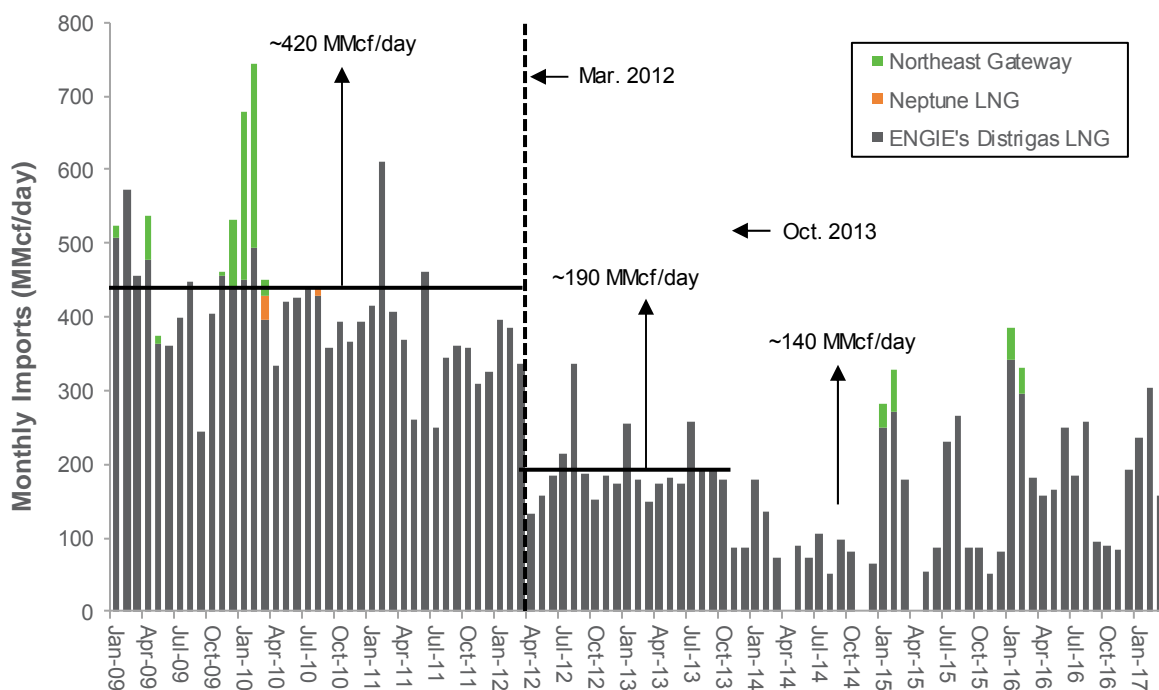
Although the New England region continues to have certain volumes of imported LNG, those volumes have been variable and are becoming winter season focused. As illustrated in Figure 13 below, the two off-shore LNG importation facilities (i.e., Northeast Gateway and Neptune LNG) had limited activity since commencing service in 2009 and 2010, respectively, and ENGIE's Distrigas LNG facility has experienced a declining trend in LNG import volumes since 2009.

⁴³ In early 2017, Neptune LNG filed for a permit to commence decommissioning work on the facility. See, U.S. Army Corps of Engineers, "Neptune LNG seeks permit to work in U.S. waters to decommission deepwater LNG port off Marblehead", February 28, 2017.

⁴⁴ The Brunswick Pipeline connects the Canaport LNG facility, which is located in Saint John, New Brunswick, to MNE-US at Calais, Maine.

⁴⁵ Sources: FERC, North American LNG Import/Export Terminals: Existing, release date May 1, 2017; and FERC, North American LNG Import/Export Terminals: Proposed, release date May 1, 2017.

Figure 13: Imported LNG Volumes to New England⁴⁶



Since the LNG market is a global market, the New England/Maritime Canada region must compete with international markets for imported LNG supplies. The volume of LNG imported into the region is influenced by various factors, including the demand for LNG in alternative markets and the need for the New England market to pull the supply by contracting for imported LNG volumes.

2. Contract Expiration and Renewal of Existing Resources

Over the next five years, EnergyNorth will be faced with decisions regarding the expiration of nearly all of its existing pipeline transportation and underground storage contracts, as well as key decisions related to its aging propane facilities and limited LNG storage capacity. As a result of EnergyNorth's resource planning process, the Company's current strategies related to each of its existing upstream capacity and underground storage contracts are provided in Table 34 below.

⁴⁶ Source: U.S. Department of Energy, LNG Annual and Monthly Reports, accessed on June 6, 2017.

Table 34: Contract Expiration and Renewal of Existing Resources

Contract Entity	Rate Schedule	Contract Number	MDQ/ MDWQ (Dth)	Storage MSQ (Dth)	Expiration Date	Renew (Yes/No)
Pipeline Transportation						
Union	M12	M12200	4,092	-	10/31/2022	Yes
TCPL	FT	41232	4,047	-	10/31/2022	Yes
Iroquois	RTS	470-01	4,047	-	11/1/2022	Yes
PNGTS	FT	1999-001	1,000	-	10/31/2019	Yes
Tennessee	FT-A (Zone 5 to Zone 6)	95346	4,000	-	11/30/2021	Yes
Tennessee	FT-A (Zone 5 to Zone 6)	2302	3,122	-	10/31/2020	Yes
Tennessee	FT-A (Zones 0,1 to Zone 6)	8587	25,407	-	10/31/2020	Yes
Tennessee	FT-A (Zone 6 to Zone 6)	42076	20,000	-	10/31/2020	Will evaluate
Tennessee	FT-A (Zone 6 to Zone 6)	72694	30,000	-	10/31/2029	Will evaluate
Underground Storage and Associated Pipeline Transportation						
Tennessee	FS-MA	523	21,844	1,560,391	10/31/2020	Yes
Tennessee	FT-A (Zone 4 to Zone 6)	632	15,265	-	10/31/2020	Yes
Honeoye	SS-NY	11234	1,957	245,280	3/31/2020	Yes
Tennessee	FT-A (Zone 5 to Zone 6)	11234	1,957	-	10/31/2020	Yes
Dominion	GSS	300076	934	102,700	3/31/2021	Yes
Tennessee	FT-A (Zone 4 to Zone 6)	11234	932	-	10/31/2020	Yes
National Fuel	FSS	O02357	6,098	670,800	3/31/2019	Yes
National Fuel	FST	N02358	6,098	-	3/31/2019	Yes
Tennessee	FT-A (Zone 4 to Zone 6)	11234	6,150	-	10/31/2020	Yes

As shown in Table 34 above, nearly all of the pipeline capacity and storage contracts currently held by the Company are scheduled to expire and require notice of renewal during the Forecast Period. EnergyNorth will need to renew all of these existing capacity resources for which the Company has a ROFR or a rollover right, with the exception of contract number 42076, firm transportation from Dracut, MA, which the Company will evaluate based on market conditions at the time of renewal. These capacity contracts are needed over the long-term to meet customer demand, they are competitively priced, and they offer important supply diversity benefits to the Company's best-cost portfolio. Therefore, in this filing, the Company is requesting that the Commission approve the renewal of those pipeline contracts designated as "Yes" in the table above as these contracts have a renewal notice within three years of the filing of the LCIRP. The Company does not expect any material changes to the contracts as a result of renewal. In addition, renewing the contracts is in the public interest because the contracts are needed to adequately meet the Company's expected customer demands under the various planning standards outlined in Section V.D. below, and the renewal of these contracts is the only viable option currently available for the Company to serve its customers reliably and flexibly at the best-cost.

In addition to the above contractual decisions, the Company must also address its aging propane facilities and the continued reliance on these facilities to perform at peak capacity during the coldest days of the year. In particular, the propane facilities in Manchester and Nashua, which provide the Company with peaking supply service, have been in operation for nearly 50 years. As with any aging facility, it becomes increasingly expensive (e.g., parts and equipment become scarcer and more expensive) and labor intensive to operate and maintain the propane facilities at peak efficiency. Moreover, the Company's customers have experienced problems with their high efficiency furnaces at various times when these propane facilities are used extensively. As more and more customers switch to higher efficiency furnaces and appliances, the Company is concerned that the customer complaints will escalate. For reliability, efficiency, security, economic, and customer satisfaction reasons, the Company concludes that the replacement of these propane facilities is necessary and appropriate to maintain reliable service and achieve a best-cost portfolio.

3. Future Portfolio Decisions

Although the Company has determined that it will renew all or nearly all of its existing upstream capacity contracts, during the forecast horizon there may be opportunities to re-optimize the Company's supply resource portfolio. When faced with making a decision, EnergyNorth employs a three-step analysis to reach its conclusions regarding contract renewals. First, the Company evaluates the need to maintain the contract or resource as part of the overall supply portfolio in the context of current and expected future market conditions. Second, depending on the type of resource needed, the Company will canvas the marketplace, including on-system investments, to determine the availability of a replacement or new resource and, where appropriate, the Company will solicit competitive bids to determine the least-cost available resource. Finally, the Company evaluates non-price factors associated with the available replacement or new resource option to determine the best-cost resource. The Company will consider the flexibility, diversity, reliability, viability, and contract term to determine the best-cost, most reliable option to meet the Company's resource need. In all cases, EnergyNorth will renew existing contracts on a cost-effective basis in order to assure that there is sufficient deliverability to meet customer requirements over the forecast horizon.

In addition to renewing existing contract resources, EnergyNorth continuously monitors and evaluates new opportunities, and adjusts the supply resource portfolio if the Company determines that incremental supply resources would contribute to a best-cost portfolio, balanced with reliability, flexibility, diversity, and viability of the resource. When these opportunities arise, the Company uses an appropriate decision-making process to determine whether modifications to the current resource plan are appropriate.

EnergyNorth's demand forecast, discussed in Section IV above, shows an increase in demand requirements over the forecast horizon, with growth in both winter period and Design Day demand. Based on a review of the Company's demand forecast and existing supply resource portfolio, the Company has incremental resource requirements on Design Day of 18,884 Dth by 2021/2022. As shown in Table 35 below, the incremental resource requirement becomes more significant if the Company's propane facilities are retired.

Table 35: Design Day Demand and Supply Resources (Dth)

Split-Year	Design Day Planning Load	Design Day Resources, including Propane	Reserve / (Deficiency) including Propane	Reserve / (Deficiency) excluding Propane
2017/18	156,822	162,033 ⁴⁷	5,211	(29,389)
2018/19	160,989	155,033	(5,956)	(40,556)
2019/20	164,640	155,033	(9,607)	(44,207)
2020/21	168,934	155,033	(13,901)	(48,501)
2021/22	173,917	155,033	(18,884)	(53,484)

With respect to gas supply alternatives available in the marketplace, the Company has identified a wide range of resource options including, but not limited to, pipeline supplies, imported LNG, on-system assets, delivered supplies, compressed natural gas (“CNG”), renewable natural gas, and portable LNG vaporization.

As discussed in Section V.C.1, given the complexity and long lead times needed to develop large incremental interstate pipeline capacity projects, LDCs may need to increase their reliance on existing infrastructure that require limited facilities for expansion and invest in on-system resources that address each LDC’s unique circumstances. Based on EnergyNorth’s review of available and viable resources in the marketplace to meet the Company’s existing and projected load requirements, the following gas supply options have been identified:

- ENGIE delivered supply to the EnergyNorth city-gates and LNG facilities;
- Repsol delivered supply to Dracut, Massachusetts;
- Pipeline transportation capacity from the Dawn Hub on the TCPL Mainline and PNGTS pipeline systems to Dracut, Massachusetts; and
- Increasing on-system LNG storage and vaporization capacity with additional infrastructure to access new gas supplies.

As noted in the Company’s most recent cost-of-gas filing in Docket No. DG 17-135, the Company has contracted with ENGIE for a combination liquid/vapor service for up to 7,000 Dth/day that can be used to either refill its LNG storage tanks during the peak period and/or deliver incremental supply to its city-gates for the 2017/18 split-year. The ENGIE service is delivered to the Company’s city-gates using existing infrastructure and requires no facility expansion or construction. Based on the unique attributes (i.e., incremental supply delivered to the Company’s city-gates and liquid/vapor service flexibility) of the ENGIE contract, the Company included the ENGIE service in its SENDOUT® analysis discussed below in Section V.D.

Repsol is capable of delivering Canaport LNG supplies via existing infrastructure (i.e., the Brunswick Pipeline and MNE pipeline systems) to the Dracut, Massachusetts interconnect between Tennessee and the Joint Facilities, or to other potential delivery points as discussed below. Based on initial discussions with Repsol, the Company may be able to contract for bundled service for the winter period. As discussed below, EnergyNorth has evaluated the Repsol service as a potential gas supply option in the Resource

⁴⁷ The 2017/18 Design Day resources include the contract with ENGIE for a combination liquid/vapor service for up to 7,000 Dth/day. See, Docket No. DG 17-135.

Mix module of its SENDOUT® analysis discussed in Section V.D.

An open season has been conducted for firm transportation on the TCPL Mainline from the Dawn Hub to East Hereford in conjunction with the proposed downstream expansion on PNGTS.⁴⁸ Specifically, the proposed PNGTS Portland XPress project is an expansion of the PNGTS system, which will provide firm transportation of up to 122,900 Dth/day of gas supplies from the East Hereford interconnect with TCPL Mainline to Westbrook, Maine (i.e., the interconnect with MNE-US) and Dracut, Massachusetts (i.e., the interconnect with Tennessee), or other potential delivery points as discussed below.⁴⁹ The Portland XPress project involves construction of compression only on both the TCPL Mainline and PNGTS/MNE Joint Facilities, and will be phased-in over three years beginning on November 1, 2018.⁵⁰ Capacity on the TCPL/PNGTS systems would provide the Company with access to the Dawn Hub, which is one of the most liquid gas supply points in North America with access to numerous suppliers and significant storage capacity. The Company has also included the TCPL/PNGTS capacity as a potential option in the Resource Mix module of its SENDOUT® analysis discussed below in Section V.D.

Finally, the Company has evaluated the option of increasing its on-system LNG storage and vaporization capacity to serve its long-term resource needs. As discussed in the 2013 IRP, and demonstrated in this filing, the Company has significant demand requirements in the winter period. LNG facilities are specifically designed to provide natural gas supply during the peak periods when customers require it most. In this way incremental LNG storage and vaporization capacity would be able to serve the Company's growing requirements for Design Day and peak period demand. Given EnergyNorth's existing resource portfolio structure, incremental LNG would increase the Company's existing on-system assets and diversify its supplies, which will increase the reliability of the overall portfolio.

As part of the Company's evaluation of its long-term gas supply portfolio, the Company assessed not only the available gas supply options, but also the delivery options associated with those supplies. With respect to deliveries to its city-gates, the Company is, for all intents and purposes, limited to one feed (i.e., TGP Concord Lateral) for delivery of gas supplies to its service territory and that feed has no additional capacity to meet the Company's growing demand. Therefore, the Company has also evaluated the option to enhance its distribution system reliability, diversity and flexibility through an extension of its system. A system extension would provide access to incremental gas supply and capacity options.

The Company will continue to monitor market trends and opportunities so that when portfolio decisions need to be made, the Company will be prepared to act swiftly using its best-cost planning process.

D. Adequacy of the Supply Resource Portfolio

1. Analytical Process

In the third step of EnergyNorth's resource planning process, the Company evaluates the ability of its resource portfolio to meet the projected Planning Load requirements in each year of the forecast. As part of this evaluation, the Company reviews possible strategies for meeting customer requirements under a variety of circumstances. Using the SENDOUT® model (described below), the Company is able to (1) determine the least-cost portfolio that will meet forecasted customer demand, and (2) test the

⁴⁸ See, TransCanada's Firm Transportation, New Capacity Open Season, dated August 31, 2017.

⁴⁹ See, Portland XPress Project Binding Open Season, dated August 30, 2017.

⁵⁰ See, PNGTS, presentation at the Northeast LDC Forum, June 6, 2017.

sensitivity of the portfolio to key inputs and assumptions, as well as its ability to meet all of the Company's planning standards and contingencies. Based on the results of this analysis, the Company is able to make preliminary decisions on the adequacy of the resource portfolio and its ability to meet system requirements.

2. SENDOUT® Model

Since 1996, the Company has been using the SENDOUT® model developed by ABB (formerly Ventyx) as its primary analytical tool in the portfolio design process. The SENDOUT® model is used on behalf of more than 100 energy companies for their gas supply planning and portfolio optimization process. The SENDOUT® model is a linear-programming optimization software tool used to assist in evaluating, selecting, and explaining long-term portfolio strategies. The SENDOUT® model can accommodate a number of resources allowing the Company to model these options more realistically and receive more meaningful information via the output reports. The model also allows the Company to examine the effect of various contracts on the total portfolio cost.

In that regard, the SENDOUT® model can be used in two ways. First, the model can be used to determine the best use of a given portfolio of supply, capacity, and storage contracts to meet a specified demand. That is, it can solve for the dispatch of resources that minimizes the cost of serving the specified demand given the existing resource and system-operating constraints. The SENDOUT® model dispatches resources based on the lowest variable cost to meet demand, assuming that demand charges are fixed. Second, the SENDOUT® model can be used to determine the optimal portfolio to meet a given demand using the Resource Mix module. To do this, the model uses a linear programming algorithm to analyze the combination of contracts and the size of each contract (e.g., maximum daily quantity ("MDQ")) to determine the combination that results in the lowest total cost, taking into account both variable and fixed costs.

3. Analytical Assumptions

The SENDOUT® model was used to evaluate EnergyNorth's resource portfolio over various weather (i.e., Normal Year, Design Year, and Design Day) and growth scenarios (i.e., Base Case, Low Growth, and High Growth), which were described in Section IV. The examination of these various scenarios enables the Company to test the adequacy and flexibility of its existing and potential resource portfolio.

The inputs to the SENDOUT® model included (1) the Company's Planning Load requirements under the various planning scenarios, and (2) the resource-specific data elements (e.g., capacity cost; fuel and variable cost; gas commodity cost; and MDQ and annual contract quantity). To perform the analysis of these various planning scenarios, the Company incorporated several key assumptions:

- First, the Company assumed that, throughout the Forecast Period, there is no change in the Company's service obligation to plan for the capacity requirements of firm sales and capacity-assigned customers.
- Second, the Company's analysis assumed that all legacy contracts expiring during the Forecast Period (see Table 34 above) would be renewed with no change in rates/tolls, quantities, or operating characteristics.
- Third, the Company used natural gas prices and/or basis values based on closing settlement prices on August 18, 2017, provided by S&P Global Market Intelligence for the length of the Forecast Period.

- Fourth, gas supplies were assumed to be available at Dracut, with the daily price for those supplies reflective of the weather pattern (i.e., colder weather days will have higher daily prices at the Dracut point).

Given the Company's growing Design Day and peak period demand requirements discussed in Section IV, the Company also incorporated the following assumptions in its SENDOUT® analysis to determine the incremental resources and associated capacity levels to meet the projected demand requirements:

- EnergyNorth assumed a contract with ENGIE for combination liquid/vapor service delivered to the Company's city-gates or LNG facilities with an MDQ of up to 7,000 Dth/day would be available for the five-year forecast horizon to help meet the Company's projected Design Day shortfall (see Table 35 above).
- The Company assumed that an extension of its system would be capable of accessing incremental deliveries of natural gas supplies to serve incremental demand requirements.
- The Company included the following gas supply resource options in the Resource Mix module to determine the most cost-effective mix of resources and capacity levels (see Section V.C.3 above):
 - Repsol delivered service to Dracut, Massachusetts and/or directly to its distribution system, with an MDQ of up to 150,000 Dth/day of winter service; and
 - Pipeline transportation capacity from the Dawn Hub on the TCPL Mainline and PNGTS pipeline systems to Dracut, Massachusetts and/or directly to its distribution system, with an MDQ of up to 150,000 Dth/day.

The SENDOUT® model produces an optimization solution for each planning scenario according to a least-cost economic dispatch of supplies, given the constraints on supply availability, storage or transportation capacity, which are always honored to avoid penalties and to ensure reliability of supply. Table 36 below summarizes the results of the Resource Mix runs in SENDOUT® for the various planning scenarios and identifies the location of the detailed SENDOUT® output for each scenario in Appendix 6.

Table 36: Summary of SENDOUT® Resource Mix Runs

Scenario	Existing Portfolio	System Extension	ENGIE MDQ (Dth/day)	Repsol MDQ (Dth/day)	TCPL/PNGTS MDQ (Dth/day)
Base Case – Normal (Appendix 6.A)	✓	✓	7,000	16,550	0
Base Case – Design (Appendix 6.B)	✓	✓	7,000	13,00	6,030
High Growth – Normal (Appendix 6.C)	✓	✓	7,000	24,800	0
High Growth – Design (Appendix 6.D)	✓	✓	7,000	17,930	8,600
Low Growth – Normal (Appendix 6.E)	✓	✓	7,000	8,800	0
Low Growth – Design (Appendix 6.F)	✓	✓	7,000	7,860	3,670

The Company's first analysis was to run the Base Case, Normal Year scenario in the Resource Mix module, allowing the SENDOUT® model to determine the most cost-effective mix of resources and capacity levels. As shown in Table 36 above, the results of this SENDOUT® run demonstrate that the Company's existing portfolio (assuming rollover and renewal of all legacy contracts), the extension of its system, 7,000 Dth/day of ENGIE capacity, a Repsol contract of 16,550 Dth/day, and zero TCPL/PNGTS capacity, contribute to a least-cost portfolio under normal weather conditions (see also, Appendix 6.A.1).

The Company's second analysis was to run the Base Case, Design Year scenario in the Resource Mix module. The results of this run demonstrate that the existing portfolio, the extension of its system, 7,000 Dth/day of ENGIE capacity, a Repsol contract of 13,000 Dth/day, and TCPL/PNGTS capacity of approximately 6,000 Dth/day, contribute to a least-cost portfolio under design weather conditions (see Appendix 6.B.1).

The Company then ran Normal and Design Year SENDOUT® model runs for its High and Low Growth forecasts as sensitivities to test the adequacy of the resource portfolio. Under normal weather conditions, the existing portfolio, the extension of its system, 7,000 Dth/day of ENGIE capacity, a Repsol contract ranging from 8,800 Dth/day to 24,800 Dth/day for Low Growth and High Growth scenarios, respectively, and zero TCPL/PNGTS capacity, contribute to a least-cost portfolio (see Appendix 6.C.1 and 6.E.1). Under design weather conditions, the portfolio includes the extension of its system, 7,000 Dth/day of ENGIE capacity, a Repsol contract of approximately 7,900 Dth/day and 17,900 Dth/day for Low Growth and High Growth, respectively, and TCPL/PNGTS capacity of approximately 3,700 Dth/day for the Low Growth scenario and 8,600 Dth/day for the High Growth scenario (see Appendix 6.D.1 and 6.F.1).

4. SENDOUT® Model Results

The adequacy of the Company's resources to meet the projected Planning Load requirements for each of the weather and growth scenarios is discussed in detail below.

Base Case

Given the rollover and renewal of all of EnergyNorth's existing pipeline transportation and storage capacity contracts that expire in the near-term (see Table 34 above), the Company's resource plan shows

that it can meet both Base Case, Normal Year and Design Year load requirements throughout the Forecast Period, with the addition of ENGIE capacity and the extension of its system to access other upstream gas supply resources (e.g., Repsol and PNGTS). These requirements are set forth in Appendix 6.B.2: Base Case – Design Year: Monthly Resources and Requirements. Therefore, to ensure continued deliverability over the peak season to meet the projected needs of its customers, the Company will refine and evaluate the addition of incremental resources.

As previously illustrated in Table 35 above, volumes in addition to the Company's existing portfolio are required to meet Design Day sendout requirements beginning in 2018/19. The SENDOUT® analysis demonstrates that the addition of ENGIE, the extension of its system to access other supply resources (e.g., Repsol and PNGTS) allow the Company to meet its Design Day sendout requirements (see Appendix 6.B.3). The Company will refine and evaluate the addition of incremental resources.

High Growth

The Company's resource plan shows that it can meet High Growth, Normal Year and Design Year load requirements throughout the Forecast Period, with the extension of its system and incremental capacity resources (e.g., ENGIE, Repsol, and TCPL/PNGTS), during the peak period and on Design Day. These incremental resources are set forth in Appendix 6.D.2: High Growth, Design Year: Monthly Resources and Requirements and Appendix 6.D.3: High Growth, Design Year: Annual Design Day. Should incremental demand increase consistent with the High Growth demand case projections, the Company would acquire adequate, least-cost, reliable resources to address the need.

Low Growth

The Company's resource plan shows that it can meet Low Growth, Normal Year and Design Year load requirements throughout the Forecast Period, with the extension of its system and incremental capacity resources (e.g., ENGIE, Repsol, and TCPL/PNGTS), during the peak period and on Design Day (see Appendices 6.E.2, 6.F.2, and 6.F.3).

Under all of the planning scenarios, the Company will need to use its resource planning process to evaluate and fill the identified needs with a best-cost, reliable mix of capacity. As the decisions for certain incremental resources (e.g., TCPL/PNGTS) require infrastructure expansions and long-term contract commitments, the Company will need to further evaluate its requirements and resource portfolio over a longer-term planning horizon. The Company will also continue to evaluate the resource options that may not require a long-term contract commitment (e.g., Repsol, LNG liquid refill alternatives, CNG, and portable LNG vaporization) to meet the incremental resource needs. The resource planning approach will need to provide a high level of flexibility to meet uncertainties in future demand, while ensuring the adequacy of the overall resource portfolio. Further, the future resource decisions will need to balance cost considerations with qualitative benefits, such as supply security, optionality, and viability.

VI. SUMMARY OF COMPLIANCE WITH DG 13-313 ORDER

In the 2013 IRP Order, the Commission provided directives to the Company for the current filing. The directives and the actions taken to comply with them are described below.

- The Company should incorporate “Staff’s methodological suggestions”, which include “apply[ing] a more nuanced approach in evaluating its energy-efficiency options” and “apply[ing] a cross-check on a company-wide basis to its modelling outputs.”⁵¹

The Company based its forecast of energy efficiency on the multi-year estimates developed in Docket No. DE 17-136, which was based on a comprehensive review of potential options and the reasonableness of implementation.

To evaluate the reasonableness of the demand forecast the Company reviewed recent historical trends in customer additions and volumes. Given the expansion in the Company’s sales and marketing efforts, as noted in Section III.A.11, the Company expects somewhat higher levels of growth, relative to actual experience, over the Forecast Period. Based on the information and analysis presented in this filing, the Company believes its demand forecast is reasonable.

- “Also, for the purposes of the next LCIRP, we ask that Liberty address all of the statutory elements of RSA 378:38 and RSA 378:39 in its plan development in a granular way, so that reviewing parties may track the correspondence of the plan with the relevant statutory standards.”⁵²

The statutes that govern LCIRPs consist of those sections of RSA 378 that fall under the heading “Least Cost Energy Planning,” which are RSA 378:37 through RSA 378:40. The first statute in this subdivision, RSA 378:37, is the Legislature’s articulation of the state’s energy policy:

The general court declares that it shall be the energy policy of this state to [1] meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while [2] providing for the reliability and diversity of energy sources; [3] to maximize the use of cost effective energy efficiency and other demand side resources; and [4] to protect the safety and health of the citizens, the physical environment of the state, and the future supplies of resources, [5] with consideration of the financial stability of the state's utilities.

(Numbers added.)

The second statute, RSA 378:38, contains the requirement that utilities must file LCIRPs and lists the topics that the utilities must address in those plans. EnergyNorth explains below how its plan addresses each of the applicable topics listed in RSA 378:38.

The third substantive statute⁵³ in this subdivision is RSA 378:39, which directs the Commission to “evaluate the consistency of each utility’s plan with this subdivision.” The Commission’s charge in this docket, therefore, is to evaluate whether EnergyNorth’s LCIRP is consistent with the State’s energy policy as articulated in RSA 378:37.

⁵¹ 2013 IRP Order, at 4-5.

⁵² Ibid., at 5.

⁵³ RSA 378:38-a authorizes the Commission to extend the deadline for a utility to file its next LCIRP.

RSA 378:39 also provides the Commission with guidance in conducting its review: “In deciding whether or not to approve the utility's plan,” i.e., whether to find that EnergyNorth’s LCIRP is consistent with the State’s energy policy as articulated in RSA 378:37, “the commission shall consider potential environmental, economic, and health-related impacts of each proposed option.” RSA 378:39 concludes with the following sentence:

Where the commission determines the options have equivalent financial costs, equivalent reliability, and equivalent environmental, economic, and health-related impacts, the following order of energy policy priorities shall guide the commission's evaluation: I. Energy efficiency and other demand-side management resources; II. Renewable energy sources; III. All other energy sources.

EnergyNorth’s interpretation of this sentence is that, to the extent the Company has supply options for meeting its customers’ projected demand, and assuming those supply options are equal in terms of cost, reliability, and impact on the environment, economy, and health, then the Commission should determine whether the Plan chooses from those options in the order required by the statute. If, however, the supply options available to EnergyNorth are not equivalent in the above respects, then the Commission must more generally determine whether the Company’s supply choices are consistent with the state energy policy contained in RSA 378:37, while considering the “potential environmental, economic, and health-related impacts of each proposed option,” RSA 378:39. EnergyNorth describes below why its LCIRP is consistent with the State’s energy policy.

EnergyNorth’s LCIRP addresses all the applicable elements of RSA 378:38 as follows. First, RSA 378:38, I, states that LCIRPs shall include a “forecast of future demand for the utility's service area.” Section III of the plan provides a detailed and comprehensive demand forecast.

Second, the plan must include an “assessment of demand-side energy management programs, including conservation, efficiency, and load management programs.” RSA 378:38, II. Section III(A)(13) of this LCIRP describes the Company’s energy efficiency programs, how these programs are integrated with those of the other New Hampshire utilities, and how those programs benefit customers. This section details the savings achieved by the programs to date and that will be realized through their useful lives. The Plan also describes the recently-adopted Energy Efficiency Resource Standard, Order No. 25,932 (Aug. 2, 2016), the savings goals established in that order, and their expected costs. Finally, this section of the Plan calculates how these programs reduce the Company’s demand forecast and demonstrates that the Company reduced its demand forecast based on the savings that these programs are expected to realize going forward.

Third, the plan must provide an “assessment of supply options including owned capacity, market procurements, renewable energy, and distributed energy resources.” RSA 378:38, III. Section V of the Plan describes all of the Company’s supply options, consisting of supply contracts, capacity on certain pipelines, out-of-state storage, and LNG and propane storage and capacity within New Hampshire. “Distributed energy resources” is not a factor to be considered in planning for a gas distribution utility. Renewable sources of gas are not yet readily available in quantities that will have a material effect on EnergyNorth’s planning.⁵⁴

Fourth, the plan must contain an “assessment of distribution and transmission requirements, including an assessment of the benefits and costs of “smart grid” technologies, and the institution or extension of

⁵⁴ EnergyNorth is nonetheless exploring opportunities to develop renewable sources of methane, and will report to the Commission as those projects become more certain.

electric utility programs designed to ensure a more reliable and resilient grid to prevent or minimize power outages, including but not limited to, infrastructure automation and technologies.” RSA 378:38, IV. This subsection of the statute is geared toward electric distribution companies and is thus not applicable here.

Fifth, the Plan must assess how it integrates with and impacts “state compliance with the Clean Air Act of 1990, as amended, and other environmental laws that may impact a utility’s assets or customers.” RSA 378:38, V. “[B]ecause [these] environmental issues primarily relate to the operation of ... generation units,” and because the Company does not own or operate generation units, this section does not apply here. *Public Serv. Co. of N.H.*, Order No. 25,828 at 8 (Oct. 19, 2015). The Company filed a motion seeking waiver of this requirement.

Sixth, the statute requires an LCIRP to assess the “long- and short-term environmental, economic, and energy price and supply impact on the state.” RSA 378:38. This is another requirement that is intended to address the impacts of electric generation, and is thus inapplicable here. Order No. 25,828 at 8 (“We recognize the difficulties for Eversource to develop such assessments, particularly given potential divestiture of Eversource’s generation units”); (Because “PSNH’s retention of its generation assets” was being considered in other proceedings, PSNH “need not address ... consideration of the Clean Air Act (as amended) or the assessment of the plan’s impact on the environment, economy, energy price and supply in New Hampshire.”); *Public Serv. Co. of N.H.*, Order No. 25,659 at 8 (May 1, 2014) (“We consider the following to be LCIRP requirements that are related to generation: the Clean Air Act amendments of 1990”).

Finally, the plan must describe how it is integrated and consistent with “the state energy strategy (“SES”) under RSA 4-E:1.” RSA 378:38. The state energy strategy⁵⁵ generally supports the expanded use and availability of natural gas, as a cheaper and cleaner alternative to oil, propane, and gasoline and diesel as vehicle fuels. EnergyNorth’s growth plans, described in this Plan, dovetail with the State’s goals and help implement the SES. The following examples illustrate how EnergyNorth’s plan is integrated and consistent with the SES.

At pages 47-48, the SES calls for the state to continue to be “engaged in regional efforts to explore ways to encourage additional pipeline capacity in the region” and ensure “that New Hampshire’s interests are represented in larger decision-making forums.” EnergyNorth continues to participate in various forums, including with other New England distribution companies to work on solutions to the supply issues facing New England, as well as working with industry organizations such as the Northeast Gas Association and the American Gas Association on broader natural gas policy matters.

EnergyNorth has expanded into several communities in New Hampshire, and its goal is to continue such expansion, in part because of the PUC’s decision to “change[] the acceptable payback period limit for Liberty Utilities” to construct new main extensions, which will “help Liberty bring natural gas to more customers in communities that are already served by the local gas distribution network.” See, e.g., Order No. 25,624 (Jan. 24, 2014).

EnergyNorth supports the SES’s recommendations, at page 48, that companies should “increase the utilization of existing infrastructure in order to provide access to natural gas to more customers already on existing networks, while minimizing environmental disruption and making existing systems more cost effective,” and at page 50, “to fully utilize the capacity of existing gas pipelines.” As described above, EnergyNorth has increased its internal sales force, which has resulted in growth within existing EnergyNorth service territories and where the Company is replacing its cast iron and bare steel mains.

⁵⁵ Available at <https://www.nh.gov/osi/energy/programs/documents/energy-strategy.pdf>.

The Company is also expanding its system into new service territories, most recently Windham and Pelham. The Company will continue these efforts.

The SES recommends that the state “should encourage targeted, strategic installations for trucked CNG in areas where the impact will be maximized.” EnergyNorth is in the process of converting its Keene division to trucked CNG, and has proposed similar facilities to serve Lebanon and Hanover.

Finally, at page 55, the SES urges expansion of alternate fuels for vehicles, including CNG. The SES notes that the “largest obstacle is the need for initial infrastructural changes to fueling and maintenance docks and regional refueling locations.” EnergyNorth has helped develop a CNG fueling station, and is constructing similar stations for its own vehicle fleet.

This Plan thus “address[ed] all of the statutory elements of RSA 378:38 and RSA 378:39 in its plan development in a granular way,” as directed in the 2013 IRP Order.

LIBERTY UTILITIES
DEMAND FORECAST SUPPORTING MATERIAL

MODELS AND REGRESSION RESULTS

Modeling Results
Liberty Utilities
Residential Heating Sales Customers

Dependent Variable: RHS_CUS
Method AutoReg
Observations 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
HH_1	1.00	56.77	16.50	3.44	0.00
DT	1.00	2.59	0.32	8.20	0.00
dm1	1.00	2,150.21	449.38	4.78	0.00
dm2	1.00	1,329.77	405.31	3.28	0.00
dm4	1.00	759.42	318.74	2.38	0.02
dm10	1.00	(1,318.65)	318.80	(4.14)	0.00
dm12	1.00	1,864.60	397.61	4.69	0.00
AR1	1.00	(0.73)	0.09	(8.22)	0.00
AR3	1.00	0.47	0.10	4.60	0.00
AR5	1.00	(0.35)	0.13	(2.72)	0.01
AR6	1.00	0.41	0.12	3.51	0.00

Model Fitness:

Regress R-Square	0.9998
Total R-Square	0.9999
SSE	59,086,089.39
MSE	844,086.99
SBC	1,373.76
MAE	652.96
MAPE	0.90
Durbin-Watson	2.02
Root MSE	918.74
AIC	1,347.42
AICC	1,351.25
HQC	1,357.99

Appendix 1
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Modeling Results
Liberty Utilities
Residential Heating Sales Customers

<u>Actual, Projected, Residual</u>					<u>Rolling 12-Month</u>			<u>Independent Variable</u>	
<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard Residual</u>	<u>Actual R12</u>	<u>Projected R12</u>	<u>DT</u>	<u>HH_1</u>
Aug-10	70,267	68,744	1,523	2.22%	1.74			18,475	367
Sep-10	68,381	69,780	(1,399)	-2.01%	(1.60)			18,506	367
Oct-10	67,612	66,873	738	1.10%	0.84			18,536	368
Nov-10	68,791	68,581	210	0.31%	0.24			18,567	368
Dec-10	70,386	71,043	(657)	-0.92%	(0.75)			18,597	368
Jan-11	71,148	71,046	102	0.14%	0.12			18,628	369
Feb-11	70,334	69,820	514	0.74%	0.59			18,659	369
Mar-11	70,407	69,663	743	1.07%	0.85			18,687	369
Apr-11	71,150	71,037	113	0.16%	0.13			18,718	370
May-11	70,984	70,306	678	0.96%	0.78			18,748	370
Jun-11	71,029	70,442	587	0.83%	0.67			18,779	371
Jul-11	70,631	70,365	266	0.38%	0.30	70,093	69,808	18,809	371
Aug-11	70,678	70,371	307	0.44%	0.35	70,128	69,944	18,840	371
Sep-11	69,550	69,876	(327)	-0.47%	(0.37)	70,225	69,952	18,871	372
Oct-11	69,465	68,207	1,257	1.84%	1.44	70,379	70,063	18,901	372
Nov-11	70,124	70,258	(134)	-0.19%	(0.15)	70,490	70,203	18,932	372
Dec-11	71,682	72,084	(402)	-0.56%	(0.46)	70,598	70,290	18,962	372
Jan-12	71,139	71,824	(685)	-0.95%	(0.78)	70,598	70,354	18,993	373
Feb-12	71,659	70,364	1,295	1.84%	1.48	70,708	70,400	19,024	373
Mar-12	71,210	71,128	82	0.12%	0.09	70,775	70,522	19,053	373
Apr-12	72,351	72,256	95	0.13%	0.11	70,875	70,623	19,084	373
May-12	72,223	71,386	837	1.17%	0.96	70,978	70,713	19,114	373
Jun-12	71,342	71,343	(1)	0.00%	(0.00)	71,004	70,789	19,145	374
Jul-12	71,888	71,403	484	0.68%	0.55	71,109	70,875	19,175	374
Aug-12	70,954	71,340	(387)	-0.54%	(0.44)	71,132	70,956	19,206	374
Sep-12	70,341	70,910	(569)	-0.80%	(0.65)	71,198	71,042	19,237	374
Oct-12	68,237	69,022	(785)	-1.14%	(0.90)	71,096	71,110	19,267	374
Nov-12	69,611	69,705	(94)	-0.13%	(0.11)	71,053	71,064	19,298	375
Dec-12	72,408	72,524	(116)	-0.16%	(0.13)	71,114	71,101	19,328	375
Jan-13	73,677	73,380	297	0.41%	0.34	71,325	71,230	19,359	375
Feb-13	72,383	73,497	(1,114)	-1.52%	(1.27)	71,386	71,491	19,390	375
Mar-13	70,819	71,427	(608)	-0.85%	(0.69)	71,353	71,516	19,418	376
Apr-13	72,311	71,978	333	0.46%	0.38	71,350	71,493	19,449	376
May-13	72,641	72,356	285	0.39%	0.33	71,384	71,574	19,479	376
Jun-13	72,521	73,297	(777)	-1.06%	(0.89)	71,483	71,737	19,510	376
Jul-13	71,859	72,368	(510)	-0.70%	(0.58)	71,480	71,817	19,540	377
Aug-13	72,319	71,568	751	1.05%	0.86	71,594	71,836	19,571	377
Sep-13	70,661	72,391	(1,730)	-2.39%	(1.98)	71,621	71,959	19,602	377
Oct-13	69,749	70,322	(573)	-0.81%	(0.66)	71,747	72,068	19,632	378
Nov-13	71,181	71,312	(131)	-0.18%	(0.15)	71,877	72,202	19,663	378
Dec-13	74,782	73,929	853	1.15%	0.98	72,075	72,319	19,693	378
Jan-14	74,841	75,810	(969)	-1.28%	(1.11)	72,172	72,521	19,724	379
Feb-14	71,548	74,077	(2,528)	-3.41%	(2.89)	72,103	72,570	19,755	379
Mar-14	71,614	71,022	592	0.83%	0.68	72,169	72,536	19,783	379
Apr-14	73,896	72,865	1,031	1.41%	1.18	72,301	72,610	19,814	380
May-14	76,243	75,019	1,224	1.63%	1.40	72,601	72,832	19,844	380
Jun-14	73,822	75,923	(2,101)	-2.77%	(2.40)	72,710	73,050	19,875	380
Jul-14	72,800	72,735	64	0.09%	0.07	72,788	73,081	19,905	381
Aug-14	70,013	72,126	(2,113)	-2.93%	(2.42)	72,596	73,128	19,936	381
Sep-14	68,915	71,251	(2,337)	-3.28%	(2.67)	72,450	73,033	19,967	381
Oct-14	69,300	70,144	(843)	-1.20%	(0.96)	72,413	73,018	19,997	381
Nov-14	71,531	71,955	(424)	-0.59%	(0.49)	72,442	73,071	20,028	382
Dec-14	76,923	75,714	1,210	1.60%	1.38	72,620	73,220	20,058	382
Jan-15	75,939	77,302	(1,363)	-1.76%	(1.56)	72,712	73,344	20,089	382
Feb-15	77,304	75,960	1,344	1.77%	1.54	73,192	73,501	20,120	382
Mar-15	75,632	75,699	(67)	-0.09%	(0.08)	73,526	73,891	20,148	382
Apr-15	76,604	76,495	109	0.14%	0.12	73,752	74,194	20,179	382
May-15	76,422	75,804	617	0.81%	0.71	73,767	74,259	20,209	383
Jun-15	75,860	74,551	1,309	1.76%	1.50	73,937	74,145	20,240	383
Jul-15	75,559	75,400	158	0.21%	0.18	74,167	74,367	20,270	383
Aug-15	75,055	73,959	1,096	1.48%	1.25	74,587	74,520	20,301	383
Sep-15	73,326	74,134	(808)	-1.09%	(0.92)	74,955	74,760	20,332	383
Oct-15	72,492	71,870	623	0.87%	0.71	75,221	74,904	20,362	383
Nov-15	73,279	73,411	(133)	-0.18%	(0.15)	75,366	75,025	20,393	383
Dec-15	76,312	75,886	427	0.56%	0.49	75,315	75,039	20,423	383
Jan-16	77,304	76,815	489	0.64%	0.56	75,429	74,999	20,454	383
Feb-16	76,281	76,427	(145)	-0.19%	(0.17)	75,344	75,038	20,485	383
Mar-16	75,849	75,348	501	0.67%	0.57	75,362	75,008	20,514	383
Apr-16	75,933	76,117	(184)	-0.24%	(0.21)	75,306	74,977	20,545	383
May-16	76,963	75,655	1,308	1.73%	1.50	75,351	74,964	20,575	383
Jun-16	76,810	76,378	432	0.57%	0.49	75,430	75,117	20,606	384
Jul-16	76,248	76,285	(38)	-0.05%	(0.04)	75,488	75,190	20,636	384
Aug-16	75,255	75,508	(252)	-0.33%	(0.29)	75,504	75,319	20,667	384
Sep-16	74,287	74,312	(25)	-0.03%	(0.03)	75,585	75,334	20,698	384
Oct-16	73,928	73,523	405	0.55%	0.46	75,704	75,472	20,728	384
Nov-16	75,872	75,288	583	0.77%	0.67	75,920	75,629	20,759	384
Dec-16	76,651	77,999	(1,348)	-1.73%	(1.54)	75,948	75,805	20,789	384
Jan-17	77,636	76,995	641	0.83%	0.73	75,976	75,820	20,820	385

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Modeling Results
Liberty Utilities
Residential Heating Sales Customers

Actual, Projected, Residual						Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	DT	HH_1
Feb-17	76,484	76,537	(53)	-0.07%	(0.06)	75,993	75,829	20,851	385
Mar-17	76,711	76,275	436	0.57%	0.50	76,065	75,906	20,879	385
Apr-17	77,606	77,750	(144)	-0.19%	(0.16)	76,204	76,042	20,910	385
May-17		76,678					76,127	20,940	386
Jun-17		76,594					76,145	20,971	386
Jul-17		76,136					76,133	21,001	386
Aug-17		76,643					76,228	21,032	387
Sep-17		76,533					76,413	21,063	387
Oct-17		75,306					76,561	21,093	387
Nov-17		76,572					76,668	21,124	387
Dec-17		78,398					76,701	21,154	388
Jan-18		79,056					76,873	21,185	388
Feb-18		78,363					77,025	21,216	388
Mar-18		77,290					77,110	21,244	389
Apr-18		78,089					77,138	21,275	389
May-18		77,382					77,197	21,305	389
Jun-18		77,522					77,274	21,336	389
Jul-18		77,570					77,394	21,366	390
Aug-18		77,699					77,482	21,397	390
Sep-18		77,709					77,580	21,428	390
Oct-18		76,451					77,675	21,458	390
Nov-18		77,857					77,782	21,489	391
Dec-18		79,815					77,900	21,519	391
Jan-19		80,241					77,999	21,550	391
Feb-19		79,508					78,094	21,581	391
Mar-19		78,283					78,177	21,609	392
Apr-19		79,139					78,265	21,640	392
May-19		78,479					78,356	21,670	392
Jun-19		78,587					78,445	21,701	392
Jul-19		78,665					78,536	21,731	393
Aug-19		78,755					78,624	21,762	393
Sep-19		78,833					78,718	21,793	393
Oct-19		77,602					78,814	21,823	393
Nov-19		79,015					78,910	21,854	394
Dec-19		80,969					79,006	21,884	394
Jan-20		81,352					79,099	21,915	394
Feb-20		80,625					79,192	21,946	394
Mar-20		79,389					79,284	21,975	395
Apr-20		80,245					79,376	22,006	395
May-20		79,579					79,468	22,036	395
Jun-20		79,674					79,559	22,067	395
Jul-20		79,762					79,650	22,097	395
Aug-20		79,854					79,742	22,128	396
Sep-20		79,944					79,834	22,159	396
Oct-20		78,714					79,927	22,189	396
Nov-20		80,124					80,019	22,220	396
Dec-20		82,077					80,112	22,250	397
Jan-21		82,455					80,204	22,281	397
Feb-21		81,727					80,295	22,312	397
Mar-21		80,482					80,386	22,340	397
Apr-21		81,334					80,477	22,371	397
May-21		80,664					80,568	22,401	398
Jun-21		80,757					80,658	22,432	398
Jul-21		80,846					80,748	22,462	398
Aug-21		80,939					80,839	22,493	398
Sep-21		81,031					80,929	22,524	398
Oct-21		79,802					81,020	22,554	399
Nov-21		81,214					81,111	22,585	399
Dec-21		83,169					81,202	22,615	399
Jan-22		83,548					81,293	22,646	399
Feb-22		82,821					81,384	22,677	399
Mar-22		81,577					81,475	22,705	400
Apr-22		82,430					81,566	22,736	400
May-22		81,762					81,658	22,766	400
Jun-22		81,856					81,750	22,797	400
Jul-22		81,947					81,841	22,827	401
Aug-22		82,041					81,933	22,858	401
Sep-22		82,135					82,025	22,889	401
Oct-22		80,908					82,117	22,919	401
Nov-22		82,320					82,210	22,950	402
Dec-22		84,276					82,302	22,980	402

Modeling Results
Liberty Utilities
Residential Heating Sales Use per Customer

Dependent Variable: RHS_UPC
Method AutoReg
Observations 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
Intercept	1	32.33	3.45	9.38	0.00
BDD	1	0.02	0.00	3.86	0.00
NGPRCR_1	1	(0.81)	0.19	(4.23)	0.00
dm1	1	93.02	5.11	18.21	0.00
dm2	1	96.77	5.22	18.52	0.00
dm3	1	87.76	4.68	18.74	0.00
dm4	1	61.95	3.68	16.82	0.00
dm5	1	24.56	2.50	9.83	0.00
dm11	1	21.37	2.86	7.48	0.00
dm12	1	58.78	4.23	13.89	0.00
AR1	1	0.29	0.11	2.56	0.01
AR10	1	0.33	0.12	2.65	0.01

Model Fitness:

Regress R-Square	0.9967
Total R-Square	0.9938
SSE	1124.66
MSE	16.30
SBC	497.07
MAE	2.88
MAPE	6.49
Durbin-Watson	1.93
Root MSE	4.04
AIC	468.34
AICC	472.93
HQC	479.87

Appendix 1

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Modeling Results
 Liberty Utilities
 Residential Heating Sales Use per Customer

Actual, Projected, Residual (Therms/ Customer)						Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	BDD	NGPRCR_1
Aug-10	15	18	(3)	-16.62%	(0.79)			2	18
Sep-10	16	20	(3)	-16.38%	(0.86)			39	18
Oct-10	24	23	1	4.34%	0.26			261	18
Nov-10	53	51	2	4.26%	0.57			584	16
Dec-10	95	96	(1)	-0.97%	(0.25)			924	13
Jan-11	132	136	(4)	-3.07%	(1.11)			1,234	13
Feb-11	146	141	5	3.44%	1.28			1,220	13
Mar-11	129	125	5	3.62%	1.20			1,006	13
Apr-11	99	95	4	4.33%	1.09			710	13
May-11	51	50	1	2.58%	0.34			364	14
Jun-11	26	23	3	11.48%	0.71			150	16
Jul-11	19	20	(1)	-5.53%	(0.29)	806	798	39	16
Aug-11	15	17	(2)	-9.49%	(0.42)	806	796	1	19
Sep-11	16	18	(1)	-8.21%	(0.39)	806	794	37	19
Oct-11	22	23	(1)	-6.46%	(0.40)	804	795	245	18
Nov-11	57	50	6	12.47%	1.66	808	795	500	17
Dec-11	88	88	0	0.12%	0.03	801	787	752	15
Jan-12	136	133	4	2.73%	0.96	805	783	1,016	13
Feb-12	134	134	(0)	-0.11%	(0.04)	793	776	1,013	13
Mar-12	134	124	10	8.31%	2.73	798	775	784	13
Apr-12	82	89	(7)	-7.56%	(1.78)	781	769	543	13
May-12	52	54	(2)	-3.02%	(0.43)	781	773	294	15
Jun-12	27	23	4	16.10%	1.00	783	773	116	14
Jul-12	17	20	(3)	-13.62%	(0.72)	781	772	39	16
Aug-12	15	19	(4)	-20.58%	(1.05)	781	775	-	18
Sep-12	16	16	(0)	-2.93%	(0.12)	780	773	63	19
Oct-12	26	24	2	9.60%	0.60	784	774	229	18
Nov-12	45	49	(4)	-8.74%	(1.15)	773	773	564	14
Dec-12	97	99	(2)	-1.87%	(0.49)	782	784	884	12
Jan-13	134	130	4	2.69%	0.93	780	782	1,071	12
Feb-13	146	142	3	2.12%	0.80	791	790	1,095	12
Mar-13	124	125	(1)	-0.76%	(0.25)	781	791	955	12
Apr-13	94	96	(2)	-1.76%	(0.45)	793	798	695	13
May-13	50	54	(4)	-8.27%	(1.19)	791	799	355	13
Jun-13	27	25	2	9.24%	0.61	791	800	125	14
Jul-13	17	19	(2)	-10.51%	(0.54)	791	800	20	16
Aug-13	15	16	(1)	-4.16%	(0.18)	791	796	1	19
Sep-13	17	20	(3)	-13.49%	(0.70)	792	800	70	21
Oct-13	22	20	2	7.93%	0.43	789	797	260	20
Nov-13	50	50	(0)	-0.94%	(0.12)	793	797	592	17
Dec-13	98	95	3	3.25%	0.82	794	793	979	14
Jan-14	139	136	3	2.42%	0.87	798	798	1,226	15
Feb-14	140	138	1	0.86%	0.31	792	794	1,217	14
Mar-14	122	128	(6)	-4.95%	(1.68)	790	797	1,108	15
Apr-14	102	96	6	6.59%	1.68	798	797	809	16
May-14	54	49	5	10.35%	1.35	803	792	377	16
Jun-14	28	20	8	38.05%	2.03	803	787	120	17
Jul-14	17	17	(1)	-3.73%	(0.17)	803	785	13	16
Aug-14	16	17	(1)	-4.90%	(0.22)	803	786	4	20
Sep-14	15	17	(2)	-9.26%	(0.42)	802	783	70	21
Oct-14	22	20	2	8.30%	0.45	802	783	239	20
Nov-14	47	49	(1)	-2.65%	(0.34)	799	782	560	16
Dec-14	90	95	(5)	-5.40%	(1.36)	791	782	873	15
Jan-15	131	135	(4)	-2.88%	(1.03)	784	781	1,158	16
Feb-15	127	137	(10)	-7.23%	(2.63)	772	780	1,366	17
Mar-15	130	131	(1)	-0.69%	(0.24)	780	783	1,231	16
Apr-15	95	93	1	1.52%	0.38	773	781	799	15
May-15	53	52	1	2.07%	0.28	771	784	328	15
Jun-15	26	22	4	18.57%	1.07	769	785	103	15
Jul-15	20	19	0	0.68%	0.04	772	788	37	16
Aug-15	15	17	(2)	-12.04%	(0.54)	771	788	1	19
Sep-15	15	17	(2)	-11.88%	(0.53)	771	788	29	22
Oct-15	22	20	1	7.35%	0.39	771	788	246	22
Nov-15	50	48	2	4.04%	0.51	773	787	509	17
Dec-15	96	95	1	0.72%	0.18	779	787	671	14
Jan-16	120	128	(8)	-6.16%	(2.09)	768	780	932	15
Feb-16	136	139	(3)	-2.17%	(0.80)	777	782	1,039	14
Mar-16	126	124	2	1.87%	0.62	773	775	848	12
Apr-16	92	95	(3)	-2.70%	(0.68)	770	776	637	11
May-16	50	55	(5)	-9.60%	(1.41)	767	780	383	12
Jun-16	26	25	0	0.78%	0.05	767	783	124	14
Jul-16	17	18	(1)	-6.52%	(0.31)	764	782	20	18
Aug-16	14	14	(0)	-1.87%	(0.07)	763	779	4	22
Sep-16	14	13	1	4.24%	0.15	762	775	37	24
Oct-16	22	16	7	42.33%	1.76	763	771	237	24
Nov-16	49	49	(0)	-0.95%	(0.12)	762	772	524	19
Dec-16	94	94	0	0.40%	0.10	760	771	859	15
Jan-17	136	132	4	3.02%	1.06	776	775	1,057	14
Feb-17	142	136	6	4.30%	1.55	781	771	957	13

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Modeling Results
Liberty Utilities
Residential Heating Sales Use per Customer

Actual, Projected, Residual (Therms/ Customer)						Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	BDD	NGPRCR_1
Mar-17	116	126	(10)	-8.01%	(2.67)	771	773	958	13
Apr-17	101	100	2	1.74%	0.46	780	778	733	12
May-17		50					772	211	13
Jun-17		24					770	141	14
Jul-17		17					770	29	19
Aug-17		12					767	8	24
Sep-17		13					767	62	25
Oct-17		16					768	265	26
Nov-17		46					764	561	20
Dec-17		92					763	879	15
Jan-18		137					768	1,138	15
Feb-18		136					768	1,137	13
Mar-18		127					770	972	13
Apr-18		96					766	705	12
May-18		53					770	374	13
Jun-18		24					770	141	14
Jul-18		17					770	29	19
Aug-18		13					772	8	24
Sep-18		13					772	62	25
Oct-18		17					772	265	26
Nov-18		46					772	561	20
Dec-18		95					775	879	16
Jan-19		133					770	1,138	15
Feb-19		139					773	1,137	13
Mar-19		126					772	972	13
Apr-19		96					772	705	12
May-19		53					772	374	13
Jun-19		23					771	141	15
Jul-19		17					771	29	19
Aug-19		13					771	8	24
Sep-19		13					771	62	26
Oct-19		15					769	265	26
Nov-19		47					771	561	20
Dec-19		93					769	879	16
Jan-20		133					770	1,138	15
Feb-20		138					769	1,137	13
Mar-20		126					769	972	14
Apr-20		96					769	705	12
May-20		53					769	374	13
Jun-20		23					769	141	15
Jul-20		17					769	29	19
Aug-20		13					769	8	24
Sep-20		12					768	62	26
Oct-20		16					768	265	26
Nov-20		47					768	561	21
Dec-20		94					768	879	16
Jan-21		133					768	1,138	15
Feb-21		138					768	1,137	13
Mar-21		126					767	972	14
Apr-21		96					767	705	13
May-21		53					767	374	13
Jun-21		23					767	141	15
Jul-21		17					767	29	19
Aug-21		12					767	8	25
Sep-21		12					767	62	26
Oct-21		16					766	265	26
Nov-21		47					766	561	21
Dec-21		93					766	879	16
Jan-22		133					766	1,138	15
Feb-22		138					766	1,137	13
Mar-22		126					766	972	14
Apr-22		96					766	705	13
May-22		53					766	374	13
Jun-22		23					766	141	15
Jul-22		17					765	29	20
Aug-22		12					765	8	25
Sep-22		12					765	62	27
Oct-22		15					765	265	27
Nov-22		46					765	561	21
Dec-22		93					765	879	16

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Modeling Results
Liberty Utilities
Residential Heating Sales Volumes

Actual, Projected, Residual (Therms)					Rolling 12-Month			Independent Variable			
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	BDD	DT	HH_1	
Aug-10	1,046,982	1,228,488	(181,506)	-14.77%	(0.65)				2	18,475	366.91
Sep-10	1,126,977	1,375,362	(248,385)	-18.06%	(0.89)				39	18,506	367.19
Oct-10	1,604,829	1,521,230	83,599	5.50%	0.30				261	18,536	367.50
Nov-10	3,628,367	3,469,400	158,967	4.58%	0.57				584	18,567	367.85
Dec-10	6,692,418	6,821,334	(128,916)	-1.89%	(0.46)				924	18,597	368.22
Jan-11	9,410,000	9,693,961	(283,961)	-2.93%	(1.02)				1,234	18,628	368.61
Feb-11	10,255,617	9,842,400	413,217	4.20%	1.48				1,220	18,659	369.02
Mar-11	9,102,093	8,690,970	411,123	4.73%	1.48				1,006	18,687	369.41
Apr-11	7,051,759	6,748,424	303,335	4.49%	1.09				710	18,718	369.80
May-11	3,645,561	3,520,009	125,552	3.57%	0.45				364	18,748	370.20
Jun-11	1,841,043	1,637,789	203,254	12.41%	0.73				150	18,779	370.59
Jul-11	1,340,459	1,413,591	(73,132)	-5.17%	(0.26)	56,746,103	55,962,956		39	18,809	370.95
Aug-11	1,068,190	1,175,072	(106,882)	-9.10%	(0.38)	56,767,311	55,909,540		1	18,840	371.30
Sep-11	1,140,417	1,248,251	(107,834)	-8.64%	(0.39)	56,780,751	55,782,428		37	18,871	371.61
Oct-11	1,504,587	1,579,421	(74,834)	-4.74%	(0.27)	56,680,509	55,840,619		245	18,901	371.90
Nov-11	3,966,152	3,533,010	433,142	12.26%	1.56	57,018,294	55,904,229		500	18,932	372.17
Dec-11	6,326,042	6,353,881	(27,840)	-0.44%	(0.10)	56,651,918	55,436,777		752	18,962	372.41
Jan-12	9,684,394	9,518,006	166,387	1.75%	0.60	56,926,311	55,260,823		1,016	18,993	372.64
Feb-12	9,606,073	9,443,034	163,039	1.73%	0.59	56,276,768	54,861,457		1,013	19,024	372.86
Mar-12	9,569,595	8,825,280	744,315	8.43%	2.67	56,744,271	54,995,768		784	19,053	373.06
Apr-12	5,929,916	6,406,240	(476,323)	-7.44%	(1.71)	55,622,428	54,653,584		543	19,084	373.25
May-12	3,754,716	3,826,923	(72,207)	-1.89%	(0.26)	55,731,583	54,960,498		294	19,114	373.44
Jun-12	1,938,328	1,669,496	268,832	16.10%	0.97	55,828,869	54,992,205		116	19,145	373.63
Jul-12	1,233,382	1,418,172	(184,790)	-13.03%	(0.66)	55,721,792	54,996,787		39	19,175	373.82
Aug-12	1,084,359	1,372,840	(288,481)	-21.01%	(1.04)	55,737,961	55,194,555		-	19,206	374.01
Sep-12	1,096,486	1,138,710	(42,224)	-3.71%	(0.15)	55,694,030	55,085,014		63	19,237	374.20
Oct-12	1,759,592	1,623,888	135,704	8.36%	0.49	55,949,035	55,129,481		229	19,267	374.40
Nov-12	3,143,729	3,449,422	(305,693)	-8.86%	(1.10)	55,126,612	55,045,893		564	19,298	374.61
Dec-12	7,052,667	7,198,650	(145,983)	-2.03%	(0.52)	55,853,238	55,890,661		884	19,328	374.83
Jan-13	9,871,969	9,574,430	297,539	3.11%	1.07	56,040,813	55,947,084		1,071	19,359	375.05
Feb-13	10,532,814	10,472,584	60,230	0.58%	0.22	56,967,553	56,976,634		1,095	19,390	375.29
Mar-13	8,765,726	8,908,612	(142,885)	-1.60%	(0.51)	56,163,684	57,059,965		955	19,418	375.52
Apr-13	6,814,611	6,904,639	(90,028)	-1.30%	(0.32)	57,048,379	57,558,365		695	19,449	375.77
May-13	3,619,799	3,930,866	(311,067)	-7.91%	(1.12)	56,913,461	57,662,308		355	19,479	376.04
Jun-13	1,973,944	1,826,398	147,546	8.08%	0.53	56,949,078	57,819,211		125	19,510	376.32
Jul-13	1,243,273	1,399,083	(155,810)	-11.14%	(0.56)	56,958,969	57,800,122		20	19,540	376.62
Aug-13	1,106,762	1,142,804	(36,042)	-3.15%	(0.13)	56,981,372	57,570,086		1	19,571	376.94
Sep-13	1,198,473	1,419,351	(220,878)	-15.56%	(0.79)	57,083,358	57,850,727		70	19,602	377.27
Oct-13	1,521,980	1,421,686	100,294	7.05%	0.36	56,845,747	57,648,526		260	19,632	377.61
Nov-13	3,528,856	3,568,786	(39,930)	-1.12%	(0.14)	57,230,874	57,767,890		592	19,663	377.96
Dec-13	7,327,674	7,015,736	311,938	4.45%	1.12	57,505,881	57,584,976		979	19,693	378.32
Jan-14	10,396,864	10,282,329	114,535	1.11%	0.41	58,030,776	58,292,875		1,226	19,724	378.67
Feb-14	9,982,848	10,247,914	(265,066)	-2.59%	(0.95)	57,480,810	58,068,205		1,217	19,755	379.03
Mar-14	8,705,582	9,083,274	(377,692)	-4.16%	(1.36)	57,420,666	58,242,868		1,108	19,783	379.37
Apr-14	7,559,996	6,993,619	566,377	8.10%	2.03	58,166,051	58,331,848		809	19,814	379.70
May-14	4,128,394	3,681,010	447,384	12.15%	1.61	58,674,646	58,081,992		377	19,844	380.04
Jun-14	2,055,518	1,531,350	524,167	34.23%	1.88	58,756,219	57,786,944		120	19,875	380.36
Jul-14	1,205,468	1,251,109	(45,641)	-3.65%	(0.16)	58,718,414	57,638,969		13	19,905	380.66
Aug-14	1,119,142	1,212,369	(93,227)	-7.69%	(0.33)	58,730,794	57,708,533		4	19,936	380.94
Sep-14	1,058,074	1,205,576	(147,502)	-12.23%	(0.53)	58,590,395	57,494,759		70	19,967	381.20
Oct-14	1,518,350	1,419,038	99,311	7.00%	0.36	58,586,765	57,492,111		239	19,997	381.43
Nov-14	3,383,186	3,495,754	(112,568)	-3.22%	(0.40)	58,441,095	57,419,079		560	20,028	381.65
Dec-14	6,915,960	7,195,616	(279,656)	-3.89%	(1.00)	58,029,381	57,598,960		873	20,058	381.85
Jan-15	9,975,755	10,456,075	(480,320)	-4.59%	(1.73)	57,608,272	57,772,706		1,158	20,089	382.02
Feb-15	9,839,927	10,422,263	(582,336)	-5.59%	(2.09)	57,465,351	57,947,054		1,366	20,120	382.19
Mar-15	9,832,342	9,909,140	(76,797)	-0.78%	(0.28)	58,592,112	58,772,920		1,231	20,148	382.33
Apr-15	7,270,233	7,151,294	118,938	1.66%	0.43	58,302,348	58,930,595		799	20,179	382.45
May-15	4,054,532	3,940,398	114,134	2.90%	0.41	58,228,486	59,189,983		328	20,209	382.57
Jun-15	1,958,015	1,622,888	335,127	20.65%	1.20	58,130,984	59,281,520		103	20,240	382.67
Jul-15	1,478,782	1,465,671	13,111	0.89%	0.05	58,404,298	59,496,083		37	20,270	382.76
Aug-15	1,113,923	1,247,869	(133,946)	-10.73%	(0.48)	58,399,079	59,531,582		1	20,301	382.84
Sep-15	1,086,251	1,246,242	(159,991)	-12.84%	(0.57)	58,427,256	59,572,249		29	20,332	382.91
Oct-15	1,570,660	1,450,492	120,168	8.28%	0.43	58,479,567	59,603,703		246	20,362	382.97
Nov-15	3,653,151	3,517,782	135,369	3.85%	0.49	58,749,531	59,625,730		509	20,393	383.03
Dec-15	7,319,738	7,227,044	92,694	1.28%	0.33	59,153,310	59,657,158		671	20,423	383.09
Jan-16	9,294,033	9,841,392	(547,359)	-5.56%	(1.97)	58,471,588	59,042,475		932	20,454	383.14
Feb-16	10,393,976	10,645,052	(251,075)	-2.36%	(0.90)	59,025,637	59,265,263		1,039	20,485	383.21
Mar-16	9,586,706	9,348,501	238,205	2.55%	0.86	58,780,001	58,704,625		848	20,514	383.27
Apr-16	6,982,850	7,194,170	(211,320)	-2.94%	(0.76)	58,492,619	58,747,501		637	20,545	383.34
May-16	3,849,164	4,185,647	(336,483)	-8.04%	(1.21)	58,287,251	58,992,750		383	20,575	383.43
Jun-16	1,973,174	1,946,928	26,245	1.35%	0.09	58,302,410	59,316,791		124	20,606	383.53
Jul-16	1,275,538	1,365,221	(89,683)	-6.57%	(0.32)	58,099,165	59,216,341		20	20,636	383.64
Aug-16	1,024,715	1,047,758	(23,043)	-2.20%	(0.08)	58,009,958	59,016,230		4	20,667	383.78
Sep-16	1,043,811	1,001,657	42,154	4.21%	0.15	57,967,518	58,771,645		37	20,698	383.93
Oct-16	1,646,187	1,150,276	495,911	43.11%	1.78	58,043,045	58,471,429		237	20,728	384.10
Nov-16	3,698,647	3,705,236	(6,589)	-0.18%	(0.02)	58,088,541	58,658,883		524	20,759	384.29
Dec-16	7,226,749	7,324,220	(97,470)	-1.33%	(0.35)	57,995,552	58,756,059		859	20,789	384.50
Jan-17	10,568,800	10,174,379	394,421	3.88%	1.42	59,270,319	59,089,046		1,057	20,820	384.72
Feb-17	10,824,412	10,385,055	439,357	4.23%	1.58	59,700,754	58,829,049		957	20,851	384.95

Modeling Results
Liberty Utilities
Residential Heating Sales Volumes

Actual, Projected, Residual (Therms)					Rolling 12-Month			Independent Variable		
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	BDD	DT	HH_1
Mar-17	8,860,891	9,577,928	(717,037)	-7.49%	(2.58)	58,974,939	59,058,476	958	20,879	385.19
Apr-17	7,857,807	7,737,985	119,823	1.55%	0.43	59,849,896	59,602,291	733	20,910	385.43
May-17		3,812,133					59,228,777	211	20,940	385.69
Jun-17		1,802,867					59,084,715	141	20,971	385.96
Jul-17		1,324,175					59,043,669	29	21,001	386.24
Aug-17		890,134					58,886,044	8	21,032	386.52
Sep-17		988,765					58,873,152	62	21,063	386.81
Oct-17		1,227,657					58,950,533	265	21,093	387.09
Nov-17		3,524,554					58,769,852	561	21,124	387.38
Dec-17		7,224,470					58,670,102	879	21,154	387.67
Jan-18		10,852,924					59,348,647	1,138	21,185	387.97
Feb-18		10,653,087					59,616,679	1,137	21,216	388.26
Mar-18		9,834,410					59,873,160	972	21,244	388.54
Apr-18		7,517,334					59,652,509	705	21,275	388.82
May-18		4,128,386					59,968,763	374	21,305	389.10
Jun-18		1,827,416					59,993,311	141	21,336	389.38
Jul-18		1,353,884					60,023,021	29	21,366	389.66
Aug-18		1,030,992					60,163,879	8	21,397	389.93
Sep-18		1,024,201					60,199,315	62	21,428	390.20
Oct-18		1,281,315					60,252,972	265	21,458	390.46
Nov-18		3,559,107					60,287,526	561	21,489	390.71
Dec-18		7,589,613					60,652,669	879	21,519	390.96
Jan-19		10,642,154					60,441,898	1,138	21,550	391.21
Feb-19		11,022,978					60,811,790	1,137	21,581	391.46
Mar-19		9,865,157					60,842,537	972	21,609	391.69
Apr-19		7,632,410					60,957,613	705	21,640	391.92
May-19		4,168,086					60,997,313	374	21,670	392.16
Jun-19		1,800,205					60,970,102	141	21,701	392.40
Jul-19		1,362,568					60,978,786	29	21,731	392.64
Aug-19		1,012,302					60,960,096	8	21,762	392.88
Sep-19		1,030,508					60,966,404	62	21,793	393.12
Oct-19		1,201,759					60,886,848	265	21,823	393.36
Nov-19		3,740,124					61,067,864	561	21,854	393.60
Dec-19		7,568,555					61,046,807	879	21,884	393.84
Jan-20		10,841,118					61,245,771	1,138	21,915	394.08
Feb-20		11,140,650					61,363,442	1,137	21,946	394.32
Mar-20		10,003,904					61,502,189	972	21,975	394.55
Apr-20		7,739,556					61,609,335	705	22,006	394.78
May-20		4,211,330					61,652,578	374	22,036	395.01
Jun-20		1,818,906					61,671,280	141	22,067	395.24
Jul-20		1,360,120					61,668,831	29	22,097	395.46
Aug-20		1,034,786					61,691,316	8	22,128	395.68
Sep-20		967,299					61,628,106	62	22,159	395.89
Oct-20		1,251,751					61,678,098	265	22,189	396.10
Nov-20		3,739,100					61,677,075	561	22,220	396.31
Dec-20		7,678,375					61,786,895	879	22,250	396.51
Jan-21		10,966,087					61,911,865	1,138	22,281	396.71
Feb-21		11,283,779					62,054,994	1,137	22,312	396.92
Mar-21		10,135,155					62,186,245	972	22,340	397.11
Apr-21		7,834,270					62,280,959	705	22,371	397.31
May-21		4,263,371					62,333,000	374	22,401	397.51
Jun-21		1,824,279					62,338,373	141	22,432	397.72
Jul-21		1,388,447					62,366,700	29	22,462	397.93
Aug-21		1,009,198					62,341,112	8	22,493	398.14
Sep-21		983,624					62,357,436	62	22,524	398.36
Oct-21		1,241,338					62,347,024	265	22,554	398.58
Nov-21		3,783,654					62,391,577	561	22,585	398.81
Dec-21		7,768,832					62,482,034	879	22,615	399.03
Jan-22		11,101,762					62,617,708	1,138	22,646	399.26
Feb-22		11,429,579					62,763,508	1,137	22,677	399.50
Mar-22		10,265,684					62,894,037	972	22,705	399.72
Apr-22		7,937,788					62,997,555	705	22,736	399.95
May-22		4,307,050					63,041,234	374	22,766	400.19
Jun-22		1,852,836					63,069,791	141	22,797	400.43
Jul-22		1,388,875					63,070,219	29	22,827	400.66
Aug-22		1,018,336					63,079,357	8	22,858	400.90
Sep-22		980,739					63,076,472	62	22,889	401.15
Oct-22		1,248,221					63,083,356	265	22,919	401.38
Nov-22		3,825,120					63,124,822	561	22,950	401.62
Dec-22		7,864,535					63,220,525	879	22,980	401.86

Modeling Results
Liberty Utilities
Residential Heating Sales Volumes

Actual, Projected, Residual (Therms)						Rolling 12-Month			Independent Variable		
	<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard Residual</u>	<u>Actual_R12</u>	<u>Projected_R12</u>	<u>BDD</u>	<u>DT</u>	<u>HH_1</u>
Plan Year	Actual		Projected						BDD	DT	HH_1
PY2011		56,680,509		55,840,619					6,511	224,804	4,439
PY2012		55,949,035		55,129,481					5,346	229,192	4,480
PY2013		56,845,747		57,648,526					6,092	233,576	4,512
PY2014		58,586,765		57,492,111					6,751	237,956	4,558
PY2015		58,479,567		59,603,703					6,727	242,336	4,589
PY2016		58,043,045		58,471,429					5,439	246,724	4,601
PY2017				58,950,533					5,804	251,108	4,627
PY2018				60,252,972					6,272	255,488	4,667
PY2019				60,886,848					6,272	259,868	4,705
PY2020				61,678,098					6,272	264,256	4,739
PY2021				62,347,024					6,272	268,640	4,769
PY2022				63,083,356					6,272	273,020	4,801
Growth											
PY2012		(731,473)		(711,138)					(1,165)	4,388	40
PY2013		896,711		2,519,045					746	4,384	32
PY2014		1,741,018		(156,415)					659	4,380	46
PY2015		(107,197)		2,111,592					(24)	4,380	32
PY2016		(436,522)		(1,132,274)					(1,289)	4,388	12
PY2017				479,104					365	4,384	26
PY2018				1,302,439					469	4,380	40
PY2019				633,875					-	4,380	37
PY2020				791,251					-	4,388	34
PY2021				668,926					-	4,384	31
PY2022				736,332					-	4,380	32
Growth Rate (%)											
PY2012		-1.3%		-1.3%					-17.9%	2.0%	0.9%
PY2013		1.6%		4.6%					13.9%	1.9%	0.7%
PY2014		3.1%		-0.3%					10.8%	1.9%	1.0%
PY2015		-0.2%		3.7%					-0.3%	1.8%	0.7%
PY2016		-0.7%		-1.9%					-19.2%	1.8%	0.3%
PY2017				0.8%					6.7%	1.8%	0.6%
PY2018				2.2%					8.1%	1.7%	0.9%
PY2019				1.1%					0.0%	1.7%	0.8%
PY2020				1.3%					0.0%	1.7%	0.7%
PY2021				1.1%					0.0%	1.7%	0.6%
PY2022				1.2%					0.0%	1.6%	0.7%

Modeling Results
Liberty Utilities
Residential Non-Heating Sales Customers

Dependent Variable: RNS_CUS
Method AutoReg
Observations 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
HH	1	33.07	6.43	5.14	0.00
DT	1	(0.47)	0.12	(3.87)	0.00
AR1	1	(1.30)	0.14	(9.21)	0.00
AR2	1	0.65	0.13	4.88	0.00

Model Fitness:

Regress R-Square	0.9973
Total R-Square	0.9997
SSE	113420.55
MSE	3658.73
SBC	398.53
MAE	44.84
MAPE	1.41
Durbin-Watson	1.84
Root MSE	60.49
AIC	392.31
AICC	393.65
HQC	394.46

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Modeling Results
Liberty Utilities
Residential Non-Heating Sales Customers

Actual, Projected, Residual					Rolling 12-Month			Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	HH	DT
Aug-10	4,146	4,188	(42)	-1.00%	(0.40)			367	18,475
Sep-10	4,024	3,992	32	0.81%	0.31			367	18,506
Oct-10	3,951	4,086	(134)	-3.29%	(1.28)			368	18,536
Nov-10	4,004	3,858	146	3.78%	1.39			368	18,567
Dec-10	4,091	4,013	78	1.94%	0.74			368	18,597
Jan-11	4,086	4,197	(111)	-2.65%	(1.06)			369	18,628
Feb-11	3,982	4,065	(83)	-2.04%	(0.79)			369	18,659
Mar-11	3,941	4,027	(87)	-2.15%	(0.83)			369	18,687
Apr-11	3,956	3,915	41	1.05%	0.39			370	18,718
May-11	3,931	3,949	(18)	-0.46%	(0.17)			370	18,748
Jun-11	3,942	3,569	374	10.47%	3.56			371	18,779
Jul-11	3,967	3,905	62	1.58%	0.59	4,002	3,980	371	18,809
Aug-11	3,953	3,993	(40)	-1.00%	(0.38)	3,986	3,964	371	18,840
Sep-11	3,867	3,836	31	0.81%	0.29	3,973	3,951	372	18,871
Oct-11	3,836	3,967	(130)	-3.29%	(1.24)	3,963	3,941	372	18,901
Nov-11	3,864	3,724	141	3.78%	1.34	3,951	3,930	372	18,932
Dec-11	3,955	3,880	75	1.94%	0.72	3,940	3,919	372	18,962
Jan-12	3,903	4,009	(106)	-2.65%	(1.01)	3,925	3,903	373	18,993
Feb-12	3,891	3,972	(81)	-2.04%	(0.77)	3,917	3,895	373	19,024
Mar-12	3,789	3,873	(83)	-2.15%	(0.79)	3,905	3,883	373	19,053
Apr-12	3,823	3,783	40	1.05%	0.38	3,893	3,872	373	19,084
May-12	3,813	3,830	(18)	-0.46%	(0.17)	3,884	3,862	373	19,114
Jun-12	3,767	3,410	357	10.47%	3.40	3,869	3,848	374	19,145
Jul-12	3,781	3,722	59	1.58%	0.56	3,854	3,833	374	19,175
Aug-12	3,722	3,759	(38)	-1.00%	(0.36)	3,834	3,814	374	19,206
Sep-12	3,730	3,700	30	0.81%	0.28	3,823	3,802	374	19,237
Oct-12	3,612	3,735	(123)	-3.29%	(1.17)	3,804	3,783	374	19,267
Nov-12	3,667	3,533	134	3.78%	1.27	3,788	3,767	375	19,298
Dec-12	3,766	3,694	72	1.94%	0.68	3,772	3,752	375	19,328
Jan-13	3,777	3,880	(103)	-2.65%	(0.98)	3,761	3,741	375	19,359
Feb-13	3,689	3,766	(77)	-2.04%	(0.73)	3,745	3,724	375	19,390
Mar-13	3,584	3,662	(79)	-2.15%	(0.75)	3,727	3,706	376	19,418
Apr-13	3,635	3,597	38	1.05%	0.36	3,712	3,691	376	19,449
May-13	3,672	3,688	(17)	-0.46%	(0.16)	3,700	3,679	376	19,479
Jun-13	3,672	3,324	348	10.47%	3.32	3,692	3,672	376	19,510
Jul-13	3,673	3,616	57	1.58%	0.54	3,683	3,663	377	19,540
Aug-13	3,730	3,768	(38)	-1.00%	(0.36)	3,684	3,664	377	19,571
Sep-13	3,662	3,632	29	0.81%	0.28	3,678	3,658	377	19,602
Oct-13	3,625	3,748	(123)	-3.29%	(1.17)	3,679	3,659	378	19,632
Nov-13	3,611	3,479	131	3.78%	1.25	3,674	3,655	378	19,663
Dec-13	3,767	3,695	72	1.94%	0.68	3,675	3,655	378	19,693
Jan-14	3,770	3,872	(103)	-2.65%	(0.98)	3,674	3,654	379	19,724
Feb-14	3,614	3,690	(75)	-2.04%	(0.72)	3,668	3,648	379	19,755
Mar-14	3,601	3,680	(79)	-2.15%	(0.75)	3,669	3,649	379	19,783
Apr-14	3,652	3,615	38	1.05%	0.36	3,671	3,651	380	19,814
May-14	3,762	3,779	(17)	-0.46%	(0.16)	3,678	3,658	380	19,844
Jun-14	3,635	3,291	345	10.47%	3.28	3,675	3,655	381	19,875
Jul-14	3,614	3,558	56	1.58%	0.54	3,670	3,651	381	19,905
Aug-14	3,447	3,482	(35)	-1.00%	(0.33)	3,647	3,627	381	19,936
Sep-14	3,304	3,278	26	0.81%	0.25	3,617	3,597	381	19,967
Oct-14	3,093	3,198	(105)	-3.29%	(1.00)	3,573	3,551	382	19,997
Nov-14	3,127	3,013	114	3.78%	1.08	3,532	3,513	382	20,028
Dec-14	3,254	3,192	62	1.94%	0.59	3,489	3,471	382	20,058
Jan-15	3,244	3,332	(88)	-2.65%	(0.84)	3,446	3,426	382	20,089
Feb-15	3,166	3,232	(66)	-2.04%	(0.63)	3,408	3,387	382	20,120
Mar-15	3,069	3,136	(68)	-2.15%	(0.64)	3,364	3,342	382	20,148
Apr-15	3,086	3,054	32	1.05%	0.31	3,317	3,295	383	20,179
May-15	3,124	3,138	(14)	-0.46%	(0.14)	3,264	3,242	383	20,209
Jun-15	3,160	3,171	(11)	-0.35%	(0.11)	3,224	3,232	383	20,240
Jul-15	3,142	3,190	(47)	-1.48%	(0.45)	3,185	3,201	383	20,270
Aug-15	3,124	3,139	(15)	-0.48%	(0.14)	3,158	3,173	383	20,301
Sep-15	3,042	3,122	(80)	-2.55%	(0.76)	3,136	3,160	383	20,332
Oct-15	3,008	3,025	(16)	-0.54%	(0.16)	3,129	3,145	383	20,362
Nov-15	3,032	3,028	4	0.14%	0.04	3,121	3,147	383	20,393
Dec-15	3,109	3,078	31	1.02%	0.30	3,109	3,137	383	20,423
Jan-16	3,122	3,157	(35)	-1.10%	(0.33)	3,099	3,122	383	20,454
Feb-16	3,068	3,120	(53)	-1.69%	(0.50)	3,091	3,113	383	20,485
Mar-16	3,036	3,038	(1)	-0.04%	(0.01)	3,088	3,105	383	20,514
Apr-16	3,110	3,027	83	2.73%	0.79	3,090	3,103	383	20,545
May-16	3,009	3,000	9	0.30%	0.09	3,080	3,091	384	20,575
Jun-16	3,029	3,027	2	0.06%	0.02	3,069	3,079	384	20,606
Jul-16	3,070	3,046	25	0.82%	0.24	3,063	3,067	384	20,636
Aug-16	3,036	3,083	(47)	-1.53%	(0.45)	3,056	3,062	384	20,667

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Modeling Results
Liberty Utilities
Residential Non-Heating Sales Customers

Actual, Projected, Residual						Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	HH	DT
Sep-16	2,990	3,008	(18)	-0.61%	(0.18)	3,052	3,053	384	20,698
Oct-16	2,953	2,968	(15)	-0.51%	(0.14)	3,047	3,048	384	20,728
Nov-16	3,032	2,947	84	2.86%	0.80	3,047	3,042	384	20,759
Dec-16	3,090	3,071	18	0.60%	0.17	3,045	3,041	385	20,789
Jan-17	3,147	3,093	54	1.76%	0.52	3,047	3,036	385	20,820
Feb-17	3,068	3,127	(60)	-1.91%	(0.57)	3,047	3,036	385	20,851
Mar-17	3,050	2,986	63	2.12%	0.60	3,048	3,032	385	20,879
Apr-17	3,050	3,011	39	1.30%	0.37	3,043	3,031	386	20,910
May-17		3,022					3,032	386	20,940
Jun-17		2,983					3,029	386	20,971
Jul-17		2,949					3,021	387	21,001
Aug-17		2,929					3,008	387	21,032
Sep-17		2,922					3,001	387	21,063
Oct-17		2,926					2,997	387	21,093
Nov-17		2,932					2,996	388	21,124
Dec-17		2,938					2,985	388	21,154
Jan-18		2,938					2,972	388	21,185
Feb-18		2,933					2,956	389	21,216
Mar-18		2,926					2,951	389	21,244
Apr-18		2,917					2,943	389	21,275
May-18		2,909					2,934	389	21,305
Jun-18		2,902					2,927	390	21,336
Jul-18		2,897					2,923	390	21,366
Aug-18		2,893					2,920	390	21,397
Sep-18		2,888					2,917	390	21,428
Oct-18		2,883					2,913	391	21,458
Nov-18		2,878					2,909	391	21,489
Dec-18		2,872					2,903	391	21,519
Jan-19		2,865					2,897	391	21,550
Feb-19		2,858					2,891	392	21,581
Mar-19		2,852					2,885	392	21,609
Apr-19		2,845					2,879	392	21,640
May-19		2,839					2,873	392	21,670
Jun-19		2,833					2,867	393	21,701
Jul-19		2,827					2,861	393	21,731
Aug-19		2,821					2,855	393	21,762
Sep-19		2,814					2,849	393	21,793
Oct-19		2,808					2,843	394	21,823
Nov-19		2,801					2,836	394	21,854
Dec-19		2,795					2,830	394	21,884
Jan-20		2,789					2,824	394	21,915
Feb-20		2,782					2,817	395	21,946
Mar-20		2,776					2,811	395	21,975
Apr-20		2,769					2,804	395	22,006
May-20		2,762					2,798	395	22,036
Jun-20		2,755					2,792	395	22,067
Jul-20		2,748					2,785	396	22,097
Aug-20		2,741					2,778	396	22,128
Sep-20		2,733					2,772	396	22,159
Oct-20		2,726					2,765	396	22,189
Nov-20		2,718					2,758	397	22,220
Dec-20		2,711					2,751	397	22,250
Jan-21		2,703					2,744	397	22,281
Feb-21		2,695					2,737	397	22,312
Mar-21		2,689					2,729	397	22,340
Apr-21		2,681					2,722	398	22,371
May-21		2,674					2,715	398	22,401
Jun-21		2,666					2,707	398	22,432
Jul-21		2,659					2,700	398	22,462
Aug-21		2,652					2,692	398	22,493
Sep-21		2,645					2,685	399	22,524
Oct-21		2,638					2,678	399	22,554
Nov-21		2,631					2,670	399	22,585
Dec-21		2,625					2,663	399	22,615
Jan-22		2,618					2,656	399	22,646
Feb-22		2,611					2,649	400	22,677
Mar-22		2,605					2,642	400	22,705
Apr-22		2,599					2,635	400	22,736
May-22		2,592					2,628	400	22,766
Jun-22		2,586					2,622	401	22,797
Jul-22		2,580					2,615	401	22,827
Aug-22		2,573					2,608	401	22,858
Sep-22		2,567					2,602	401	22,889
Oct-22		2,560					2,595	402	22,919
Nov-22		2,554					2,589	402	22,950
Dec-22		2,548					2,583	402	22,980

Modeling Results
Liberty Utilities
Residential Non-Heating Sales Use per Customer

Dependent Variable: RNS_UPC
Method: AutoReg
Observations: 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
Intercept	1	18.62	3.15	5.92	0.00
BDD_1	1	0.02	0.00	5.12	0.00
NGPRCR_2	1	(0.42)	0.16	(2.60)	0.01
AR1	1	(0.90)	0.08	(11.44)	0.00
AR3	1	0.30	0.08	3.71	0.00
AR11	1	(0.17)	0.08	(2.21)	0.03

Model Fitness:

Regress R-Square	0.3597
Total R-Square	0.9533
SSE	286.80
MSE	3.82
SBC	361.42
MAE	1.46
MAPE	7.79
Durbin-Watson	2.25
Root MSE	1.96
AIC	347.05
AICC	348.19
HQC	352.82

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Modeling Results
Liberty Utilities
Residential Non-Heating Sales Use per Customer

Actual, Projected, Residual (Therms/ Customer)						Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	BDD_1	NGPRCR_2
Aug-10	9	12	(3)	-23.87%	(1.53)			19	16
Sep-10	11	9	2	21.28%	0.97			2	18
Oct-10	12	13	(0)	-1.41%	(0.09)			39	18
Nov-10	17	17	0	0.28%	0.02			261	18
Dec-10	24	23	1	3.96%	0.47			584	16
Jan-11	29	30	(1)	-3.57%	(0.56)			924	13
Feb-11	30	33	(3)	-9.23%	(1.58)			1,234	13
Mar-11	27	29	(2)	-7.15%	(1.07)			1,220	13
Apr-11	24	23	1	4.64%	0.55			1,006	13
May-11	19	20	(1)	-5.27%	(0.54)			710	13
Jun-11	14	14	(0)	-1.58%	(0.12)			364	14
Jul-11	12	12	1	5.23%	0.32	227	233	150	16
Aug-11	10	12	(2)	-19.09%	(1.22)	227	233	39	16
Sep-11	10	9	1	11.85%	0.58	227	234	1	19
Oct-11	12	12	(0)	-0.07%	(0.00)	227	233	37	19
Nov-11	19	17	2	9.26%	0.82	229	234	245	18
Dec-11	24	23	1	5.09%	0.60	229	234	500	17
Jan-12	31	28	4	13.04%	1.87	232	231	752	15
Feb-12	31	33	(2)	-6.08%	(1.05)	233	232	1,016	13
Mar-12	31	29	3	8.70%	1.31	238	232	1,013	13
Apr-12	23	25	(1)	-5.64%	(0.72)	237	234	784	13
May-12	20	18	2	11.03%	1.04	239	232	543	13
Jun-12	15	15	1	6.07%	0.46	240	232	294	15
Jul-12	11	14	(2)	-17.45%	(1.23)	239	234	116	14
Aug-12	10	10	0	0.97%	0.05	239	232	39	16
Sep-12	10	9	0	5.25%	0.26	238	232	-	18
Oct-12	13	12	1	9.93%	0.61	239	231	63	19
Nov-12	17	17	(1)	-4.42%	(0.40)	237	232	229	18
Dec-12	26	25	1	3.61%	0.47	239	234	564	14
Jan-13	34	31	3	8.21%	1.32	242	237	884	12
Feb-13	35	36	(1)	-1.78%	(0.33)	246	240	1,071	12
Mar-13	33	33	(0)	-0.78%	(0.14)	247	245	1,095	12
Apr-13	27	29	(1)	-3.74%	(0.56)	251	248	955	12
May-13	21	21	(1)	-3.54%	(0.39)	252	252	695	13
Jun-13	16	14	1	9.82%	0.73	252	251	355	13
Jul-13	12	12	(0)	-0.93%	(0.06)	253	250	125	14
Aug-13	10	10	(1)	-5.68%	(0.30)	252	250	20	16
Sep-13	11	9	2	16.40%	0.80	253	250	1	19
Oct-13	12	13	(1)	-4.53%	(0.30)	253	251	70	21
Nov-13	19	17	2	14.67%	1.27	255	250	260	20
Dec-13	30	26	4	14.93%	2.02	259	251	592	17
Jan-14	39	37	3	7.16%	1.37	265	257	979	14
Feb-14	40	41	(1)	-1.48%	(0.31)	269	262	1,226	15
Mar-14	35	36	(1)	-3.66%	(0.69)	271	265	1,217	14
Apr-14	33	28	5	17.58%	2.60	277	264	1,108	15
May-14	22	25	(3)	-10.97%	(1.43)	279	268	809	16
Jun-14	17	14	3	22.54%	1.65	281	268	377	16
Jul-14	11	11	(0)	-1.65%	(0.10)	280	268	120	17
Aug-14	10	11	(0)	-1.51%	(0.08)	281	268	13	16
Sep-14	10	9	1	8.15%	0.40	280	268	4	20
Oct-14	11	12	(1)	-8.32%	(0.52)	279	267	70	21
Nov-14	15	16	(1)	-7.70%	(0.64)	275	267	239	20
Dec-14	22	23	(1)	-5.81%	(0.70)	267	264	560	16
Jan-15	27	29	(1)	-4.11%	(0.61)	255	256	873	15
Feb-15	28	31	(3)	-9.67%	(1.57)	243	247	1,158	16
Mar-15	28	32	(4)	-11.85%	(1.94)	236	242	1,366	17
Apr-15	25	26	(1)	-3.20%	(0.43)	228	239	1,231	16
May-15	23	20	4	18.15%	1.86	229	234	799	15
Jun-15	12	17	(5)	-28.07%	(2.53)	224	237	328	15
Jul-15	13	11	2	17.28%	0.99	225	237	103	15
Aug-15	9	12	(2)	-20.08%	(1.23)	224	238	37	16
Sep-15	9	10	(0)	-4.98%	(0.25)	223	238	1	19
Oct-15	11	9	2	22.08%	1.01	223	235	29	22
Nov-15	16	15	1	7.07%	0.55	224	234	246	22
Dec-15	25	23	2	8.31%	0.98	227	233	509	17
Jan-16	28	28	0	1.69%	0.24	228	232	671	14
Feb-16	31	29	1	4.07%	0.62	230	230	932	15
Mar-16	31	30	2	5.63%	0.87	234	228	1,039	14
Apr-16	24	27	(4)	-13.09%	(1.84)	232	230	848	12
May-16	18	19	(1)	-4.01%	(0.39)	227	229	637	11
Jun-16	14	14	1	4.51%	0.32	229	225	383	12
Jul-16	11	11	1	5.07%	0.28	227	225	124	14
Aug-16	9	9	(0)	-5.01%	(0.25)	227	222	20	18
Sep-16	9	9	0	1.52%	0.07	226	221	4	22
Oct-16	11	10	1	10.54%	0.57	227	223	37	24

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Modeling Results
Liberty Utilities
Residential Non-Heating Sales Use per Customer

Actual, Projected, Residual (Therms/ Customer)						Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	BDD_1	NGPRCR_2
Nov-16	16	16	(0)	-0.76%	(0.06)	227	224	237	24
Dec-16	24	23	2	6.65%	0.79	227	224	524	19
Jan-17	31	31	0	1.11%	0.18	230	228	859	15
Feb-17	34	33	1	2.81%	0.49	233	231	1,057	14
Mar-17	26	30	(5)	-15.70%	(2.48)	228	232	957	13
Apr-17	24	23	0	1.79%	0.22	228	228	958	13
May-17		18					228	733	12
Jun-17		11					225	211	13
Jul-17		11					225	141	14
Aug-17		9					225	29	19
Sep-17		9					225	8	24
Oct-17		11					226	62	25
Nov-17		15					225	265	26
Dec-17		23					225	561	20
Jan-18		29					223	879	15
Feb-18		32					222	1,138	15
Mar-18		31					222	1,137	13
Apr-18		26					225	972	13
May-18		21					227	705	12
Jun-18		15					231	374	13
Jul-18		12					232	141	14
Aug-18		9					232	29	19
Sep-18		9					232	8	24
Oct-18		10					231	62	25
Nov-18		14					230	265	26
Dec-18		22					229	561	20
Jan-19		28					228	879	16
Feb-19		31					228	1,138	15
Mar-19		31					228	1,137	13
Apr-19		27					229	972	13
May-19		22					230	705	12
Jun-19		16					231	374	13
Jul-19		12					232	141	15
Aug-19		10					232	29	19
Sep-19		8					232	8	24
Oct-19		10					231	62	26
Nov-19		14					230	265	26
Dec-19		21					229	561	20
Jan-20		27					229	879	16
Feb-20		31					228	1,138	15
Mar-20		31					228	1,137	13
Apr-20		27					229	972	14
May-20		23					229	705	12
Jun-20		17					230	374	13
Jul-20		13					231	141	15
Aug-20		10					231	29	19
Sep-20		8					231	8	24
Oct-20		9					230	62	26
Nov-20		13					229	265	26
Dec-20		20					229	561	21
Jan-21		27					228	879	16
Feb-21		31					228	1,138	15
Mar-21		31					228	1,137	13
Apr-21		27					228	972	14
May-21		23					228	705	13
Jun-21		18					229	374	13
Jul-21		13					229	141	15
Aug-21		10					230	29	19
Sep-21		8					229	8	25
Oct-21		9					229	62	26
Nov-21		12					229	265	26
Dec-21		19					228	561	21
Jan-22		26					228	879	16
Feb-22		30					227	1,138	15
Mar-22		31					227	1,137	13
Apr-22		27					227	972	14
May-22		23					228	705	13
Jun-22		18					228	374	13
Jul-22		14					228	141	15
Aug-22		10					229	29	20
Sep-22		8					229	8	25
Oct-22		9					228	62	27
Nov-22		12					228	265	27
Dec-22		19					228	561	21

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Modeling Results
Liberty Utilities
Residential Non-Heating Sales Volumes

Actual, Projected, Residual (Therms)					Rolling 12-Month		Independent Variable			
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	BDD_1	EE	DT
Aug-10	38,982	51,723	(12,741)	-24.63%	(1.74)			19	367	18,475
Sep-10	42,716	34,941	7,775	22.25%	1.06			2	367	18,506
Oct-10	48,741	51,121	(2,380)	-4.65%	(0.32)			39	368	18,536
Nov-10	66,358	63,762	2,596	4.07%	0.35			261	368	18,567
Dec-10	97,415	91,915	5,500	5.98%	0.75			584	368	18,597
Jan-11	117,867	125,557	(7,690)	-6.12%	(1.05)			924	369	18,628
Feb-11	118,786	133,591	(14,804)	-11.08%	(2.02)			1,234	369	18,659
Mar-11	105,222	115,820	(10,597)	-9.15%	(1.45)			1,220	369	18,687
Apr-11	94,133	89,023	5,110	5.74%	0.70			1,006	370	18,718
May-11	73,287	77,716	(4,429)	-5.70%	(0.60)			710	370	18,748
Jun-11	55,791	51,314	4,477	8.73%	0.61			364	371	18,779
Jul-11	48,591	45,457	3,134	6.89%	0.43	907,890	931,938	150	371	18,809
Aug-11	39,262	49,019	(9,757)	-19.90%	(1.33)	908,170	929,234	39	371	18,840
Sep-11	40,587	35,996	4,591	12.75%	0.63	906,041	930,289	1	372	18,871
Oct-11	46,634	48,252	(1,618)	-3.35%	(0.22)	903,934	927,421	37	372	18,901
Nov-11	71,537	63,092	8,445	13.39%	1.15	909,113	926,751	245	372	18,932
Dec-11	94,740	88,434	6,306	7.13%	0.86	906,438	923,270	500	372	18,962
Jan-12	121,950	110,819	11,131	10.04%	1.52	910,521	908,532	752	373	18,993
Feb-12	121,031	131,547	(10,516)	-7.99%	(1.43)	912,765	906,488	1,016	373	19,024
Mar-12	119,276	112,140	7,136	6.36%	0.97	926,819	902,809	1,013	373	19,053
Apr-12	88,689	93,012	(4,323)	-4.65%	(0.59)	921,375	906,798	784	373	19,084
May-12	76,795	69,483	7,312	10.52%	1.00	924,883	898,565	543	373	19,114
Jun-12	58,156	49,632	8,524	17.17%	1.16	927,248	896,883	294	374	19,145
Jul-12	42,464	50,639	(8,175)	-16.14%	(1.12)	921,121	902,066	116	374	19,175
Aug-12	37,225	37,241	(16)	-0.04%	(0.00)	919,084	890,288	39	374	19,206
Sep-12	36,705	34,594	2,111	6.10%	0.29	915,202	888,887	-	374	19,237
Oct-12	47,056	44,262	2,794	6.31%	0.38	915,625	884,896	63	374	19,267
Nov-12	61,199	61,700	(501)	-0.81%	(0.07)	905,286	883,505	229	375	19,298
Dec-12	97,292	92,113	5,179	5.62%	0.71	907,839	887,184	564	375	19,328
Jan-13	126,722	120,289	6,433	5.35%	0.88	912,611	896,654	884	375	19,359
Feb-13	129,556	134,655	(5,099)	-3.79%	(0.70)	921,136	899,762	1,071	375	19,390
Mar-13	118,619	122,186	(3,567)	-2.92%	(0.49)	920,479	909,807	1,095	376	19,418
Apr-13	99,945	102,750	(2,804)	-2.73%	(0.38)	931,735	919,545	955	376	19,449
May-13	75,653	78,792	(3,139)	-3.98%	(0.43)	930,593	928,854	695	376	19,479
Jun-13	57,627	47,502	10,125	21.32%	1.38	930,064	926,724	355	376	19,510
Jul-13	42,837	42,568	269	0.63%	0.04	930,437	918,653	125	377	19,540
Aug-13	36,279	38,853	(2,574)	-6.62%	(0.35)	929,491	920,264	20	377	19,571
Sep-13	39,952	34,049	5,903	17.34%	0.81	932,738	919,719	1	377	19,602
Oct-13	44,028	47,687	(3,659)	-7.67%	(0.50)	929,710	923,144	70	378	19,632
Nov-13	68,739	57,761	10,977	19.00%	1.50	937,250	919,205	260	378	19,663
Dec-13	112,422	95,955	16,467	17.16%	2.25	952,380	923,047	592	378	19,693
Jan-14	148,186	142,046	6,140	4.32%	0.84	973,844	944,804	979	379	19,724
Feb-14	144,349	149,571	(5,222)	-3.49%	(0.71)	988,637	959,720	1,226	379	19,755
Mar-14	125,973	133,641	(7,668)	-5.74%	(1.05)	995,990	971,175	1,217	379	19,783
Apr-14	122,267	102,903	19,364	18.82%	2.64	1,018,312	971,328	1,108	380	19,814
May-14	84,225	95,040	(10,815)	-11.38%	(1.48)	1,026,884	987,576	809	380	19,844
Jun-14	62,632	46,267	16,365	35.37%	2.23	1,031,889	986,341	377	381	19,875
Jul-14	40,827	40,868	(42)	-0.10%	(0.01)	1,029,879	984,641	120	381	19,905
Aug-14	36,174	37,100	(926)	-2.50%	(0.13)	1,029,774	982,888	13	381	19,936
Sep-14	33,585	30,807	2,778	9.02%	0.38	1,023,407	979,647	4	381	19,967
Oct-14	34,331	38,719	(4,389)	-11.33%	(0.60)	1,013,710	970,679	70	382	19,997
Nov-14	46,238	48,269	(2,032)	-4.21%	(0.28)	991,209	961,187	239	382	20,028
Dec-14	71,408	74,367	(2,959)	-3.98%	(0.40)	950,195	939,599	560	382	20,058
Jan-15	88,690	95,012	(6,322)	-6.65%	(0.86)	890,698	892,565	873	382	20,089
Feb-15	89,077	100,671	(11,595)	-11.52%	(1.58)	835,426	843,666	1,158	382	20,120
Mar-15	85,236	98,821	(13,586)	-13.75%	(1.85)	794,689	808,846	1,366	382	20,148
Apr-15	77,249	78,976	(1,727)	-2.19%	(0.24)	749,671	784,918	1,231	383	20,179
May-15	72,644	61,766	10,878	17.61%	1.48	738,090	751,644	799	383	20,209
Jun-15	39,339	54,886	(15,547)	-28.33%	(2.12)	714,797	760,264	328	383	20,240
Jul-15	40,584	35,122	5,462	15.55%	0.75	714,554	754,518	103	383	20,270
Aug-15	29,513	37,106	(7,593)	-20.46%	(1.04)	707,893	754,524	37	383	20,301
Sep-15	27,802	30,026	(2,224)	-7.41%	(0.30)	702,110	753,743	1	383	20,332
Oct-15	32,408	26,691	5,717	21.42%	0.78	700,187	741,715	29	383	20,362
Nov-15	48,904	45,613	3,292	7.22%	0.45	702,853	739,058	246	383	20,393
Dec-15	76,286	69,727	6,559	9.41%	0.89	707,732	734,419	509	383	20,423
Jan-16	87,393	86,904	490	0.56%	0.07	706,435	726,310	671	383	20,454
Feb-16	93,910	91,785	2,125	2.31%	0.29	711,268	717,424	932	383	20,485
Mar-16	95,154	90,122	5,032	5.58%	0.69	721,187	708,725	1,039	383	20,514
Apr-16	73,103	81,874	(8,771)	-10.71%	(1.20)	717,041	711,623	848	383	20,545
May-16	54,684	56,801	(2,116)	-3.73%	(0.29)	699,081	706,658	637	384	20,575
Jun-16	43,291	41,398	1,894	4.58%	0.26	703,034	693,169	383	384	20,606
Jul-16	33,890	31,993	1,897	5.93%	0.26	696,339	690,040	124	384	20,636
Aug-16	27,217	29,098	(1,881)	-6.46%	(0.26)	694,043	682,031	20	384	20,667
Sep-16	26,474	26,238	236	0.90%	0.03	692,715	678,243	4	384	20,698
Oct-16	33,960	30,880	3,080	9.97%	0.42	694,267	682,432	37	384	20,728
Nov-16	48,105	47,125	980	2.08%	0.13	693,468	683,944	237	384	20,759
Dec-16	75,653	70,516	5,137	7.28%	0.70	692,834	684,733	524	385	20,789
Jan-17	98,019	95,270	2,749	2.89%	0.38	703,460	693,100	859	385	20,820
Feb-17	105,052	104,172	879	0.84%	0.12	714,602	705,487	1,057	385	20,851
Mar-17	77,997	90,604	(12,607)	-13.91%	(1.72)	697,444	705,968	957	385	20,879
Apr-17	71,748	69,584	2,164	3.11%	0.30	696,090	693,679	958	386	20,910
May-17		55,884					692,762	733	386	20,940
Jun-17		32,744					684,109	211	386	20,971
Jul-17		31,037					683,152	141	387	21,001

Modeling Results
Liberty Utilities
Residential Non-Heating Sales Volumes

<u>Actual, Projected, Residual (Therms)</u>					<u>Rolling 12-Month</u>		<u>Independent Variable</u>			
<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard Residual</u>	<u>Actual_R12</u>	<u>Projected_R12</u>	<u>BDD_1</u>	<u>EE</u>	<u>DT</u>
Aug-17		26,866					680,920	29	387	21,032
Sep-17		26,328					681,010	8	387	21,063
Oct-17		32,139					682,269	62	387	21,093
Nov-17		45,227					680,371	265	388	21,124
Dec-17		66,687					676,542	561	388	21,154
Jan-18		86,305					667,577	879	388	21,185
Feb-18		93,548					656,952	1,138	389	21,216
Mar-18		89,322					655,671	1,137	389	21,244
Apr-18		74,935					661,021	972	389	21,275
May-18		60,251					665,388	705	389	21,305
Jun-18		43,880					676,524	374	390	21,336
Jul-18		33,401					678,888	141	390	21,366
Aug-18		27,202					679,225	29	390	21,397
Sep-18		25,064					677,961	8	390	21,428
Oct-18		29,838					675,660	62	391	21,458
Nov-18		41,647					672,080	265	391	21,489
Dec-18		62,200					667,592	561	391	21,519
Jan-19		80,472					661,759	879	391	21,550
Feb-19		89,688					657,899	1,138	392	21,581
Mar-19		87,376					655,953	1,137	392	21,609
Apr-19		75,707					656,725	972	392	21,640
May-19		62,374					658,848	705	392	21,670
Jun-19		46,348					661,316	374	393	21,701
Jul-19		34,986					662,902	141	393	21,731
Aug-19		27,326					663,025	29	393	21,762
Sep-19		23,642					661,604	8	393	21,793
Oct-19		27,077					658,843	62	394	21,823
Nov-19		37,915					655,111	265	394	21,854
Dec-19		57,744					650,656	561	394	21,884
Jan-20		76,087					646,271	879	394	21,915
Feb-20		86,030					642,613	1,138	395	21,946
Mar-20		85,096					640,333	1,137	395	21,975
Apr-20		74,913					639,539	972	395	22,006
May-20		62,716					639,881	705	395	22,036
Jun-20		47,231					640,763	374	395	22,067
Jul-20		35,652					641,428	141	396	22,097
Aug-20		27,210					641,313	29	396	22,128
Sep-20		22,492					640,163	8	396	22,159
Oct-20		24,885					637,971	62	396	22,189
Nov-20		34,806					634,861	265	397	22,220
Dec-20		53,969					631,086	561	397	22,250
Jan-21		72,100					627,100	879	397	22,281
Feb-21		82,375					623,444	1,138	397	22,312
Mar-21		82,349					620,698	1,137	397	22,340
Apr-21		73,233					619,018	972	398	22,371
May-21		61,940					618,242	705	398	22,401
Jun-21		47,080					618,092	374	398	22,432
Jul-21		35,602					618,042	141	398	22,462
Aug-21		26,834					617,666	29	398	22,493
Sep-21		21,530					616,703	8	399	22,524
Oct-21		23,191					615,009	62	399	22,554
Nov-21		32,366					612,569	265	399	22,585
Dec-21		50,850					609,451	561	399	22,615
Jan-22		68,651					606,002	879	399	22,646
Feb-22		79,057					602,684	1,138	400	22,677
Mar-22		79,659					599,994	1,137	400	22,705
Apr-22		71,372					598,133	972	400	22,736
May-22		60,823					597,016	705	400	22,766
Jun-22		46,554					596,490	374	401	22,797
Jul-22		35,286					596,174	141	401	22,827
Aug-22		26,413					595,754	29	401	22,858
Sep-22		20,783					595,007	8	401	22,889
Oct-22		21,951					593,767	62	402	22,919
Nov-22		30,546					591,947	265	402	22,950
Dec-22		48,412					589,508	561	402	22,980

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Modeling Results
Liberty Utilities
Residential Non-Heating Sales Volumes

Actual, Projected, Residual (Therms)						Rolling 12-Month		Independent Variable			
	<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard Residual</u>	<u>Actual R12</u>	<u>Projected R12</u>	<u>BDD_1</u>	<u>EE</u>	<u>DT</u>
Plan Year	Actual		Projected						BDD_1	EE	DT
PY2011		903,934		927,421					6,527	4,439	224,804
PY2012		915,625		884,896					5,362	4,480	229,192
PY2013		929,710		923,144					6,060	4,512	233,576
PY2014		1,013,710		970,679					6,772	4,559	237,956
PY2015		700,187		741,715					6,720	4,591	242,336
PY2016		694,267		682,432					5,447	4,603	246,724
PY2017				682,269					5,776	4,630	251,108
PY2018				675,660					6,272	4,671	255,488
PY2019				658,843					6,272	4,707	259,868
PY2020				637,971					6,272	4,741	264,256
PY2021				615,009					6,272	4,772	268,640
PY2022				593,767					6,272	4,804	273,020
Growth											
PY2012		11,690		(42,524)					(1,165)	40	4,388
PY2013		14,086		38,248					698	32	4,384
PY2014		84,000		47,534					712	47	4,380
PY2015		(313,523)		(228,964)					(52)	32	4,380
PY2016		(5,920)		(59,283)					(1,273)	12	4,388
PY2017				(164)					329	28	4,384
PY2018				(6,609)					497	40	4,380
PY2019				(16,817)					-	37	4,380
PY2020				(20,871)					-	34	4,388
PY2021				(22,962)					-	30	4,384
PY2022				(21,242)					-	32	4,380
Growth Rate (%)											
PY2012		1.3%		-4.6%					-17.8%	0.9%	2.0%
PY2013		1.5%		4.3%					13.0%	0.7%	1.9%
PY2014		9.0%		5.1%					11.7%	1.0%	1.9%
PY2015		-30.9%		-23.6%					-0.8%	0.7%	1.8%
PY2016		-0.8%		-8.0%					-18.9%	0.3%	1.8%
PY2017				0.0%					6.0%	0.6%	1.8%
PY2018				-1.0%					8.6%	0.9%	1.7%
PY2019				-2.5%					0.0%	0.8%	1.7%
PY2020				-3.2%					0.0%	0.7%	1.7%
PY2021				-3.6%					0.0%	0.6%	1.7%
PY2022				-3.5%					0.0%	0.7%	1.6%

Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Customers

Dependent Variable: CHF_CUS
Method: AutoReg
Observations: 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
Intercept	1	(2306.66)	873.17	(2.64)	0.01
EE	1	14.23	5.89	2.41	0.02
DT	1	0.25	0.10	2.37	0.02
dm1	1	820.51	83.17	9.87	0.00
dm2	1	617.82	72.18	8.56	0.00
dm3	1	291.50	66.94	4.35	0.00
dm4	1	429.83	72.14	5.96	0.00
dm5	1	660.62	82.63	7.99	0.00
dm6	1	503.83	81.42	6.19	0.00
dm12	1	462.04	77.40	5.97	0.00
AR1	1	(0.54)	0.09	(5.77)	0.00
AR3	1	0.50	0.09	5.48	0.00
AR4	1	(0.34)	0.09	(4.01)	0.00
AR6	1	0.63	0.08	7.64	0.00
AR7	1	(0.60)	0.09	(6.54)	0.00
AR9	1	0.31	0.10	3.05	0.00

<u>Model Fitness:</u>	
Regress R-Square	0.9092
Total R-Square	0.9399
SSE	1240575.29
MSE	17230.21
SBC	1167.78
MAE	85.83
MAPE	0.90
Durbin-Watson	1.83
Root MSE	131.26
AIC	1128.14
AICC	1135.80
HQC	1144.11

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Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Customers

Actual, Projected, Residual					Rolling 12-Month			Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	EE	DT
Aug-10	8,968	8,855	114	1.29%	0.95			454.0725	18,475
Sep-10	8,716	8,776	(60)	-0.68%	(0.50)			454.3101	18,506
Oct-10	8,693	8,685	8	0.09%	0.07			454.5329	18,536
Nov-10	8,886	8,820	66	0.75%	0.55			454.7449	18,567
Dec-10	9,216	9,231	(15)	-0.16%	(0.12)			454.95	18,597
Jan-11	9,329	9,357	(27)	-0.29%	(0.23)			455.1553	18,628
Feb-11	9,265	9,304	(40)	-0.43%	(0.33)			455.3514	18,659
Mar-11	9,244	9,259	(16)	-0.17%	(0.13)			455.5521	18,687
Apr-11	9,317	9,368	(51)	-0.54%	(0.42)			455.7678	18,718
May-11	9,261	9,297	(36)	-0.38%	(0.30)			455.9959	18,748
Jun-11	9,163	9,166	(3)	-0.04%	(0.03)			456.2403	18,777
Jul-11	9,055	8,924	131	1.46%	1.09	9,093	9,087	456.5047	18,809
Aug-11	8,995	8,977	18	0.20%	0.15	9,095	9,097	456.7951	18,840
Sep-11	8,858	8,758	100	1.14%	0.83	9,107	9,096	457.1006	18,871
Oct-11	8,827	8,818	9	0.10%	0.08	9,118	9,107	457.4243	18,901
Nov-11	9,044	9,078	(35)	-0.38%	(0.29)	9,131	9,128	457.7641	18,932
Dec-11	9,348	9,414	(66)	-0.70%	(0.55)	9,142	9,143	458.1186	18,962
Jan-12	9,423	9,472	(49)	-0.51%	(0.41)	9,150	9,153	458.4919	18,993
Feb-12	9,481	9,372	109	1.17%	0.91	9,168	9,159	458.8639	19,024
Mar-12	9,413	9,384	29	0.31%	0.24	9,182	9,169	459.2452	19,053
Apr-12	9,542	9,578	(36)	-0.38%	(0.30)	9,201	9,187	459.6402	19,084
May-12	9,483	9,452	31	0.33%	0.26	9,219	9,199	460.0412	19,114
Jun-12	9,297	9,383	(86)	-0.92%	(0.72)	9,230	9,217	460.4463	19,145
Jul-12	9,266	9,063	203	2.24%	1.69	9,248	9,229	460.854	19,175
Aug-12	9,074	9,071	3	0.03%	0.02	9,255	9,237	461.2698	19,206
Sep-12	8,980	8,936	44	0.49%	0.37	9,265	9,252	461.6802	19,237
Oct-12	8,775	8,901	(126)	-1.41%	(1.05)	9,260	9,259	462.0917	19,267
Nov-12	9,058	9,157	(99)	-1.08%	(0.82)	9,262	9,265	462.504	19,298
Dec-12	9,539	9,532	7	0.07%	0.06	9,278	9,275	462.9171	19,328
Jan-13	9,786	9,669	118	1.22%	0.98	9,308	9,291	463.3374	19,359
Feb-13	9,659	9,703	(44)	-0.45%	(0.36)	9,323	9,319	463.7376	19,390
Mar-13	9,473	9,469	4	0.04%	0.03	9,328	9,326	464.1381	19,418
Apr-13	9,549	9,687	(138)	-1.42%	(1.15)	9,328	9,335	464.552	19,449
May-13	9,578	9,578	(1)	-0.01%	(0.01)	9,336	9,346	464.9657	19,479
Jun-13	9,443	9,466	(24)	-0.25%	(0.20)	9,348	9,353	465.379	19,510
Jul-13	9,343	9,210	132	1.44%	1.10	9,355	9,365	465.7918	19,540
Aug-13	9,321	9,322	(0)	0.00%	(0.00)	9,375	9,386	466.2127	19,571
Sep-13	9,112	9,193	(81)	-0.88%	(0.67)	9,386	9,407	466.6319	19,602
Oct-13	9,004	9,057	(52)	-0.57%	(0.43)	9,405	9,420	467.0602	19,632
Nov-13	9,192	9,228	(36)	-0.39%	(0.30)	9,417	9,426	467.5012	19,663
Dec-13	9,690	9,723	(34)	-0.35%	(0.28)	9,429	9,442	467.9591	19,693
Jan-14	9,742	9,872	(130)	-1.32%	(1.08)	9,426	9,459	468.4458	19,724
Feb-14	9,403	9,705	(302)	-3.12%	(2.52)	9,404	9,459	468.9322	19,755
Mar-14	9,562	9,477	84	0.89%	0.70	9,412	9,460	469.4458	19,783
Apr-14	9,891	9,877	14	0.14%	0.12	9,440	9,476	470.0082	19,814
May-14	10,174	10,012	162	1.62%	1.35	9,490	9,512	470.6069	19,844
Jun-14	9,793	9,766	27	0.28%	0.22	9,519	9,537	471.2455	19,875
Jul-14	9,617	9,475	142	1.50%	1.19	9,542	9,559	471.928	19,905
Aug-14	9,113	9,553	(441)	-4.61%	(3.67)	9,524	9,578	472.6654	19,936
Sep-14	8,780	9,025	(244)	-2.71%	(2.03)	9,497	9,564	473.4286	19,967
Oct-14	8,962	8,886	76	0.86%	0.63	9,493	9,550	474.2234	19,997
Nov-14	9,319	9,488	(169)	-1.78%	(1.41)	9,504	9,572	475.0437	20,028
Dec-14	10,283	10,179	104	1.02%	0.87	9,553	9,610	475.8838	20,058
Jan-15	10,117	10,224	(107)	-1.05%	(0.89)	9,585	9,639	476.7517	20,089
Feb-15	10,523	10,138	384	3.79%	3.20	9,678	9,675	477.5851	20,120
Mar-15	10,083	10,009	73	0.73%	0.61	9,721	9,719	478.4205	20,148
Apr-15	10,253	10,122	131	1.30%	1.09	9,751	9,740	479.2807	20,179
May-15	10,086	9,945	142	1.43%	1.18	9,744	9,734	480.1312	20,209
Jun-15	10,092	9,853	239	2.42%	1.99	9,769	9,741	480.9664	20,240
Jul-15	9,905	9,978	(74)	-0.74%	(0.61)	9,793	9,783	481.7804	20,270
Aug-15	9,756	9,568	188	1.96%	1.56	9,847	9,785	482.5852	20,301
Sep-15	9,513	9,572	(59)	-0.61%	(0.49)	9,908	9,830	483.3581	20,332
Oct-15	9,444	9,428	16	0.17%	0.14	9,948	9,875	484.1163	20,362
Nov-15	9,665	9,675	(10)	-0.11%	(0.09)	9,977	9,891	484.8638	20,393
Dec-15	10,182	10,037	145	1.45%	1.21	9,968	9,879	485.6044	20,423
Jan-16	10,365	10,281	84	0.82%	0.70	9,989	9,884	486.3543	20,454
Feb-16	10,237	10,274	(37)	-0.36%	(0.31)	9,965	9,895	487.0812	20,485
Mar-16	10,073	10,067	6	0.06%	0.05	9,964	9,900	487.813	20,514
Apr-16	10,216	10,219	(3)	-0.03%	(0.02)	9,961	9,908	488.5659	20,545
May-16	10,315	10,237	78	0.76%	0.65	9,980	9,932	489.3319	20,575
Jun-16	10,274	10,142	132	1.30%	1.10	9,995	9,957	490.1147	20,606
Jul-16	9,975	9,939	37	0.37%	0.31	10,001	9,953	490.9181	20,636
Aug-16	9,760	9,915	(155)	-1.56%	(1.29)	10,002	9,982	491.7548	20,667
Sep-16	9,632	9,638	(6)	-0.06%	(0.05)	10,012	9,988	492.5926	20,698
Oct-16	9,632	9,673	(42)	-0.43%	(0.35)	10,027	10,008	493.439	20,728
Nov-16	10,029	9,932	97	0.98%	0.81	10,058	10,030	494.2882	20,759
Dec-16	10,222	10,416	(194)	-1.86%	(1.61)	10,061	10,061	495.1344	20,789
Jan-17	10,341	10,541	(199)	-1.89%	(1.66)	10,059	10,083	495.9856	20,820

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Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Customers

<u>Actual, Projected, Residual</u>						<u>Rolling 12-Month</u>		<u>Independent Variable</u>	
<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard Residual</u>	<u>Actual R12</u>	<u>Projected R12</u>	<u>EE</u>	<u>DT</u>
Feb-17	10,278	10,329	(50)	-0.49%	(0.42)	10,062	10,087	496.7819	20,851
Mar-17	10,267	10,281	(14)	-0.14%	(0.12)	10,078	10,105	497.559	20,879
Apr-17	10,464	10,496	(32)	-0.31%	(0.27)	10,099	10,128	498.3373	20,910
May-17		10,439					10,145	499.0839	20,940
Jun-17		10,500					10,175	499.7935	20,971
Jul-17		10,200					10,197	500.4602	21,001
Aug-17		10,120					10,214	501.0935	21,032
Sep-17		9,863					10,232	501.6772	21,063
Oct-17		9,939					10,255	502.2265	21,093
Nov-17		10,259					10,282	502.7464	21,124
Dec-17		10,621					10,299	503.2414	21,154
Jan-18		10,799					10,320	503.7243	21,185
Feb-18		10,630					10,346	504.1693	21,216
Mar-18		10,542					10,367	504.6044	21,244
Apr-18		10,616					10,377	505.0487	21,275
May-18		10,614					10,392	505.4919	21,305
Jun-18		10,570					10,398	505.939	21,336
Jul-18		10,287					10,405	506.3943	21,366
Aug-18		10,286					10,419	506.8672	21,397
Sep-18		10,063					10,436	507.3406	21,428
Oct-18		10,124					10,451	507.82	21,458
Nov-18		10,345					10,458	508.3031	21,489
Dec-18		10,766					10,470	508.788	21,519
Jan-19		10,958					10,484	509.2804	21,550
Feb-19		10,794					10,497	509.7466	21,581
Mar-19		10,703					10,511	510.2084	21,609
Apr-19		10,812					10,527	510.6794	21,640
May-19		10,861					10,548	511.1416	21,670
Jun-19		10,742					10,562	511.5931	21,701
Jul-19		10,429					10,574	512.0315	21,731
Aug-19		10,434					10,586	512.4615	21,762
Sep-19		10,255					10,602	512.8669	21,793
Oct-19		10,300					10,617	513.252	21,823
Nov-19		10,485					10,628	513.6146	21,854
Dec-19		10,945					10,643	513.9521	21,884
Jan-20		11,142					10,658	514.2671	21,915
Feb-20		10,954					10,672	514.5427	21,946
Mar-20		10,814					10,681	514.7867	21,975
Apr-20		10,951					10,693	515.0006	22,006
May-20		11,037					10,707	515.1772	22,036
Jun-20		10,890					10,720	515.3144	22,067
Jul-20		10,554					10,730	515.4097	22,097
Aug-20		10,562					10,741	515.4672	22,128
Sep-20		10,411					10,754	515.4934	22,159
Oct-20		10,421					10,764	515.4979	22,189
Nov-20		10,573					10,771	515.4899	22,220
Dec-20		11,053					10,780	515.4779	22,250
Jan-21		11,273					10,791	515.4706	22,281
Feb-21		11,070					10,801	515.4766	22,312
Mar-21		10,891					10,807	515.5038	22,340
Apr-21		11,045					10,815	515.5618	22,371
May-21		11,152					10,825	515.6595	22,401
Jun-21		10,990					10,833	515.8052	22,432
Jul-21		10,630					10,839	516.0077	22,462
Aug-21		10,656					10,847	516.2734	22,493
Sep-21		10,541					10,858	516.5894	22,524
Oct-21		10,538					10,868	516.9547	22,554
Nov-21		10,672					10,876	517.3638	22,585
Dec-21		11,168					10,885	517.8119	22,615
Jan-22		11,420					10,898	518.3018	22,646
Feb-22		11,214					10,910	518.7953	22,677
Mar-22		11,016					10,920	519.3112	22,705
Apr-22		11,192					10,932	519.8627	22,736
May-22		11,328					10,947	520.4278	22,766
Jun-22		11,162					10,961	521.0014	22,797
Jul-22		10,782					10,974	521.5783	22,827
Aug-22		10,822					10,988	522.164	22,858
Sep-22		10,735					11,004	522.7362	22,889
Oct-22		10,724					11,019	523.3013	22,919
Nov-22		10,840					11,033	523.8564	22,950
Dec-22		11,344					11,048	524.3983	22,980

Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Use per Customer

Dependent Variable: CHF_UPC
Method: AutoReg
Observations: 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
Intercept	1	91.12	19.70	4.63	0.00
BDD_1	1	0.75	0.03	29.24	0.00
dm1	1	227.57	23.50	9.69	0.00
dm2	1	93.04	20.50	4.54	0.00
dm4	1	(125.77)	19.63	(6.41)	0.00
dm5	1	(183.87)	22.91	(8.03)	0.00
dm6	1	(106.25)	20.35	(5.22)	0.00
dm11	1	57.73	19.37	2.98	0.00
dm12	1	149.27	22.92	6.51	0.00
AR1	1	(0.62)	0.10	(6.54)	0.00

Model Fitness:

Regress R-Square	0.9482
Total R-Square	0.9823
SSE	176,792.01
MSE	2,490.03
SBC	897.06
MAE	36.29
MAPE	11.78
Durbin-Watson	2.25
Root MSE	49.90
AIC	873.11
AICC	876.26
HQC	882.72

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Modeling Results

Liberty Utilities

Commercial and Industrial Heating Sales and Transportation Use per Customer

Actual, Projected, Residual (Therms/ Customer)						Rolling 12-Month		Independent Variable
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	BDD_1
Aug-10	86	105	(19)	-18.08%	(0.40)			19
Sep-10	97	80	17	21.00%	0.36			2
Oct-10	133	123	10	7.93%	0.21			39
Nov-10	334	352	(17)	-4.94%	(0.37)			261
Dec-10	610	671	(62)	-9.19%	(1.31)			584
Jan-11	958	967	(10)	-0.99%	(0.20)			924
Feb-11	1,054	1,075	(21)	-1.95%	(0.44)			1,234
Mar-11	947	970	(23)	-2.39%	(0.49)			1,220
Apr-11	729	682	47	6.84%	0.99			1,006
May-11	379	445	(66)	-14.83%	(1.40)			710
Jun-11	184	220	(36)	-16.29%	(0.76)			364
Jul-11	120	158	(37)	-23.68%	(0.79)	5,631	5,848	150
Aug-11	88	68	19	28.45%	0.41	5,632	5,811	39
Sep-11	106	72	35	48.21%	0.74	5,641	5,803	1
Oct-11	122	128	(6)	-4.71%	(0.13)	5,630	5,807	37
Nov-11	361	334	28	8.25%	0.59	5,657	5,789	245
Dec-11	608	633	(25)	-3.91%	(0.53)	5,655	5,751	500
Jan-12	941	877	64	7.30%	1.36	5,638	5,660	752
Feb-12	978	981	(3)	-0.32%	(0.07)	5,563	5,567	1,016
Mar-12	964	870	95	10.88%	2.01	5,580	5,466	1,013
Apr-12	609	624	(15)	-2.33%	(0.31)	5,461	5,408	784
May-12	392	349	43	12.20%	0.91	5,473	5,312	543
Jun-12	215	253	(39)	-15.27%	(0.82)	5,504	5,345	294
Jul-12	113	184	(71)	-38.72%	(1.52)	5,496	5,372	116
Aug-12	94	80	15	18.42%	0.31	5,503	5,384	39
Sep-12	104	75	29	38.83%	0.62	5,501	5,387	-
Oct-12	159	146	13	9.02%	0.28	5,538	5,405	63
Nov-12	297	333	(36)	-10.83%	(0.77)	5,474	5,405	229
Dec-12	684	648	36	5.58%	0.77	5,550	5,420	564
Jan-13	931	993	(62)	-6.24%	(1.32)	5,540	5,535	884
Feb-13	1,077	954	122	12.82%	2.60	5,639	5,509	1,071
Mar-13	920	967	(47)	-4.85%	(1.00)	5,595	5,606	1,095
Apr-13	703	686	17	2.45%	0.36	5,688	5,668	955
May-13	379	441	(63)	-14.23%	(1.34)	5,675	5,761	695
Jun-13	194	220	(26)	-11.82%	(0.55)	5,654	5,727	355
Jul-13	113	149	(36)	-24.00%	(0.76)	5,655	5,692	125
Aug-13	94	62	32	51.65%	0.68	5,654	5,674	20
Sep-13	98	84	14	16.09%	0.29	5,648	5,684	1
Oct-13	150	147	3	2.26%	0.07	5,639	5,684	70
Nov-13	319	348	(28)	-8.18%	(0.60)	5,661	5,699	260
Dec-13	681	668	13	1.92%	0.27	5,658	5,719	592
Jan-14	1,012	1,049	(37)	-3.53%	(0.79)	5,739	5,775	979
Feb-14	1,020	1,076	(56)	-5.24%	(1.20)	5,683	5,898	1,226
Mar-14	896	950	(54)	-5.70%	(1.15)	5,659	5,881	1,217
Apr-14	774	729	45	6.19%	0.96	5,730	5,924	1,108
May-14	464	500	(36)	-7.19%	(0.76)	5,815	5,982	809
Jun-14	250	237	14	5.76%	0.29	5,871	5,998	377
Jul-14	154	170	(16)	-9.64%	(0.35)	5,911	6,019	120
Aug-14	153	84	69	82.14%	1.46	5,970	6,041	13
Sep-14	146	126	20	15.73%	0.42	6,018	6,083	4
Oct-14	150	176	(26)	-14.66%	(0.55)	6,019	6,113	70
Nov-14	338	331	6	1.89%	0.13	6,037	6,096	239
Dec-14	624	665	(41)	-6.14%	(0.87)	5,981	6,094	560
Jan-15	957	950	7	0.70%	0.14	5,925	5,995	873
Feb-15	893	1,040	(148)	-14.18%	(3.14)	5,798	5,959	1,158
Mar-15	1,048	1,014	34	3.35%	0.72	5,950	6,022	1,366
Apr-15	690	846	(156)	-18.42%	(3.31)	5,866	6,140	1,231
May-15	448	382	66	17.21%	1.40	5,851	6,022	799
Jun-15	232	195	37	19.23%	0.80	5,832	5,980	328
Jul-15	153	170	(16)	-9.51%	(0.34)	5,832	5,980	103
Aug-15	118	110	9	8.02%	0.19	5,798	6,006	37
Sep-15	101	91	10	11.18%	0.22	5,753	5,971	1
Oct-15	135	119	16	13.74%	0.35	5,738	5,913	29
Nov-15	372	346	26	7.48%	0.55	5,773	5,928	246
Dec-15	716	646	71	10.94%	1.50	5,864	5,908	509
Jan-16	905	880	25	2.86%	0.53	5,813	5,838	671
Feb-16	1,026	934	93	9.91%	1.97	5,946	5,732	932
Mar-16	994	958	36	3.72%	0.76	5,892	5,676	1,039
Apr-16	673	678	(5)	-0.75%	(0.11)	5,875	5,508	848
May-16	407	429	(22)	-5.09%	(0.46)	5,835	5,555	637
Jun-16	210	286	(76)	-26.62%	(1.62)	5,813	5,647	383
Jul-16	121	146	(24)	-16.75%	(0.52)	5,781	5,623	124
Aug-16	95	67	28	42.10%	0.60	5,757	5,580	20
Sep-16	83	87	(5)	-5.48%	(0.10)	5,739	5,577	4
Oct-16	135	111	24	21.38%	0.51	5,739	5,569	37
Nov-16	369	336	32	9.54%	0.68	5,735	5,559	237
Dec-16	682	659	24	3.61%	0.51	5,701	5,572	524
Jan-17	1,031	992	39	3.89%	0.82	5,827	5,684	859

Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Use per Customer

<u>Actual, Projected, Residual (Therms/ Customer)</u>						<u>Rolling 12-Month</u>		<u>Independent Variable</u>
<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard Residual</u>	<u>Actual R12</u>	<u>Projected R12</u>	<u>BDD_1</u>
Feb-17	1,072	1,018	54	5.35%	1.16	5,872	5,768	1,057
Mar-17	894	868	26	3.02%	0.56	5,772	5,677	957
Apr-17	754	736	18	2.47%	0.39	5,853	5,735	958
May-17		501					5,806	733
Jun-17		171					5,691	211
Jul-17		215					5,760	141
Aug-17		124					5,817	29
Sep-17		104					5,834	8
Oct-17		142					5,865	62
Nov-17		350					5,878	265
Dec-17		661					5,880	561
Jan-18		977					5,866	879
Feb-18		1,035					5,883	1,138
Mar-18		942					5,957	1,137
Apr-18		693					5,914	972
May-18		435					5,848	705
Jun-18		265					5,942	374
Jul-18		197					5,924	141
Aug-18		113					5,913	29
Sep-18		97					5,906	8
Oct-18		138					5,902	62
Nov-18		347					5,899	265
Dec-18		660					5,897	561
Jan-19		976					5,896	879
Feb-19		1,035					5,896	1,138
Mar-19		941					5,895	1,137
Apr-19		692					5,895	972
May-19		434					5,895	705
Jun-19		264					5,895	374
Jul-19		197					5,895	141
Aug-19		113					5,895	29
Sep-19		97					5,895	8
Oct-19		138					5,895	62
Nov-19		347					5,895	265
Dec-19		660					5,895	561
Jan-20		976					5,895	879
Feb-20		1,035					5,895	1,138
Mar-20		941					5,895	1,137
Apr-20		692					5,895	972
May-20		434					5,895	705
Jun-20		264					5,895	374
Jul-20		197					5,895	141
Aug-20		113					5,895	29
Sep-20		97					5,895	8
Oct-20		138					5,895	62
Nov-20		347					5,895	265
Dec-20		660					5,895	561
Jan-21		976					5,895	879
Feb-21		1,035					5,895	1,138
Mar-21		941					5,895	1,137
Apr-21		692					5,895	972
May-21		434					5,895	705
Jun-21		264					5,895	374
Jul-21		197					5,895	141
Aug-21		113					5,895	29
Sep-21		97					5,895	8
Oct-21		138					5,895	62
Nov-21		347					5,895	265
Dec-21		660					5,895	561
Jan-22		976					5,895	879
Feb-22		1,035					5,895	1,138
Mar-22		941					5,895	1,137
Apr-22		692					5,895	972
May-22		434					5,895	705
Jun-22		264					5,895	374
Jul-22		197					5,895	141
Aug-22		113					5,895	29
Sep-22		97					5,895	8
Oct-22		138					5,895	62
Nov-22		347					5,895	265
Dec-22		660					5,895	561

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Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Volumes

Actual, Projected, Residual (Therms)					Rolling 12-Month		Independent Variable			
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	BDD_1	EE	DT
Aug-10	773,801	932,572	(158,770)	-17.03%	(0.42)			19	454	18,475
Sep-10	847,466	705,165	142,302	20.18%	0.38			2	454	18,506
Oct-10	1,154,150	1,068,366	85,784	8.03%	0.23			39	455	18,536
Nov-10	2,970,489	3,101,613	(131,124)	-4.23%	(0.35)			261	455	18,567
Dec-10	5,617,633	6,195,914	(578,281)	-9.33%	(1.53)			584	455	18,597
Jan-11	8,936,064	9,051,982	(115,918)	-1.28%	(0.31)			924	455	18,628
Feb-11	9,761,200	9,997,571	(236,371)	-2.36%	(0.63)			1,234	455	18,659
Mar-11	8,749,514	8,978,984	(229,471)	-2.56%	(0.61)			1,220	456	18,687
Apr-11	6,792,317	6,392,273	400,043	6.26%	1.06			1,006	456	18,718
May-11	3,511,873	4,139,419	(627,547)	-15.16%	(1.66)			710	456	18,748
Jun-11	1,686,752	2,015,677	(328,925)	-16.32%	(0.87)			364	456	18,779
Jul-11	1,089,227	1,406,557	(317,330)	-22.56%	(0.84)	51,890,485	53,986,092	150	457	18,809
Aug-11	789,738	613,605	176,133	28.70%	0.47	51,906,422	53,667,126	39	457	18,840
Sep-11	942,972	629,074	313,898	49.90%	0.83	52,001,927	53,591,035	1	457	18,871
Oct-11	1,072,464	1,124,371	(51,908)	-4.62%	(0.14)	51,920,241	53,647,040	37	457	18,901
Nov-11	3,265,807	3,028,365	237,442	7.84%	0.63	52,215,559	53,573,793	245	458	18,932
Dec-11	5,682,492	5,955,366	(272,875)	-4.58%	(0.72)	52,280,418	53,333,246	500	458	18,962
Jan-12	8,867,031	8,306,324	560,708	6.75%	1.48	52,211,386	52,587,587	752	458	18,993
Feb-12	9,270,523	9,193,028	77,495	0.84%	0.21	51,720,709	51,783,044	1,016	459	19,024
Mar-12	9,076,095	8,160,044	916,051	11.23%	2.43	52,047,290	50,964,104	1,013	459	19,053
Apr-12	5,815,062	5,976,438	(161,376)	-2.70%	(0.43)	51,070,035	50,548,269	784	460	19,084
May-12	3,713,365	3,298,635	414,730	12.57%	1.10	51,271,527	49,707,484	543	460	19,114
Jun-12	1,996,349	2,377,923	(381,574)	-16.05%	(1.01)	51,581,124	50,069,730	294	460	19,145
Jul-12	1,046,794	1,670,743	(623,949)	-37.35%	(1.65)	51,538,692	50,333,917	116	461	19,175
Aug-12	857,334	723,762	133,572	18.46%	0.35	51,606,288	50,444,073	39	461	19,206
Sep-12	935,288	670,408	264,881	39.51%	0.70	51,598,605	50,485,408	-	462	19,237
Oct-12	1,396,589	1,299,375	97,214	7.48%	0.26	51,922,730	50,660,411	63	462	19,267
Nov-12	2,689,688	3,049,198	(359,511)	-11.79%	(0.95)	51,346,610	50,681,244	229	463	19,298
Dec-12	6,521,136	6,172,073	349,063	5.66%	0.92	52,185,254	50,897,951	564	463	19,328
Jan-13	9,110,625	9,600,650	(490,024)	-5.10%	(1.30)	52,428,848	52,192,277	884	463	19,359
Feb-13	10,399,907	9,260,189	1,139,718	12.31%	3.02	53,558,232	52,259,438	1,071	464	19,390
Mar-13	8,715,811	9,156,306	(440,495)	-4.81%	(1.17)	53,197,949	53,255,700	1,095	464	19,418
Apr-13	6,711,286	6,645,582	65,704	0.99%	0.17	54,094,173	53,924,844	955	465	19,449
May-13	3,626,967	4,228,832	(601,864)	-14.23%	(1.59)	54,007,776	54,855,040	695	465	19,479
Jun-13	1,830,463	2,081,179	(250,717)	-12.05%	(0.66)	53,841,889	54,558,297	355	465	19,510
Jul-13	1,059,508	1,374,293	(314,786)	-22.91%	(0.83)	53,854,603	54,261,847	125	466	19,540
Aug-13	874,781	576,865	297,916	51.64%	0.79	53,872,050	54,114,951	20	466	19,571
Sep-13	891,017	774,367	116,649	15.06%	0.31	53,827,778	54,218,910	1	467	19,602
Oct-13	1,351,535	1,329,273	22,262	1.67%	0.06	53,782,724	54,248,808	70	467	19,632
Nov-13	2,934,230	3,207,840	(273,610)	-8.53%	(0.72)	54,027,266	54,407,450	260	468	19,663
Dec-13	6,597,201	6,495,328	101,873	1.57%	0.27	54,103,331	54,730,704	592	468	19,693
Jan-14	9,858,260	10,355,666	(497,407)	-4.80%	(1.32)	54,850,966	55,485,721	979	468	19,724
Feb-14	9,591,315	10,447,662	(856,347)	-8.20%	(2.27)	54,042,373	56,673,193	1,226	469	19,755
Mar-14	8,570,163	9,008,232	(438,070)	-4.86%	(1.16)	53,896,725	56,525,119	1,217	469	19,783
Apr-14	7,652,773	7,196,550	456,223	6.34%	1.21	54,838,212	57,076,088	1,108	470	19,814
May-14	4,717,539	5,002,037	(284,498)	-5.69%	(0.75)	55,928,783	57,849,293	809	471	19,844
Jun-14	2,449,597	2,309,726	139,871	6.06%	0.37	56,547,918	58,077,840	377	471	19,875
Jul-14	1,478,224	1,611,641	(133,417)	-8.28%	(0.35)	56,966,634	58,315,188	120	472	19,905
Aug-14	1,390,328	800,243	590,085	73.74%	1.56	57,482,181	58,538,565	13	473	19,936
Sep-14	1,282,881	1,139,390	143,491	12.59%	0.38	57,874,045	58,903,588	4	473	19,967
Oct-14	1,347,265	1,565,224	(217,959)	-13.93%	(0.58)	57,869,776	59,139,539	70	474	19,997
Nov-14	3,147,311	3,144,830	2,481	0.08%	0.01	58,082,857	59,076,529	239	475	20,028
Dec-14	6,421,115	6,772,035	(350,920)	-5.18%	(0.93)	57,906,770	59,353,236	560	476	20,058
Jan-15	9,678,042	9,712,739	(34,697)	-0.36%	(0.09)	57,726,552	58,710,309	873	477	20,089
Feb-15	9,395,152	10,547,804	(1,152,651)	-10.93%	(3.05)	57,530,390	58,810,451	1,158	478	20,120
Mar-15	10,568,848	10,152,067	416,780	4.11%	1.10	59,529,075	59,954,286	1,366	478	20,148
Apr-15	7,075,300	8,561,889	(1,486,589)	-17.36%	(3.94)	58,951,602	61,319,624	1,231	479	20,179
May-15	4,517,855	3,800,235	717,619	18.88%	1.90	58,751,918	60,117,822	799	480	20,209
Jun-15	2,341,048	1,916,984	424,064	22.12%	1.12	58,643,368	59,725,081	328	481	20,240
Jul-15	1,519,502	1,691,632	(172,130)	-10.18%	(0.46)	58,684,646	59,805,071	103	482	20,270
Aug-15	1,154,975	1,048,603	106,372	10.14%	0.28	58,449,293	60,053,432	37	483	20,301
Sep-15	965,088	873,382	91,706	10.50%	0.24	58,131,500	59,787,423	1	483	20,332
Oct-15	1,274,385	1,118,543	155,842	13.93%	0.41	58,058,619	59,340,742	29	484	20,362
Nov-15	3,598,872	3,352,015	246,857	7.36%	0.65	58,510,180	59,547,928	246	485	20,393
Dec-15	7,291,765	6,479,232	812,533	12.54%	2.15	59,380,831	59,255,126	509	486	20,423
Jan-16	9,381,936	9,047,659	334,277	3.69%	0.88	59,084,725	58,590,045	671	486	20,454
Feb-16	10,507,408	9,594,739	912,668	9.51%	2.42	60,196,981	57,636,981	932	487	20,485
Mar-16	10,013,216	9,647,959	365,257	3.79%	0.97	59,641,349	57,132,873	1,039	488	20,514
Apr-16	6,876,996	6,931,177	(54,181)	-0.78%	(0.14)	59,443,045	55,502,161	848	489	20,545
May-16	4,201,751	4,393,673	(191,922)	-4.37%	(0.51)	59,126,941	56,095,599	637	489	20,575
Jun-16	2,155,929	2,900,346	(744,418)	-25.67%	(1.97)	58,941,821	57,078,961	383	490	20,606
Jul-16	1,210,377	1,448,574	(238,197)	-16.44%	(0.63)	58,632,697	56,835,903	124	491	20,636
Aug-16	930,199	665,013	265,186	39.88%	0.70	58,407,920	56,452,313	20	492	20,667
Sep-16	795,570	842,245	(46,675)	-5.54%	(0.12)	58,238,403	56,421,176	4	493	20,698
Oct-16	1,300,286	1,075,912	224,373	20.85%	0.59	58,264,304	56,378,545	37	493	20,728
Nov-16	3,695,890	3,341,094	354,796	10.62%	0.94	58,361,322	56,367,624	237	494	20,759
Dec-16	6,975,769	6,860,622	115,147	1.68%	0.30	58,045,326	56,749,014	524	495	20,789
Jan-17	10,656,811	10,455,735	201,075	1.92%	0.53	59,320,200	58,157,090	859	496	20,820
Feb-17	11,019,762	10,511,691	508,071	4.83%	1.35	59,832,554	59,074,041	1,057	497	20,851
Mar-17	9,179,129	8,922,495	256,634	2.88%	0.68	58,998,467	58,348,577	957	498	20,879
Apr-17	7,888,958	7,722,705	166,252	2.15%	0.44	60,010,430	59,140,106	958	498	20,910
May-17		5,226,219					59,972,652	733	499	20,940
Jun-17		1,794,771					58,867,076	211	500	20,971
Jul-17		2,187,876					59,606,378	141	500	21,001

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Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Volumes

Actual, Projected, Residual (Therms)					Rolling 12-Month		Independent Variable					
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual	R12	Projected	R12	BDD_1	EE	DT
Aug-17		1,254,601						60,195,966		29	501	21,032
Sep-17		1,027,914						60,381,635		8	502	21,063
Oct-17		1,409,755						60,715,478		62	502	21,093
Nov-17		3,587,798						60,962,182		265	503	21,124
Dec-17		7,023,604						61,125,164		561	503	21,154
Jan-18		10,553,439						61,222,868		879	504	21,185
Feb-18		11,006,614						61,717,792		1,138	504	21,216
Mar-18		9,927,269						62,722,565		1,137	505	21,244
Apr-18		7,352,384						62,352,244		972	505	21,275
May-18		4,611,849						61,737,874		705	505	21,305
Jun-18		2,796,023						62,739,126		374	506	21,336
Jul-18		2,025,558						62,576,808		141	506	21,366
Aug-18		1,162,191						62,484,398		29	507	21,397
Sep-18		979,717						62,436,201		8	507	21,428
Oct-18		1,392,723						62,419,169		62	508	21,458
Nov-18		3,590,505						62,421,876		265	508	21,489
Dec-18		7,101,782						62,500,054		561	509	21,519
Jan-19		10,697,760						62,644,374		879	509	21,550
Feb-19		11,169,156						62,806,916		1,138	510	21,581
Mar-19		10,074,360						62,954,007		1,137	510	21,609
Apr-19		7,485,397						63,087,020		972	511	21,640
May-19		4,717,566						63,192,736		705	511	21,670
Jun-19		2,840,275						63,236,988		374	512	21,701
Jul-19		2,052,859						63,264,289		141	512	21,731
Aug-19		1,178,489						63,280,587		29	512	21,762
Sep-19		998,174						63,299,045		8	513	21,793
Oct-19		1,416,724						63,323,046		62	513	21,823
Nov-19		3,638,952						63,371,494		265	514	21,854
Dec-19		7,219,618						63,489,329		561	514	21,884
Jan-20		10,876,984						63,668,554		879	514	21,915
Feb-20		11,334,089						63,833,488		1,138	515	21,946
Mar-20		10,179,222						63,938,350		1,137	515	21,975
Apr-20		7,581,806						64,034,759		972	515	22,006
May-20		4,793,978						64,111,171		705	515	22,036
Jun-20		2,879,530						64,150,427		374	515	22,067
Jul-20		2,077,378						64,174,946		141	515	22,097
Aug-20		1,192,941						64,189,398		29	515	22,128
Sep-20		1,013,331						64,204,554		8	515	22,159
Oct-20		1,433,312						64,221,142		62	515	22,189
Nov-20		3,669,530						64,251,720		265	515	22,220
Dec-20		7,290,630						64,322,731		561	515	22,250
Jan-21		11,004,950						64,450,697		879	515	22,281
Feb-21		11,454,578						64,571,185		1,138	515	22,312
Mar-21		10,251,729						64,643,692		1,137	516	22,340
Apr-21		7,647,036						64,708,922		972	516	22,371
May-21		4,844,059						64,759,003		705	516	22,401
Jun-21		2,905,889						64,785,362		374	516	22,432
Jul-21		2,092,494						64,800,478		141	516	22,462
Aug-21		1,203,568						64,811,105		29	516	22,493
Sep-21		1,026,007						64,823,781		8	517	22,524
Oct-21		1,449,405						64,839,874		62	517	22,554
Nov-21		3,703,680						64,874,025		265	517	22,585
Dec-21		7,366,449						64,949,843		561	518	22,615
Jan-22		11,149,022						65,093,916		879	518	22,646
Feb-22		11,603,350						65,242,688		1,138	519	22,677
Mar-22		10,369,118						65,360,078		1,137	519	22,705
Apr-22		7,748,564						65,461,607		972	520	22,736
May-22		4,920,322						65,537,870		705	520	22,766
Jun-22		2,951,410						65,583,391		374	521	22,797
Jul-22		2,122,311						65,613,207		141	522	22,827
Aug-22		1,222,270						65,631,910		29	522	22,858
Sep-22		1,044,862						65,650,764		8	523	22,889
Oct-22		1,475,076						65,676,436		62	523	22,919
Nov-22		3,761,930						65,734,685		265	524	22,950
Dec-22		7,482,737						65,850,973		561	524	22,980

Modeling Results
Liberty Utilities
Commercial and Industrial Heating Sales and Transportation Volumes

<u>Actual, Projected, Residual (Therms)</u>						Rolling 12-Month		<u>Independent Variable</u>			
<u>Plan Year</u>	<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard Residual</u>	<u>Actual R12</u>	<u>Projected R12</u>	<u>BDD_1</u>	<u>EE</u>	<u>DT</u>
	Actual		Projected						BDD_1	EE	DT
PY2011		51,920,241	53,647,040						6,527	5,472	224,804
PY2012		51,922,730	50,660,411						5,362	5,519	229,192
PY2013		53,782,724	54,248,808						6,060	5,577	233,576
PY2014		57,869,776	59,139,539						6,772	5,646	237,956
PY2015		58,058,619	59,340,742						6,720	5,756	242,336
PY2016		58,264,304	56,378,545						5,447	5,868	246,724
PY2017			60,715,478						5,776	5,982	251,108
PY2018			62,419,169						6,272	6,063	255,488
PY2019			63,323,046						6,272	6,130	259,868
PY2020			64,221,142						6,272	6,179	264,256
PY2021			64,839,874						6,272	6,190	268,640
PY2022			65,676,436						6,272	6,243	273,020
Growth											
PY2012		2,489	(2,986,629)						(1,165)	47	4,388
PY2013		1,859,994	3,588,398						698	59	4,384
PY2014		4,087,051	4,890,731						712	69	4,380
PY2015		188,844	201,204						(52)	110	4,380
PY2016		205,684	(2,962,197)						(1,273)	113	4,388
PY2017			4,336,932						329	114	4,384
PY2018			1,703,692						497	81	4,380
PY2019			903,877						-	67	4,380
PY2020			898,097						-	48	4,388
PY2021			618,732						-	12	4,384
PY2022			836,561						-	52	4,380
Growth Rate (%)											
PY2012		0.0%	-5.6%						-17.8%	0.9%	2.0%
PY2013		3.6%	7.1%						13.0%	1.1%	1.9%
PY2014		7.6%	9.0%						11.7%	1.2%	1.9%
PY2015		0.3%	0.3%						-0.8%	1.9%	1.8%
PY2016		0.4%	-5.0%						-18.9%	2.0%	1.8%
PY2017			7.7%						6.0%	1.9%	1.8%
PY2018			2.8%						8.6%	1.4%	1.7%
PY2019			1.4%						0.0%	1.1%	1.7%
PY2020			1.4%						0.0%	0.8%	1.7%
PY2021			1.0%						0.0%	0.2%	1.7%
PY2022			1.3%						0.0%	0.8%	1.6%

Modeling Results
Liberty Utilities
Commercial and Industrial Non-Heating Sales and Transportation Customers

Dependent Variable: CNF_CUS
Method AutoReg
Observations 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
Intercept	1	1,226.28	143.22	8.56	0.00
RSL	1	0.01	0.01	2.00	0.05
OILPRCCI_2	1	6.18	1.30	4.76	0.00
dm1	1	48.88	8.69	5.62	0.00
dm11	1	21.26	8.75	2.43	0.02
dm12	1	61.94	9.80	6.32	0.00
AR1	1	(0.84)	0.07	(11.47)	0.00
AR3	1	0.38	0.08	4.89	0.00
AR15	1	(0.17)	0.10	(1.63)	0.11
AR16	1	0.23	0.10	2.28	0.03

<u>Model Fitness:</u>	
Regress R-Square	0.5132
Total R-Square	0.7552
SSE	40,153.73
MSE	565.55
SBC	779.24
MAE	16.52
MAPE	1.02
Durbin-Watson	2.20
Root MSE	23.78
AIC	755.29
AICC	758.43
HQC	764.90

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Modeling Results
 Liberty Utilities
 Commercial and Industrial Non-Heating Sales and Transportation Customers

Actual, Projected, Residual					Rolling 12-Month			Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	RSL	OILPRCCI_2
Aug-10	1,603	1,565	38	2.45%	1.61			19,567	19
Sep-10	1,556	1,592	(36)	-2.26%	(1.52)			19,679	19
Oct-10	1,539	1,545	(6)	-0.37%	(0.24)			19,785	19
Nov-10	1,561	1,553	8	0.53%	0.35			19,885	20
Dec-10	1,614	1,616	(2)	-0.12%	(0.08)			19,979	21
Jan-11	1,627	1,620	8	0.47%	0.32			20,070	21
Feb-11	1,602	1,599	3	0.19%	0.13			20,153	22
Mar-11	1,591	1,617	(26)	-1.62%	(1.10)			20,232	23
Apr-11	1,603	1,601	2	0.12%	0.08			20,311	25
May-11	1,600	1,601	(1)	-0.07%	(0.05)			20,387	25
Jun-11	1,597	1,609	(12)	-0.71%	(0.49)			20,461	25
Jul-11	1,596	1,606	(10)	-0.61%	(0.41)	1,591	1,594	20,533	25
Aug-11	1,601	1,607	(6)	-0.37%	(0.25)	1,591	1,597	20,605	25
Sep-11	1,592	1,612	(21)	-1.29%	(0.88)	1,594	1,599	20,674	25
Oct-11	1,591	1,601	(10)	-0.63%	(0.42)	1,598	1,604	20,742	25
Nov-11	1,617	1,618	(2)	-0.10%	(0.07)	1,603	1,609	20,809	25
Dec-11	1,640	1,660	(20)	-1.20%	(0.84)	1,605	1,613	20,874	26
Jan-12	1,632	1,641	(9)	-0.54%	(0.38)	1,605	1,614	20,939	26
Feb-12	1,632	1,599	33	2.05%	1.38	1,608	1,614	21,000	25
Mar-12	1,620	1,646	(26)	-1.56%	(1.08)	1,610	1,617	21,060	25
Apr-12	1,646	1,639	7	0.43%	0.30	1,614	1,620	21,119	25
May-12	1,651	1,640	10	0.63%	0.44	1,618	1,623	21,177	25
Jun-12	1,636	1,642	(6)	-0.39%	(0.27)	1,621	1,626	21,234	25
Jul-12	1,649	1,625	24	1.48%	1.02	1,625	1,628	21,289	25
Aug-12	1,629	1,633	(4)	-0.24%	(0.16)	1,628	1,630	21,343	25
Sep-12	1,617	1,623	(5)	-0.34%	(0.23)	1,630	1,631	21,395	25
Oct-12	1,566	1,609	(43)	-2.67%	(1.81)	1,628	1,631	21,446	25
Nov-12	1,599	1,597	2	0.13%	0.08	1,626	1,630	21,495	25
Dec-12	1,661	1,650	11	0.65%	0.45	1,628	1,629	21,543	26
Jan-13	1,695	1,676	19	1.14%	0.81	1,633	1,631	21,591	26
Feb-13	1,661	1,663	(1)	-0.08%	(0.06)	1,636	1,637	21,635	26
Mar-13	1,627	1,662	(35)	-2.11%	(1.48)	1,636	1,638	21,678	25
Apr-13	1,644	1,622	22	1.36%	0.93	1,636	1,637	21,721	25
May-13	1,665	1,639	25	1.54%	1.06	1,637	1,637	21,764	25
Jun-13	1,662	1,656	6	0.37%	0.26	1,640	1,638	21,805	25
Jul-13	1,665	1,654	11	0.64%	0.45	1,641	1,640	21,845	25
Aug-13	1,667	1,643	24	1.47%	1.02	1,644	1,641	21,885	25
Sep-13	1,624	1,643	(19)	-1.19%	(0.82)	1,645	1,643	21,923	25
Oct-13	1,583	1,612	(29)	-1.83%	(1.24)	1,646	1,643	21,960	25
Nov-13	1,592	1,593	(1)	-0.04%	(0.03)	1,645	1,643	21,997	25
Dec-13	1,645	1,642	3	0.18%	0.12	1,644	1,642	22,033	26
Jan-14	1,653	1,650	4	0.23%	0.16	1,641	1,640	22,068	26
Feb-14	1,581	1,637	(56)	-3.43%	(2.37)	1,634	1,638	22,102	25
Mar-14	1,628	1,605	23	1.44%	0.97	1,634	1,633	22,135	24
Apr-14	1,665	1,647	19	1.12%	0.78	1,636	1,635	22,168	24
May-14	1,731	1,680	52	3.07%	2.17	1,641	1,638	22,202	24
Jun-14	1,668	1,706	(38)	-2.21%	(1.59)	1,642	1,643	22,235	24
Jul-14	1,649	1,649	0	0.00%	0.00	1,641	1,642	22,267	24
Aug-14	1,569	1,608	(38)	-2.39%	(1.62)	1,632	1,639	22,300	24
Sep-14	1,516	1,560	(43)	-2.78%	(1.83)	1,624	1,632	22,332	24
Oct-14	1,534	1,524	10	0.64%	0.41	1,619	1,625	22,363	24
Nov-14	1,582	1,591	(8)	-0.52%	(0.35)	1,619	1,625	22,394	24
Dec-14	1,717	1,666	50	3.02%	2.12	1,625	1,627	22,423	25
Jan-15	1,696	1,729	(33)	-1.92%	(1.40)	1,628	1,633	22,452	25
Feb-15	1,734	1,670	64	3.83%	2.70	1,641	1,636	22,478	24
Mar-15	1,661	1,662	(1)	-0.04%	(0.03)	1,644	1,641	22,502	16
Apr-15	1,657	1,648	8	0.51%	0.35	1,643	1,641	22,526	16
May-15	1,628	1,603	25	1.55%	1.05	1,634	1,635	22,548	16
Jun-15	1,616	1,603	14	0.85%	0.57	1,630	1,626	22,568	16
Jul-15	1,611	1,587	23	1.47%	0.98	1,627	1,621	22,586	16
Aug-15	1,604	1,596	8	0.48%	0.32	1,630	1,620	22,603	16
Sep-15	1,571	1,569	2	0.15%	0.10	1,634	1,621	22,619	16
Oct-15	1,550	1,555	(5)	-0.34%	(0.23)	1,636	1,623	22,638	16
Nov-15	1,567	1,553	14	0.88%	0.58	1,634	1,620	22,660	16
Dec-15	1,633	1,612	21	1.28%	0.87	1,627	1,616	22,688	16
Jan-16	1,644	1,644	0	0.02%	0.01	1,623	1,609	22,723	16
Feb-16	1,611	1,618	(6)	-0.40%	(0.27)	1,613	1,604	22,766	16
Mar-16	1,586	1,608	(23)	-1.41%	(0.96)	1,606	1,600	22,819	13
Apr-16	1,632	1,574	57	3.65%	2.42	1,604	1,594	22,884	13
May-16	1,604	1,584	20	1.23%	0.83	1,602	1,592	22,964	13
Jun-16	1,599	1,579	20	1.29%	0.86	1,601	1,590	23,059	13
Jul-16	1,585	1,580	5	0.31%	0.21	1,599	1,589	23,171	13
Aug-16	1,556	1,558	(2)	-0.14%	(0.09)	1,595	1,586	23,303	13
Sep-16	1,538	1,541	(2)	-0.16%	(0.10)	1,592	1,584	23,446	13
Oct-16	1,526	1,534	(8)	-0.52%	(0.34)	1,590	1,582	23,602	13
Nov-16	1,569	1,557	12	0.77%	0.50	1,590	1,583	23,768	13
Dec-16	1,570	1,620	(50)	-3.10%	(2.12)	1,585	1,583	23,941	13
Jan-17	1,590	1,584	6	0.38%	0.26	1,581	1,578	24,122	13
Feb-17	1,567	1,559	9	0.56%	0.37	1,577	1,573	24,296	13
Mar-17	1,575	1,617	(42)	-2.59%	(1.77)	1,576	1,574	24,471	15
Apr-17	1,591	1,598	(7)	-0.46%	(0.31)	1,572	1,576	24,649	15
May-17		1,600					1,577	24,822	15
Jun-17		1,607					1,580	24,989	15
Jul-17		1,608					1,582	25,146	15

Modeling Results
Liberty Utilities
Commercial and Industrial Non-Heating Sales and Transportation Customers

Actual, Projected, Residual					Rolling 12-Month			Independent Variable			
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual	R12	Projected	R12	RSL	OILPRCCI_2
Aug-17		1,611						1,586	25,295	15	
Sep-17		1,605						1,592	25,433	15	
Oct-17		1,600						1,597	25,562	15	
Nov-17		1,616						1,602	25,685	15	
Dec-17		1,659						1,605	25,802	15	
Jan-18		1,652						1,611	25,917	15	
Feb-18		1,617						1,616	26,023	15	
Mar-18		1,625						1,617	26,126	17	
Apr-18		1,639						1,620	26,232	16	
May-18		1,643						1,624	26,338	16	
Jun-18		1,640						1,626	26,445	17	
Jul-18		1,637						1,629	26,554	17	
Aug-18		1,632						1,630	26,668	17	
Sep-18		1,629						1,632	26,781	17	
Oct-18		1,627						1,635	26,896	17	
Nov-18		1,649						1,637	27,011	17	
Dec-18		1,692						1,640	27,126	17	
Jan-19		1,683						1,643	27,242	17	
Feb-19		1,637						1,644	27,351	17	
Mar-19		1,644						1,646	27,458	17	
Apr-19		1,648						1,647	27,566	17	
May-19		1,652						1,647	27,670	17	
Jun-19		1,651						1,648	27,770	17	
Jul-19		1,652						1,650	27,865	17	
Aug-19		1,649						1,651	27,957	18	
Sep-19		1,647						1,653	28,043	18	
Oct-19		1,645						1,654	28,125	18	
Nov-19		1,667						1,656	28,203	18	
Dec-19		1,710						1,657	28,279	18	
Jan-20		1,701						1,659	28,355	18	
Feb-20		1,656						1,660	28,426	18	
Mar-20		1,659						1,662	28,497	18	
Apr-20		1,661						1,663	28,569	18	
May-20		1,661						1,663	28,641	18	
Jun-20		1,662						1,664	28,714	18	
Jul-20		1,661						1,665	28,788	18	
Aug-20		1,661						1,666	28,866	18	
Sep-20		1,660						1,667	28,944	18	
Oct-20		1,661						1,668	29,024	18	
Nov-20		1,683						1,670	29,106	18	
Dec-20		1,726						1,671	29,190	18	
Jan-21		1,715						1,672	29,277	18	
Feb-21		1,668						1,673	29,361	18	
Mar-21		1,670						1,674	29,447	18	
Apr-21		1,671						1,675	29,537	18	
May-21		1,672						1,676	29,629	18	
Jun-21		1,673						1,677	29,723	18	
Jul-21		1,673						1,678	29,818	18	
Aug-21		1,673						1,679	29,916	18	
Sep-21		1,673						1,680	30,014	18	
Oct-21		1,674						1,681	30,113	18	
Nov-21		1,697						1,682	30,214	18	
Dec-21		1,740						1,683	30,315	18	
Jan-22		1,730						1,685	30,420	18	
Feb-22		1,683						1,686	30,520	18	
Mar-22		1,684						1,687	30,621	18	
Apr-22		1,684						1,688	30,726	18	
May-22		1,685						1,689	30,831	18	
Jun-22		1,687						1,690	30,937	18	
Jul-22		1,688						1,692	31,044	18	
Aug-22		1,688						1,693	31,152	18	
Sep-22		1,689						1,694	31,258	18	
Oct-22		1,691						1,696	31,364	18	
Nov-22		1,714						1,697	31,469	18	
Dec-22		1,756						1,698	31,572	18	

Modeling Results
Liberty Utilities
Commercial and Industrial Non-Heating Sales and Transportation Use per Customer

Dependent Variable: CNF_UPC
Method AutoReg
Observations 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
BDD_1	1	0.66	0.15	4.54	0.00
AR1	1	(0.54)	0.09	(5.85)	0.00
AR12	1	(0.44)	0.10	(4.49)	0.00

Model Fitness:
Regress R-Square 0.4739
Total R-Square 0.9636
SSE 2,510,312.84
MSE 32,183.50
SBC 1,087.20
MAE 143.60
MAPE 19.18
Durbin-Watson 2.30
Root MSE 179.40
AIC 1,080.02
AICC 1,080.33
HQC 1,082.90

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Modeling Results

Liberty Utilities

Commercial and Industrial Non-Heating Sales and Transportation Use per Customer

Actual, Projected, Residual (Therms/ Customer)					Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	BDD_1
Aug-10	344	13	332	2632.40%	1.83			19
Sep-10	544	300	244	81.52%	1.35			2
Oct-10	371	507	(135)	-26.72%	(0.75)			39
Nov-10	577	487	90	18.41%	0.50			261
Dec-10	868	753	115	15.26%	0.64			584
Jan-11	974	1,044	(70)	-6.73%	(0.39)			924
Feb-11	991	1,152	(161)	-13.98%	(0.89)			1,234
Mar-11	847	989	(142)	-14.33%	(0.78)			1,220
Apr-11	1,064	745	319	42.76%	1.76			1,006
May-11	540	839	(299)	-35.64%	(1.65)			710
Jun-11	611	366	245	66.85%	1.35			364
Jul-11	574	449	125	27.83%	0.69	8,305	7,643	150
Aug-11	627	431	196	45.60%	1.09	8,588	8,062	39
Sep-11	539	569	(30)	-5.26%	(0.17)	8,583	8,331	1
Oct-11	395	470	(75)	-15.87%	(0.41)	8,607	8,294	37
Nov-11	623	543	80	14.71%	0.44	8,653	8,350	245
Dec-11	682	795	(113)	-14.18%	(0.62)	8,468	8,392	500
Jan-12	867	849	17	2.04%	0.10	8,361	8,197	752
Feb-12	957	950	7	0.75%	0.04	8,327	7,996	1,016
Mar-12	1,091	843	248	29.41%	1.37	8,571	7,850	1,013
Apr-12	760	924	(164)	-17.77%	(0.91)	8,267	8,028	784
May-12	604	521	83	15.91%	0.46	8,331	7,710	543
Jun-12	601	492	110	22.29%	0.61	8,320	7,835	294
Jul-12	515	509	6	1.26%	0.04	8,261	7,895	116
Aug-12	456	531	(75)	-14.15%	(0.42)	8,089	7,995	39
Sep-12	540	472	68	14.38%	0.38	8,091	7,898	-
Oct-12	636	500	137	27.38%	0.76	8,332	7,928	63
Nov-12	453	679	(226)	-33.33%	(1.25)	8,162	8,064	229
Dec-12	847	693	154	22.19%	0.85	8,326	7,962	564
Jan-13	913	1,006	(93)	-9.25%	(0.51)	8,372	8,119	884
Feb-13	1,236	1,014	223	21.99%	1.23	8,652	8,182	1,071
Mar-13	895	1,198	(303)	-25.26%	(1.67)	8,456	8,537	1,095
Apr-13	993	832	161	19.35%	0.89	8,689	8,445	955
May-13	794	765	29	3.82%	0.16	8,879	8,689	695
Jun-13	669	596	72	12.13%	0.40	8,946	8,794	355
Jul-13	595	512	82	16.03%	0.45	9,026	8,797	125
Aug-13	290	482	(193)	-39.97%	(1.07)	8,860	8,749	20
Sep-13	477	390	87	22.18%	0.48	8,796	8,667	1
Oct-13	393	569	(175)	-30.81%	(0.97)	8,553	8,736	70
Nov-13	712	495	217	43.92%	1.20	8,813	8,551	260
Dec-13	974	896	79	8.80%	0.44	8,941	8,754	592
Jan-14	1,122	1,110	12	1.05%	0.06	9,149	8,858	979
Feb-14	1,290	1,303	(13)	-1.03%	(0.07)	9,203	9,148	1,226
Mar-14	909	1,141	(232)	-20.36%	(1.28)	9,216	9,091	1,217
Apr-14	1,312	950	362	38.15%	2.00	9,535	9,209	1,108
May-14	723	998	(275)	-27.57%	(1.52)	9,465	9,442	809
Jun-14	434	543	(110)	-20.16%	(0.61)	9,230	9,390	377
Jul-14	532	406	126	31.07%	0.70	9,168	9,283	120
Aug-14	393	377	16	4.27%	0.09	9,271	9,178	13
Sep-14	560	423	137	32.42%	0.76	9,354	9,211	4
Oct-14	814	503	310	61.58%	1.71	9,774	9,146	70
Nov-14	857	815	43	5.27%	0.24	9,920	9,465	239
Dec-14	1,369	1,009	360	35.63%	1.99	10,314	9,579	560
Jan-15	1,532	1,331	201	15.11%	1.11	10,725	9,800	873
Feb-15	1,448	1,498	(50)	-3.34%	(0.28)	10,883	9,994	1,158
Mar-15	1,381	1,321	60	4.56%	0.33	11,355	10,174	1,366
Apr-15	1,346	1,331	16	1.19%	0.09	11,389	10,555	1,231
May-15	881	901	(19)	-2.13%	(0.11)	11,548	10,458	799
Jun-15	1,001	490	511	104.15%	2.82	12,114	10,404	328
Jul-15	766	695	71	10.15%	0.39	12,348	10,693	103
Aug-15	716	575	141	24.54%	0.78	12,671	10,891	37
Sep-15	844	623	220	35.38%	1.22	12,955	11,092	1
Oct-15	580	818	(238)	-29.05%	(1.31)	12,721	11,406	29
Nov-15	1,146	778	369	47.40%	2.04	13,010	11,369	246
Dec-15	1,363	1,314	49	3.74%	0.27	13,005	11,674	509
Jan-16	1,483	1,426	58	4.05%	0.32	12,956	11,768	671
Feb-16	1,617	1,484	132	8.93%	0.73	13,125	11,755	932
Mar-16	1,444	1,443	1	0.08%	0.01	13,188	11,877	1,039
Apr-16	1,050	1,208	(158)	-13.08%	(0.87)	12,891	11,754	848
May-16	916	843	73	8.60%	0.40	12,926	11,697	637
Jun-16	596	869	(274)	-31.49%	(1.51)	12,521	12,076	383
Jul-16	846	577	269	46.58%	1.49	12,601	11,958	124
Aug-16	502	735	(233)	-31.74%	(1.29)	12,387	12,119	20

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Modeling Results

Liberty Utilities

Commercial and Industrial Non-Heating Sales and Transportation Use per Customer

Actual, Projected, Residual (Therms/ Customer)					Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	BDD_1
Sep-16	805	642	163	25.47%	0.90	12,349	12,137	4
Oct-16	810	710	101	14.22%	0.56	12,579	12,029	37
Nov-16	922	1,021	(98)	-9.61%	(0.54)	12,355	12,272	237
Dec-16	1,172	1,218	(46)	-3.77%	(0.25)	12,164	12,176	524
Jan-17	1,236	1,478	(241)	-16.34%	(1.34)	11,917	12,228	859
Feb-17	1,755	1,506	249	16.54%	1.38	12,055	12,250	1,057
Mar-17	1,265	1,543	(278)	-18.02%	(1.54)	11,876	12,350	957
Apr-17	1,294	1,194	100	8.36%	0.55	12,120	12,336	958
May-17		1,063					12,556	733
Jun-17		606					12,292	211
Jul-17		685					12,400	141
Aug-17		558					12,222	29
Sep-17		654					12,234	8
Oct-17		742					12,267	62
Nov-17		896					12,143	265
Dec-17		1,129					12,053	561
Jan-18		1,291					11,866	879
Feb-18		1,606					11,966	1,138
Mar-18		1,497					11,920	1,137
Apr-18		1,341					12,067	972
May-18		1,102					12,105	705
Jun-18		799					12,299	374
Jul-18		656					12,270	141
Aug-18		564					12,276	29
Sep-18		589					12,210	8
Oct-18		669					12,137	62
Nov-18		836					12,078	265
Dec-18		1,067					12,015	561
Jan-19		1,274					11,999	879
Feb-19		1,508					11,900	1,138
Mar-19		1,493					11,897	1,137
Apr-19		1,355					11,911	972
May-19		1,135					11,944	705
Jun-19		855					12,000	374
Jul-19		673					12,017	141
Aug-19		576					12,029	29
Sep-19		567					12,007	8
Oct-19		624					11,963	62
Nov-19		786					11,912	265
Dec-19		1,011					11,857	561
Jan-20		1,237					11,820	879
Feb-20		1,444					11,756	1,138
Mar-20		1,456					11,719	1,137
Apr-20		1,341					11,706	972
May-20		1,142					11,713	705
Jun-20		884					11,742	374
Jul-20		697					11,765	141
Aug-20		594					11,783	29
Sep-20		567					11,783	8
Oct-20		605					11,764	62
Nov-20		753					11,730	265
Dec-20		969					11,688	561
Jan-21		1,198					11,648	879
Feb-21		1,394					11,598	1,138
Mar-21		1,413					11,555	1,137
Apr-21		1,312					11,526	972
May-21		1,129					11,513	705
Jun-21		890					11,519	374
Jul-21		710					11,532	141
Aug-21		609					11,547	29
Sep-21		575					11,556	8
Oct-21		601					11,552	62
Nov-21		736					11,535	265
Dec-21		941					11,507	561
Jan-22		1,165					11,474	879
Feb-22		1,354					11,434	1,138
Mar-22		1,372					11,393	1,137
Apr-22		1,277					11,358	972
May-22		1,104					11,333	705
Jun-22		879					11,322	374
Jul-22		710					11,322	141
Aug-22		616					11,328	29
Sep-22		582					11,336	8
Oct-22		603					11,338	62
Nov-22		729					11,332	265
Dec-22		925					11,316	561

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Modeling Results
 Liberty Utilities
 Commercial and Industrial Non-Heating Sales and Transportation Volumes

Actual, Projected, Residual (Therms)					Rolling 12-Month			Independent Variable		
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	BDD_1	RSL	OILPRCCI_2
Aug-10	551,611	19,706	531,905	2699.21%	1.81			19	19,567	19
Sep-10	846,260	476,990	369,269	77.42%	1.26			2	19,679	19
Oct-10	571,241	782,478	(211,237)	-27.00%	(0.72)			39	19,785	19
Nov-10	899,981	756,012	143,969	19.04%	0.49			261	19,885	20
Dec-10	1,400,523	1,216,474	184,049	15.13%	0.63			584	19,979	21
Jan-11	1,585,102	1,691,595	(106,493)	-6.30%	(0.36)			924	20,070	21
Feb-11	1,587,323	1,841,866	(254,543)	-13.82%	(0.87)			1,234	20,153	22
Mar-11	1,348,113	1,599,430	(251,317)	-15.71%	(0.86)			1,220	20,232	23
Apr-11	1,705,400	1,193,146	512,254	42.93%	1.75			1,006	20,311	25
May-11	863,990	1,343,348	(479,359)	-35.68%	(1.63)			710	20,387	25
Jun-11	976,474	589,462	387,012	65.66%	1.32			364	20,461	25
Jul-11	916,768	721,550	195,218	27.06%	0.67	13,252,785	12,232,058	150	20,533	25
Aug-11	1,004,571	692,501	312,069	45.06%	1.06	13,705,745	12,904,854	39	20,605	25
Sep-11	857,322	916,729	(59,407)	-6.48%	(0.20)	13,716,808	13,344,592	1	20,674	25
Oct-11	628,999	752,354	(123,355)	-16.40%	(0.42)	13,774,565	13,314,468	37	20,742	25
Nov-11	1,006,852	878,579	128,273	14.60%	0.44	13,881,435	13,437,035	245	20,809	25
Dec-11	1,118,994	1,319,855	(200,861)	-15.22%	(0.68)	13,599,907	13,540,416	500	20,874	26
Jan-12	1,414,741	1,394,078	20,662	1.48%	0.07	13,429,545	13,242,900	752	20,939	26
Feb-12	1,561,842	1,519,138	42,703	2.81%	0.15	13,404,064	12,920,172	1,016	21,000	25
Mar-12	1,767,637	1,387,528	380,109	27.39%	1.29	13,823,588	12,708,270	1,013	21,060	25
Apr-12	1,250,341	1,513,882	(263,541)	-17.41%	(0.90)	13,368,529	13,029,006	784	21,119	25
May-12	996,635	854,484	142,151	16.64%	0.48	13,501,175	12,540,142	543	21,177	25
Jun-12	983,084	807,034	176,051	21.81%	0.60	13,507,785	12,757,714	294	21,234	25
Jul-12	849,006	826,187	22,819	2.76%	0.08	13,440,022	12,862,350	116	21,289	25
Aug-12	742,181	866,527	(124,346)	-14.35%	(0.42)	13,177,632	13,036,376	39	21,343	25
Sep-12	873,364	766,163	107,201	13.99%	0.37	13,193,674	12,885,810	-	21,395	25
Oct-12	997,028	804,211	192,817	23.98%	0.66	13,561,703	12,937,667	63	21,446	25
Nov-12	724,290	1,085,091	(360,801)	-33.25%	(1.23)	13,279,142	13,144,179	229	21,495	25
Dec-12	1,405,715	1,143,017	262,698	22.98%	0.89	13,565,863	12,967,341	564	21,543	26
Jan-13	1,547,173	1,685,747	(138,573)	-8.22%	(0.47)	13,698,296	13,259,010	884	21,591	26
Feb-13	2,053,964	1,685,083	368,882	21.89%	1.26	14,190,419	13,424,954	1,071	21,635	26
Mar-13	1,456,498	1,990,787	(534,289)	-26.84%	(1.82)	13,879,280	14,028,213	1,095	21,678	25
Apr-13	1,632,247	1,349,363	282,884	20.96%	0.96	14,261,185	13,863,694	955	21,721	25
May-13	1,321,187	1,253,329	67,858	5.41%	0.23	14,585,737	14,262,539	695	21,764	25
Jun-13	1,111,371	987,462	123,909	12.55%	0.42	14,714,024	14,442,967	355	21,805	25
Jul-13	989,805	847,602	142,202	16.78%	0.48	14,854,822	14,464,382	125	21,845	25
Aug-13	482,704	792,421	(309,717)	-39.08%	(1.06)	14,595,346	14,390,276	20	21,885	25
Sep-13	774,013	641,125	132,888	20.73%	0.45	14,495,996	14,265,239	1	21,923	25
Oct-13	622,778	916,814	(294,036)	-32.07%	(1.00)	14,121,746	14,377,841	70	21,960	25
Nov-13	1,133,767	788,089	345,678	43.86%	1.18	14,531,223	14,080,839	260	21,997	25
Dec-13	1,603,311	1,471,020	132,291	8.99%	0.45	14,728,818	14,408,842	592	22,033	26
Jan-14	1,855,035	1,831,691	23,344	1.27%	0.08	15,036,680	14,554,786	979	22,068	26
Feb-14	2,038,605	2,132,942	(94,337)	-4.42%	(0.32)	15,021,321	15,002,645	1,226	22,102	25
Mar-14	1,479,713	1,831,599	(351,886)	-19.21%	(1.20)	15,044,536	14,843,457	1,217	22,135	24
Apr-14	2,184,463	1,563,688	620,775	39.70%	2.11	15,596,752	15,057,782	1,108	22,168	24
May-14	1,251,382	1,676,218	(424,836)	-25.34%	(1.45)	15,526,947	15,480,671	809	22,202	24
Jun-14	723,859	927,102	(203,243)	-21.92%	(0.69)	15,139,435	15,420,311	377	22,235	24
Jul-14	877,855	669,772	208,083	31.07%	0.71	15,027,485	15,242,480	120	22,267	24
Aug-14	617,169	606,378	10,790	1.78%	0.04	15,161,949	15,056,438	13	22,300	24
Sep-14	848,656	659,163	189,492	28.75%	0.65	15,236,591	15,074,476	4	22,332	24
Oct-14	1,247,821	767,368	480,453	62.61%	1.64	15,861,634	14,925,030	70	22,363	24
Nov-14	1,356,924	1,295,725	61,199	4.72%	0.21	16,084,792	15,432,666	239	22,394	24
Dec-14	2,349,732	1,681,706	668,026	39.72%	2.28	16,831,213	15,643,352	560	22,423	25
Jan-15	2,598,350	2,301,497	296,852	12.90%	1.01	17,574,528	16,113,158	873	22,452	25
Feb-15	2,510,068	2,501,092	8,975	0.36%	0.03	18,045,990	16,481,308	1,158	22,478	24
Mar-15	2,294,239	2,195,192	99,047	4.51%	0.34	18,860,516	16,844,902	1,366	22,502	16
Apr-15	2,230,489	2,193,112	37,377	1.70%	0.13	18,906,542	17,474,325	1,231	22,526	16
May-15	1,434,928	1,443,769	(8,840)	-0.61%	(0.03)	19,090,089	17,241,876	799	22,548	16
Jun-15	1,617,180	785,520	831,659	105.87%	2.83	19,983,410	17,100,295	328	22,568	16
Jul-15	1,233,687	1,103,775	129,912	11.77%	0.44	20,339,242	17,534,298	103	22,586	16
Aug-15	1,147,675	917,130	230,545	25.14%	0.79	20,869,748	17,845,050	37	22,603	16
Sep-15	1,325,578	977,711	347,867	35.58%	1.19	21,346,670	18,163,598	1	22,619	16
Oct-15	899,071	1,271,613	(372,543)	-29.30%	(1.27)	20,997,920	18,667,843	29	22,638	16
Nov-15	1,796,356	1,208,011	588,345	48.70%	2.00	21,437,352	18,580,129	246	22,660	16
Dec-15	2,226,402	2,118,941	107,461	5.07%	0.37	21,314,022	19,017,364	509	22,688	16
Jan-16	2,439,065	2,343,737	95,328	4.07%	0.32	21,154,738	19,059,604	671	22,723	16
Feb-16	2,604,903	2,401,045	203,858	8.49%	0.69	21,249,573	18,959,557	932	22,766	16
Mar-16	2,289,484	2,320,531	(31,047)	-1.34%	(0.11)	21,244,818	19,084,896	1,039	22,819	13
Apr-16	1,713,437	1,902,043	(188,606)	-9.92%	(0.64)	20,727,766	18,793,827	848	22,884	13
May-16	1,468,655	1,335,876	132,779	9.94%	0.45	20,761,493	18,685,934	637	22,964	13
Jun-16	952,328	1,372,485	(420,157)	-30.61%	(1.43)	20,096,641	19,272,899	383	23,059	13
Jul-16	1,341,366	912,286	429,081	47.03%	1.46	20,204,320	19,081,410	124	23,171	13
Aug-16	780,640	1,145,264	(364,624)	-31.84%	(1.24)	19,837,286	19,309,543	20	23,303	13
Sep-16	1,238,935	989,061	249,874	25.26%	0.85	19,750,643	19,320,894	4	23,446	13
Oct-16	1,236,729	1,088,459	148,270	13.62%	0.51	20,088,301	19,137,739	37	23,602	13
Nov-16	1,447,756	1,589,438	(141,682)	-8.91%	(0.48)	19,739,701	19,519,166	237	23,768	13
Dec-16	1,840,899	1,974,323	(133,424)	-6.76%	(0.45)	19,354,198	19,374,548	524	23,941	13
Jan-17	1,965,644	2,340,563	(374,919)	-16.02%	(1.28)	18,880,777	19,371,374	859	24,122	13
Feb-17	2,750,504	2,347,122	403,382	17.19%	1.37	19,026,378	19,317,451	1,057	24,296	13
Mar-17	1,991,682	2,494,143	(502,461)	-20.15%	(1.71)	18,728,576	19,491,063	957	24,471	15
Apr-17	2,057,571	1,907,502	150,069	7.87%	0.51	19,072,710	19,496,522	958	24,649	15
May-17		1,700,742					19,861,387	733	24,822	15
Jun-17		973,083					19,461,985	211	24,989	15
Jul-17		1,102,253					19,651,952	141	25,146	15
Aug-17		898,085					19,404,773	29	25,295	15
Sep-17		1,049,746					19,465,457	8	25,433	15
Oct-17		1,187,691					19,564,690	62	25,562	15
Nov-17		1,448,030					19,423,282	265	25,685	15
Dec-17		1,872,527					19,321,486	561	25,802	15

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Modeling Results
Liberty Utilities
Commercial and Industrial Non-Heating Sales and Transportation Volumes

Actual, Projected, Residual (Therms)					Rolling 12-Month			Independent Variable		
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	BDD_1	RSL	OILPRCCI_2
Jan-18		2,131,910				19,112,833		879	25,917	15
Feb-18		2,597,859				19,363,569		1,138	26,023	15
Mar-18		2,432,585				19,302,012		1,137	26,126	17
Apr-18		2,197,029				19,591,539		972	26,232	16
May-18		1,810,037				19,700,834		705	26,338	16
Jun-18		1,310,692				20,038,443		374	26,445	17
Jul-18		1,073,594				20,009,784		141	26,554	17
Aug-18		919,608				20,031,307		29	26,668	17
Sep-18		958,901				19,940,462		8	26,781	17
Oct-18		1,088,104				19,840,875		62	26,896	17
Nov-18		1,379,454				19,772,299		265	27,011	17
Dec-18		1,804,569				19,704,341		561	27,126	17
Jan-19		2,144,319				19,716,749		879	27,242	17
Feb-19		2,467,587				19,586,477		1,138	27,351	17
Mar-19		2,454,628				19,608,520		1,137	27,458	17
Apr-19		2,232,795				19,644,286		972	27,566	17
May-19		1,874,744				19,708,994		705	27,670	17
Jun-19		1,412,490				19,810,792		374	27,770	17
Jul-19		1,112,284				19,849,483		141	27,865	17
Aug-19		949,516				19,879,391		29	27,957	18
Sep-19		932,879				19,853,370		8	28,043	18
Oct-19		1,027,292				19,792,557		62	28,125	18
Nov-19		1,309,575				19,722,678		265	28,203	18
Dec-19		1,729,563				19,647,673		561	28,279	18
Jan-20		2,104,595				19,607,949		879	28,355	18
Feb-20		2,391,155				19,531,518		1,138	28,426	18
Mar-20		2,416,286				19,493,176		1,137	28,497	18
Apr-20		2,227,773				19,488,154		972	28,569	18
May-20		1,897,464				19,510,874		705	28,641	18
Jun-20		1,468,958				19,567,341		374	28,714	18
Jul-20		1,157,004				19,612,061		141	28,788	18
Aug-20		985,985				19,648,530		29	28,866	18
Sep-20		940,402				19,656,053		8	28,944	18
Oct-20		1,004,281				19,633,042		62	29,024	18
Nov-20		1,266,442				19,589,909		265	29,106	18
Dec-20		1,671,711				19,532,056		561	29,190	18
Jan-21		2,053,788				19,481,249		879	29,277	18
Feb-21		2,325,494				19,415,587		1,138	29,361	18
Mar-21		2,359,226				19,358,527		1,137	29,447	18
Apr-21		2,192,328				19,323,082		972	29,537	18
May-21		1,888,704				19,314,322		705	29,629	18
Jun-21		1,488,877				19,334,242		374	29,723	18
Jul-21		1,188,028				19,365,266		141	29,818	18
Aug-21		1,018,933				19,398,213		29	29,916	18
Sep-21		961,847				19,419,658		8	30,014	18
Oct-21		1,005,425				19,420,802		62	30,113	18
Nov-21		1,248,544				19,402,905		265	30,214	18
Dec-21		1,637,255				19,368,450		561	30,315	18
Jan-22		2,015,008				19,329,670		879	30,420	18
Feb-22		2,278,433				19,282,609		1,138	30,520	18
Mar-22		2,310,095				19,233,479		1,137	30,621	18
Apr-22		2,150,216				19,191,367		972	30,726	18
May-22		1,861,448				19,164,110		705	30,831	18
Jun-22		1,482,351				19,157,584		374	30,937	18
Jul-22		1,198,227				19,167,783		141	31,044	18
Aug-22		1,039,795				19,188,645		29	31,152	18
Sep-22		983,590				19,210,388		8	31,258	18
Oct-22		1,018,920				19,223,883		62	31,364	18
Nov-22		1,249,567				19,224,905		265	31,469	18
Dec-22		1,624,306				19,211,956		561	31,572	18

Modeling Results
Liberty Utilities
Commercial and Industrial Non-Heating Sales and Transportation Volumes

<u>Actual, Projected, Residual (Therms)</u>						<u>Rolling 12-Month</u>		<u>Independent Variable</u>		
	<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error %</u>	<u>Standard</u>				
<u>Plan Year</u>	<u>Actual</u>	<u>Projected</u>				<u>Residual</u>	<u>Actual_R12</u>	<u>Projected_R12</u>	<u>BDD_1</u>	<u>RSL</u>
									<u>BDD_1</u>	<u>RSL</u>
PY2011	13,774,565	13,314,468							6,527	244,033
PY2012	13,561,703	12,937,667							5,362	253,683
PY2013	14,121,746	14,377,841							6,060	260,845
PY2014	15,861,634	14,925,030							6,772	266,201
PY2015	20,997,920	18,667,843							6,720	270,337
PY2016	20,088,301	19,137,739							5,447	276,085
PY2017		19,564,690							5,776	296,492
PY2018		19,840,875							6,272	315,467
PY2019		19,792,557							6,272	331,185
PY2020		19,633,042							6,272	343,306
PY2021		19,420,802							6,272	355,129
PY2022		19,223,883							6,272	369,401
Growth										
PY2012	(212,862)	(376,801)							(1,165)	9,650
PY2013	560,043	1,440,175							698	7,163
PY2014	1,739,888	547,188							712	5,356
PY2015	5,136,286	3,742,814							(52)	4,135
PY2016	(909,619)	469,896							(1,273)	5,749
PY2017		426,951							329	20,407
PY2018		276,185							497	18,975
PY2019		(48,318)							-	15,718
PY2020		(159,515)							-	12,121
PY2021		(212,240)							-	11,823
PY2022		(196,919)							-	14,272
Growth Rate (%)										
PY2012	-1.5%	-2.8%							-17.8%	4.0%
PY2013	4.1%	11.1%							13.0%	2.8%
PY2014	12.3%	3.8%							11.7%	2.1%
PY2015	32.4%	25.1%							-0.8%	1.6%
PY2016	-4.3%	2.5%							-18.9%	2.1%
PY2017		2.2%							6.0%	7.4%
PY2018		1.4%							8.6%	6.4%
PY2019		-0.2%							0.0%	5.0%
PY2020		-0.8%							0.0%	3.7%
PY2021		-1.1%							0.0%	3.4%
PY2022		-1.0%							0.0%	4.0%

Modeling Results
Liberty Utilities
Commercial & Industrial Heating Capacity Exempt Volume (therm)

Dependent Variable: CHZ_VOL
Method AutoReg
Observations 69

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
EMP	1	423.23	4.79	88.35	0.00
HDD	1	611.87	2.28	268.30	0.00
EARCH0	1	22.86	0.07	340.97	0.00
EARCH5	1	(0.33)	0.08	(4.31)	0.00
THETA	1	(1.14)	0.47	(2.43)	0.02

Model Fitness:

Regress R-Square	0.9762
Total R-Square	0.9762
SSE	71,301,781.49
MSE	8,802,689,072.70
SBC	2,101.00
MAE	72,730.78
MAPE	18.04
Durbin-Watson	
Root MSE	95,000.15
AIC	2,089.03
AICC	2,089.83
HQC	2,093.83

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Modeling Results

Liberty Utilities

Commercial & Industrial Heating Capacity Exempt Volume (therm)

Actual, Projected, Residual (Therms/ Customer)						Rolling 12-Month		Independent Variable
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	EMP
Aug-10	140,978	211,556	(70,579)	-33.36%	(0.75)			497
Sep-10	187,011	256,220	(69,209)	-27.01%	(0.73)			497
Oct-10	400,863	483,217	(82,354)	-17.04%	(0.87)			497
Nov-10	578,578	652,085	(73,507)	-11.27%	(0.78)			497
Dec-10	851,874	899,274	(47,400)	-5.27%	(0.50)			497
Jan-11	905,216	1,031,434	(126,218)	-12.24%	(1.34)			497
Feb-11	775,786	881,528	(105,742)	-12.00%	(1.12)			497
Mar-11	697,865	770,177	(72,312)	-9.39%	(0.77)			497
Apr-11	469,439	519,329	(49,889)	-9.61%	(0.53)			497
May-11	303,741	346,199	(42,458)	-12.26%	(0.45)			497
Jun-11	178,372	257,521	(79,149)	-30.73%	(0.84)			497
Jul-11	129,295	210,466	(81,171)	-38.57%	(0.86)	5,619,018	6,519,006	497
Aug-11	160,021	211,766	(51,745)	-24.44%	(0.55)	5,638,061	6,519,216	497
Sep-11	152,625	254,075	(101,450)	-39.93%	(1.07)	5,603,675	6,517,071	498
Oct-11	423,368	466,496	(43,128)	-9.25%	(0.46)	5,626,180	6,500,351	498
Nov-11	658,379	566,957	91,422	16.12%	0.97	5,705,982	6,415,223	498
Dec-11	848,226	775,118	73,108	9.43%	0.77	5,702,333	6,291,067	498
Jan-12	932,240	889,674	42,566	4.78%	0.45	5,729,356	6,149,306	499
Feb-12	815,067	771,722	43,345	5.62%	0.46	5,768,637	6,039,500	499
Mar-12	731,899	610,333	121,565	19.92%	1.29	5,802,671	5,879,657	499
Apr-12	566,378	476,486	89,892	18.87%	0.95	5,899,610	5,836,814	500
May-12	461,360	305,929	155,430	50.81%	1.65	6,057,228	5,796,544	500
Jun-12	205,922	259,584	(53,662)	-20.67%	(0.57)	6,084,778	5,798,607	501
Jul-12	149,486	212,015	(62,530)	-29.49%	(0.66)	6,104,969	5,800,157	501
Aug-12	159,161	212,175	(53,013)	-24.99%	(0.56)	6,104,109	5,800,565	501
Sep-12	162,308	288,813	(126,506)	-43.80%	(1.34)	6,113,792	5,835,304	502
Oct-12	456,206	415,624	40,581	9.76%	0.43	6,146,630	5,784,432	502
Nov-12	697,251	699,071	(1,821)	-0.26%	(0.02)	6,185,502	5,916,546	502
Dec-12	777,840	807,521	(29,681)	-3.68%	(0.31)	6,115,116	5,948,949	503
Jan-13	1,060,998	928,208	132,790	14.31%	1.41	6,243,874	5,987,483	503
Feb-13	895,237	837,177	58,060	6.94%	0.61	6,324,044	6,052,937	503
Mar-13	769,932	757,768	12,165	1.61%	0.13	6,362,078	6,200,372	504
Apr-13	550,758	519,273	31,485	6.06%	0.33	6,346,457	6,243,159	504
May-13	323,104	341,348	(18,244)	-5.34%	(0.19)	6,208,202	6,278,578	504
Jun-13	203,572	238,066	(34,495)	-14.49%	(0.37)	6,205,851	6,257,060	505
Jul-13	172,566	213,710	(41,144)	-19.25%	(0.44)	6,228,932	6,258,754	505
Aug-13	197,450	215,048	(17,599)	-8.18%	(0.19)	6,267,220	6,261,628	505
Sep-13	341,721	297,761	43,960	14.76%	0.47	6,446,633	6,270,575	505
Oct-13	557,302	448,389	108,913	24.29%	1.15	6,547,729	6,303,340	506
Nov-13	761,731	704,260	57,471	8.16%	0.61	6,612,210	6,308,528	506
Dec-13	908,117	921,585	(13,468)	-1.46%	(0.14)	6,742,487	6,422,593	506
Jan-14	1,023,971	1,006,753	17,218	1.71%	0.18	6,705,461	6,501,138	507
Feb-14	753,950	910,808	(156,858)	-17.22%	(1.66)	6,564,174	6,574,770	507
Mar-14	643,026	874,223	(231,197)	-26.45%	(2.45)	6,437,268	6,691,225	507
Apr-14	450,395	545,178	(94,783)	-17.39%	(1.00)	6,336,905	6,717,130	507
May-14	320,145	345,861	(25,717)	-7.44%	(0.27)	6,333,945	6,721,643	508
Jun-14	179,682	230,385	(50,703)	-22.01%	(0.54)	6,310,055	6,713,961	508
Jul-14	152,146	215,271	(63,125)	-29.32%	(0.67)	6,289,635	6,715,523	509
Aug-14	251,534	219,757	31,777	14.46%	0.34	6,343,720	6,720,232	509
Sep-14	194,892	297,068	(102,176)	-34.39%	(1.08)	6,196,891	6,719,539	510
Oct-14	412,186	426,402	(14,216)	-3.33%	(0.15)	6,051,775	6,697,551	510
Nov-14	615,915	690,360	(74,445)	-10.78%	(0.79)	5,905,959	6,683,652	511
Dec-14	739,085	810,542	(71,456)	-8.82%	(0.76)	5,736,927	6,572,608	511
Jan-15	1,048,853	1,039,040	9,813	0.94%	0.10	5,761,809	6,604,894	512
Feb-15	933,384	1,065,617	(132,233)	-12.41%	(1.40)	5,941,243	6,759,703	513
Mar-15	713,195	874,989	(161,794)	-18.49%	(1.71)	6,011,412	6,760,470	513
Apr-15	494,376	536,918	(42,542)	-7.92%	(0.45)	6,055,394	6,752,210	514
May-15	301,379	299,201	2,178	0.73%	0.02	6,036,628	6,705,550	515
Jun-15	287,333	262,794	24,539	9.34%	0.26	6,144,279	6,737,959	515
Jul-15	271,614	219,050	52,564	24.00%	0.56	6,263,747	6,741,738	516
Aug-15	228,262	218,757	9,505	4.34%	0.10	6,240,474	6,740,738	517
Sep-15	239,547	253,948	(14,401)	-5.67%	(0.15)	6,285,129	6,697,619	518
Oct-15	482,104	484,937	(2,833)	-0.58%	(0.03)	6,355,047	6,756,154	518
Nov-15	551,338	576,416	(25,078)	-4.35%	(0.27)	6,290,470	6,642,209	519
Dec-15	664,121	684,410	(20,289)	-2.96%	(0.21)	6,215,506	6,516,078	520
Jan-16	1,019,756	896,421	123,335	13.76%	1.31	6,186,409	6,373,459	521
Feb-16	956,624	815,326	141,298	17.33%	1.50	6,209,649	6,123,169	521
Mar-16	824,918	663,856	161,062	24.26%	1.71	6,321,372	5,912,035	522
Apr-16	703,702	557,044	146,659	26.33%	1.55	6,530,698	5,932,160	522
May-16	452,978	353,540	99,438	28.13%	1.05	6,682,298	5,986,500	523
Jun-16	325,020	241,188	83,832	34.76%	0.89	6,719,985	5,964,893	524
Jul-16	185,255	226,716	(41,460)	-18.29%	(0.44)	6,633,626	5,972,559	524
Aug-16	168,814	228,807	(59,993)	-26.22%	(0.64)	6,574,178	5,982,609	525
Sep-16	322,661	266,853	55,808	20.91%	0.59	6,657,293	5,995,514	525
Oct-16	695,765	467,697	228,068	48.76%	2.42	6,870,954	5,978,275	525
Nov-16	681,276	618,348	62,928	10.18%	0.67	7,000,892	6,020,207	526
Dec-16	862,102	877,280	(15,178)	-1.73%	(0.16)	7,198,872	6,213,076	526
Jan-17	953,972	860,852	93,120	10.82%	0.99	7,133,088	6,177,507	526

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Modeling Results
Liberty Utilities
Commercial & Industrial Heating Capacity Exempt Volume (therm)

Actual, Projected, Residual (Therms/ Customer)					Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual R12	Projected R12	EMP
Feb-17	846,253	755,680	90,573	11.99%	0.96	7,022,717	6,117,860	526
Mar-17	893,468	861,584	31,884	3.70%	0.34	7,091,266	6,315,588	526
Apr-17	854,928	481,036	373,892	77.73%	3.96	7,242,491	6,239,580	526
May-17		363,531					6,249,571	527
Jun-17		255,186					6,263,568	527
Jul-17		226,202					6,263,054	526
Aug-17		229,567					6,263,815	526
Sep-17		291,924					6,288,886	526
Oct-17		477,867					6,299,055	526
Nov-17		653,318					6,334,025	526
Dec-17		867,780					6,324,525	526
Jan-18		969,878					6,433,551	526
Feb-18		866,310					6,544,181	525
Mar-18		768,149					6,450,746	525
Apr-18		539,031					6,508,742	525
May-18		362,808					6,508,018	525
Jun-18		254,411					6,507,243	525
Jul-18		225,407					6,506,449	525
Aug-18		228,786					6,505,668	525
Sep-18		291,183					6,504,927	524
Oct-18		477,188					6,504,248	524
Nov-18		652,718					6,503,649	524
Dec-18		867,273					6,503,142	525
Jan-19		969,473					6,502,737	525
Feb-19		866,005					6,502,432	525
Mar-19		767,943					6,502,225	525
Apr-19		538,920					6,502,114	525
May-19		362,780					6,502,086	525
Jun-19		254,451					6,502,127	525
Jul-19		225,496					6,502,215	525
Aug-19		228,900					6,502,329	525
Sep-19		291,303					6,502,449	525
Oct-19		477,296					6,502,557	525
Nov-19		652,800					6,502,639	525
Dec-19		867,316					6,502,682	525
Jan-20		969,466					6,502,675	525
Feb-20		865,944					6,502,614	524
Mar-20		767,822					6,502,494	524
Apr-20		538,737					6,502,311	524
May-20		362,534					6,502,065	524
Jun-20		254,145					6,501,759	524
Jul-20		225,134					6,501,397	524
Aug-20		228,489					6,500,986	524
Sep-20		290,851					6,500,534	524
Oct-20		476,811					6,500,050	524
Nov-20		652,292					6,499,542	523
Dec-20		866,795					6,499,021	523
Jan-21		968,943					6,498,497	523
Feb-21		865,430					6,497,983	523
Mar-21		767,330					6,497,490	523
Apr-21		538,279					6,497,032	523
May-21		362,125					6,496,623	523
Jun-21		253,799					6,496,276	523
Jul-21		224,866					6,496,009	523
Aug-21		228,317					6,495,836	523
Sep-21		290,785					6,495,771	524
Oct-21		476,863					6,495,822	524
Nov-21		652,469					6,495,999	524
Dec-21		867,102					6,496,306	524
Jan-22		969,386					6,496,750	524
Feb-22		866,004					6,497,324	525
Mar-22		768,033					6,498,027	525
Apr-22		539,113					6,498,861	525
May-22		363,083					6,499,820	525
Jun-22		254,874					6,500,895	526
Jul-22		226,047					6,502,076	526
Aug-22		229,594					6,503,352	526
Sep-22		292,144					6,504,712	527
Oct-22		478,293					6,506,141	527
Nov-22		653,957					6,507,629	527
Dec-22		868,636					6,509,164	528

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Modeling Results
Liberty Utilities
Commercial & Industrial Heating Capacity Exempt Volume (therm)

<u>Actual, Projected, Residual (Therms/ Customer)</u>				<u>Rolling 12-Month</u>		<u>Independent Variable</u>
<u>Plan Year</u>	<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>Project Error</u> %	<u>Standard</u> <u>Residual</u>
	Actual		Projected			
PY2011		5,626,180	6,500,351			5,966
PY2012		6,146,630	5,784,432			6,001
PY2013		6,547,729	6,303,340			6,050
PY2014		6,051,775	6,697,551			6,094
PY2015		6,355,047	6,756,154			6,173
PY2016		6,870,954	5,978,275			6,271
PY2017			6,299,055			6,315
PY2018			6,504,248			6,300
PY2019			6,502,557			6,296
PY2020			6,500,050			6,290
PY2021			6,495,822			6,280
PY2022			6,506,141			6,305
Growth						EMP
PY2012		520,450	(715,919)			35
PY2013		401,099	518,908			49
PY2014		(495,955)	394,211			44
PY2015		303,272	58,602			79
PY2016		515,907	(777,879)			98
PY2017			320,781			44
PY2018			205,193			(15)
PY2019			(1,691)			(4)
PY2020			(2,508)			(6)
PY2021			(4,227)			(10)
PY2022			10,319			24
Growth Rate (%)						
PY2012		9.3%	-11.0%			0.6%
PY2013		6.5%	9.0%			0.8%
PY2014		-7.6%	6.3%			0.7%
PY2015		5.0%	0.9%			1.3%
PY2016		8.1%	-11.5%			1.6%
PY2017			5.4%			0.7%
PY2018			3.3%			-0.2%
PY2019			0.0%			-0.1%
PY2020			0.0%			-0.1%
PY2021			-0.1%			-0.2%
PY2022			0.2%			0.4%

Modeling Results
Liberty Utilities
Commercial & Industrial Non-Heating Capacity Exempt Volume (therm)

Dependent Variable: CNZ_VOL
Method: AutoReg
Observations: 81

<u>Variables</u>	<u>DF</u>	<u>Estimate</u>	<u>Standard Error</u>	<u>t Value</u>	<u>Approx Pr > t </u>
NGPRCCI	1	(61,620.02)	26,286.40	(2.34)	0.02
LBF	1	4,675.97	567.19	8.24	0.00
AR1	1	(0.75)	0.08	(9.83)	0.00

Model Fitness:

Regress R-Square	0.8487
Total R-Square	0.9887
SSE	1,686,253,900,000.00
MSE	3,984,057.81
SBC	2,217.90
MAE	152,407.07
MAPE	8.83
Durbin-Watson	2.20
Root MSE	199,601.05
AIC	2,210.71
AICC	2,211.03
HQC	2,213.60

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Modeling Results
 Liberty Utilities
 Commercial & Industrial Non-Heating Capacity Exempt Volume (therm)

Actual, Projected, Residual (Therms/ Customer)					Rolling 12-Month		Independent Variable	
Date	Actual	Projected	Residual	Project Error %	Standard Residual	Actual_R12	Projected_R12	NGPRCCI
Aug-10	1,950,425	1,752,586	197,840	11.29%	1.00			12
Sep-10	1,826,173	1,864,006	(37,833)	-2.03%	(0.19)			12
Oct-10	2,115,185	1,850,825	264,360	14.28%	1.34			11
Nov-10	2,050,704	2,043,204	7,499	0.37%	0.04			11
Dec-10	1,907,995	1,933,388	(25,393)	-1.31%	(0.13)			12
Jan-11	1,827,172	1,916,189	(89,017)	-4.65%	(0.45)			11
Feb-11	1,907,952	1,800,526	107,426	5.97%	0.54			11
Mar-11	2,110,034	1,870,252	239,783	12.82%	1.21			11
Apr-11	1,850,023	1,988,623	(138,600)	-6.97%	(0.70)			12
May-11	1,995,780	1,826,791	168,990	9.25%	0.85			12
Jun-11	1,782,060	2,001,212	(219,153)	-10.95%	(1.11)			11
Jul-11	1,701,048	1,743,276	(42,229)	-2.42%	(0.21)	23,024,551	22,590,877	11
Aug-11	1,413,618	1,718,512	(304,894)	-17.74%	(1.54)	22,487,744	22,556,804	11
Sep-11	1,767,808	1,488,848	278,960	18.74%	1.41	22,429,380	22,181,646	12
Oct-11	2,004,594	1,813,821	190,773	10.52%	0.96	22,318,789	22,144,642	11
Nov-11	2,033,315	1,929,373	103,942	5.39%	0.53	22,301,400	22,030,811	11
Dec-11	2,241,951	2,001,627	240,324	12.01%	1.22	22,635,356	22,099,050	11
Jan-12	2,299,771	2,109,254	190,517	9.03%	0.96	23,107,955	22,292,114	11
Feb-12	2,112,414	2,172,699	(60,285)	-2.77%	(0.30)	23,312,417	22,664,287	11
Mar-12	2,023,473	2,018,762	4,712	0.23%	0.02	23,225,856	22,812,797	11
Apr-12	2,014,847	1,896,011	118,836	6.27%	0.60	23,390,680	22,720,185	13
May-12	2,039,560	2,057,651	(18,091)	-0.88%	(0.09)	23,434,460	22,951,046	11
Jun-12	1,893,625	2,006,852	(113,226)	-5.64%	(0.57)	23,546,025	22,956,685	10
Jul-12	1,670,038	1,857,060	(187,022)	-10.07%	(0.95)	23,515,015	23,070,469	11
Aug-12	1,752,436	1,667,871	84,565	5.07%	0.43	23,853,833	23,019,828	11
Sep-12	1,674,140	1,798,256	(124,116)	-6.90%	(0.63)	23,760,164	23,329,236	11
Oct-12	2,136,826	1,787,949	348,877	19.51%	1.76	23,892,396	23,303,364	10
Nov-12	1,970,019	2,067,175	(97,156)	-4.70%	(0.49)	23,829,101	23,441,166	10
Dec-12	1,976,534	1,929,474	47,059	2.44%	0.24	23,563,684	23,369,014	10
Jan-13	2,229,562	1,944,839	284,723	14.64%	1.44	23,493,474	23,204,599	10
Feb-13	1,920,009	2,130,286	(210,277)	-9.87%	(1.06)	23,301,070	23,162,187	10
Mar-13	2,110,187	1,845,939	264,248	14.32%	1.34	23,387,784	22,989,364	11
Apr-13	1,871,466	2,036,422	(164,956)	-8.10%	(0.83)	23,244,402	23,129,775	11
May-13	1,856,088	1,886,541	(30,454)	-1.61%	(0.15)	23,060,929	22,958,664	11
Jun-13	1,813,361	1,783,471	29,890	1.68%	0.15	22,980,665	22,735,283	12
Jul-13	1,657,259	1,719,538	(62,280)	-3.62%	(0.31)	22,967,885	22,597,761	13
Aug-13	2,166,005	1,649,582	516,423	31.31%	2.61	23,381,454	22,579,473	13
Sep-13	1,910,572	1,996,879	(86,307)	-4.32%	(0.44)	23,617,886	22,778,095	14
Oct-13	2,170,613	1,942,031	228,582	11.77%	1.16	23,651,673	22,932,177	12
Nov-13	2,066,684	2,151,992	(85,308)	-3.96%	(0.43)	23,748,337	23,016,993	11
Dec-13	1,916,097	1,961,194	(45,097)	-2.30%	(0.23)	23,687,900	23,048,713	12
Jan-14	1,940,652	1,915,030	25,622	1.34%	0.13	23,398,990	23,018,904	11
Feb-14	1,694,606	1,837,573	(142,967)	-7.78%	(0.72)	23,173,588	22,726,190	12
Mar-14	1,703,562	1,676,261	27,302	1.63%	0.14	22,766,963	22,556,512	13
Apr-14	1,588,728	1,622,362	(33,635)	-2.07%	(0.17)	22,484,225	22,142,453	14
May-14	1,913,786	1,660,741	253,045	15.24%	1.28	22,541,923	21,916,652	13
Jun-14	2,299,436	1,919,856	379,580	19.77%	1.92	23,027,998	22,053,037	12
Jul-14	1,989,796	2,161,616	(171,821)	-7.95%	(0.87)	23,360,535	22,495,116	12
Aug-14	2,147,301	1,919,894	227,407	11.84%	1.15	23,341,832	22,765,428	12
Sep-14	2,081,127	2,087,739	(6,613)	-0.32%	(0.03)	23,512,386	22,856,288	12
Oct-14	2,183,201	2,132,247	50,954	2.39%	0.26	23,524,974	23,046,505	10
Nov-14	2,113,837	2,080,504	33,332	1.60%	0.17	23,572,128	22,975,017	10
Dec-14	1,441,442	1,981,143	(539,702)	-27.24%	(2.73)	23,097,473	22,994,967	11
Jan-15	1,295,810	1,337,492	(41,682)	-3.12%	(0.21)	22,452,631	22,417,429	14
Feb-15	1,108,755	1,458,456	(349,701)	-23.98%	(1.77)	21,866,780	22,038,312	13
Mar-15	1,276,226	1,290,318	(14,091)	-1.09%	(0.07)	21,439,444	21,652,369	12
Apr-15	1,190,441	1,443,030	(252,589)	-17.50%	(1.28)	21,041,158	21,473,037	12
May-15	1,641,179	1,432,603	208,576	14.56%	1.05	20,768,551	21,244,900	10
Jun-15	1,893,529	1,727,511	166,018	9.61%	0.84	20,362,644	21,052,555	10
Jul-15	1,833,189	1,894,026	(60,837)	-3.21%	(0.31)	20,206,037	20,784,965	10
Aug-15	1,858,343	1,824,526	33,817	1.85%	0.17	19,917,079	20,689,597	10
Sep-15	1,730,089	1,894,401	(164,313)	-8.67%	(0.83)	19,566,041	20,496,259	10
Oct-15	2,090,840	1,838,404	252,436	13.73%	1.28	19,473,680	20,202,416	9
Nov-15	1,860,913	2,037,481	(176,569)	-8.67%	(0.89)	19,220,756	20,159,393	9
Dec-15	1,652,725	1,777,901	(125,177)	-7.04%	(0.63)	19,432,039	19,956,150	11
Jan-16	1,781,688	1,737,840	43,848	2.52%	0.22	19,917,917	20,356,498	10
Feb-16	1,195,855	1,857,253	(661,398)	-35.61%	(3.34)	20,005,017	20,755,295	9
Mar-16	1,194,944	1,435,614	(240,670)	-16.76%	(1.22)	19,923,734	20,900,592	8
Apr-16	1,542,099	1,382,765	159,333	11.52%	0.81	20,275,391	20,840,326	9
May-16	1,469,636	1,627,561	(157,925)	-9.70%	(0.80)	20,103,849	21,035,285	9
Jun-16	1,704,808	1,540,857	163,951	10.64%	0.83	19,915,128	20,848,631	10
Jul-16	1,653,546	1,629,084	24,462	1.50%	0.12	19,735,486	20,583,689	12
Aug-16	1,872,660	1,690,925	181,736	10.75%	0.92	19,749,803	20,450,087	12

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Modeling Results
Liberty Utilities
Commercial & Industrial Non-Heating Capacity Exempt Volume (therm)

<u>Actual, Projected, Residual (Therms/ Customer)</u>				<u>Project Error</u>		<u>Standard</u>	<u>Rolling 12-Month</u>		<u>Independent Variable</u>
<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>%</u>	<u>Residual</u>		<u>Actual_R12</u>	<u>Projected_R12</u>	<u>NGPRCCI</u>
Sep-16	1,746,095	1,864,248	(118,152)	-6.34%	(0.60)		19,765,810	20,419,934	12
Oct-16	1,737,462	1,854,201	(116,739)	-6.30%	(0.59)		19,412,431	20,435,730	10
Nov-16	1,734,980	1,781,459	(46,479)	-2.61%	(0.23)		19,286,499	20,179,708	10
Dec-16	1,599,948	1,747,868	(147,921)	-8.46%	(0.75)		19,233,722	20,149,676	11
Jan-17	1,546,398	1,687,092	(140,694)	-8.34%	(0.71)		18,998,432	20,098,928	10
Feb-17	1,510,127	1,615,922	(105,794)	-6.55%	(0.53)		19,312,704	19,857,596	11
Mar-17	1,521,070	1,666,085	(145,016)	-8.70%	(0.73)		19,638,829	20,088,067	10
Apr-17	1,453,959	1,615,051	(161,092)	-9.97%	(0.81)		19,550,690	20,320,353	10
May-17		1,545,960						20,238,751	10
Jun-17		1,580,026						20,277,921	11
Jul-17		1,504,758						20,153,594	13
Aug-17		1,559,736						20,022,405	13
Sep-17		1,610,019						19,768,176	13
Oct-17		1,742,275						19,656,251	11
Nov-17		1,765,453						19,640,244	11
Dec-17		1,748,148						19,640,524	12
Jan-18		1,813,233						19,766,665	11
Feb-18		1,805,130						19,955,874	11
Mar-18		1,882,589						20,172,378	10
Apr-18		1,877,168						20,434,495	11
May-18		1,853,674						20,742,209	11
Jun-18		1,798,193						20,960,376	12
Jul-18		1,647,296						21,102,915	14
Aug-18		1,653,664						21,196,843	14
Sep-18		1,668,050						21,254,874	14
Oct-18		1,780,066						21,292,665	12
Nov-18		1,781,194						21,308,405	12
Dec-18		1,744,999						21,305,256	13
Jan-19		1,800,016						21,292,038	12
Feb-19		1,781,701						21,268,609	12
Mar-19		1,858,380						21,244,399	11
Apr-19		1,847,251						21,214,483	11
May-19		1,818,340						21,179,149	12
Jun-19		1,755,995						21,136,952	13
Jul-19		1,590,689						21,080,344	16
Aug-19		1,595,582						21,022,262	16
Sep-19		1,609,544						20,963,756	15
Oct-19		1,728,795						20,912,486	13
Nov-19		1,727,534						20,858,826	13
Dec-19		1,686,765						20,800,593	14
Jan-20		1,750,655						20,751,232	13
Feb-20		1,730,226						20,699,757	13
Mar-20		1,812,068						20,653,445	12
Apr-20		1,799,592						20,605,786	12
May-20		1,768,456						20,555,902	13
Jun-20		1,701,617						20,501,523	14
Jul-20		1,523,757						20,434,592	17
Aug-20		1,528,626						20,367,635	17
Sep-20		1,543,346						20,301,437	16
Oct-20		1,670,840						20,243,482	14
Nov-20		1,668,150						20,184,098	14
Dec-20		1,623,658						20,120,991	15
Jan-21		1,749,441						20,119,777	13
Feb-21		1,728,832						20,118,383	13
Mar-21		1,811,262						20,117,578	12
Apr-21		1,798,710						20,116,695	12
May-21		1,767,178						20,115,417	13
Jun-21		1,699,623						20,113,423	14
Jul-21		1,520,510						20,110,176	17
Aug-21		1,525,721						20,107,270	17
Sep-21		1,540,871						20,104,795	17
Oct-21		1,669,950						20,103,904	15
Nov-21		1,668,303						20,104,058	15
Dec-21		1,624,194						20,104,594	15
Jan-22		1,758,044						20,113,196	13
Feb-22		1,737,790						20,122,155	13
Mar-22		1,820,470						20,131,363	12
Apr-22		1,808,154						20,140,808	12
May-22		1,776,448						20,150,078	13
Jun-22		1,708,525						20,158,979	14
Jul-22		1,529,435						20,167,905	17
Aug-22		1,534,898						20,177,082	17
Sep-22		1,550,222						20,186,434	17
Oct-22		1,679,891						20,196,375	15
Nov-22		1,679,521						20,207,593	15
Dec-22		1,636,049						20,219,448	15

Modeling Results
Liberty Utilities
Commercial & Industrial Non-Heating Capacity Exempt Volume (therm)

<u>Actual, Projected, Residual (Therms/ Customer)</u>				<u>Project Error</u>		<u>Standard</u>	<u>Rolling 12-Month</u>		<u>Independent Variable</u>
<u>Plan Year</u>	<u>Date</u>	<u>Actual</u>	<u>Projected</u>	<u>Residual</u>	<u>%</u>	<u>Residual</u>	<u>Actual_R12</u>	<u>Projected_R12</u>	<u>NGPRCCI</u>
	Actual		Projected						NGPRCCI
PY2011		22,318,789	22,144,642						136
PY2012		23,892,396	23,303,364						132
PY2013		23,651,673	22,932,177						139
PY2014		23,524,974	23,046,505						143
PY2015		19,473,680	20,202,416						130
PY2016		19,412,431	20,435,730						121
PY2017			19,656,251						134
PY2018			21,292,665						145
PY2019			20,912,486						157
PY2020			20,243,482						169
PY2021			20,103,904						173
PY2022			20,196,375						173
Growth									
PY2012		1,573,607	1,158,722						(4)
PY2013		(240,723)	(371,187)						6
PY2014		(126,699)	114,328						4
PY2015		(4,051,294)	(2,844,089)						(13)
PY2016		(61,249)	233,315						(9)
PY2017			(779,480)						12
PY2018			1,636,414						12
PY2019			(380,179)						12
PY2020			(669,003)						12
PY2021			(139,578)						3
PY2022			92,471						0
Growth Rate (%)									
PY2012		7.1%	5.2%						-2.7%
PY2013		-1.0%	-1.6%						4.8%
PY2014		-0.5%	0.5%						3.1%
PY2015		-17.2%	-12.3%						-9.0%
PY2016		-0.3%	1.2%						-6.6%
PY2017			-3.8%						10.3%
PY2018			8.3%						8.6%
PY2019			-1.8%						8.2%
PY2020			-3.2%						7.7%
PY2021			-0.7%						1.8%
PY2022			0.5%						0.0%

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APPENDIX 2 ENERGY EFFICIENCY

APPENDIX 2

Energy Efficiency

Energy efficiency is a priority for the Company and is a key strategy for building a modern and sustainable energy future. Since 2003, EnergyNorth has partnered with the New Hampshire natural gas and electric utilities to manage and administer a statewide portfolio of Energy Efficiency Programs, also known as NHSaves. During this period, customers in New Hampshire have saved over 27.7 million natural gas MMBtus and 13 billion electric kilowatt-hours over the life of the energy efficiency measures installed. These energy savings have resulted in customer cost savings of \$2.2 billion. EnergyNorth's investment during this period has been over \$46 million with lifetime natural gas MMBtu savings of nearly 22 million.

The Company, through NHSaves, offers a suite of efficiency solutions designed to meet the varied needs of our customers, including helping homeowners to retrofit and reinsulate their homes, helping businesses install more efficient boiler, water heating and control systems, and helping municipal and school districts better manage their energy needs. Table 2-1 summarizes the current NHSaves program offerings:

Table 2-1: NHSaves Program Offerings

Program	Measure-Level Examples	Incentives
<i>Residential Sector</i>		
ENERGY STAR Homes	New construction measures beyond current building code standards	Builder training and verification of code+ measure installations
ENERGY STAR Products	High-efficient heating, water heating and control systems	Varies by product: \$150 up to \$1,500
Home Energy Assistance	Low income air sealing, weatherization and electrical measures	No cost service
Home Energy Reports	Individual energy usage information, comparing performance amongst homes	Free
Home Performance with ENERGY STAR	Audit, air sealing and weatherization measures	50% rebate up to \$4,000
<i>Non-Residential Sector</i>		
Small Business	Boilers, furnaces, water heaters, controls, faucet aerators, pre-rinse spray valves and weatherization measures	Up to 75% of project costs
Large Business	Custom boiler, water heating, steam traps, process, thermal envelope applications & technical assistance	Up to 50% of project costs

APPENDIX 2 ENERGY EFFICIENCY

The NHSaves programs are adaptable to unique efficiency opportunities, provide turnkey solutions to help identify savings opportunities for customers, and assist with measure installations. The programs have an education and workforce training component, and the utilities engage with numerous market actors such as architects, builders, distributors, installers, product manufacturers, and retailers to help drive customer activity.

Examples of how NHSaves programs are currently benefiting NH customers follows:

- Working with Home Energy Raters and private builders to incent the construction of highly efficient homes using 15-20 percent less energy compared to a standard new home;
- Providing incentives for investments in air-sealing and weatherization in existing homes performed by qualified private contractors to reduce homeowner's heating costs by more than 15 percent;
- Helping income qualified customers receive insulation, air-sealing and other weatherization work, saving them about \$350 per year on energy costs, through our collaboration with the New Hampshire Office of Strategic Initiatives Weatherization Assistance Program and the Community Action Agencies around the state;
- Helping customers invest in highly efficient natural gas products, saving 10 percent to 20 percent of the energy used if they had purchased standard models, by working with equipment distributors, suppliers and heating system contractors across the state to on education, incentive and training programs;
- Helping small and large business and non-profit agencies identify and install more efficient natural gas controls, heating equipment and industrial process equipment. These energy efficiency improvements are implemented in partnership with private contractors throughout the state who help the business sector reduce energy use and save significantly on energy bills, resulting in more money be available to invest in their businesses and agencies;
- Focusing special attention on energy savings opportunities with municipalities which helps to save energy in public buildings, reducing overall costs to taxpayers; and
- Working with local financial institutions to introduce a private lending program to assist customers in making energy efficiency investments and helping better address the up-front cost of projects.

Impact of the NHSaves Programs on Energy Consumption

Table 2-2 summarizes EnergyNorth's annual and lifetime MMBtu savings, customer participation, and program costs and benefits for the period of 2003 through 2016. During this time, over \$46 million in energy efficiency investments have been made, resulting in nearly 22 million lifetime MMBtu savings at a benefit value of almost \$193 million.

Table 2-2: NHSaves Program Results – EnergyNorth, 2003 - 2016

Year	Annual MMBtu Savings	Lifetime MMBtu Savings	EE Measures/ Participants	Utility Costs (000's)	Benefits (000's)
2003	37,668	577,895	2,959	\$929	\$5,085
2004	72,609	1,113,961	3,594	\$1,584	\$9,803
2005	75,700	1,161,377	6,198	\$1,740	\$10,220

APPENDIX 2 ENERGY EFFICIENCY

Year	Annual MMBtu Savings	Lifetime MMBtu Savings	EE Measures/ Participants	Utility Costs (000's)	Benefits (000's)
2006	84,366	1,294,334	6,396	\$1,830	\$11,390
2007	152,840	2,344,840	5,578	\$1,628	\$20,634
2008	96,930	1,487,083	2,666	\$2,652	\$13,086
2009	120,588	2,095,844	4,110	\$2,485	\$19,000
2010	78,227	1,499,657	4,192	\$3,584	\$16,933
2011	75,747	1,257,675	2,050	\$3,338	\$11,906
2012	148,267	2,046,801	3,214	\$6,226	\$14,659
2013	115,340	1,647,299	2,765	\$4,589	\$16,898
2014	116,946	1,757,567	2,627	\$5,314	\$13,375
2015	144,485	1,878,813	31,180	\$5,177	\$13,976
2016	110,177	1,773,980	31,093	\$4,980	\$16,079
2003 - 2016	1,429,891	21,937,125	108,622	\$46,055	\$193,043

Table 2-3 details EnergyNorth's annual and lifetime MMBtu savings, customer participation, and program cost and benefits by customer program and sector for its most recently completed program year of 2016. Based on these results, the Company saved energy at an average cost of \$0.31 cents¹ per lifetime therm, as compared to the current average Tier 2 retail price per therm of \$0.86, as of September 7, 2016 (New Hampshire Office of Strategic Initiatives). This represents a simple benefit/cost ratio on program investments of 3.1 to 1.

¹ Value calculated by dividing the total program costs and utility performance incentive (\$4,979,871 + \$437,305) by (Lifetime MMBtu savings achieved (1,773,980) x 10 to convert MMBtus to Therms).

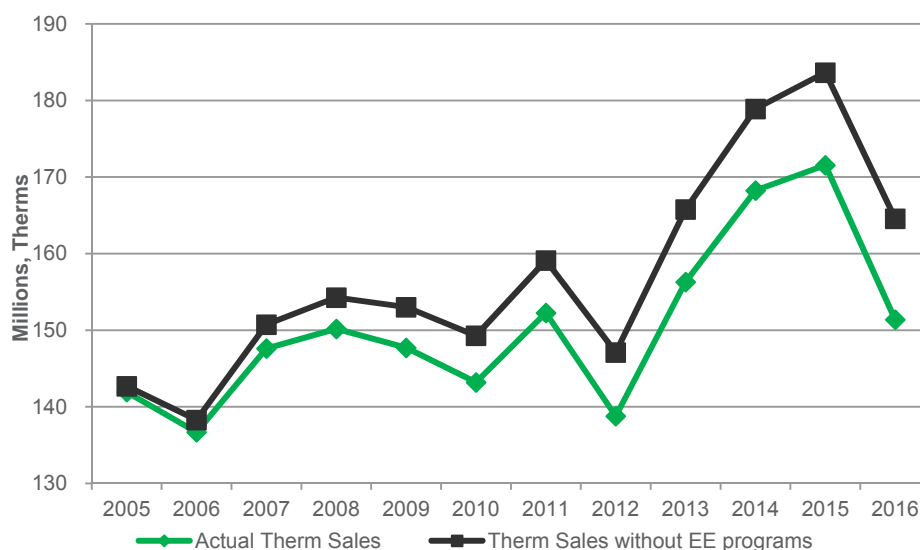
APPENDIX 2 ENERGY EFFICIENCY

Table 2-3: NHSaves Programs Results – EnergyNorth, 2016

Sector/Program	Annual MMBtu Savings	Lifetime MMBtu Savings	EE Measures / Participants	Utility Expenditures (000's)	Benefits (000's)
Residential Sector					
ENERGY STAR Homes	938	23,438	41	\$99	\$1,261
ENERGY STAR Products	16,658	283,075	1,569	\$971	\$2,428
Home Energy Assistance	6,998	142,640	246	\$1,004	\$1,305
Home Energy Reports	9,622	30,030	25,000	\$245	\$227
Home Performance with ENERGY STAR	13,901	311,156	668	\$479	\$2,538
Residential Total	48,116	790,338	27,524	\$2,798	\$7,758
Commercial & Industrial Sector					
Large Business	41,330	633,340	1,162	\$1,362	\$5,823
Small Business	20,732	350,303	2,407	\$796	\$2,498
C&I Education	-	-	-	\$24	-
C&I Total	62,061	983,642	3,569	\$2,182	\$8,321
Overall Total	110,177	1,773,980	\$31,093	\$4,980	\$16,079

The 2016 annual MMBtu savings are approximately 0.73 percent of EnergyNorth's total billed delivery MMBtu sales in 2016 (1,101,770 / 151,496,926). The average life of the installed energy efficiency measures is 16.10 years. Thus, the savings associated with the measures installed in 2016 will continue well into the future and the cumulative impact of the programs will become more significant over time. As illustrated in Figure 2-1, the cumulative impact of the NHSaves Programs over the past twelve years has resulted in a decline of delivered therm sales of 8.7 percent in 2016.

Figure 2-1: Cumulative Impact of NHSaves Program Savings on EnergyNorth Annual Therm Sales



APPENDIX 2 ENERGY EFFICIENCY

In addition to the direct energy benefits to customers, the NHSaves programs also result in:

- *Reduced Emissions* – energy efficiency measures help decrease energy consumption, which reduces carbon dioxide emissions, airborne mercury, and other harmful pollutants that cause illnesses as power plants burn fewer fossil fuels to meet lower demand. This reduction in emissions helps create various health and well-being benefits including reduced symptoms of respiratory and cardiovascular conditions, rheumatism, arthritis, allergies, and fewer injuries. For reference, the cumulative emission reduction impact of EnergyNorth's programs from 2003 to date is the equivalent to taking 245,687 passenger vehicles off the road for a year.²
- *Creating jobs* – Spending on energy-efficient technologies and services supports the local workforce. According to a study from the Political Economy Research Institute (PERI) of the University of Massachusetts at Amherst (2012)³, every million dollars spent on energy-efficient measures, such as building retrofits, supports seven direct jobs and 4.9 indirect jobs. Using this calculation, EnergyNorth's investment in energy efficiency since 2003 supported 547 full time equivalents (FTEs) or 1.1 million work hours (using 2,080 hours for each FTE).
- *Other Non-Energy Impacts* - Those who participate in the NHSaves programs also realize benefits such as improved air quality, increased comfort, improved performance and productivity, reduced maintenance costs, improved building value, and healthier and more comfortable buildings in which to live and work (Figure 2-2). These benefits are particularly important to income-eligible and moderate-income customers, who spend higher portions of their household budgets on energy and housing costs.

² Environmental Protection Agency (2017). "Greenhouse Gas Equivalency Calculator". Retrieved from <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>; Value computed based on 21,937,125 lifetime MMBtu's of natural gas saved by EnergyNorth Natural Gas EE programs from 2002 to 2016. Passenger vehicles are defined as 2-axle 4-tire vehicles, including passenger cars, vans, pickup trucks, and sport/utility vehicles.

³ Burr, A., Majerski, C., Stellberg, S., Garrett-Peltier, H. (2012, March). "Analysis of Job Creation and Energy Cost Savings". Retrieved from http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/PERI-IMT-2012-Analysis_Job_Creation.pdf

APPENDIX 2 ENERGY EFFICIENCY

Figure 2-2: Additional Benefits from Energy Efficiency



Energy Efficiency Resource Standard

On August 2, 2016, the Commission issued Order 25,932 and adopted an Energy Efficiency Resource Standard (“EERS”), which established energy savings goals as a percentage of the NH Utilities’ retail sales. This order set increasing energy efficiency goals and provided a funding mechanism to reach these new goals. The approved EERS framework consists of 3-year planning periods with associated savings goals and a long-term goal to pursue all cost-effective energy efficiency opportunities and measures.

The cumulative energy savings goal over the 3-year planning period is 2.25 percent of retail natural gas sales, relative to a 2014 baseline. When compared to the previous three years of 2015, 2016, and 2017, the statewide NHSaves programs goals for the New Hampshire Utilities for 2018, 2019, and 2020 will increase by approximately 78,000 MMBtu.

The EERS will allow the New Hampshire Utilities to reach more customers and also drive expanded partnerships to achieve more comprehensive energy efficiency. New initiatives to achieve these goals include a residential energy audit option, a financing option for moderate income residents, new measure offerings in both residential and commercial programs, and multi-year energy planning to encourage long-term energy savings projects among large commercial customers.

APPENDIX 2 ENERGY EFFICIENCY

Table 2-4 below depicts a comparison of the proposed program targets and funding levels for the Company under the new EERS over the 2018-2020 period as part of Docket No. DE 17-136,⁴ and the previous three-year period.

Table 2-4: Comparison to Previous 3-Year Period

EnergyNorth Programs	2015-2017	2018-2020
Cumulative Lifetime MMBtu Savings	5,108,388	5,851,269
Cumulative Annual MMBtu Savings	351,973	415,081
Cumulative Annual Savings as a % of 2014 Delivery Sales	2.17%	2.55%
Cumulative Program Funding	\$18,063,490	\$24,769,671
Program Cost per Lifetime MMBTU Savings	\$3.54	\$4.23

⁴ New Hampshire Public Utilities Commission, DE 17-136 (September 1, 2017). "2018-2020 New Hampshire Statewide Energy Efficiency Plan." Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2017/17-136/INITIAL%20FILING%20-%20PETITION/17-136_2017-09-01_NHUTILITIES_EE_PLAN.PDF

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APPENDIX 3 DAILY REGRESSION MODEL

APPENDIX 3

Description of the Daily Regression Model

The Company developed a linear-regression equation using data for the reference-year period April 1, 2016, through March 31, 2017. Its regression equation uses daily sales and capacity-assigned volumes as its dependent variable and temperature as its independent variable.¹

Normalized daily sendout is calculated using that regression equation. Specifically, the actual daily firm sendout is regressed against HDD data, HDD data lagged over two days, and a weekend dummy variable. These variables were selected for the regression analysis because, based on the Company's experience, they are relevant explanatory variables underlying daily sales and capacity-assigned volumes.

The Manchester, New Hampshire weather station is the source of the weather data that is used as the principal explanatory variable in its regression equations. The Manchester weather station was selected because it is close to the center of the Company's service territory, on a load-weighted basis. Specifically, the HDD value for each 24-hour period of 10 a.m. to 10 a.m. (i.e., the gas day) corresponds to the same daily period of observations of the sendout data.

After reviewing the historical relationship (and results of the regression analyses) between sales and capacity-assigned volumes and HDD over the split years 2006/07 through 2016/17 (see Table 3-1, below), the Company decided to estimate the regression equation as a segmented model. A segmented model is a "regression model where the relationships between the response and one or more explanatory variables are piecewise linear, namely represented by two or more straight lines connected at unknown values: these values are usually referred as breakpoints."² That is, the model may have a different slope before and after a breakpoint. Since a significant portion of the Company's sendout is due to spaceheating usage and spaceheating only occurs when average air temperatures fall below a certain level, the segmented model was used for modeling the relationship between daily sales and capacity-assigned volumes and HDD. Stated differently, as the air temperature falls to a certain level (i.e., a breakpoint), customers' usage patterns change. To reflect that relationship, a segmented model was used. This form of regression equation is the same that the Company used in its 2010 and 2013 Integrated Resource Plans (DG 10-041 and DG 13-313).

Frequency plots were created to review the relationship between customer usage and the day of the week. From the frequency plots (periodogram) of the residuals of the sales and capacity-assigned volumes vs. HDD regression, the Company continues to observe a significant peak at frequency 0.14 (and its harmonic at 0.28), which indicates a correlation in the error term once in 1/0.14, or seven days, confirming the Company's observations that weekday and weekend sendout requirements are different at similar HDD levels. Examining the average of the residuals by day of the week, the Company again used a second independent variable, a weekday/weekend dummy variable set to zero for Mondays through Thursdays, one on Fridays and Sundays, and two on Saturdays. The introduction of this second independent variable adds an incremental improvement in the adjusted R² of the equations and, more importantly, eliminates the seven-day correlation of the residuals. The sign of the coefficient (negative)

¹ Sendout includes both sales and capacity-assigned transportation customer requirements.

² Segmented: an R package to fit regression models with broken-line relationships, R News, Volume 8/1, May 2008, page 20.

APPENDIX 3 DAILY REGRESSION MODEL

implies that there is a reduction in sendout on weekend days versus weekday days at similar temperatures, as has been observed by the Company.

Again, the Company observed a correlation between lagged temperature and the residuals of the above equation and it investigated adding a third independent variable. Its three choices were: (1) the difference between HDD on day t and HDD on day t-1, (2) the difference between HDD on day t and mean of the HDD on day t-1 and day t-2, or (3) the difference between HDD on day t and the mean of the HDD on day t-1 and day t-2 and day t-3. The differences were used in lieu of the actual lagged values to avoid correlation among the independent variables. The Company chose option (2) as the optimal additional independent variable. The underlying theory of this analysis is that heating requirements increase as two consecutive days of cold weather occur, which cools down structures to a greater degree than would be experienced on a single day. The negative sign of the coefficient implies that, if a day is colder than the average of the previous two days, the increase in sendout will be somewhat lower than what would be forecast without the coefficient, and vice versa.

The table below lists the coefficients for the final regression equation form. As noted above, the 2016/17 regression equation was used to allocate its monthly forecast volumes to its daily forecast volumes. In the table below, Intercept is the Dth sendout predicted at HDD=0, Slope1 is the Dth/HDD usage below the Breakpoint HDD level, Slope2 is the incremental Dth/HDD usage above the Breakpoint HDD level, the Standard Error is expressed in Dth, and the Breakpoint HDD is the HDD value at which spaceheating equipment is observed to turn on. The signs of the Slope1 and Slope2 coefficients (positive) imply that as temperatures get colder and HDD increases in value, then sendout will increase, which agrees with what the Company observes.

Table 3-1: Daily Segmented Regression Model Results

Split Year	Intercept	Slope1	Slope2	Weekend	Lagged Delta HDD	Standard Error	Adjusted R ²	Breakpoint HDD
2006/07	13821.97	332.57	1640.84	-1988.96	-230.03	2577	0.9904	10.24
2007/08	12691.10	323.95	1598.45	-1692.66	-260.81	2479	0.9911	9.245
2008/09	12966.30	381.04	1571.44	-2042.38	-317.73	2511	0.9918	10.247
2009/10	12351.09	324.77	1693.18	-2015.95	-271.09	2688	0.9882	10.202
2010/11	13017.19	317.34	1597.81	-2280.08	-273.08	2587	0.9911	9.592
2011/12	13057.03	384.43	1604.85	-2351.78	-306.33	2502	0.9880	10.022
2012/13	13446.66	350.30	1764.66	-2250.40	-318.18	2867	0.9882	10.609
2013/14	12934.94	337.58	1569.72	-1660.49	-342.18	3380	0.9869	8.622
2014/15	14383.78	403.82	1435.11	-2169.73	-314.66	5123	0.9695	8.793
2015/16	16040.07	433.66	1944.89	-2748.38	-488.13	5224	0.9667	8.933
2016/17	15605.63	449.13	1774.94	-2051.89	-421.72	4102	0.9801	9.516

The table above sets forth the 2016/17 regression coefficients for EnergyNorth. The functional form of the equation, in pseudocode, is:

APPENDIX 3 DAILY REGRESSION MODEL

```
Sendout = Intercept Coefficient +  
Weekend Dummy Coefficient * Weekend Dummy Variable +  
Slope1 Coefficient * min(HDD~t~, Breakpoint HDD) +  
if(HDD~t~<=Breakpoint HDD) {0} else {(Slope1 Coefficient + Slope2 Coefficient) *  
  (HDD~t~ - Breakpoint HDD)} +  
Lagged Delta HDD Coefficient * (HDD~t~ - average(HDD~t-1~, HDD~t-2~))
```

As seen above, the adjusted R^2 value for the 2016/17 regression is 0.980, and all the t-statistics of the independent variables are greater than 2.0, indicating that these variables are significant at the 95-percent level.

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APPENDIX 4 MONTE CARLO ANALYSIS

APPENDIX 4

Description of the Monte Carlo Analysis

A Monte Carlo simulation method was used to generate synthetic daily HDD values for Manchester, NH for purposes of establishing its Design Year planning standards. The application of the Monte Carlo method allows for a much larger time series of daily temperature values on which to base the planning standards.

The Monte Carlo methodology generally implies the generation of a dataset of synthetic values, larger than a given dataset of actual observations, based on the observed statistical properties of the actual dataset. The larger size of the synthetic dataset (4,096 simulated years) can assist in the determination of a better approximation of average expected temperatures (i.e., normal weather) as well as the likelihood of extreme weather events, such as those the Company seeks to define in its design standards.

In developing a time series of daily temperature values much larger than the Company's existing actual historical observations from 1979 through 2016, specific consideration had to be given than to generate 365 random values for each year of the synthetic dataset. First, consideration of the seasonality of temperature values had to be given. Second, consideration of the interdependence of one day's temperature value with the prior day's value had to be given, as well. To generate its set of synthetic data values, the Company chose to model its temperature data using a first-order autoregressive process (denoted AR(1)).

Letting X_t denote the temperature value on the t^{th} day, the AR(1) process requires that the conditional probability distribution of X_t , given the past record of observed temperatures, X_{t-1}, X_{t-2}, \dots , depends only on X_{t-1} , the observed temperature value for the previous day. This property can be expressed as:

$$X_t - \mu = \Phi(X_{t-1} - \mu) + \varepsilon_t, \quad (1)$$

where the daily temperature values are expressed in terms of deviations from their common mean μ , and Φ denotes the first-order autocorrelation coefficient. The error terms (ε_t) in equation (1) are assumed to constitute a "white-noise process"; that is, they are uncorrelated random variables with zero mean and constant variance σ_ε^2 . It is further assumed that the ε_t are normally distributed [denoted $N(0, \sigma_\varepsilon^2)$].

The first-order autocorrelation coefficient Φ measures the degree of dependence between the temperature values on consecutive days, X_{t-1} and X_t . A value of $\Phi = 0$ implies that X_{t-1} and X_t are uncorrelated (i.e., X_t is completely unpredictable from the past record of daily temperatures), whereas a value of $\Phi = 1$ or -1 implies that the X_t are perfectly correlated (i.e., X_t is completely predictable). For daily temperature time series, typically $0 < \Phi < 1$, meaning that the X_t are positively, but not perfectly, correlated. An AR(1) process is stationary (i.e., all the joint probability distributions of the X_t are time invariant) if $|\Phi| < 1$.

The requirement that the error term ε_t is normally distributed implies that the daily temperature X_t also is normally distributed. Letting σ^2 denote the variance of X_t , it is straightforward to show that σ^2 is related to σ_ε^2 , the variance of an error term, by

$$\sigma_\varepsilon^2 = (1 - \Phi^2) \sigma^2 \quad (2)$$

APPENDIX 4 MONTE CARLO ANALYSIS

We see by equation (2), that the stronger the dependence between X_{t-1} and X_t , the greater the reduction in the variance of an error term relative to the variance of daily temperature. More importantly, (2) implies that an AR(1) process can be completely characterized in terms of three parameters, μ , Φ and σ^2 .

The Company used the dataset of thirty-eight calendar years of daily average air temperature (in °F; 1977 through 2016) at the Manchester, NH airport as the source data for its Monte Carlo analysis. For the purposes of this analysis, the data for leap days were removed. To begin its analysis, the Company determined the annual (365-day) cycle in the dataset Fourier analysis and removed it from the input dataset (i.e. it “deseasonalized” the temperature pattern over the course of the year) to conduct its analysis on the variations in temperature about the long-term mean values. The Company then calculated Φ , the first-order autocorrelation coefficient, over the entire dataset of deseasonalized daily average temperatures. For each calendar day, the Company then computed the mean and standard deviation values (32 observations per day) to establish the μ and σ^2 parameters required for its AR(1) process.

To create 4,096 years of synthetic daily temperature time series, the Company generated 365 random HDD deviation values (January 1st – December 31st) denoted by $X'1$, $X'2$, ..., $X'365$, from the AR(1) process. The initial daily temperature deviation value (for the day of January 1st), $X'1$ was produced from the $N(\mu, \sigma^2)$ normal distribution by means of a random number generator. Each subsequent daily temperature deviation value, $X'n$, was produced using Equations (1) and (2) from the $N(\mu, \sigma^2)$ normal distribution by means of a random number generator and the first-order autocorrelation coefficient Φ . Finally, the entire Monte Carlo data series was re-seasonalized by adding back in the 365-day seasonal component removed at the beginning of the analysis.

The results of the Monte Carlo analysis establish the mean expected annual HDD as approximately 6,314 with a standard deviation of approximately 277 HDD.

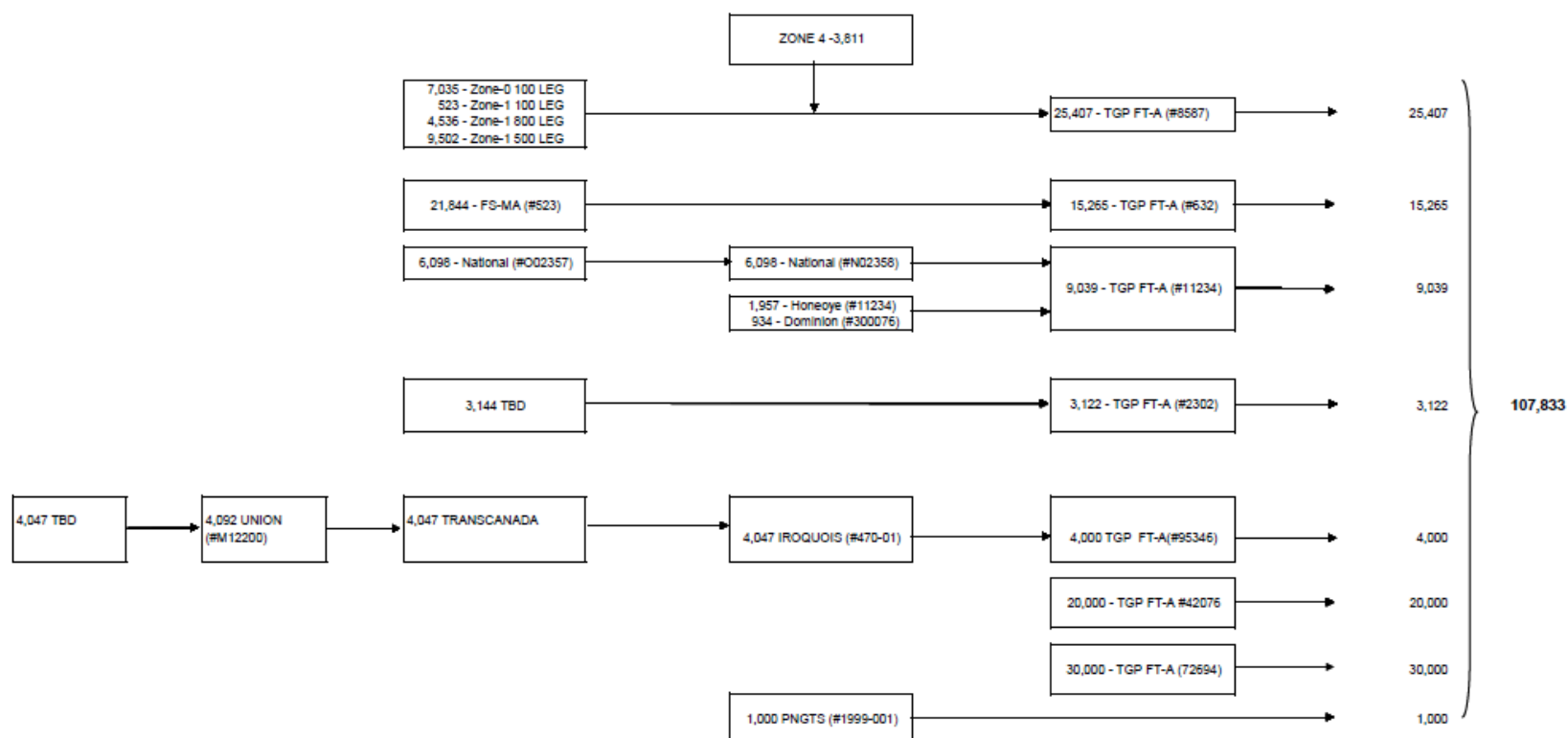
The results of the Monte Carlo analysis establish the mean expected coldest day as 4.27 °F (60.73 HDD) with a standard deviation of 5.33 °F.

APPENDIX 5 EXISTING RESOURCE PORTFOLIO

APPENDIX 5

Existing Supply Resource Portfolio

LIBERTY UTILITIES (ENERGYNORTH NATURAL GAS) CORP.
Transportation Available for Pipeline Supply and Storage
(MMBtu)



APPENDIX 5 EXISTING RESOURCE PORTFOLIO

LIBERTY UTILITIES (ENERGYNORTH NATURAL GAS) CORP.
Transportation Available for Pipeline Supply and Storage
(MMBtu)

Agreements for Gas Supply and Transportation

SOURCE	RATE SCHEDULE	CONTRACT NUMBER	TYPE	MDG MMBTU	MAQ * MMBTU	EXPIRATION DATE	NOTIFICATION DATE	RENEWAL OPTIONS
Niagara	NA	NA	Supply	3,147	1,148,655	3/31/2018	N/a	Terminates
ANE	NA	NA	Supply	4,047	611,097	Peak Only	N/a	Terminates
ENGIE	FCS		Firm Combination Liquid and Vapor Svc	Up to 7 trucks	630,000	3/31/2018 Peak Only	-	Terminates
Dracut or Z5	NA	NA	Supply	Up to 20,000 / day	1,412,000	2/28/2018	-	Terminates
TGP Long-Haul	NA	NA	Supply	21,596	3,908,876	4/30/2018	N/a	Terminates
Northern Transport	NA	NA	Trucking	28,500 Gallons	900,000 Gallons		N/a	Terminates
Dominion Transmission Incorporated	GSS	300076	Storage	934	102,700	3/31/2021	3/31/2019	Mutually agreed upon
Honeye Storage Corporation	SS-NY	11234	Storage	1,957	245,380	3/31/2020	12 months notice	Evergreen Provision
National Fuel Gas Supply Corporation	FSS	002358	Storage	6,098	670,800	3/31/2019	3/31/2018	Evergreen Provision
National Fuel Gas Supply Corporation	FSST	N02358	Transportation	6,098	670,800	3/31/2019	3/31/2018	Evergreen Provision
Iroquois Gas Transmission System	RTS	47001	Transportation	4,047	1,477,155	11/1/2018	11/1/2017	Evergreen Provision
Portland Natural Gas Transmission System	FT 1999-01	1999-001	Transportation	1,000	365,000	10/31/2019	10/31/2018	Evergreen Provision
Tennessee Gas Pipeline Company	FS-MA	523	Storage	21,844	1,560,391	10/31/2020	10/31/2019	Evergreen Provision
Tennessee Gas Pipeline Company	FTA	8587	Transportation	25,407	9,273,555	10/31/2020	10/31/2019	Evergreen Provision
Tennessee Gas Pipeline Company	FTA	2302	Transportation	3,122	1,139,530	10/31/2020	10/31/2019	Evergreen Provision
Tennessee Gas Pipeline Company	FTA	632	Transportation	15,265	5,571,725	10/31/2020	10/31/2019	Evergreen Provision
Tennessee Gas Pipeline Company	FTA	11234	Transportation	9,039	3,299,235	10/31/2020	10/31/2019	Evergreen Provision
Tennessee Gas Pipeline Company	FTA	72694	Transportation	30,000	10,950,000	10/31/2029	10/31/2029	Evergreen Provision
Tennessee Gas Pipeline Company	FTA	95346	Transportation	4,000	1,460,000	11/30/2021	11/30/2020	Evergreen Provision
Tennessee Gas Pipeline Company	FTA	42076	Transportation	20,000	7,300,000	10/31/2020	10/31/2019	Evergreen Provision
TransCanada Pipeline	FT	41232	Transportation	4,047	1,477,155	10/31/2022	10/31/2020	Evergreen Provision
Union Gas Limited	M12	M12200	Transportation	4,092	1,493,580	10/31/2022	10/31/2020	Evergreen Provision

* MAQ is calculated on a 365 day calendar year.

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	55740	Injection Cost	48	Transportation Cost	2311	JAN 19, 2018	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	156.82
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	156.82
Total Variable	55767	Total Variable	94	Total Variable	2311		
Demand/Reservation Co	11129	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11224	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	66991	Net Storage Cost	1762	Net Trans Cost	17620	Total Gas Cost	86374
						Total Revenue	0
						Net Cost	86374

Avg Cost of Served Demand 5.525 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.221 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary									
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served
ENGIDesign	15634.1	0.0	15634.1	0.0	15634.1	15634.1	0.0	0	156.8
Total	15634.1	0.0	15634.1	0.0	15634.1	15634.1	0.0	0	156.8

Supply Summary									
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost
ENGUSGC	2377.8	18250.0	15872.2			3.0110	7160	0	7160
ENGNiagara	1146.6	1167.3	20.6			2.3679	2715	0	2715
ENGPNGTS	84.0	84.0	0.0			4.2010	353	0	353
ENG3Winter	80.8	91.7	10.9			15.0000	1212	0	1212
ENG-Z4	6570.3	6690.4	120.1			2.3201	15243	0	15243
Dracut 20	210.6	7300.0	7089.4			6.5638	1382	0	1382
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691
DLiqSummer	21.0	21.0	0.0						
ENG Dawn	764.2	2190.0	1425.8			3.1700	2423	0	2423

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REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary

Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	662.2	662.2	0.0							
Dracut 30	3255.4	10950.0	7694.6			6.1858	20137	0	20137	6.1858
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	15872.0						55767	11224	66991	

Storage Summary

Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	240.9	241.5	0	0.0	12	95	0.0	-1	130	57	-73
ENGPropane	77	100	149.9	149.9	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	1774.0	1739.4	0	19.0	1498	96	0.0	16	2573	3509	936
ENGDomion	103	100	108.8	106.7	0	2.1	103	100	0.0	0	178	242	64
ENGNGFG	671	100	725.3	719.6	0	5.7	671	100	5.7	0	1164	1599	435
ENGHON	246	100	236.9	236.9	0	0.0	246	100	0.0	0	427	552	125
Total	2592	97	3235.8	3193.9	0	26.8	2607	98	5.7	15	5426	6939	1513

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPPProd	2377.8	0.0	2377.8	7882.5	5504.7	0	5043	0	5043	2.1210
ENG TGP2Stg	107.8	2.2	105.6	7882.5	7777.0	28	0	0	28	0.2572
ENG TGPLong	5996.1	0.0	5996.1	8698.1	2702.0	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPSHORT	2796.9	23.8	2773.1	10262.0	7488.9	315	2688	0	3003	1.0736
TrCanCharges	755.5	8.7	746.8	1477.2	730.3	0	698	0	698	0.9233
IroqCharges	746.8	4.6	742.2	1460.0	717.8	66	640	0	706	0.9454
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.5	0.0	241.5	8654.9	8413.4	0	0	0	0	0.0000
ENGPropane	149.9	0.0	149.9	6335.0	6185.1	0	0	0	0	0.0000
ENG C3Truck	149.9	0.0	149.9	4380.0	4230.1	150	0	0	150	1.0000
Dracut 30	2819.2	5.9	2813.3	10950.0	8136.7	122	4388	0	4511	1.6000
UnionCharges	764.2	8.7	755.5	1477.2	721.6	0	140	0	140	0.1832
Dracut 20	650.8	1.4	649.4	7300.0	6650.6	28	1134	0	1162	1.7854

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2270.1	63.3	2206.8	9125.0	6918.2	675	0	0	675	0.2976
Z4toTGPLH	3821.8	32.5	3789.3	7665.0	3875.7	430	0	0	430	0.1126
Z4toStg	2748.5	9.1	2739.4	7882.5	5143.1	136	0	0	136	0.0495
Engie2CG	410.1	1.1	409.0	1057.0	648.0	14	0	0	14	0.0334
██████████	638.3	1.3	637.0	5810.5	5173.5	28	0	0	28	0.0434
██████████	658.1	19.7	638.3	5822.7	5184.4	0	0	0	0	0.0000
Repsol2Drac	4.1	0.1	4.0	15.9	11.9	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	219.9	0.0	219.9	1057.0	837.1	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		190.4				2311	15309		17620	0.5961

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	55781	Injection Cost	48	Transportation Cost	2349	JAN 19, 2019	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	160.99
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	160.99
Total Variable	55808	Total Variable	94	Total Variable	2349		
Demand/Reservation Co	11129	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11224	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	67032	Net Storage Cost	1762	Net Trans Cost	17659	Total Gas Cost	86453
						Total Revenue	0
						Net Cost	86453

Avg Cost of Served Demand 5.378 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.112 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	16075.2	0.0	16075.2	0.0	16075.2	16075.2	0.0	0	161.0	0.0
Total	16075.2	0.0	16075.2	0.0	16075.2	16075.2	0.0	0	161.0	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2399.6	18250.0	15850.4			2.9029	6966	0	6966	2.9029
ENGNiagara	1146.6	1167.3	20.6			2.1649	2482	0	2482	2.1649
ENGPNGTS	84.0	84.0	0.0			4.0502	340	0	340	4.0502
ENG3Winter	86.8	91.7	5.0			15.0000	1302	0	1302	15.0000
ENG-Z4	6614.7	6690.4	75.7			2.1146	13987	0	13987	2.1146
Dracut 20	288.5	7300.0	7011.5			6.7489	1947	0	1947	6.7489
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	839.2	2190.0	1350.8			2.9126	2444	0	2444	2.9126

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	662.2	662.2	0.0							
Dracut 30	3460.3	10950.0	7489.7			6.1833	21396	0	21396	6.1833
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	30.0	30.0			0.0000	0	0	0	0.0000
Total	16302.0						55808	11224	67032	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.5	241.5	0	0.0	12	95	0.0	0	57	55	-2
ENGPropane	77	100	155.9	155.9	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	3509	3139	-370
ENGDominion	103	100	109.1	107.0	0	2.1	103	100	0.0	0	242	221	-21
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1599	1434	-166
ENGHON	246	100	234.5	234.5	0	0.0	246	100	0.0	0	552	519	-34
Total	2607	98	3237.4	3210.6	0	26.8	2607	98	5.6	0	6939	6347	-592

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2399.6	0.0	2399.6	7882.5	5482.9	0	5043	0	5043	2.1017
ENG TGP2Stg	106.4	2.2	104.2	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6066.3	0.0	6066.3	8698.1	2631.8	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPShort	2807.6	23.9	2783.7	10262.0	7478.3	316	2688	0	3004	1.0699
TrCanCharges	829.7	9.5	820.1	1477.2	657.0	0	698	0	698	0.8408
IroqCharges	820.1	5.1	815.0	1460.0	645.0	73	640	0	713	0.8688
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.5	0.0	241.5	8654.9	8413.4	0	0	0	0	0.0000
ENGPropane	155.9	0.0	155.9	6335.0	6179.1	0	0	0	0	0.0000
ENG C3Truck	155.9	0.0	155.9	4380.0	4224.1	156	0	0	156	1.0000
Dracut 30	2980.0	6.3	2973.7	10950.0	7976.3	129	4388	0	4518	1.5160
UnionCharges	839.2	9.6	829.7	1477.2	647.5	0	140	0	140	0.1668
Dracut 20	772.9	1.6	771.3	7300.0	6528.7	34	1134	0	1167	1.5101

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22

BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2293.3	63.9	2229.4	9125.0	6895.6	682	0	0	682	0.2976
Z4toTGPLH	3869.8	32.9	3836.9	7665.0	3828.1	436	0	0	436	0.1126
Z4toStg	2744.9	9.1	2735.9	7882.5	5146.7	136	0	0	136	0.0495
Engie2CG	409.5	1.1	408.4	1057.0	648.6	14	0	0	14	0.0334
██████████	638.1	1.3	636.8	5810.5	5173.7	28	0	0	28	0.0434
██████████	657.8	19.7	638.1	5822.7	5184.6	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	15.9	11.7	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.5	0.0	220.5	1057.0	836.5	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		194.3				2349	15309		17659	0.5839

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	56400	Injection Cost	48	Transportation Cost	2377	JAN 19, 2020	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	164.64
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	164.64
Total Variable	56427	Total Variable	94	Total Variable	2377		
Demand/Reservation Co	11129	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11224	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	67651	Net Storage Cost	1762	Net Trans Cost	17686	Total Gas Cost	87099
						Total Revenue	0
						Net Cost	87099

Avg Cost of Served Demand 5.255 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.025 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	16575.5	0.0	16575.5	0.0	16575.5	16575.5	0.0	0	164.6	0.0
Total	16575.5	0.0	16575.5	0.0	16575.5	16575.5	0.0	0	164.6	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2373.9	18300.0	15926.1			2.7913	6626	0	6626	2.7913
ENGNiagara	1143.8	1170.5	26.7			2.1356	2443	0	2443	2.1356
ENGPNGTS	84.3	84.3	0.0			3.9659	334	0	334	3.9659
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6654.4	6698.7	44.3			1.9745	13139	0	13139	1.9745
Dracut 20	373.9	7320.0	6946.1			6.5717	2457	0	2457	6.5717
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	941.4	2196.0	1254.6			2.7962	2632	0	2632	2.7962

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	662.2	662.2	0.0							
Dracut 30	3759.9	10980.0	7220.1			6.0322	22680	0	22680	6.0322
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	45.0	45.0			0.0000	0	0	0	0.0000
Total	16805.6						56427	11224	67651	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.6	241.6	0	0.0	12	95	0.0	0	55	54	-0
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	3139	2992	-148
ENGDominion	103	100	109.7	107.6	0	2.1	103	100	0.0	0	221	210	-11
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1434	1363	-71
ENGHON	246	100	234.5	234.5	0	0.0	246	100	0.0	0	519	492	-26
Total	2607	98	3243.1	3216.2	0	26.8	2607	98	5.6	0	6347	6091	-256

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPProd	2373.9	0.0	2373.9	7904.1	5530.3	0	5043	0	5043	2.1245
ENGTGP2Stg	106.4	2.2	104.2	7904.1	7800.0	27	0	0	27	0.2572
ENGTGPLong	6080.0	0.0	6080.0	8719.7	2639.7	0	0	0	0	0.0000
ENGTGPBND	1143.8	7.1	1136.7	1142.7	5.9	98	267	0	365	0.3191
ENGTGPShort	2808.2	23.9	2784.3	10290.1	7505.8	316	2688	0	3004	1.0697
TrCanCharges	930.7	10.7	920.0	1481.2	561.2	0	698	0	698	0.7496
IroqCharges	920.0	5.7	914.3	1464.0	549.7	82	640	0	721	0.7842
ENGPNGTS	84.3	0.8	83.5	366.0	282.5	0	312	0	312	3.6990
ENGLNG	241.6	0.0	241.6	8678.6	8437.0	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6370.0	6209.2	0	0	0	0	0.0000
ENG3Truck	160.8	0.0	160.8	4392.0	4231.2	161	0	0	161	1.0000
Dracut 30	3202.0	6.7	3195.2	10980.0	7784.8	139	4388	0	4527	1.4139
UnionCharges	941.4	10.7	930.7	1481.2	550.5	0	140	0	140	0.1487
Dracut 20	936.2	2.0	934.2	7320.0	6385.8	41	1134	0	1174	1.2544

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22

BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2267.5	63.2	2204.3	9150.0	6945.7	675	0	0	675	0.2976
Z4toTGPLH	3908.9	33.2	3875.7	7686.0	3810.3	440	0	0	440	0.1126
Z4toStg	2745.5	9.1	2736.5	7904.1	5167.7	136	0	0	136	0.0495
Engie2CG	409.4	1.1	408.3	1064.0	655.7	14	0	0	14	0.0334
██████████	638.0	1.3	636.7	5826.4	5189.8	28	0	0	28	0.0434
██████████	657.7	19.7	638.0	5838.7	5200.7	0	0	0	0	0.0000
Repsol2Drac	4.4	0.1	4.3	16.0	11.7	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37881.0	37881.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2928.0	2928.0	0	0	0	0	0.0000
Engie2ENGLNG	220.6	0.0	220.6	1064.0	843.4	221	0	0	221	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		197.6				2377	15309		17686	0.5716

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	59123	Injection Cost	48	Transportation Cost	2397	JAN 19, 2021	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	168.93
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	168.93
Total Variable	59151	Total Variable	94	Total Variable	2397		
Demand/Reservation Co	11129	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11224	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	70374	Net Storage Cost	1762	Net Trans Cost	17707	Total Gas Cost	89843
						Total Revenue	0
						Net Cost	89843

Avg Cost of Served Demand 5.285 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.083 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17000.6		0.0	17000.6	0.0	17000.6	17000.6	0.0	0	168.9	0.0
Total	17000.6		0.0	17000.6	0.0	17000.6	17000.6	0.0	0	168.9	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2366.2	18250.0	15883.8			2.8097	6648	0	6648	2.8097
ENGNiagara	1142.6	1167.3	24.6			2.1441	2450	0	2450	2.1441
ENGPNGTS	84.0	84.0	0.0			3.9597	332	0	332	3.9597
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6658.3	6690.4	32.1			1.9829	13203	0	13203	1.9829
Dracut 20	506.5	7300.0	6793.5			6.7139	3400	0	3400	6.7139
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	1035.4	2190.0	1154.6			2.7763	2874	0	2874	2.7763

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	662.2	662.2	0.0							
Dracut 30	3966.9	10950.0	6983.1			6.0871	24147	0	24147	6.0871
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	17233.9						59151	11224	70374	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.5	241.5	0	0.0	12	95	0.0	0	54	54	0
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	2992	3017	25
ENGDomion	103	100	108.5	106.4	0	2.1	103	100	0.0	0	210	212	2
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1363	1375	12
ENGHON	246	100	233.3	233.3	0	0.0	246	100	0.0	0	492	491	-1
Total	2607	98	3240.6	3213.8	0	26.8	2607	98	5.6	0	6091	6129	38

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2366.2	0.0	2366.2	7882.5	5516.3	0	5043	0	5043	2.1313
ENG TGP2Stg	106.4	2.2	104.2	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6078.8	0.0	6078.8	8698.1	2619.3	0	0	0	0	0.0000
ENG TGPBND	1142.6	7.1	1135.6	1139.5	4.0	98	267	0	365	0.3193
ENG TGPShort	2805.8	23.8	2782.0	10262.0	7480.0	316	2688	0	3004	1.0705
TrCanCharges	1023.6	11.8	1011.8	1477.2	465.4	0	698	0	698	0.6815
IroqCharges	1011.8	6.3	1005.5	1460.0	454.5	90	640	0	730	0.7210
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.5	0.0	241.5	8654.9	8413.4	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3469.5	7.3	3462.2	10950.0	7487.8	151	4388	0	4539	1.3083
UnionCharges	1035.4	11.8	1023.6	1477.2	453.6	0	140	0	140	0.1352
Dracut 20	1008.2	2.1	1006.1	7300.0	6293.9	44	1134	0	1177	1.1679

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2259.9	63.0	2196.9	9125.0	6928.1	672	0	0	672	0.2976
Z4toTGPLH	3915.2	33.3	3881.9	7665.0	3783.1	441	0	0	441	0.1126
Z4toStg	2743.1	9.1	2734.1	7882.5	5148.5	136	0	0	136	0.0495
Engie2CG	409.5	1.1	408.4	1057.0	648.6	14	0	0	14	0.0334
██████████	638.0	1.3	636.7	5810.5	5173.9	28	0	0	28	0.0434
██████████	657.7	19.7	638.0	5822.7	5184.7	0	0	0	0	0.0000
Repsol2Drac	4.4	0.1	4.3	15.9	11.6	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.5	0.0	220.5	1057.0	836.5	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		200.9				2397	15309		17707	0.5613

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	62914	Injection Cost	48	Transportation Cost	2426	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	173.92
Other Variable Cost	28	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	173.92
Total Variable	62941	Total Variable	94	Total Variable	2426		
Demand/Reservation Co	11129	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11224	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	74165	Net Storage Cost	1762	Net Trans Cost	17736	Total Gas Cost	93663
						Total Revenue	0
						Net Cost	93663

Avg Cost of Served Demand 5.344 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.179 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17527.6		0.0	17527.6	0.0	17527.6	17527.6	0.0	0	173.9	0.0
Total	17527.6		0.0	17527.6	0.0	17527.6	17527.6	0.0	0	173.9	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2373.4	18250.0	15876.6			2.8356	6730	0	6730	2.8356
ENGNiagara	1144.1	1167.3	23.1			2.1910	2507	0	2507	2.1910
ENGPNGTS	84.0	84.0	0.0			3.9303	330	0	330	3.9303
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6665.3	6690.4	25.1			2.0468	13642	0	13642	2.0468
Dracut 20	669.9	7300.0	6630.1			7.1021	4758	0	4758	7.1021
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	1122.6	2190.0	1067.4			2.7870	3129	0	3129	2.7870

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary

Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	662.2	662.2	0.0							
Dracut 30	4215.6	10950.0	6734.4			6.1037	25731	0	25731	6.1037
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	17748.9						62941	11224	74165	

Storage Summary

Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.2	241.2	0	0.0	12	95	0.0	0	54	55	1
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1759.8	1756.5	0	18.8	1482	95	0.0	-16	3017	3087	70
ENGDomion	103	100	108.5	106.3	0	2.1	103	100	0.0	0	212	219	7
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1375	1418	43
ENGHON	246	100	233.3	233.3	0	0.0	246	100	0.0	0	491	505	14
Total	2607	98	3224.5	3213.4	0	26.6	2591	97	5.6	-16	6129	6263	135

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPPProd	2373.4	0.0	2373.4	7882.5	5509.2	0	5043	0	5043	2.1249
ENG TGP2Stg	106.3	2.2	104.1	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6108.4	0.0	6108.4	8698.1	2589.7	0	0	0	0	0.0000
ENG TGPBND	1144.1	7.1	1137.0	1139.5	2.5	98	267	0	365	0.3190
ENG TGPSshort	2805.7	23.8	2781.9	10262.0	7480.1	316	2688	0	3004	1.0706
TrCanCharges	1109.8	12.8	1097.1	1477.2	380.1	0	698	0	698	0.6285
IroqCharges	1097.1	6.8	1090.3	1460.0	369.7	97	640	0	737	0.6719
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.2	0.0	241.2	8654.9	8413.7	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3704.2	7.8	3696.5	10950.0	7253.5	161	4388	0	4549	1.2281
UnionCharges	1122.6	12.8	1109.8	1477.2	367.3	0	140	0	140	0.1247
Dracut 20	1185.7	2.5	1183.2	7300.0	6116.8	51	1134	0	1185	0.9996

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

Ventyx

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NOV 2021 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2267.1	63.2	2203.9	9125.0	6921.1	675	0	0	675	0.2976
Z4toTGPLH	3938.0	33.5	3904.5	7665.0	3760.5	444	0	0	444	0.1126
Z4toStg	2727.3	9.0	2718.3	7882.5	5164.2	135	0	0	135	0.0495
Engie2CG	409.8	1.1	408.7	1057.0	648.3	14	0	0	14	0.0334
██████████	637.9	1.3	636.6	5810.5	5174.0	28	0	0	28	0.0434
██████████	657.6	19.7	637.9	5822.7	5184.8	0	0	0	0	0.0000
Repsol2Drac	4.6	0.1	4.4	15.9	11.5	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.2	0.0	220.2	1057.0	836.8	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		204.6				2426	15309		17736	0.5497

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	289959	Injection Cost	238	Transportation Cost	11861	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	230	Other Variable Cost	0	System Served	173.92
Other Variable Cost	135	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	173.92
Total Variable	290094	Total Variable	469	Total Variable	11861		
Demand/Reservation Co	55646	Demand Cost	3477	Demand Cost	76547		
Other Fixed Cost	472	Other Fixed Cost	4865	Other Fixed Cost	0		
Total Fixed	56119	Total Fixed	8343	Total Fixed	76547		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	346213	Net Storage Cost	8812	Net Trans Cost	88408	Total Gas Cost	443432
						Total Revenue	0
						Net Cost	443432

Avg Cost of Served Demand 5.355 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.123 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	82813.0	0.0	82813.0	0.0	82813.0	82813.0	0.0	0	173.9	0.0
Total	82813.0	0.0	82813.0	0.0	82813.0	82813.0	0.0	0	173.9	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	11890.9	91300.0	79409.1			2.8703	34130	0	34130	2.8703
ENGNiagara	5723.9	5839.5	115.7			2.2008	12597	0	12597	2.2008
ENGPNGTS	420.2	420.2	0.0			4.0214	1690	0	1690	4.0214
ENG3Winter	442.8	458.7	15.9			15.0000	6642	0	6642	15.0000
ENG-Z4	33163.0	33460.3	297.3			2.0871	69215	0	69215	2.0871
Dracut 20	2049.3	36520.0	34470.7			6.8044	13944	0	13944	6.8044
ENG3Summer	345.5	467.3	121.8			10.0000	3455	0	3455	10.0000
DLiqSummer	105.0	105.0	0.0							
ENG Dawn	4702.8	10956.0	6253.2			2.8711	13503	0	13503	2.8711

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REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	3310.9	3310.9	0.0							
Dracut 30	18658.0	54780.0	36122.0			6.1148	114091	0	114091	6.1148
Engie Combo	3150.0	3150.0	0.0							
C/G SUPPLY	0.0	75.0	75.0			0.0000	0	0	0	0.0000
Total	83962.4						290094	56119	346213	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	1206.6	1207.2	0	0.0	12	95	0.0	-1	130	55	-75
ENGPropane	77	100	788.3	788.3	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	8860.4	8765.5	0	94.8	1482	95	0.0	0	2573	3087	514
ENGDominion	103	100	544.7	534.0	0	10.6	103	100	0.0	0	178	219	41
ENGNGFG	671	100	3608.8	3580.3	0	28.5	671	100	28.3	0	1164	1418	254
ENGHON	246	100	1172.6	1172.6	0	0.0	246	100	0.0	0	427	505	78
Total	2592	97	16181.3	16047.9	0	133.9	2591	97	28.3	-1	5426	6263	837

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	11890.9	0.0	11890.9	39434.3	27543.4	0	25216	0	25216	2.1206
ENG TGP2Stg	533.1	10.9	522.2	39434.3	38912.1	137	0	0	137	0.2572
ENG TGPLong	30329.5	0.0	30329.5	43512.1	13182.6	0	0	0	0	0.0000
ENG TGPBND	5723.9	35.5	5688.4	5700.8	12.4	489	1337	0	1825	0.3189
ENG TGPShort	14024.1	119.2	13904.9	51338.0	37433.1	1580	13438	0	15018	1.0709
TrCanCharges	4649.3	53.5	4595.8	7389.8	2794.0	0	3488	0	3488	0.7502
IroqCharges	4595.8	28.5	4567.3	7304.0	2736.7	408	3199	0	3607	0.7848
ENG PNGTS	420.2	4.2	416.0	1826.0	1410.0	1	1559	0	1560	3.7122
ENGLNG	1207.2	0.0	1207.2	43298.1	42090.9	0	0	0	0	0.0000
ENGPropane	788.3	0.0	788.3	31710.0	30921.7	0	0	0	0	0.0000
ENG C3Truck	788.3	0.0	788.3	21912.0	21123.7	788	0	0	788	1.0000
Dracut 30	16174.8	34.0	16140.9	54780.0	38639.1	702	21942	0	22644	1.3999
UnionCharges	4702.8	53.6	4649.3	7389.8	2740.6	0	700	0	700	0.1489
Dracut 20	4553.8	9.6	4544.2	36520.0	31975.8	198	5668	0	5866	1.2882

REDACTED

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	11357.8	316.6	11041.2	45650.0	34608.8	3380	0	0	3380	0.2976
Z4toTGPLH	19453.6	165.4	19288.3	38346.0	19057.7	2191	0	0	2191	0.1126
Z4toStg	13709.4	45.2	13664.1	39434.3	25770.2	679	0	0	679	0.0495
Engie2CG	2048.4	5.7	2042.6	5292.0	3249.4	68	0	0	68	0.0334
██████████	3190.3	6.7	3183.6	29068.5	25884.9	138	0	0	138	0.0434
██████████	3289.0	98.7	3190.3	29129.7	25939.3	0	0	0	0	0.0000
Repsol2Drac	21.9	0.7	21.3	79.5	58.3	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	188991.0	188991.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	14608.0	14608.0	0	0	0	0	0.0000
Engie2ENGLNG	1101.6	0.0	1101.6	5292.0	4190.4	1102	0	0	1102	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		987.8				11861	76547		88408	0.5720

APPENDIX 6.A.1 BASE CASE NORMAL YEAR RESOURCE MIX

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
 BASE CASE - Draw 0

Ventyx

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RESOURCE MIX RESULTS

Units: MDT

=====

	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Supplies	DAWN	NOV 2017	OCT 2022	0.00	150.00	0.00
	Repsol 40	NOV 2017	OCT 2022	0.00	150.00	16.55
	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Segments		NOV 2017	OCT 2022	0.00	150.00	15.92
		NOV 2017	OCT 2022	0.00	150.00	15.95
	Repsol2Drac	NOV 2017	OCT 2022	0.00	50.00	0.11
	Dawn2Dracut	NOV 2017	OCT 2022	0.00	50.00	0.00
	DAWNTCPL	NOV 2017	OCT 2022	0.00	150.00	0.00
		NOV 2017	OCT 2022	0.00	150.00	0.00

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Forecast Demand													
ENGIDesign	1496.6	2416.9	2893.8	2590.6	2103.6	1206.4	701.2	420.1	318.0	316.4	400.6	769.9	15634.1
Total Demand	1496.6	2416.9	2893.8	2590.6	2103.6	1206.4	701.2	420.1	318.0	316.4	400.6	769.9	15634.1
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.3	30.5	33.5	31.0	25.2	12.1	7.5	4.8	4.2	4.2	4.7	8.5	190.4
Injection	3.4	0.0	0.0	0.0	0.0	0.8	2.3	4.1	5.0	5.1	4.4	1.8	26.8
Withdrawal	0.4	1.3	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7
Total Fuel	28.0	31.7	35.0	32.4	26.4	12.9	9.8	8.9	9.2	9.3	9.1	10.3	222.9
Storage Injections													
ENGLNG	2.9	35.8	68.8	67.0	45.4	0.0	7.1	2.9	0.0	0.0	8.7	2.3	240.9
ENGPropane	0.0	0.0	59.6	21.2	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	149.9
ENGFSMA	257.0	0.0	0.0	0.0	0.0	0.0	147.9	281.2	316.3	319.0	302.4	131.1	1755.0
ENGDominion	9.2	0.0	0.0	0.0	0.0	8.1	0.9	4.4	24.4	28.2	23.3	8.1	106.7
ENGNGFG	48.8	0.0	0.0	0.0	0.0	77.8	85.7	124.3	137.5	135.4	79.8	30.3	719.6
ENGHON	26.9	0.0	0.0	0.0	0.0	28.0	5.6	21.0	41.1	41.3	39.8	33.3	236.9
Total Inj	344.8	35.8	128.4	88.2	45.4	113.8	258.6	445.3	530.8	535.5	465.5	216.7	3208.9
Total Req	1869.4	2484.4	3057.3	2711.1	2175.4	1333.1	969.6	874.3	858.1	861.1	875.2	996.9	19065.9
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	397.0	88.1	20.6	0.0	0.0	0.0	0.0	24.4	2377.8
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	59.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.8
ENG-Z4	249.0	257.3	257.3	232.4	257.3	739.9	787.6	759.3	742.9	745.9	753.8	787.6	6570.3
Dracut 20	11.9	6.8	70.9	37.1	66.7	17.1	0.0	0.0	0.0	0.0	0.0	0.0	210.6
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAwn	110.5	126.9	126.9	114.6	114.0	91.3	28.7	0.0	0.0	0.0	0.0	51.3	764.2
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	165.5	215.2	212.3	69.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	662.2
Dracut 30	515.6	604.1	657.1	650.5	513.3	292.8	8.9	0.0	0.0	0.0	0.0	13.2	3255.4
Engie Combo	2.9	149.4	185.4	188.2	104.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1602.7	1844.8	2108.3	1939.7	1628.6	1330.2	966.7	871.4	855.1	858.2	872.4	993.9	15872.0

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.5
ENGPropane	0.0	0.0	124.4	25.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	149.9
ENGFSMA	179.0	368.9	466.0	429.0	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1739.4
ENGDominion	9.2	22.4	29.0	25.3	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.7
ENGNGFG	48.8	158.6	189.0	170.7	152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	719.6
ENGHON	26.9	54.0	60.7	54.0	41.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	236.9
Total With	266.8	639.7	948.9	771.4	546.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3193.9
=====													
Total Supply	1869.4	2484.4	3057.3	2711.1	2175.4	1333.1	969.6	874.3	858.1	861.1	875.2	996.9	19065.9
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	13	2	2	12	9	13	13	10	7	13	13
ENGPropane	77	77	77	12	8	8	8	19	31	42	54	65	77
ENGFSMA	1482	1560	1192	726	297	0	0	148	429	745	1064	1367	1482
ENGDominion	103	103	80	51	26	5	13	14	19	43	71	95	103
ENGNGFG	671	671	512	323	152	0	78	163	288	425	561	640	671
ENGHON	246	246	192	132	78	36	64	70	91	132	173	213	246
Total Inv	2592	2670	2066	1246	562	61	172	428	870	1398	1930	2393	2592
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 09:24:14

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Forecast Demand													
ENGIDesign	1535.4	2483.9	2966.0	2660.6	2159.4	1233.8	720.1	435.2	331.9	333.2	421.2	794.7	16075.2
Total Demand	1535.4	2483.9	2966.0	2660.6	2159.4	1233.8	720.1	435.2	331.9	333.2	421.2	794.7	16075.2
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.8	30.6	33.7	31.0	25.9	12.3	7.7	4.9	4.3	4.3	5.8	8.9	194.3
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.1	4.1	4.9	5.0	4.6	1.8	26.8
Withdrawal	0.4	1.3	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.5	31.8	35.2	32.4	27.2	13.2	9.8	8.9	9.3	9.4	10.4	10.7	226.7
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.0	45.4	0.0	7.1	2.9	0.0	0.0	8.7	2.3	241.5
ENGPropane	0.0	0.0	58.2	28.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	155.9
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	115.9	287.3	312.4	319.0	306.6	156.7	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	11.0	1.1	4.2	23.1	27.6	26.8	3.1	107.0
ENGNGFG	44.4	0.0	0.0	0.0	0.0	86.6	102.8	108.1	137.5	131.1	96.4	8.2	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	33.7	8.0	17.1	41.3	41.3	40.0	26.3	234.5
Total Inj	343.4	35.8	126.9	95.6	45.4	131.2	246.5	431.1	525.8	530.6	490.1	208.1	3210.6
Total Req	1907.3	2551.5	3128.1	2788.6	2232.0	1378.3	976.3	875.2	866.9	873.2	921.8	1013.4	19512.6
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	407.3	89.4	23.9	0.0	0.0	0.0	0.0	31.3	2399.6
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	58.2	28.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	86.8
ENG-Z4	249.0	257.3	257.3	232.4	257.3	758.9	787.6	760.2	751.7	758.0	757.4	787.6	6614.7
Dracut 20	10.7	16.3	91.5	67.7	80.3	22.0	0.0	0.0	0.0	0.0	0.0	0.0	288.5
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAwn	122.8	126.9	126.9	114.6	124.7	94.9	29.1	0.0	0.0	0.0	43.0	56.3	839.2
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	165.5	215.2	208.8	72.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	662.2
Dracut 30	528.2	665.8	704.2	693.1	530.3	309.2	11.8	0.0	0.0	0.0	0.0	17.8	3460.3
Engie Combo	3.5	149.4	185.4	186.6	105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1626.9	1915.9	2174.5	2015.3	1684.5	1375.4	973.4	872.4	864.0	870.3	918.9	1010.5	16302.0

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.5
ENGPropane	0.0	0.0	127.2	28.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	155.9
ENGFSMA	196.1	368.9	467.8	427.1	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	29.0	25.3	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.0
ENGNGFG	44.4	158.4	189.0	170.7	152.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	50.1	60.7	54.5	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	234.5
Total With	280.4	635.5	953.6	773.3	547.5	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3210.6
Total Supply	1907.3	2551.5	3128.1	2788.6	2232.0	1378.3	976.3	875.2	866.9	873.2	921.8	1013.4	19512.6
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	10	7	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	724	297	0	0	116	403	716	1035	1341	1498
ENGDominion	103	103	80	51	26	6	17	18	22	45	73	100	103
ENGNGFG	671	671	512	323	153	0	87	189	298	435	566	663	671
ENGHON	246	246	196	135	81	39	72	80	97	139	180	220	246
Total Inv	2607	2670	2070	1244	566	64	192	436	864	1387	1914	2402	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Forecast Demand													
ENGIDesign	1580.0	2537.4	3029.1	2778.4	2204.3	1268.0	742.9	453.0	347.5	353.3	444.1	837.5	16575.5
Total Demand	1580.0	2537.4	3029.1	2778.4	2204.3	1268.0	742.9	453.0	347.5	353.3	444.1	837.5	16575.5
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.9	30.6	33.7	31.9	25.8	12.6	10.1	5.2	4.9	4.5	4.9	8.4	197.6
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.7	3.8	5.1	5.0	4.2	1.8	26.8
Withdrawal	0.4	1.2	1.5	1.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.6	31.8	35.2	33.3	27.1	13.4	12.8	9.0	10.0	9.5	9.1	10.2	230.1
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.1	45.4	0.0	7.1	2.9	2.9	0.0	5.8	2.3	241.6
ENGPropane	0.0	0.0	60.6	31.1	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	176.2	263.2	319.0	319.0	280.5	140.0	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	5.6	2.3	2.0	28.3	28.3	25.0	5.9	107.6
ENGNGFG	44.4	0.0	0.0	0.0	0.0	93.8	95.2	108.5	137.5	128.0	82.9	24.9	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	30.7	32.0	37.1	41.3	36.6	19.8	10.2	234.5
Total Inj	343.4	35.8	129.4	98.2	45.4	130.0	324.3	425.2	540.7	523.5	425.4	194.8	3216.2
Total Req	1952.0	2605.0	3193.7	2909.9	2276.8	1411.5	1080.1	887.2	898.2	886.3	878.6	1042.5	20021.9
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	398.7	394.1	91.4	26.9	0.0	0.0	0.0	0.0	0.0	2373.9
ENGNiagara	94.2	97.4	97.4	91.1	97.4	91.4	97.4	93.1	97.4	97.4	92.2	97.4	1143.8
ENGPNGTS	8.3	11.0	12.2	10.8	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.3
ENG3Winter	0.0	0.0	60.6	31.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	240.7	257.3	762.2	787.6	762.2	759.9	771.1	762.2	787.6	6654.4
Dracut 20	15.2	23.5	126.5	87.0	90.7	30.9	0.0	0.0	0.0	0.0	0.0	0.0	373.9
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	0.0	5.8	2.3	21.0
ENGDAwn	122.8	126.9	126.9	118.7	126.1	99.1	125.4	11.1	20.2	0.0	0.0	64.2	941.4
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	165.5	215.2	205.5	75.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	662.2
Dracut 30	568.3	724.4	749.4	733.8	570.6	326.8	16.2	0.0	0.0	0.0	0.0	70.3	3759.9
Engie Combo	3.5	145.8	185.4	188.1	107.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1671.6	1978.2	2257.2	2105.6	1728.9	1408.6	1077.1	884.3	895.3	883.4	875.8	1039.6	16805.6

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.1	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.6
ENGPropane	0.0	0.0	129.7	31.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	448.3	446.6	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	29.0	26.1	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.6
ENGNGFG	44.4	151.6	189.0	176.8	153.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	56.5	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	234.5
Total With	280.4	626.8	936.5	804.3	547.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3216.2
=====													
Total Supply	1952.0	2605.0	3193.7	2909.9	2276.8	1411.5	1080.1	887.2	898.2	886.3	878.6	1042.5	20021.9
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	10	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	743	297	0	0	176	439	758	1077	1358	1498
ENGDominion	103	103	80	51	25	5	11	13	15	43	72	97	103
ENGNGFG	671	671	519	330	153	0	94	189	298	435	563	646	671
ENGHON	246	246	198	137	81	39	69	101	138	180	216	236	246
Total Inv	2607	2670	2079	1272	566	63	190	512	934	1472	1992	2415	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 09:24:14

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Forecast Demand													
ENGIDesign	1632.3	2610.2	3103.5	2781.5	2258.0	1304.5	766.1	469.6	362.1	370.2	467.6	875.1	17000.6
Total Demand	1632.3	2610.2	3103.5	2781.5	2258.0	1304.5	766.1	469.6	362.1	370.2	467.6	875.1	17000.6
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	25.0	30.8	34.0	31.1	26.1	12.9	10.3	7.1	5.2	4.6	5.1	8.7	200.9
Injection	3.4	0.0	0.0	0.0	0.0	1.0	2.9	4.5	5.1	4.8	3.7	1.4	26.8
Withdrawal	0.4	1.2	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.7	32.1	35.5	32.4	27.3	13.9	13.2	11.7	10.3	9.4	8.7	10.2	233.3
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.0	45.4	0.0	7.1	2.9	2.9	2.9	2.9	2.3	241.5
ENGPropane	0.0	0.0	60.1	31.7	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	187.4	297.9	319.0	317.8	290.7	85.2	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	12.8	12.8	14.7	28.3	18.1	5.9	3.7	106.4
ENGNGFG	44.4	0.0	0.0	0.0	0.0	93.5	79.8	127.6	137.5	124.3	52.1	56.0	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	22.7	10.2	27.3	41.3	41.3	37.4	26.3	233.3
Total Inj	343.4	35.8	128.8	98.7	45.4	128.9	308.8	481.8	540.7	516.0	400.4	184.9	3213.8
Total Req	2004.4	2678.0	3267.8	2912.6	2330.8	1447.3	1088.1	963.0	913.1	895.6	876.8	1070.2	20447.7
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	395.6	94.1	28.9	0.0	0.0	0.0	0.0	0.0	2366.2
ENGNiagara	94.2	97.4	97.4	88.0	97.4	92.0	97.4	93.6	97.4	97.4	93.2	97.4	1142.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	60.1	31.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	765.7	777.4	762.2	787.6	6658.3
Dracut 20	45.3	37.7	155.5	121.2	104.1	42.6	0.0	0.0	0.0	0.0	0.0	0.0	506.5
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAwn	122.8	126.9	126.9	114.6	126.9	103.4	125.8	86.5	29.3	0.0	0.1	72.1	1035.4
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	165.5	215.2	203.1	78.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	662.2
Dracut 30	590.7	774.3	779.2	765.2	602.2	343.3	21.9	0.0	0.0	0.0	0.0	90.1	3966.9
Engie Combo	3.5	149.4	185.4	181.9	109.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1724.1	2045.8	2315.4	2133.5	1781.3	1444.4	1085.1	960.2	910.2	892.7	873.9	1067.2	17233.9

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.5
ENGPropane	0.0	0.0	126.8	34.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	467.8	427.1	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	28.2	25.3	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.4
ENGNGFG	44.4	156.9	189.0	170.7	154.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	54.8	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.3
Total With	280.4	632.1	952.3	779.1	549.5	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3213.8
=====													
Total Supply	2004.4	2678.0	3267.8	2912.6	2330.8	1447.3	1088.1	963.0	913.1	895.6	876.8	1070.2	20447.7
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	10	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	724	297	0	0	187	485	804	1122	1413	1498
ENGDominion	103	103	80	52	27	6	19	32	47	75	93	99	103
ENGNGFG	671	671	514	325	154	0	93	173	301	438	563	615	671
ENGHON	246	246	198	137	83	40	62	73	100	141	183	220	246
Total Inv	2607	2670	2074	1250	570	66	192	498	977	1514	2027	2425	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Forecast Demand													
ENGIDesign	1685.7	2685.5	3189.7	2858.2	2320.6	1343.4	790.2	486.6	376.1	387.3	489.9	914.4	17527.6
Total Demand	1685.7	2685.5	3189.7	2858.2	2320.6	1343.4	790.2	486.6	376.1	387.3	489.9	914.4	17527.6
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	25.1	31.0	34.0	31.2	26.4	13.1	10.5	7.6	5.5	5.7	5.4	9.0	204.6
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.8	4.5	5.1	5.1	3.4	1.4	26.6
Withdrawal	0.4	1.2	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.8	32.2	35.5	32.6	27.6	14.1	13.2	12.1	10.6	10.8	8.8	10.4	236.9
Storage Injections													
ENGLNG	3.5	35.8	68.5	67.0	45.4	0.0	7.1	2.9	2.9	2.9	2.9	2.3	241.2
ENGPropane	0.0	0.0	57.1	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	238.0	308.8	319.0	319.0	216.5	81.1	1740.9
ENGDominion	10.1	0.0	0.0	0.0	0.0	5.5	1.0	17.4	28.1	28.3	10.1	5.8	106.3
ENGNGFG	44.4	0.0	0.0	0.0	0.0	102.8	22.1	105.2	137.5	137.5	112.0	53.6	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	20.0	13.4	34.9	41.3	41.3	34.2	21.3	233.3
Total Inj	343.4	35.8	125.6	101.6	45.4	128.3	293.0	480.7	540.5	540.7	387.2	175.6	3197.8
Total Req	2057.8	2753.5	3350.9	2992.4	2393.6	1485.8	1096.5	979.4	927.3	938.8	885.9	1100.4	20962.3
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	398.3	96.5	30.9	0.0	0.0	0.0	0.0	0.0	2373.4
ENGNiagara	94.2	97.4	97.4	88.0	97.4	92.6	97.4	94.0	97.4	97.4	93.7	97.4	1144.1
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	57.1	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	769.9	780.2	762.2	787.6	6665.3
Dracut 20	37.3	65.2	231.6	158.6	121.0	56.3	0.0	0.0	0.0	0.0	0.0	0.0	669.9
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	126.9	108.2	126.3	102.5	39.2	40.4	8.8	79.2	1122.6
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	165.5	215.2	199.2	82.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	662.2
Dracut 30	652.2	823.7	806.1	792.7	639.5	360.4	27.7	0.0	0.0	0.0	0.0	113.3	4215.6
Engie Combo	3.5	149.0	185.4	181.1	111.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1777.5	2122.3	2415.6	2196.6	1843.2	1482.9	1093.5	976.6	924.3	935.8	883.1	1097.5	17748.9

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx Page 10
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.6	67.0	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.2
ENGPropane	0.0	0.0	126.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	451.6	443.4	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	28.2	25.3	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.3
ENGNGFG	44.4	156.0	189.0	170.7	155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	54.8	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.3
Total With	280.3	631.2	935.3	795.8	550.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3213.4
=====													
Total Supply	2057.8	2753.5	3350.9	2992.4	2393.6	1485.8	1096.5	979.4	927.3	938.8	885.9	1100.4	20962.3
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	740	297	0	0	238	547	866	1185	1401	1498
ENGDominion	103	103	80	52	27	6	12	13	30	58	87	97	103
ENGNGFG	671	671	515	326	155	0	103	125	230	368	505	617	671
ENGHON	246	246	198	137	83	40	60	73	108	149	191	225	246
Total Inv	2607	2670	2075	1265	571	66	191	481	959	1496	2034	2419	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx Page 11
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Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Forecast Demand						
ENGIDesign	15634.1	16075.2	16575.5	17000.6	17527.6	82813.0
Total Demand	15634.1	16075.2	16575.5	17000.6	17527.6	82813.0
Forecast Rt Mrktr Imbalance						
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed						
Transport	190.4	194.3	197.6	200.9	204.6	987.8
Injection	26.8	26.8	26.8	26.8	26.6	133.9
Withdrawal	5.7	5.6	5.6	5.6	5.6	28.3
Total Fuel	222.9	226.7	230.1	233.3	236.9	1150.0
Storage Injections						
ENGLNG	240.9	241.5	241.6	241.5	241.2	1206.6
ENGPropane	149.9	155.9	160.8	160.8	160.8	788.3
ENGFSMA	1755.0	1756.5	1756.5	1756.5	1740.9	8765.5
ENGDominion	106.7	107.0	107.6	106.4	106.3	534.0
ENGNGFG	719.6	715.2	715.2	715.2	715.2	3580.3
ENGHON	236.9	234.5	234.5	233.3	233.3	1172.6
Total Inj	3208.9	3210.6	3216.2	3213.8	3197.8	16047.3
Total Req	19065.9	19512.6	20021.9	20447.7	20962.3	100010.3
=====						
Sources of Supply						
ENGUSGC	2377.8	2399.6	2373.9	2366.2	2373.4	11890.9
ENGNiagara	1146.6	1146.6	1143.8	1142.6	1144.1	5723.9
ENGPNGTS	84.0	84.0	84.3	84.0	84.0	420.2
ENG3Winter	80.8	86.8	91.7	91.7	91.7	442.8
ENG-Z4	6570.3	6614.7	6654.4	6658.3	6665.3	33163.0
Dracut 20	210.6	288.5	373.9	506.5	669.9	2049.3
ENG3Summer	69.1	69.1	69.1	69.1	69.1	345.5
DLiqSummer	21.0	21.0	21.0	21.0	21.0	105.0
ENGDAwn	764.2	839.2	941.4	1035.4	1122.6	4702.8
DAWN	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	662.2	662.2	662.2	662.2	662.2	3310.9
Dracut 30	3255.4	3460.3	3759.9	3966.9	4215.6	18658.0
Engie Combo	630.0	630.0	630.0	630.0	630.0	3150.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	15872.0	16302.0	16805.6	17233.9	17748.9	83962.4

APPENDIX 6.A.2 BASE CASE NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1333 V9 Normal Demand-8-18-17 Pricing-RMix ERD to 21-22
BASE CASE - Draw 0Ventyx Page 12
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Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Storage Withdrawals						
ENGLNG	241.5	241.5	241.6	241.5	241.2	1207.2
ENGPropane	149.9	155.9	160.8	160.8	160.8	788.3
ENGFSMA	1739.4	1756.5	1756.5	1756.5	1756.5	8765.5
ENGDominion	106.7	107.0	107.6	106.4	106.3	534.0
ENGNGFG	719.6	715.2	715.2	715.2	715.2	3580.3
ENGHON	236.9	234.5	234.5	233.3	233.3	1172.6
Total With	3193.9	3210.6	3216.2	3213.8	3213.4	16047.9
Total Supply	19065.9	19512.6	20021.9	20447.7	20962.3	100010.3
=====						
Net Storage Inv. Adj.						
ENGLNG	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0
=====						
Start of Year Inventory						
ENGLNG	13	12	12	12	12	13
ENGPropane	77	77	77	77	77	77
ENGFSMA	1482	1498	1498	1498	1498	1482
ENGDominion	103	103	103	103	103	103
ENGNGFG	671	671	671	671	671	671
ENGHON	246	246	246	246	246	246
Total Inv	2592	2607	2607	2607	2607	2592
=====						
Unsupplied Demand						
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	59110	Injection Cost	47	Transportation Cost	2305	JAN 19, 2018	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	156.82
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	156.82
Total Variable	59137	Total Variable	92	Total Variable	2305		
Demand/Reservation Co	9593	Demand Cost	695	Demand Cost	19202		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	9688	Total Fixed	1669	Total Fixed	19202		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	68825	Net Storage Cost	1761	Net Trans Cost	21506	Total Gas Cost	92092
						Total Revenue	0
						Net Cost	92092

Avg Cost of Served Demand 5.449 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.008 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved	
ENGIDesign	16901.8	0.0	16901.8	0.0	16901.8	16901.8	0.0	0	156.8	0.0	
Total	16901.8	0.0	16901.8	0.0	16901.8	16901.8	0.0	0	156.8	0.0	

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2348.2	18250.0	15901.8			3.0144	7078	0	7078	3.0144
ENGNiagara	1146.6	1167.3	20.6			2.3679	2715	0	2715	2.3679
ENGPNGTS	84.0	84.0	0.0			4.2010	353	0	353	4.2010
ENG3Winter	62.6	91.7	29.2			15.0000	939	0	939	15.0000
ENG-Z4	6558.5	6690.4	131.9			2.3200	15216	0	15216	2.3200
Dracut 20	795.1	7300.0	6504.9			5.1451	4091	0	4091	5.1451
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	738.4	2190.0	1451.6			3.1931	2358	0	2358	3.1931

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APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1164.9	2199.7	1034.8			3.1643	3686	0	3686	3.1643
Repsol 40	520.1	520.1	0.0							
Dracut 30	3033.5	10950.0	7916.5			5.9320	17995	0	17995	5.9320
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	17172.0						59137	9688	68825	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	207.5	208.1	0	0.0	12	95	0.0	-1	130	57	-73
ENGPropane	77	100	131.7	131.7	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	1757.9	1723.5	0	18.8	1498	96	0.0	16	2573	3510	938
ENGDominion	103	100	110.5	108.3	0	2.2	103	100	0.0	0	178	246	67
ENGNGFG	671	100	705.9	700.3	0	5.6	671	100	5.5	0	1164	1593	429
ENGHON	246	100	243.8	243.8	0	0.0	246	100	0.0	0	427	555	128
Total	2592	97	3157.1	3115.6	0	26.5	2607	98	5.5	15	5426	6940	1514

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPProd	2348.2	0.0	2348.2	7882.5	5534.4	0	5043	0	5043	2.1478
ENGTGP2Stg	74.6	1.5	73.1	7882.5	7809.4	19	0	0	19	0.2572
ENGTGPLong	5982.4	0.0	5982.4	8698.1	2715.7	0	0	0	0	0.0000
ENGTGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENGTGPShort	2770.3	23.5	2746.8	10262.0	7515.2	312	2688	0	3000	1.0828
TrCanCharges	730.0	8.4	721.6	1477.2	755.6	0	698	0	698	0.9557
IroqCharges	721.6	4.5	717.1	1460.0	742.9	64	640	0	704	0.9754
ENGPNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	208.1	0.0	208.1	8654.9	8446.8	0	0	0	0	0.0000
ENGPropane	131.7	0.0	131.7	6335.0	6203.3	0	0	0	0	0.0000
ENG3Truck	131.7	0.0	131.7	4380.0	4248.3	132	0	0	132	1.0000
Dracut 30	2715.4	5.7	2709.7	10950.0	8240.3	118	4388	0	4506	1.6595
UnionCharges	738.4	8.4	730.0	1477.2	747.2	0	140	0	140	0.1896
Dracut 20	1118.2	2.3	1115.8	7300.0	6184.2	49	1134	0	1182	1.0573

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2273.5	63.4	2210.2	9125.0	6914.8	677	0	0	677	0.2976
Z4toTGPLH	3804.6	32.3	3772.2	7665.0	3892.8	429	0	0	429	0.1126
Z4toStg	2754.0	9.1	2744.9	7882.5	5137.7	136	0	0	136	0.0495
Engie2CG	443.5	1.2	442.3	1057.0	614.7	15	0	0	15	0.0334
██████████	1628.7	3.4	1625.3	6683.6	5058.3	71	0	0	71	0.0434
██████████	515.0	15.5	499.6	4565.5	4065.9	0	0	0	0	0.0000
Repsol2Drac	5.1	0.2	4.9	15.9	10.9	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	186.5	0.0	186.5	1057.0	870.5	186	0	0	186	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1164.9	18.5	1146.3	2164.7	1018.3	0	2186	0	2186	1.8769
██████████	1146.3	17.2	1129.1	2132.2	1003.1	0	████████████████████	████████████████████	████████████████████	████████████████████
Total		223.1				2305	████████████████████	████████████████████	████████████████████	████████████████████

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	59034	Injection Cost	47	Transportation Cost	2345	JAN 19, 2019	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	160.99
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	160.99
Total Variable	59061	Total Variable	92	Total Variable	2345		
Demand/Reservation Co	9593	Demand Cost	695	Demand Cost	19202		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	9688	Total Fixed	1669	Total Fixed	19202		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	68749	Net Storage Cost	1761	Net Trans Cost	21547	Total Gas Cost	92056
						Total Revenue	0
						Net Cost	92056

Avg Cost of Served Demand 5.298 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.898 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17376.0	0.0	17376.0	0.0	17376.0	17376.0	0.0	0	161.0	0.0
Total	17376.0	0.0	17376.0	0.0	17376.0	17376.0	0.0	0	161.0	0.0

Supply Summary

Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2373.3	18250.0	15876.7			2.9071	6899	0	6899	2.9071
ENGNiagara	1146.6	1167.3	20.6			2.1649	2482	0	2482	2.1649
ENGPNGTS	84.0	84.0	0.0			4.0502	340	0	340	4.0502
ENG3Winter	68.6	91.7	23.2			15.0000	1028	0	1028	15.0000
ENG-Z4	6617.6	6690.4	72.8			2.1145	13993	0	13993	2.1145
Dracut 20	883.3	7300.0	6416.7			5.3471	4723	0	4723	5.3471
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	758.8	2190.0	1431.2			2.9538	2241	0	2241	2.9538

REDACTED

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary

Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1217.2	2199.7	982.5			2.9204	3555	0	3555	2.9204
Repsol 40	520.1	520.1	0.0							
Dracut 30	3245.9	10950.0	7704.1			5.9351	19264	0	19264	5.9351
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	30.0	30.0			0.0000	0	0	0	0.0000
Total	17635.4						59061	9688	68749	

Storage Summary

Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	209.4	209.4	0	0.0	12	95	0.0	0	57	55	-2
ENGPropane	77	100	137.7	137.7	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1755.7	1736.9	0	18.8	1498	96	0.0	0	3510	3141	-370
ENGDominion	103	100	109.5	107.4	0	2.1	103	100	0.0	0	246	221	-24
ENGNGFG	671	100	703.0	697.4	0	5.6	671	100	5.5	0	1593	1431	-162
ENGHON	246	100	246.0	246.0	0	0.0	246	100	0.0	0	555	518	-37
Total	2607	98	3161.3	3134.8	0	26.5	2607	98	5.5	0	6940	6344	-596

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPPProd	2373.3	0.0	2373.3	7882.5	5509.3	0	5043	0	5043	2.1250
ENGTGP2Stg	71.0	1.5	69.5	7882.5	7813.0	18	0	0	18	0.2572
ENGTGPLong	6069.1	0.0	6069.1	8698.1	2629.0	0	0	0	0	0.0000
ENGTGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENGTGPShort	2782.2	23.6	2758.6	10262.0	7503.4	313	2688	0	3001	1.0786
TrCanCharges	750.1	8.6	741.5	1477.2	735.7	0	698	0	698	0.9300
IroqCharges	741.5	4.6	736.9	1460.0	723.1	66	640	0	706	0.9515
ENGPNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	209.4	0.0	209.4	8654.9	8445.5	0	0	0	0	0.0000
ENGPropane	137.7	0.0	137.7	6335.0	6197.3	0	0	0	0	0.0000
ENG3Truck	137.7	0.0	137.7	4380.0	4242.3	138	0	0	138	1.0000
Dracut 30	2918.7	6.1	2912.6	10950.0	8037.4	127	4388	0	4515	1.5469
UnionCharges	758.8	8.6	750.1	1477.2	727.0	0	140	0	140	0.1845
Dracut 20	1215.1	2.6	1212.6	7300.0	6087.4	53	1134	0	1186	0.9764

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Scen 1334-8-8-17 Pricing-RMix RD to 21-22
 DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2302.3	64.2	2238.1	9125.0	6886.9	685	0	0	685	0.2976
Z4toTGPLH	3863.8	32.8	3831.0	7665.0	3834.0	435	0	0	435	0.1126
Z4toStg	2753.8	9.1	2744.7	7882.5	5137.9	136	0	0	136	0.0495
Engie2CG	441.6	1.2	440.4	1057.0	616.6	15	0	0	15	0.0334
██████████	1679.7	3.5	1676.2	6683.6	5007.4	73	0	0	73	0.0434
██████████	515.4	15.5	499.9	4565.5	4065.6	0	0	0	0	0.0000
Repsol2Drac	4.8	0.1	4.6	15.9	11.3	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	188.4	0.0	188.4	1057.0	868.6	188	0	0	188	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1217.2	19.4	1197.8	2164.7	966.9	0	2186	0	2186	1.7963
██████████	1197.8	18.0	1179.8	2132.2	952.4	0	████████████████████	████████████████████	████████████████████	████████████████████
Total		227.4				2345	████████████████████	████████████████████	████████████████████	████████████████████

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	60152	Injection Cost	47	Transportation Cost	2388	JAN 19, 2020	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	164.64
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	164.64
Total Variable	60179	Total Variable	92	Total Variable	2388		
Demand/Reservation Co	9593	Demand Cost	695	Demand Cost	19202		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	9688	Total Fixed	1669	Total Fixed	19202		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	69867	Net Storage Cost	1761	Net Trans Cost	21590	Total Gas Cost	93218
						Total Revenue	0
						Net Cost	93218

Avg Cost of Served Demand 5.195 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.837 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17944.8	0.0	17944.8	0.0	17944.8	17944.8	0.0	0	164.6	0.0
Total	17944.8	0.0	17944.8	0.0	17944.8	17944.8	0.0	0	164.6	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2358.7	18300.0	15941.3			2.7936	6589	0	6589	2.7936
ENGNIagara	1145.4	1170.5	25.0			2.1355	2446	0	2446	2.1355
ENGPNGTS	84.3	84.3	0.0			3.9659	334	0	334	3.9659
ENG3Winter	79.5	91.7	12.3			15.0000	1192	0	1192	15.0000
ENG-Z4	6655.4	6698.7	43.3			1.9745	13141	0	13141	1.9745
Dracut 20	1070.5	7320.0	6249.5			5.3281	5704	0	5704	5.3281
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENGDAwn	772.8	2196.0	1423.2			2.8520	2204	0	2204	2.8520

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APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1320.0	2205.7	885.6			2.8103	3710	0	3710	2.8103
Repsol 40	520.1	520.1	0.0							
Dracut 30	3482.0	10980.0	7498.0			5.8894	20507	0	20507	5.8894
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	45.0	45.0			0.0000	0	0	0	0.0000
Total	18208.8						60179	9688	69867	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	217.4	217.4	0	0.0	12	95	0.0	0	55	54	-0
ENGPropane	77	100	148.6	148.6	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1757.6	1738.8	0	18.8	1498	96	0.0	0	3141	2991	-150
ENGDominion	103	100	110.6	108.4	0	2.2	103	100	0.0	0	221	210	-11
ENGNGFG	671	100	708.3	702.7	0	5.6	671	100	5.6	0	1431	1363	-68
ENGHON	246	100	247.4	247.4	0	0.0	246	100	0.0	0	518	490	-28
Total	2607	98	3189.9	3163.3	0	26.6	2607	98	5.6	0	6344	6088	-256

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPProd	2358.7	0.0	2358.7	7904.1	5545.4	0	5043	0	5043	2.1381
ENGTGP2Stg	80.0	1.6	78.3	7904.1	7825.8	21	0	0	21	0.2572
ENGTGPLong	6082.8	0.0	6082.8	8719.7	2636.9	0	0	0	0	0.0000
ENGTGPBND	1145.4	7.1	1138.3	1142.7	4.3	98	267	0	365	0.3187
ENGTGPShort	2791.8	23.7	2768.1	10290.1	7522.0	314	2688	0	3002	1.0753
TrCanCharges	764.0	8.8	755.2	1481.2	726.0	0	698	0	698	0.9131
IroqCharges	755.2	4.7	750.5	1464.0	713.5	67	640	0	707	0.9359
ENGPNGTS	84.3	0.8	83.5	366.0	282.5	0	312	0	312	3.6990
ENGLNG	217.4	0.0	217.4	8678.6	8461.2	0	0	0	0	0.0000
ENGPropane	148.6	0.0	148.6	6370.0	6221.4	0	0	0	0	0.0000
ENG3Truck	148.6	0.0	148.6	4392.0	4243.4	149	0	0	149	1.0000
Dracut 30	3248.3	6.8	3241.5	10980.0	7738.5	141	4388	0	4529	1.3944
UnionCharges	772.8	8.8	764.0	1481.2	717.2	0	140	0	140	0.1812
Dracut 20	1308.8	2.7	1306.0	7320.0	6014.0	57	1134	0	1191	0.9096

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APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2278.7	63.5	2215.2	9150.0	6934.8	678	0	0	678	0.2976
Z4toTGPLH	3900.7	33.2	3867.6	7686.0	3818.4	439	0	0	439	0.1126
Z4toStg	2754.7	9.1	2745.6	7904.1	5158.6	136	0	0	136	0.0495
Engie2CG	433.6	1.2	432.4	1064.0	631.6	14	0	0	14	0.0334
██████████	1779.5	3.7	1775.7	6702.0	4926.2	77	0	0	77	0.0434
██████████	515.4	15.5	499.9	4578.0	4078.1	0	0	0	0	0.0000
Repsol2Drac	4.8	0.1	4.6	16.0	11.4	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37881.0	37881.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2928.0	2928.0	0	0	0	0	0.0000
Engie2ENGLNG	196.4	0.0	196.4	1064.0	867.6	196	0	0	196	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1320.0	21.0	1299.0	2170.6	871.6	0	2186	0	2186	1.6563
██████████	1299.0	19.5	1279.6	2138.0	858.5	0	██████████	██████████	██████████	██████████
Total		231.9				2388	██████████	██████████	██████████	██████████

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	62690	Injection Cost	47	Transportation Cost	2423	JAN 19, 2021	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	168.93
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	168.93
Total Variable	62717	Total Variable	93	Total Variable	2423		
Demand/Reservation Co	9593	Demand Cost	695	Demand Cost	19202		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	9688	Total Fixed	1669	Total Fixed	19202		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	72405	Net Storage Cost	1762	Net Trans Cost	21624	Total Gas Cost	95791
						Total Revenue	0
						Net Cost	95791

Avg Cost of Served Demand 5.215 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.885 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary												
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After	Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	18367.2		0.0	18367.2	0.0	18367.2		18367.2	0.0	0	168.9	0.0
Total	18367.2		0.0	18367.2	0.0	18367.2		18367.2	0.0	0	168.9	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2355.2	18250.0	15894.8			2.8115	6622	0	6622	2.8115
ENGNiagara	1144.2	1167.3	23.0			2.1441	2453	0	2453	2.1441
ENGPNGTS	84.0	84.0	0.0			3.9597	332	0	332	3.9597
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6658.9	6690.4	31.5			1.9829	13204	0	13204	1.9829
Dracut 20	1266.6	7300.0	6033.4			5.4680	6926	0	6926	5.4680
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	777.9	2190.0	1412.1			2.8501	2217	0	2217	2.8501

REDACTED

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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NOV 2020 thru OCT 2021

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1411.6	2199.7	788.1			2.7950	3945	0	3945	2.7950
Repsol 40	520.1	520.1	0.0							
Dracut 30	3605.5	10950.0	7344.5			5.9086	21303	0	21303	5.9086
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	18635.7						62717	9688	72405	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	221.9	221.2	0	0.0	13	100	0.0	1	54	57	3
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1757.0	1738.2	0	18.8	1498	96	0.0	0	2991	3019	28
ENGDominion	103	100	112.3	110.1	0	2.2	103	100	0.0	0	210	213	2
ENGNGFG	671	100	716.2	710.5	0	5.7	671	100	5.6	0	1363	1372	9
ENGHON	246	100	245.9	245.9	0	0.0	246	100	0.0	0	490	490	0
Total	2607	98	3214.1	3186.8	0	26.6	2608	98	5.6	1	6088	6130	42

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2355.2	0.0	2355.2	7882.5	5527.3	0	5043	0	5043	2.1413
ENG TGP2Stg	89.3	1.8	87.5	7882.5	7795.1	23	0	0	23	0.2572
ENG TGPLong	6075.4	0.0	6075.4	8698.1	2622.7	0	0	0	0	0.0000
ENG TGPBND	1144.2	7.1	1137.1	1139.5	2.4	98	267	0	365	0.3190
ENG TGPSHORT	2799.1	23.8	2775.3	10262.0	7486.6	315	2688	0	3003	1.0728
TrCanCharges	769.0	8.8	760.2	1477.2	717.0	0	698	0	698	0.9071
IroqCharges	760.2	4.7	755.4	1460.0	704.6	67	640	0	707	0.9303
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	221.2	0.0	221.2	8654.9	8433.7	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3344.3	7.0	3337.2	10950.0	7612.8	145	4388	0	4533	1.3556
UnionCharges	777.9	8.9	769.0	1477.2	708.2	0	140	0	140	0.1800
Dracut 20	1532.4	3.2	1529.2	7300.0	5770.8	67	1134	0	1200	0.7832

REDACTED

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
 DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2265.9	63.2	2202.8	9125.0	6922.2	674	0	0	674	0.2976
Z4toTGPLH	3905.8	33.2	3872.6	7665.0	3792.4	440	0	0	440	0.1126
Z4toStg	2753.0	9.1	2743.9	7882.5	5138.6	136	0	0	136	0.0495
Engie2CG	429.1	1.2	427.9	1057.0	629.1	14	0	0	14	0.0334
██████████	1868.2	3.9	1864.3	6683.6	4819.4	81	0	0	81	0.0434
██████████	515.4	15.5	499.9	4565.5	4065.6	0	0	0	0	0.0000
Repsol2Drac	4.8	0.1	4.6	15.9	11.3	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	200.9	0.0	200.9	1057.0	856.1	201	0	0	201	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1411.6	22.4	1389.1	2164.7	775.5	0	2186	0	2186	1.5489
██████████	1389.1	20.8	1368.3	2132.2	763.9	0	██████████	██████████	██████████	██████████
Total		235.7				2423	██████████	██████████	██████████	██████████

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	66913	Injection Cost	47	Transportation Cost	2454	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	173.92
Other Variable Cost	28	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	173.92
Total Variable	66940	Total Variable	93	Total Variable	2454		
Demand/Reservation Co	9593	Demand Cost	695	Demand Cost	19202		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	9688	Total Fixed	1669	Total Fixed	19202		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	76628	Net Storage Cost	1762	Net Trans Cost	21655	Total Gas Cost	100045
						Total Revenue	0
						Net Cost	100045

Avg Cost of Served Demand 5.284 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.993 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	18933.7		0.0	18933.7	0.0	18933.7	18933.7	0.0	0	173.9	0.0
Total	18933.7		0.0	18933.7	0.0	18933.7	18933.7	0.0	0	173.9	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2365.7	18250.0	15884.3			2.8368	6711	0	6711	2.8368
ENGNiagara	1145.8	1167.3	21.5			2.1910	2510	0	2510	2.1910
ENGPNGTS	84.0	84.0	0.0			3.9303	330	0	330	3.9303
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6665.7	6690.4	24.7			2.0468	13643	0	13643	2.0468
Dracut 20	1467.7	7300.0	5832.3			5.8201	8542	0	8542	5.8201
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	788.8	2190.0	1401.2			2.8722	2266	0	2266	2.8722

REDACTED

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22

DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1495.3	2199.7	704.3			2.8083	4199	0	4199	2.8083
Repsol 40	520.1	520.1	0.0							
Dracut 30	3844.7	10950.0	7105.3			5.9837	23005	0	23005	5.9837
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	19189.6						66940	9688	76628	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	224.3	225.0	0	0.0	12	95	0.0	-1	57	55	-2
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1737.8	1734.8	0	18.6	1482	95	0.0	-16	3019	3086	67
ENGDominion	103	100	112.7	110.5	0	2.2	103	100	0.0	0	213	219	7
ENGNGFG	671	100	715.3	709.6	0	5.7	671	100	5.6	0	1372	1418	45
ENGHON	246	100	247.8	247.8	0	0.0	246	100	0.0	0	490	505	15
Total	2608	98	3198.8	3188.6	0	26.4	2591	97	5.6	-16	6130	6262	132

Transportation Summary											
Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost	
ENGTGPProd	2365.7	0.0	2365.7	7882.5	5516.8	0	5043	0	5043	2.1318	
ENGTGP2Stg	88.2	1.8	86.4	7882.5	7796.2	23	0	0	23	0.2572	
ENGTGPLong	6110.1	0.0	6110.1	8698.1	2588.0	0	0	0	0	0.0000	
ENGTGPBND	1145.8	7.1	1138.7	1139.5	0.9	98	267	0	365	0.3187	
ENGTGPShort	2797.2	23.8	2773.4	10262.0	7488.6	315	2688	0	3003	1.0735	
TrCanCharges	779.9	9.0	770.9	1477.2	706.3	0	698	0	698	0.8945	
IroqCharges	770.9	4.8	766.1	1460.0	693.9	68	640	0	708	0.9186	
ENGPNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155	
ENGLNG	225.0	0.0	225.0	8654.9	8429.9	0	0	0	0	0.0000	
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000	
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000	
Dracut 30	3604.9	7.6	3597.4	10950.0	7352.6	156	4388	0	4545	1.2607	
UnionCharges	788.8	9.0	779.9	1477.2	697.3	0	140	0	140	0.1775	
Dracut 20	1712.2	3.6	1708.6	7300.0	5591.4	74	1134	0	1208	0.7055	

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APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

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 DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2277.5	63.5	2214.0	9125.0	6911.0	678	0	0	678	0.2976
Z4toTGPLH	3929.4	33.4	3896.0	7665.0	3769.0	443	0	0	443	0.1126
Z4toStg	2736.3	9.0	2727.3	7882.5	5155.3	136	0	0	136	0.0495
Engie2CG	426.7	1.2	425.5	1057.0	631.5	14	0	0	14	0.0334
██████████	1949.2	4.1	1945.1	6683.6	4738.6	85	0	0	85	0.0434
██████████	515.2	15.5	499.7	4565.5	4065.8	0	0	0	0	0.0000
Repsol2Drac	5.0	0.1	4.8	15.9	11.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	203.3	0.0	203.3	1057.0	853.7	203	0	0	203	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1495.3	23.8	1471.5	2164.7	693.1	0	2186	0	2186	1.4621
██████████	1471.5	22.1	1449.5	2132.2	682.7	0	██████████	██████████	██████████	██████████
Total		240.1				2454	██████████	██████████	██████████	██████████

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	307899	Injection Cost	236	Transportation Cost	11915	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	227	Other Variable Cost	0	System Served	173.92
Other Variable Cost	135	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	173.92
Total Variable	308034	Total Variable	463	Total Variable	11915		
Demand/Reservation Co	47967	Demand Cost	3477	Demand Cost	96008		
Other Fixed Cost	472	Other Fixed Cost	4865	Other Fixed Cost	0		
Total Fixed	48439	Total Fixed	8343	Total Fixed	96008		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	356474	Net Storage Cost	8806	Net Trans Cost	107923	Total Gas Cost	473202
						Total Revenue	0
						Net Cost	473202

Avg Cost of Served Demand 5.286 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.924 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	89523.5	0.0	89523.5	0.0	89523.5	89523.5	0.0	0	173.9	0.0
Total	89523.5	0.0	89523.5	0.0	89523.5	89523.5	0.0	0	173.9	0.0

Supply Summary

Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	11801.0	91300.0	79499.0			2.8726	33900	0	33900	2.8726
ENGNiagara	5728.7	5839.5	110.9			2.2007	12607	0	12607	2.2007
ENGPNGTS	420.2	420.2	0.0			4.0214	1690	0	1690	4.0214
ENG3Winter	394.1	458.7	64.6			15.0000	5912	0	5912	15.0000
ENG-Z4	33156.1	33460.3	304.2			2.0870	69197	0	69197	2.0870
Dracut 20	5483.2	36520.0	31036.8			5.4686	29986	0	29986	5.4686
ENG3Summer	345.5	467.3	121.8			10.0000	3455	0	3455	10.0000
DLiqSummer	105.0	105.0	0.0							
ENG Dawn	3836.6	10956.0	7119.4			2.9415	11286	0	11286	2.9415

REDACTED

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary

Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	6608.9	11004.3	4395.4			2.8893	19095	0	19095	2.8893
Repsol 40	2600.7	2600.7	0.0							
Dracut 30	17211.5	54780.0	37568.5			5.9306	102074	0	102074	5.9306
Engie Combo	3150.0	3150.0	0.0							
C/G SUPPLY	0.0	75.0	75.0			0.0000	0	0	0	0.0000
Total	90841.6						308034	48439	356474	

Storage Summary

Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	1080.4	1081.0	0	0.0	12	95	0.0	-1	130	55	-75
ENGPropane	77	100	739.6	739.6	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	8766.0	8672.2	0	93.8	1482	95	0.0	0	2573	3086	513
ENGDominion	103	100	555.6	544.8	0	10.8	103	100	0.0	0	178	219	41
ENGNGFG	671	100	3548.6	3520.6	0	28.0	671	100	27.8	0	1164	1418	253
ENGHON	246	100	1230.9	1230.9	0	0.0	246	100	0.0	0	427	505	78
Total	2592	97	15921.1	15789.1	0	132.7	2591	97	27.8	-1	5426	6262	836

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	11801.0	0.0	11801.0	39434.3	27633.3	0	25216	0	25216	2.1368
ENG TGP2Stg	403.1	8.2	394.8	39434.3	39039.5	104	0	0	104	0.2572
ENG TGPLong	30319.8	0.0	30319.8	43512.1	13192.3	0	0	0	0	0.0000
ENG TGPBND	5728.7	35.5	5693.2	5700.8	7.6	489	1337	0	1826	0.3187
ENG TGPSHORT	13940.7	118.5	13822.2	51338.0	37515.8	1570	13438	0	15009	1.0766
TrCanCharges	3792.9	43.6	3749.3	7389.8	3640.5	0	3488	0	3488	0.9196
IroqCharges	3749.3	23.2	3726.0	7304.0	3578.0	333	3199	0	3531	0.9419
ENG PNGTS	420.2	4.2	416.0	1826.0	1410.0	1	1559	0	1560	3.7122
ENGLNG	1081.0	0.0	1081.0	43298.1	42217.1	0	0	0	0	0.0000
ENGPropane	739.6	0.0	739.6	31710.0	30970.4	0	0	0	0	0.0000
ENG C3Truck	739.6	0.0	739.6	21912.0	21172.4	740	0	0	740	1.0000
Dracut 30	15831.6	33.2	15798.4	54780.0	38981.6	687	21942	0	22629	1.4293
UnionCharges	3836.6	43.7	3792.9	7389.8	3596.9	0	700	0	700	0.1825
Dracut 20	6886.7	14.5	6872.3	36520.0	29647.7	299	5668	0	5967	0.8665

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APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
 DESIGN BASE CASE - Draw 0

Ventyx

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Report 1z (Continued)

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	11398.0	317.7	11080.3	45650.0	34569.7	3392	0	0	3392	0.2976
Z4toTGPLH	19404.4	164.9	19239.5	38346.0	19106.5	2186	0	0	2186	0.1126
Z4toStg	13751.7	45.4	13706.3	39434.3	25728.0	681	0	0	681	0.0495
Engie2CG	2174.6	6.1	2168.5	5292.0	3123.5	73	0	0	73	0.0334
██████████	8905.3	18.7	8886.6	33436.5	24549.9	387	0	0	387	0.0434
██████████	2576.3	77.3	2499.0	22840.0	20341.0	0	0	0	0	0.0000
Repsol2Drac	24.4	0.7	23.7	79.5	55.9	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	188991.0	188991.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	14608.0	14608.0	0	0	0	0	0.0000
Engie2ENGLNG	975.4	0.0	975.4	5292.0	4316.6	975	0	0	975	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	6608.9	105.1	6503.8	10829.3	4325.5	0	10932	0	10932	1.6541
██████████	6503.8	97.6	6406.3	10666.9	4260.6	0	██████████	██████████	██████████	██████████
Total		1158.2				11915	██████████	██████████	██████████	██████████

APPENDIX 6.B.1 BASE CASE DESIGN YEAR RESOURCE MIX

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
 DESIGN BASE CASE - Draw 0

Ventyx Page 19
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RESOURCE MIX RESULTS

Units: MDT

=====

	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Supplies	DAWN	NOV 2017	OCT 2022	0.00	150.00	6.03
	Repsol 40	NOV 2017	OCT 2022	0.00	150.00	13.00
	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Segments	██████████	NOV 2017	OCT 2022	0.00	150.00	18.31
	██████████	NOV 2017	OCT 2022	0.00	150.00	12.51
	Repsol2Drac	NOV 2017	OCT 2022	0.00	50.00	0.11
	Dawn2Dracut	NOV 2017	OCT 2022	0.00	50.00	0.00
	DAWNTCPL	NOV 2017	OCT 2022	0.00	150.00	5.93
	██████████	NOV 2017	OCT 2022	0.00	150.00	5.84

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 16-Sep-2017
Report 13 13:11:02

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Forecast Demand													
ENGIDesign	1621.5	2706.4	3199.1	2760.8	2326.1	1339.6	703.0	420.9	318.9	317.2	401.5	786.7	16901.8
Total Demand	1621.5	2706.4	3199.1	2760.8	2326.1	1339.6	703.0	420.9	318.9	317.2	401.5	786.7	16901.8
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	30.1	34.4	40.2	36.5	29.3	16.5	7.9	4.8	4.2	4.2	4.7	10.4	223.1
Injection	3.0	0.0	0.0	0.0	0.0	0.7	2.4	4.0	5.0	5.1	4.3	2.1	26.5
Withdrawal	0.2	1.3	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Total Fuel	33.3	35.7	41.7	37.7	30.5	17.2	10.3	8.8	9.2	9.3	9.0	12.5	255.2
Storage Injections													
ENGLNG	2.9	32.4	49.7	67.0	34.4	0.0	7.1	2.9	0.0	0.0	8.7	2.3	207.5
ENGPropane	0.0	0.0	54.9	7.7	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	131.7
ENGFSMA	241.1	0.0	0.0	0.0	0.0	0.0	155.7	287.8	316.8	318.9	291.0	127.9	1739.1
ENGDominion	7.3	0.0	0.0	0.0	0.0	13.7	8.2	4.3	25.5	27.3	14.8	7.3	108.3
ENGNGFG	29.5	0.0	0.0	0.0	0.0	49.4	67.8	103.6	135.7	137.5	103.2	73.6	700.3
ENGHON	30.1	0.0	0.0	0.0	0.0	32.0	6.7	34.7	41.1	40.1	35.7	23.4	243.8
Total Inj	311.0	32.4	104.6	74.7	34.4	95.1	256.9	444.6	530.6	535.3	465.0	246.0	3130.6
Total Req	1965.7	2774.6	3345.3	2873.3	2391.1	1451.9	970.2	874.4	858.7	861.9	875.4	1045.2	20287.6
=====													
Sources of Supply													
ENGUSGC	609.9	426.2	426.2	385.0	398.7	79.8	4.5	0.0	0.0	0.0	0.0	17.7	2348.2
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENGCSWinter	0.0	0.0	54.9	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.6
ENG-Z4	249.0	257.3	257.3	232.4	257.3	726.4	787.6	759.4	743.5	746.6	754.0	787.6	6558.5
Dracut 20	81.3	261.5	231.5	38.9	163.5	18.5	0.0	0.0	0.0	0.0	0.0	0.0	795.1
ENGCSSummer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAwn	115.6	126.9	126.9	114.6	118.7	83.7	13.9	0.0	0.0	0.0	0.0	38.0	738.4
DAWN	176.8	186.8	186.8	168.7	174.8	150.8	39.2	0.0	0.0	0.0	0.0	81.0	1164.9
Repsol 40	0.0	78.2	221.0	211.6	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	520.1
Dracut 30	394.9	504.5	648.7	650.2	545.0	288.6	1.1	0.0	0.0	0.0	0.0	0.6	3033.5
Engie Combo	2.9	163.1	175.6	190.8	97.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1732.8	2113.1	2438.4	2098.3	1872.1	1449.0	967.3	871.5	855.8	858.9	872.6	1042.2	17172.0

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0Ventyx Page 2
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	32.4	60.8	67.0	24.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	208.1
ENGPropane	0.0	0.0	100.8	30.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	131.7
ENGFSMA	163.1	372.9	466.7	439.8	281.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1723.5
ENGDominion	7.3	27.3	29.0	24.9	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	108.3
ENGNGFG	29.5	170.3	189.0	159.0	152.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	700.3
ENGHON	30.1	58.6	60.7	53.4	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.8
Total With	232.9	661.5	906.9	775.0	519.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3115.6
=====													
Total Supply	1965.7	2774.6	3345.3	2873.3	2391.1	1451.9	970.2	874.4	858.7	861.9	875.4	1045.2	20287.6
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	13	2	2	12	9	13	13	10	7	13	13
ENGPropane	77	77	77	31	8	8	8	19	31	42	54	65	77
ENGFSMA	1482	1560	1187	721	281	0	0	156	443	760	1079	1370	1482
ENGDominion	103	103	75	46	22	2	15	24	28	53	81	95	103
ENGNGFG	671	671	500	311	152	0	49	117	221	356	494	597	671
ENGHON	246	246	188	127	74	33	65	71	106	147	187	223	246
Total Inv	2592	2670	2041	1239	538	54	146	400	842	1369	1902	2364	2592
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 16-Sep-2017
Report 13 13:11:02

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Forecast Demand													
ENGIDesign	1663.5	2781.3	3279.0	2835.4	2387.7	1370.0	721.9	436.1	332.7	334.1	422.1	812.0	17376.0
Total Demand	1663.5	2781.3	3279.0	2835.4	2387.7	1370.0	721.9	436.1	332.7	334.1	422.1	812.0	17376.0
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	30.6	34.5	40.6	36.3	30.2	17.0	8.1	4.9	4.3	4.4	5.7	10.8	227.4
Injection	2.9	0.0	0.0	0.0	0.0	1.0	2.2	4.0	4.9	5.0	4.4	2.1	26.5
Withdrawal	0.2	1.4	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Total Fuel	33.7	35.9	42.1	37.5	31.4	17.9	10.4	8.9	9.2	9.3	10.1	12.9	259.4
Storage Injections													
ENGLNG	3.5	37.1	46.6	67.0	34.3	0.0	7.1	2.9	0.0	0.0	8.7	2.3	209.4
ENGPropane	0.0	0.0	34.3	34.3	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	137.7
ENGFSMA	238.9	0.0	0.0	0.0	0.0	0.0	142.5	277.7	314.9	317.6	289.4	155.8	1736.9
ENGDominion	6.4	0.0	0.0	0.0	0.0	17.4	4.6	9.9	21.1	23.6	21.5	3.0	107.4
ENGNGFG	26.6	0.0	0.0	0.0	0.0	75.9	73.9	96.6	137.5	136.3	109.6	40.9	697.4
ENGHON	31.3	0.0	0.0	0.0	0.0	34.7	5.1	31.8	40.5	41.3	37.3	24.0	246.0
Total Inj	306.8	37.1	80.9	101.3	34.3	128.0	244.7	430.4	525.5	530.4	478.1	237.5	3134.8
Total Req	2004.0	2854.3	3402.0	2974.2	2453.4	1515.9	977.0	875.3	867.5	873.8	910.3	1062.5	20770.2
=====													
Sources of Supply													
ENGUSGC	612.3	426.2	426.2	385.0	412.5	82.6	5.6	0.0	0.0	0.0	0.0	22.8	2373.3
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	34.3	34.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.6
ENG-Z4	249.0	257.3	257.3	232.4	257.3	760.3	787.6	760.2	752.3	758.6	757.6	787.6	6617.6
Dracut 20	79.4	266.4	267.0	78.1	166.8	25.7	0.0	0.0	0.0	0.0	0.0	0.0	883.3
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	122.8	85.7	16.5	0.0	0.0	0.0	0.0	42.6	758.8
DAWN	180.8	186.8	186.8	168.7	180.8	155.1	41.3	0.0	0.0	0.0	31.3	85.5	1217.2
Repsol 40	0.0	69.7	229.4	204.1	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	520.1
Dracut 30	410.0	543.6	683.1	714.4	586.4	302.6	2.1	0.0	0.0	0.0	0.0	3.6	3245.9
Engie Combo	3.5	159.9	172.9	190.8	103.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1760.3	2145.3	2493.5	2220.7	1953.6	1513.1	974.1	872.4	864.6	870.9	907.4	1059.5	17635.4

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 16-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	37.1	57.7	67.0	24.5	2.9	2.9	2.9	2.9	2.9	2.9	2.9	209.4
ENGPropane	0.0	0.0	103.4	34.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	137.7
ENGFSMA	176.5	409.7	468.8	416.4	265.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1736.9
ENGDominion	6.4	28.0	29.0	24.1	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.4
ENGNGFG	26.6	174.3	189.0	158.5	148.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	697.4
ENGHON	31.3	59.9	60.7	53.2	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	246.0
Total With	243.7	709.0	908.5	753.5	499.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3134.8
=====													
Total Supply	2004.0	2854.3	3402.0	2974.2	2453.4	1515.9	977.0	875.3	867.5	873.8	910.3	1062.5	20770.2
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	10	7	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1151	682	266	0	0	143	420	735	1053	1342	1498
ENGDominion	103	103	75	46	22	2	19	24	34	55	78	100	103
ENGNGFG	671	671	496	307	149	0	76	150	246	384	520	630	671
ENGHON	246	246	186	126	73	32	66	71	103	144	185	222	246
Total Inv	2607	2670	1998	1170	518	53	178	420	847	1370	1897	2372	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Forecast Demand													
ENGIDesign	1711.8	2841.3	3349.1	2995.4	2437.4	1408.0	744.7	453.8	348.4	354.2	444.9	855.7	17944.8
Total Demand	1711.8	2841.3	3349.1	2995.4	2437.4	1408.0	744.7	453.8	348.4	354.2	444.9	855.7	17944.8
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	30.8	34.7	40.6	37.2	30.1	17.4	11.6	5.0	4.4	4.5	4.9	10.7	231.9
Injection	3.0	0.0	0.0	0.0	0.0	1.0	3.0	3.9	4.9	4.9	3.9	1.9	26.6
Withdrawal	0.3	1.4	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	34.1	36.1	42.1	38.5	31.1	18.4	14.6	8.9	9.3	9.4	8.9	12.7	264.0
Storage Injections													
ENGLNG	3.5	44.2	46.6	67.0	35.1	0.0	7.1	2.9	2.9	0.0	5.8	2.3	217.4
ENGPropane	0.0	0.0	47.8	31.7	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	148.6
ENGFSMA	240.8	0.0	0.0	0.0	0.0	0.0	195.7	263.1	310.4	317.7	289.8	121.3	1738.8
ENGDominion	7.2	0.0	0.0	0.0	0.0	20.5	6.4	8.4	20.2	20.8	13.6	11.3	108.4
ENGNGFG	31.9	0.0	0.0	0.0	0.0	78.1	97.3	109.0	137.0	131.9	65.6	51.9	702.7
ENGHON	32.7	0.0	0.0	0.0	0.0	29.3	22.7	18.5	38.6	41.3	38.7	25.6	247.4
Total Inj	316.1	44.2	94.4	98.7	35.1	127.9	340.7	413.4	520.7	523.3	424.9	223.9	3163.3
Total Req	2062.0	2921.6	3485.6	3132.6	2503.6	1554.3	1100.1	876.1	878.4	886.9	878.7	1092.2	21372.1
=====													
Sources of Supply													
ENGUSGC	615.3	426.2	426.2	398.7	398.7	85.5	7.9	0.0	0.0	0.0	0.0	0.0	2358.7
ENGNiagara	94.2	97.4	97.4	91.1	97.4	92.9	97.4	93.1	97.4	97.4	92.3	97.4	1145.4
ENGPNGTS	8.3	11.0	12.2	10.8	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.3
ENG3Winter	0.0	0.0	47.8	31.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.5
ENG-Z4	249.0	257.3	257.3	240.7	257.3	762.2	787.6	762.2	760.3	771.6	762.2	787.6	6655.4
Dracut 20	105.3	293.4	312.9	115.0	206.1	37.7	0.0	0.0	0.0	0.0	0.0	0.0	1070.5
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	0.0	5.8	2.3	21.0
ENG3Dawn	122.8	126.9	126.9	118.7	122.8	87.6	19.2	0.0	0.0	0.0	0.0	47.8	772.8
DAWN	180.8	186.8	186.8	174.8	180.8	160.5	158.1	0.0	0.0	0.0	0.0	91.4	1320.0
Repsol 40	0.0	74.4	227.5	195.1	23.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	520.1
Dracut 30	429.7	579.6	710.3	786.3	609.6	318.1	3.4	0.0	0.0	0.0	0.0	44.9	3482.0
Engie Combo	3.5	158.8	171.4	188.1	108.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1808.9	2211.9	2576.7	2351.0	2013.9	1551.4	1097.1	873.3	875.5	883.9	875.9	1089.3	18208.8

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	44.2	57.7	67.0	25.3	2.9	2.9	2.9	2.9	2.9	2.9	2.9	217.4
ENGPropane	0.0	0.0	114.0	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	148.6
ENGFSMA	178.4	400.5	458.6	435.8	265.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1738.8
ENGDominion	7.2	28.0	29.0	24.6	19.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	108.4
ENGNGFG	31.9	178.3	189.0	164.6	138.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	702.7
ENGHON	32.7	58.7	60.7	55.0	40.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	247.4
Total With	253.1	709.7	908.9	781.6	489.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3163.3
=====													
Total Supply	2062.0	2921.6	3485.6	3132.6	2503.6	1554.3	1100.1	876.1	878.4	886.9	878.7	1092.2	21372.1
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	10	13	12
ENGPropane	77	77	77	11	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1160	701	266	0	0	196	459	769	1087	1377	1498
ENGDominion	103	103	75	46	21	1	22	28	37	57	78	91	103
ENGNGFG	671	671	493	304	139	0	78	175	284	421	553	619	671
ENGHON	246	246	188	127	72	32	61	84	102	141	182	221	246
Total Inv	2607	2670	2004	1190	507	52	177	515	926	1444	1964	2386	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Forecast Demand													
ENGIDesign	1768.5	2922.7	3431.5	2964.2	2496.8	1448.5	767.9	470.4	363.0	371.1	468.4	894.1	18367.2
Total Demand	1768.5	2922.7	3431.5	2964.2	2496.8	1448.5	767.9	470.4	363.0	371.1	468.4	894.1	18367.2
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	31.1	35.4	40.7	35.7	30.4	17.7	12.6	5.9	5.4	4.6	5.1	11.1	235.7
Injection	3.1	0.0	0.0	0.0	0.0	1.2	3.2	4.0	5.1	4.9	3.5	1.7	26.6
Withdrawal	0.3	1.4	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	34.5	36.8	42.2	37.0	31.5	18.9	15.8	10.0	10.5	9.5	8.6	12.8	267.9
Storage Injections													
ENGLNG	3.5	48.9	44.5	67.0	37.0	0.0	6.5	2.9	2.9	2.9	2.9	2.9	221.9
ENGPropane	0.0	0.0	66.1	25.7	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	240.3	0.0	0.0	0.0	0.0	0.0	231.1	292.3	319.0	314.6	224.2	116.7	1738.2
ENGDominion	9.2	0.0	0.0	0.0	0.0	18.3	10.0	11.2	28.3	26.5	4.5	2.1	110.1
ENGNGFG	39.7	0.0	0.0	0.0	0.0	98.8	62.9	81.3	137.5	118.5	127.6	44.1	710.5
ENGHON	32.2	0.0	0.0	0.0	0.0	10.7	26.1	27.9	41.3	41.2	29.1	37.3	245.9
Total Inj	324.9	48.9	110.5	92.7	37.0	127.8	348.2	427.1	540.7	515.2	399.8	214.7	3187.5
Total Req	2127.8	3008.5	3584.3	3093.8	2565.3	1595.1	1131.9	907.5	914.2	895.8	876.8	1121.6	21822.6
=====													
Sources of Supply													
ENGUSGC	620.4	426.2	426.2	385.0	398.7	88.1	10.4	0.0	0.0	0.0	0.0	0.0	2355.2
ENGNiagara	94.2	97.4	97.4	88.0	97.4	93.5	97.4	93.6	97.4	97.4	93.2	97.4	1144.2
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	66.1	25.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	766.0	777.7	762.2	787.6	6658.9
Dracut 20	155.3	307.4	328.2	191.8	232.8	51.1	0.0	0.0	0.0	0.0	0.0	0.0	1266.6
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	6.5	2.9	2.9	2.9	2.9	2.9	21.0
ENGDAwn	122.8	126.9	126.9	114.6	122.8	90.1	22.9	0.0	0.0	0.0	0.0	50.8	777.9
DAWN	180.8	186.8	186.8	168.7	180.8	165.4	182.9	30.9	30.0	0.0	0.2	98.2	1411.6
Repsol 40	0.0	82.1	225.4	182.0	30.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	520.1
Dracut 30	431.7	601.6	756.6	785.4	626.5	334.9	4.7	0.0	0.0	0.0	0.0	63.9	3605.5
Engie Combo	3.5	157.1	172.9	181.1	115.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1866.0	2254.0	2656.0	2365.2	2072.1	1592.2	1128.9	904.7	911.2	892.9	874.0	1118.6	18635.7

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	48.9	55.6	67.0	26.5	2.9	2.9	2.9	2.9	2.9	2.9	2.9	221.2
ENGPropane	0.0	0.0	126.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	177.8	434.6	467.9	392.4	265.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1738.2
ENGDominion	9.2	28.0	29.0	24.1	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.1
ENGNGFG	39.7	182.9	189.0	158.5	140.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	710.5
ENGHON	32.2	60.0	60.7	52.0	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	245.9
Total With	261.8	754.5	928.3	728.7	493.2	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3186.8
=====													
Total Supply	2127.8	3008.5	3584.3	3093.8	2565.3	1595.1	1131.9	907.5	914.2	895.8	876.8	1121.6	21822.6
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	10	13	13	13	13	13	12
ENGPropane	77	77	77	17	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1126	658	266	0	0	231	523	843	1157	1381	1498
ENGDominion	103	103	75	46	22	2	20	30	41	70	96	101	103
ENGNGFG	671	671	488	299	140	0	99	162	243	381	499	627	671
ENGHON	246	246	186	126	74	33	43	69	97	139	180	209	246
Total Inv	2607	2670	1964	1147	511	54	179	525	949	1487	1999	2396	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
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SENDOUT® Version 14.1.1 REP 13 16-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Forecast Demand													
ENGIDesign	1826.3	3007.1	3527.1	3045.9	2565.9	1491.7	792.2	487.5	377.0	388.2	490.7	934.2	18933.7
Total Demand	1826.3	3007.1	3527.1	3045.9	2565.9	1491.7	792.2	487.5	377.0	388.2	490.7	934.2	18933.7
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	31.3	35.9	40.5	35.8	30.8	18.1	12.9	7.8	5.7	4.7	5.2	11.5	240.1
Injection	3.1	0.0	0.0	0.0	0.0	1.1	3.0	4.3	5.1	4.6	3.4	1.8	26.4
Withdrawal	0.3	1.5	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	34.6	37.3	42.0	37.1	31.8	19.2	15.9	12.1	10.8	9.3	8.6	13.4	272.1
Storage Injections													
ENGLNG	2.9	49.2	45.8	67.0	38.5	0.0	7.1	2.9	2.9	2.9	2.9	2.3	224.3
ENGPropane	0.0	0.0	61.7	30.1	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	236.9	0.0	0.0	0.0	0.0	0.0	225.0	275.6	319.0	310.6	243.5	108.6	1719.2
ENGDominion	10.1	0.0	0.0	0.0	0.0	24.7	5.0	15.8	28.3	8.3	1.8	16.4	110.5
ENGNGF	38.8	0.0	0.0	0.0	0.0	80.4	58.7	125.5	137.5	132.4	92.6	43.6	709.6
ENGHON	34.2	0.0	0.0	0.0	0.0	22.7	26.1	40.0	41.3	35.3	26.8	21.4	247.8
Total Inj	322.8	49.2	107.5	97.1	38.5	127.8	333.5	471.2	540.7	501.0	379.2	203.9	3172.3
Total Req	2183.7	3093.6	3676.6	3180.1	2636.3	1638.7	1141.6	970.7	928.5	898.5	878.5	1151.4	22378.2
=====													
Sources of Supply													
ENGUSGC	623.3	426.2	426.2	385.0	398.7	91.1	15.0	0.0	0.0	0.0	0.0	0.0	2365.7
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.1	97.4	94.0	97.4	97.4	93.7	97.4	1145.8
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	61.7	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	770.2	780.3	762.2	787.6	6665.7
Dracut 20	164.0	320.8	385.2	267.2	263.4	67.0	0.0	0.0	0.0	0.0	0.0	0.0	1467.7
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	122.8	94.5	25.0	0.0	0.0	0.0	0.0	55.4	788.8
DAWN	180.8	186.8	186.8	168.7	180.8	168.3	183.9	93.8	40.2	0.0	1.4	103.8	1495.3
Repsol 40	0.0	90.7	206.6	182.0	40.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	520.1
Dracut 30	478.0	647.6	794.6	814.4	667.9	351.7	6.1	0.0	0.0	0.0	0.0	84.3	3844.7
Engie Combo	2.9	158.6	175.4	174.1	118.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1923.3	2323.4	2730.4	2467.1	2157.8	1635.8	1138.6	967.9	925.6	895.5	875.7	1148.5	19189.6

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0Ventyx Page 10
SENDOUT® Version 14.1.1 REP 13 16-Sep-2017
Report 13 (Continued) 13:11:02

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	52.6	53.5	67.0	28.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	225.0
ENGPropane	0.0	0.0	130.8	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	174.5	444.1	483.3	383.0	250.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1734.8
ENGDominion	10.1	28.2	29.0	23.1	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.5
ENGNGFG	38.8	184.6	189.0	158.5	138.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	709.6
ENGHON	34.2	60.7	60.7	51.3	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	247.8
Total With	260.4	770.2	946.2	713.0	478.5	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3188.6
=====													
Total Supply	2183.7	3093.6	3676.6	3180.1	2636.3	1638.7	1141.6	970.7	928.5	898.5	878.5	1151.4	22378.2
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	10	2	2	12	9	13	13	13	13	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1116	633	250	0	0	225	501	820	1130	1374	1498
ENGDominion	103	103	74	46	22	2	27	32	48	76	84	86	103
ENGNGFG	671	671	486	297	139	0	80	139	265	402	535	627	671
ENGHON	246	246	186	125	74	33	55	81	121	163	198	225	246
Total Inv	2608	2670	1949	1110	494	54	179	510	978	1516	2014	2390	2608
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 16-Sep-2017
Report 13 13:11:02

Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Forecast Demand						
ENGIDesign	16901.8	17376.0	17944.8	18367.2	18933.7	89523.5
Total Demand	16901.8	17376.0	17944.8	18367.2	18933.7	89523.5
Forecast Rt Mrktr Imbalance						
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed						
Transport	223.1	227.4	231.9	235.7	240.1	1158.2
Injection	26.5	26.5	26.6	26.6	26.4	132.7
Withdrawal	5.5	5.5	5.6	5.6	5.6	27.8
Total Fuel	255.2	259.4	264.0	267.9	272.1	1318.6
Storage Injections						
ENGLNG	207.5	209.4	217.4	221.9	224.3	1080.4
ENGPropane	131.7	137.7	148.6	160.8	160.8	739.6
ENGFSMA	1739.1	1736.9	1738.8	1738.2	1719.2	8672.2
ENGDominion	108.3	107.4	108.4	110.1	110.5	544.8
ENGNGFG	700.3	697.4	702.7	710.5	709.6	3520.6
ENGHON	243.8	246.0	247.4	245.9	247.8	1230.9
Total Inj	3130.6	3134.8	3163.3	3187.5	3172.3	15788.5
Total Req	20287.6	20770.2	21372.1	21822.6	22378.2	106630.6
=====						
Sources of Supply						
ENGUSGC	2348.2	2373.3	2358.7	2355.2	2365.7	11801.0
ENGNiagara	1146.6	1146.6	1145.4	1144.2	1145.8	5728.7
ENGPNGTS	84.0	84.0	84.3	84.0	84.0	420.2
ENG3Winter	62.6	68.6	79.5	91.7	91.7	394.1
ENG-Z4	6558.5	6617.6	6655.4	6658.9	6665.7	33156.1
Dracut 20	795.1	883.3	1070.5	1266.6	1467.7	5483.2
ENG3Summer	69.1	69.1	69.1	69.1	69.1	345.5
DLiqSummer	21.0	21.0	21.0	21.0	21.0	105.0
ENGDAwn	738.4	758.8	772.8	777.9	788.8	3836.6
DAWN	1164.9	1217.2	1320.0	1411.6	1495.3	6608.9
Repsol 40	520.1	520.1	520.1	520.1	520.1	2600.7
Dracut 30	3033.5	3245.9	3482.0	3605.5	3844.7	17211.5
Engie Combo	630.0	630.0	630.0	630.0	630.0	3150.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	17172.0	17635.4	18208.8	18635.7	19189.6	90841.6

APPENDIX 6.B.2 BASE CASE DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0Ventyx Page 12
SENDOUT® Version 14.1.1 REP 13 16-Sep-2017
Report 13 (Continued) 13:11:02

Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Storage Withdrawals						
ENGLNG	208.1	209.4	217.4	221.2	225.0	1081.0
ENGPropane	131.7	137.7	148.6	160.8	160.8	739.6
ENGFSMA	1723.5	1736.9	1738.8	1738.2	1734.8	8672.2
ENGDominion	108.3	107.4	108.4	110.1	110.5	544.8
ENGNGFG	700.3	697.4	702.7	710.5	709.6	3520.6
ENGHON	243.8	246.0	247.4	245.9	247.8	1230.9
Total With	3115.6	3134.8	3163.3	3186.8	3188.6	15789.1
Total Supply	20287.6	20770.2	21372.1	21822.6	22378.2	106630.6
=====						
Net Storage Inv. Adj.						
ENGLNG	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0
=====						
Start of Year Inventory						
ENGLNG	13	12	12	12	13	13
ENGPropane	77	77	77	77	77	77
ENGFSMA	1482	1498	1498	1498	1498	1482
ENGDominion	103	103	103	103	103	103
ENGNGFG	671	671	671	671	671	671
ENGHON	246	246	246	246	246	246
Total Inv	2592	2607	2607	2607	2608	2592
=====						
Unsupplied Demand						
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 16-Sep-2017
Report 9B 13:11:02

Peak Subperiod Demand Forecast by Class

JAN 19, 2018		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	156.8		
ThirtyDay			
TOTAL	156.8		

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 16-Sep-2017
Report 9C 13:11:02

Peak Subperiod Demand Summary

JAN 19, 2018		Daily System Activity			Units: MDT
=====					
AREA	FORECAST				
	TOTAL	TOTAL	TOTAL		
	DEMAND	SERVED	UNSERVED		
ENGIDemand	156.8	156.8	0.0		
ThirtyDay	0.0	0.0	0.0		
=====					
TOTAL	156.8	156.8	0.0		

REDACTED

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
 DESIGN BASE CASE - Draw 0

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 SENDOUT® Version 14.1.1 REP 9D 16-Sep-2017
 Report 9D 13:11:02

JAN 19, 2018

Daily System Activity

Units: MDT

Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel
----- Served -----														
ENGIDesign	156.8		ENGUSGC	13.75	ENGLNG			11.10		2	15	ENGTGPPProd	13.75	
			ENGNIagara	3.14	ENGPropane			28.60		3	3	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA			19.42		954	61	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion			0.93		58	56	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG			6.10	0.05	385	57	ENGTGPShort	28.11	0.24
			Dracut 20		ENGHON			1.96		150	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	6.03								ENGPropane	34.60	
			Repsol 40	13.00								ENG3Truck	6.00	
			Dracut 30	28.59								Dracut 30	28.63	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20		
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													18.31	0.04
													12.51	0.39
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	5.93	0.10
													5.84	0.09
Total	156.8		Total	90.30	Total			68.10	0.05	1551		Total		1.53

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 16-Sep-2017
Report 9B 13:11:02

Peak Subperiod Demand Forecast by Class

JAN 19, 2019		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	161.0		
ThirtyDay			
TOTAL	161.0		

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 16-Sep-2017
Report 9C 13:11:02

Peak Subperiod Demand Summary

JAN 19, 2019		Daily System Activity			Units: MDT
=====					
AREA	FORECAST				
	TOTAL DEMAND	TOTAL SERVED	TOTAL UNSERVED		
ENGIDemand	161.0	161.0	0.0		
ThirtyDay	0.0	0.0	0.0		
=====					
TOTAL	161.0	161.0	0.0		

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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SENDOUT® Version 14.1.1 REP 9D 16-Sep-2017
Report 9D 13:11:02

JAN 19, 2019

Daily System Activity

Units: MDT

Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel
--- Served ---														
ENGIDesign	160.9		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75	
			ENGNIagara	3.14	ENGPropane		28.60			6	8	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			915	59	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		381	57	ENGTGPShort	28.11	0.24
			Dracut 20	2.77	ENGHON		1.96			149	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	6.03								ENGPropane	34.60	
			Repsol 40	13.00								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	2.80	0.01
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													18.31	0.04
													12.51	0.39
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	5.93	0.10
													5.84	0.09
Total	160.9	Total	94.47	Total			68.10	0.05		1510	Total			1.54

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 16-Sep-2017
Report 9B 13:11:02

Peak Subperiod Demand Forecast by Class

JAN 19, 2020		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	164.6		
ThirtyDay			
TOTAL	164.6		

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 16-Sep-2017
Report 9C 13:11:02

Peak Subperiod Demand Summary

JAN 19, 2020		Daily System Activity			Units: MDT
=====					
AREA	FORECAST				
	TOTAL DEMAND	TOTAL SERVED	TOTAL UNSERVED		
ENGIDemand	164.6	164.6	0.0		
ThirtyDay	0.0	0.0	0.0		
=====					
TOTAL	164.6	164.6	0.0		

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

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SENDOUT® Version 14.1.1 REP 9D 16-Sep-2017
Report 9D 13:11:02

JAN 19, 2020

Daily System Activity

Units: MDT

Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel
----- Served -----														
ENGIDesign	164.6		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane		28.60			10	13	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			934	60	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		377	56	ENGTGPShort	28.11	0.24
			Dracut 20	6.42	ENGHON		1.96			150	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	6.03								ENGPropane	34.60	
			Repsol 40	13.00								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	6.45	0.01
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													18.31	0.04
													12.51	0.39
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	5.93	0.10
													5.84	0.09
Total	164.6		Total	98.13	Total		68.10	0.05		1530		Total		1.55

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 16-Sep-2017
Report 9B 13:11:02

Peak Subperiod Demand Forecast by Class

JAN 19, 2021		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	168.9		
ThirtyDay			
TOTAL	168.9		

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 16-Sep-2017
Report 9C 13:11:02

Peak Subperiod Demand Summary

JAN 19, 2021		Daily System Activity		Units: MDT
=====				
AREA	FORECAST			
	TOTAL DEMAND	TOTAL SERVED	TOTAL UNSERVED	
ENGIDemand	168.9	168.9	0.0	
ThirtyDay	0.0	0.0	0.0	
=====				
TOTAL	168.9	168.9	0.0	

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9D 16-Sep-2017
Report 9D 13:11:02

JAN 19, 2021

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	168.9		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane		28.60			14	18	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			891	57	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		372	55	ENGTGPShort	28.11	0.24
			Dracut 20	10.73	ENGHON		1.96			149	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGdawn	4.09								ENGLNG	11.10	
			DAWN	6.03								ENGPropane	34.60	
			Repsol 40	13.00								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	10.75	0.02
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													18.31	0.04
													12.51	0.39
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	5.93	0.10
													5.84	0.09
Total	168.9		Total	102.4	Total		68.10	0.05		1484		Total		1.55

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 16-Sep-2017
Report 9B 13:11:02

Peak Subperiod Demand Forecast by Class

JAN 19, 2022		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	173.9		
ThirtyDay			
TOTAL	173.9		

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
DESIGN BASE CASE - Draw 0

Ventyx Page 14
SENDOUT® Version 14.1.1 REP 9C 16-Sep-2017
Report 9C 13:11:02

Peak Subperiod Demand Summary

JAN 19, 2022

Daily System Activity

Units: MDT

```
=====
AREA          FORECAST
              TOTAL    TOTAL    TOTAL
              DEMAND   SERVED  UNSERVED
ENGIDemand    173.9    173.9     0.0
ThirtyDay      0.0      0.0      0.0
=====
TOTAL          173.9    173.9     0.0
=====
```


REDACTED

APPENDIX 6.B.3 BASE CASE DESIGN DAY

Scen 1334-8-8-17 Pricing-RMix RD to 21-22
 DESIGN BASE CASE - Draw 0

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 SENDOUT® Version 14.1.1 REP 9D 16-Sep-2017
 Report 9D 13:11:02

JAN 19, 2022

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	173.9		ENGUSGC	13.75	ENGLNG			10.91		2	16	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane			24.52		26	33	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA			19.42		866	55	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion			0.93		57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG			6.10	0.05	370	55	ENGTGPShort	28.11	0.24
			Dracut 20	20.00	ENGHON			1.96		148	60	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	10.91	
			DAWN	6.03								ENGPropane	30.52	
			Repsol 40	13.00								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	20.00	0.04
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													18.31	0.04
													12.51	0.39
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	5.93	0.10
													5.84	0.09
Total	173.9		Total	111.7	Total			63.83	0.05	1469		Total		1.57

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

Ventyx Page 1
SENDOUT® Version 14.1.1 REP 1 15-Sep-2017
Report 1 08:23:52

NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	54038	Injection Cost	48	Transportation Cost	2305	JAN 19, 2018	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	158.31
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	158.31
Total Variable	54064	Total Variable	94	Total Variable	2305		
Demand/Reservation Co	14697	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	14792	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	68856	Net Storage Cost	1762	Net Trans Cost	17615	Total Gas Cost	88233
						Total Revenue	0
						Net Cost	88233

Avg Cost of Served Demand 5.590 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.295 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	15782.9		0.0	15782.9	0.0	15782.9	15782.9	0.0	0	158.3	0.0
Total	15782.9		0.0	15782.9	0.0	15782.9	15782.9	0.0	0	158.3	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2382.3	18250.0	15867.7			3.0106	7172	0	7172	3.0106
ENGNiagara	1146.6	1167.3	20.6			2.3679	2715	0	2715	2.3679
ENGPNGTS	84.0	84.0	0.0			4.2010	353	0	353	4.2010
ENG3Winter	65.4	91.7	26.3			15.0000	981	0	981	15.0000
ENG-Z4	6592.1	6690.4	98.3			2.3200	15294	0	15294	2.3200
Dracut 20	211.7	7300.0	7088.3			5.5239	1170	0	1170	5.5239
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	767.5	2190.0	1422.5			3.1684	2432	0	2432	3.1684

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REDACTED

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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Report 1 (Continued) 08:23:52

NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	992.2	992.2	0.0							
Dracut 30	3069.4	10950.0	7880.6			5.7977	17796	0	17796	5.7977
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	16031.4						54064	14792	68856	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	240.7	241.3	0	0.0	12	95	0.0	-1	130	57	-73
ENGPropane	77	100	134.5	134.5	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	1774.0	1739.4	0	19.0	1498	96	0.0	16	2573	3509	936
ENGDomion	103	100	108.8	106.7	0	2.1	103	100	0.0	0	178	243	64
ENGNGFG	671	100	725.3	719.6	0	5.7	671	100	5.7	0	1164	1600	436
ENGHON	246	100	236.9	236.9	0	0.0	246	100	0.0	0	427	552	125
Total	2592	97	3220.2	3178.4	0	26.8	2607	98	5.7	15	5426	6940	1515

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2382.3	0.0	2382.3	7882.5	5500.3	0	5043	0	5043	2.1170
ENG TGP2Stg	107.8	2.2	105.6	7882.5	7777.0	28	0	0	28	0.2572
ENG TGPLong	6022.1	0.0	6022.1	8698.1	2676.0	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPSshort	2796.9	23.8	2773.1	10262.0	7488.9	315	2688	0	3003	1.0736
TrCanCharges	758.8	8.7	750.1	1477.2	727.1	0	698	0	698	0.9193
IroqCharges	750.1	4.7	745.4	1460.0	714.6	67	640	0	706	0.9417
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.3	0.0	241.3	8654.9	8413.6	0	0	0	0	0.0000
ENGPropane	134.5	0.0	134.5	6335.0	6200.5	0	0	0	0	0.0000
ENG C3Truck	134.5	0.0	134.5	4380.0	4245.5	135	0	0	135	1.0000
Dracut 30	2665.1	5.6	2659.5	10950.0	8290.5	116	4388	0	4504	1.6900
UnionCharges	767.5	8.7	758.8	1477.2	718.4	0	140	0	140	0.1824
Dracut 20	620.2	1.3	618.9	7300.0	6681.1	27	1134	0	1161	1.8713

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APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

Ventyx

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Report 1 (Continued)

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2274.5	63.4	2211.1	9125.0	6913.9	677	0	0	677	0.2976
Z4toTGPLH	3843.6	32.7	3811.0	7665.0	3854.0	433	0	0	433	0.1126
Z4toStg	2748.5	9.1	2739.4	7882.5	5143.1	136	0	0	136	0.0495
Engie2CG	410.3	1.1	409.2	1057.0	647.8	14	0	0	14	0.0334
██████████	958.3	2.0	956.3	8725.1	7768.8	42	0	0	42	0.0434
██████████	987.9	29.6	958.3	8743.4	7785.2	0	0	0	0	0.0000
Repsol2Drac	4.2	0.1	4.1	15.9	11.8	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	219.7	0.0	219.7	1057.0	837.3	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		201.0				2305	15309		17615	0.5860

REDACTED

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD

- Draw 0

Ventyx

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Report 1

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NOV 2018 thru OCT 2019

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	55035	Injection Cost	48	Transportation Cost	2357	JAN 19, 2019	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	164.10
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	164.10
Total Variable	55062	Total Variable	94	Total Variable	2357		
Demand/Reservation Co	14697	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	14792	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	69854	Net Storage Cost	1762	Net Trans Cost	17666	Total Gas Cost	89282
						Total Revenue	0
						Net Cost	89282

Avg Cost of Served Demand 5.449 USD/DT
(System Cost/Served Dem.)Avg Cost of Gas Purchased 4.202 USD/DT
(Supply Cost/LDC Purchase)

=====											
	Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved	
ENGIDesign	16386.1	0.0	16386.1	0.0	16386.1	16386.1	0.0	0	164.1	0.0	
Total	16386.1	0.0	16386.1	0.0	16386.1	16386.1	0.0	0	164.1	0.0	
=====											

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2407.8	18250.0	15842.2			2.9020	6988	0	6988	2.9020
ENGNiagara	1146.6	1167.3	20.6			2.1649	2482	0	2482	2.1649
ENGPNGTS	84.0	84.0	0.0			4.0502	340	0	340	4.0502
ENG3Winter	75.4	91.7	16.3			15.0000	1131	0	1131	15.0000
ENG-Z4	6624.5	6690.4	65.9			2.1144	14007	0	14007	2.1144
Dracut 20	306.6	7300.0	6993.4			5.8313	1788	0	1788	5.8313
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	882.9	2190.0	1307.1			2.8931	2554	0	2554	2.8931

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APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD

- Draw 0

Ventyx

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Report 1 (Continued)

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NOV 2018 thru OCT 2019

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	992.2	992.2	0.0							
Dracut 30	3384.8	10950.0	7565.2			5.8730	19879	0	19879	5.8730
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	30.0	30.0			0.0000	0	0	0	0.0000
Total	16624.8						55062	14792	69854	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.4	241.4	0	0.0	12	95	0.0	0	57	55	-2
ENGPropane	77	100	144.5	144.5	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	3509	3140	-370
ENGDominion	103	100	109.1	107.0	0	2.1	103	100	0.0	0	243	222	-21
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1600	1432	-168
ENGHON	246	100	234.5	234.5	0	0.0	246	100	0.0	0	552	518	-34
Total	2607	98	3225.9	3199.1	0	26.8	2607	98	5.6	0	6940	6345	-595

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2407.8	0.0	2407.8	7882.5	5474.7	0	5043	0	5043	2.0945
ENG TGP2Stg	106.4	2.2	104.2	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6084.0	0.0	6084.0	8698.1	2614.1	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPShort	2807.6	23.9	2783.7	10262.0	7478.3	316	2688	0	3004	1.0699
TrCanCharges	872.8	10.0	862.8	1477.2	614.4	0	698	0	698	0.7992
IroqCharges	862.8	5.3	857.4	1460.0	602.6	77	640	0	716	0.8302
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.4	0.0	241.4	8654.9	8413.5	0	0	0	0	0.0000
ENGPropane	144.5	0.0	144.5	6335.0	6190.5	0	0	0	0	0.0000
ENG C3Truck	144.5	0.0	144.5	4380.0	4235.5	145	0	0	145	1.0000
Dracut 30	2914.7	6.1	2908.6	10950.0	8041.4	127	4388	0	4515	1.5490
UnionCharges	882.9	10.1	872.8	1477.2	604.3	0	140	0	140	0.1586
Dracut 20	780.9	1.6	779.3	7300.0	6520.7	34	1134	0	1168	1.4951

REDACTED

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

Ventyx

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NOV 2018 thru OCT 2019

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2301.5	64.1	2237.3	9125.0	6887.7	685	0	0	685	0.2976
Z4toTGPLH	3879.6	33.0	3846.6	7665.0	3818.4	437	0	0	437	0.1126
Z4toStg	2744.9	9.1	2735.9	7882.5	5146.7	136	0	0	136	0.0495
Engie2CG	409.6	1.1	408.5	1057.0	648.5	14	0	0	14	0.0334
██████████	958.1	2.0	956.1	8725.1	7769.0	42	0	0	42	0.0434
██████████	987.7	29.6	958.1	8743.4	7785.4	0	0	0	0	0.0000
Repsol2Drac	4.4	0.1	4.3	15.9	11.6	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.4	0.0	220.4	1057.0	836.6	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		206.3				2357	15309		17666	0.5701

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 1 15-Sep-2017
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NOV 2019 thru OCT 2020

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	56676	Injection Cost	48	Transportation Cost	2395	JAN 19, 2020	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	169.45
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	169.45
Total Variable	56703	Total Variable	94	Total Variable	2395		
Demand/Reservation Co	14697	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	14792	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	71495	Net Storage Cost	1762	Net Trans Cost	17704	Total Gas Cost	90961
						Total Revenue	0
						Net Cost	90961

Avg Cost of Served Demand 5.332 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.132 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17059.9	0.0	17059.9	0.0	17059.9	17059.9	0.0	0	169.5	0.0
Total	17059.9	0.0	17059.9	0.0	17059.9	17059.9	0.0	0	169.5	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2380.4	18300.0	15919.6			2.7909	6643	0	6643	2.7909
ENGNiagara	1145.5	1170.5	25.0			2.1354	2446	0	2446	2.1354
ENGPNGTS	84.3	84.3	0.0			3.9659	334	0	334	3.9659
ENG3Winter	82.9	91.7	8.9			15.0000	1243	0	1243	15.0000
ENG-Z4	6663.2	6698.7	35.5			1.9744	13156	0	13156	1.9744
Dracut 20	463.6	7320.0	6856.4			5.8634	2718	0	2718	5.8634
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	1012.7	2196.0	1183.3			2.7781	2813	0	2813	2.7781

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	992.2	992.2	0.0							
Dracut 30	3758.3	10980.0	7221.7			5.7781	21716	0	21716	5.7781
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	45.0	45.0			0.0000	0	0	0	0.0000
Total	17303.1						56703	14792	71495	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.6	241.6	0	0.0	12	95	0.0	0	55	54	-0
ENGPropane	77	100	152.0	152.0	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	3140	2991	-148
ENGDominion	103	100	109.7	107.6	0	2.1	103	100	0.0	0	222	211	-11
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1432	1363	-68
ENGHON	246	100	234.5	234.5	0	0.0	246	100	0.0	0	518	492	-26
Total	2607	98	3234.2	3207.3	0	26.8	2607	98	5.6	0	6345	6091	-254

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPPProd	2380.4	0.0	2380.4	7904.1	5523.8	0	5043	0	5043	2.1187
ENGTGP2Stg	106.4	2.2	104.2	7904.1	7800.0	27	0	0	27	0.2572
ENGTGPLong	6095.0	0.0	6095.0	8719.7	2624.7	0	0	0	0	0.0000
ENGTGPBND	1145.5	7.1	1138.4	1142.7	4.3	98	267	0	365	0.3187
ENGTGPShort	2808.2	23.9	2784.3	10290.1	7505.8	316	2688	0	3004	1.0697
TrCanCharges	1001.1	11.5	989.6	1481.2	491.6	0	698	0	698	0.6968
IroqCharges	989.6	6.1	983.5	1464.0	480.5	88	640	0	728	0.7352
ENGPNGTS	84.3	0.8	83.5	366.0	282.5	0	312	0	312	3.6990
ENGLNG	241.6	0.0	241.6	8678.6	8437.0	0	0	0	0	0.0000
ENGPropane	152.0	0.0	152.0	6370.0	6218.0	0	0	0	0	0.0000
ENG3Truck	152.0	0.0	152.0	4392.0	4240.0	152	0	0	152	1.0000
Dracut 30	3197.9	6.7	3191.2	10980.0	7788.8	139	4388	0	4527	1.4157
UnionCharges	1012.7	11.5	1001.1	1481.2	480.1	0	140	0	140	0.1383
Dracut 20	1028.4	2.2	1026.2	7320.0	6293.8	45	1134	0	1178	1.1458

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APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary

Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2274.0	63.4	2210.6	9150.0	6939.4	677	0	0	677	0.2976
Z4toTGPLH	3917.7	33.3	3884.4	7686.0	3801.6	441	0	0	441	0.1126
Z4toStg	2745.5	9.1	2736.5	7904.1	5167.7	136	0	0	136	0.0495
Engie2CG	409.4	1.1	408.3	1064.0	655.7	14	0	0	14	0.0334
	958.1	2.0	956.1	8749.0	7792.9	42	0	0	42	0.0434
	987.7	29.6	958.1	8767.4	7809.3	0	0	0	0	0.0000
Repsol2Drac	4.4	0.1	4.3	16.0	11.7	0	0	0	0	0.0000
	0.0	0.0	0.0	37881.0	37881.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2928.0	2928.0	0	0	0	0	0.0000
Engie2ENGLNG	220.6	0.0	220.6	1064.0	843.4	221	0	0	221	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		210.7				2395	15309		17704	0.5548

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	60507	Injection Cost	48	Transportation Cost	2433	JAN 19, 2021	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	175.56
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	175.56
Total Variable	60534	Total Variable	94	Total Variable	2433		
Demand/Reservation Co	14697	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	14792	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	75326	Net Storage Cost	1762	Net Trans Cost	17743	Total Gas Cost	94831
						Total Revenue	0
						Net Cost	94831

Avg Cost of Served Demand 5.367 USD/DT
(System Cost/Served Dem.)Avg Cost of Gas Purchased 4.204 USD/DT
(Supply Cost/LDC Purchase)

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	Demand Summary									
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17667.9	0.0	17667.9	0.0	17667.9	17667.9	0.0	0	175.6	0.0
Total	17667.9	0.0	17667.9	0.0	17667.9	17667.9	0.0	0	175.6	0.0
=====										

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2375.6	18250.0	15874.4			2.8093	6674	0	6674	2.8093
ENGNiagara	1144.3	1167.3	23.0			2.1440	2453	0	2453	2.1440
ENGPNGTS	84.0	84.0	0.0			3.9597	332	0	332	3.9597
ENG3Winter	91.4	91.7	0.3			15.0000	1371	0	1371	15.0000
ENG-Z4	6665.0	6690.4	25.4			1.9829	13216	0	13216	1.9829
Dracut 20	672.2	7300.0	6627.8			5.9909	4027	0	4027	5.9909
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	1137.9	2190.0	1052.1			2.7563	3137	0	3137	2.7563

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APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary

Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	992.2	992.2	0.0							
Dracut 30	4032.9	10950.0	6917.1			5.8824	23724	0	23724	5.8824
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	17915.6						60534	14792	75326	

Storage Summary

Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.4	241.4	0	0.0	12	95	0.0	0	54	54	0
ENGPropane	77	100	160.5	160.5	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	2991	3017	25
ENGDomion	103	100	108.5	106.4	0	2.1	103	100	0.0	0	211	212	1
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1363	1376	12
ENGHON	246	100	233.3	233.3	0	0.0	246	100	0.0	0	492	491	-1
Total	2607	98	3240.2	3213.4	0	26.8	2607	98	5.6	0	6091	6129	38

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2375.6	0.0	2375.6	7882.5	5506.9	0	5043	0	5043	2.1229
ENG TGP2Stg	106.4	2.2	104.2	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6094.6	0.0	6094.6	8698.1	2603.5	0	0	0	0	0.0000
ENG TGPBND	1144.3	7.1	1137.2	1139.5	2.4	98	267	0	365	0.3190
ENG TGPSshort	2805.8	23.8	2782.0	10262.0	7480.0	316	2688	0	3004	1.0705
TrCanCharges	1125.0	12.9	1112.0	1477.2	365.1	0	698	0	698	0.6201
IroqCharges	1112.0	6.9	1105.1	1460.0	354.9	99	640	0	738	0.6640
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.4	0.0	241.4	8654.9	8413.5	0	0	0	0	0.0000
ENGPropane	160.5	0.0	160.5	6335.0	6174.5	0	0	0	0	0.0000
ENG C3Truck	160.5	0.0	160.5	4380.0	4219.5	161	0	0	161	1.0000
Dracut 30	3566.0	7.5	3558.5	10950.0	7391.5	155	4388	0	4543	1.2740
UnionCharges	1137.9	13.0	1125.0	1477.2	352.2	0	140	0	140	0.1230
Dracut 20	1143.4	2.4	1141.0	7300.0	6159.0	50	1134	0	1183	1.0349

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APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary

Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2269.3	63.2	2206.0	9125.0	6919.0	675	0	0	675	0.2976
Z4toTGPLH	3921.9	33.3	3888.5	7665.0	3776.5	442	0	0	442	0.1126
Z4toStg	2743.1	9.1	2734.1	7882.5	5148.5	136	0	0	136	0.0495
Engie2CG	409.6	1.1	408.5	1057.0	648.5	14	0	0	14	0.0334
	958.1	2.0	956.1	8725.1	7769.0	42	0	0	42	0.0434
	987.7	29.6	958.1	8743.4	7785.4	0	0	0	0	0.0000
Repsol2Drac	4.4	0.1	4.3	15.9	11.6	0	0	0	0	0.0000
	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.4	0.0	220.4	1057.0	836.6	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		215.2				2433	15309		17743	0.5414

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	65559	Injection Cost	48	Transportation Cost	2473	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	182.50
Other Variable Cost	28	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	182.50
Total Variable	65587	Total Variable	94	Total Variable	2473		
Demand/Reservation Co	14697	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	14792	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	80379	Net Storage Cost	1762	Net Trans Cost	17783	Total Gas Cost	99924
						Total Revenue	0
						Net Cost	99924

Avg Cost of Served Demand 5.433 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.315 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	18392.4	0.0	18392.4	0.0	18392.4	18392.4	0.0	0	182.5	0.0
Total	18392.4	0.0	18392.4	0.0	18392.4	18392.4	0.0	0	182.5	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2385.3	18250.0	15864.7			2.8351	6763	0	6763	2.8351
ENGNiagara	1146.0	1167.3	21.3			2.1909	2511	0	2511	2.1909
ENGPNGTS	84.0	84.0	0.0			3.9303	330	0	330	3.9303
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6672.7	6690.4	17.7			2.0467	13657	0	13657	2.0467
Dracut 20	934.5	7300.0	6365.5			6.4199	6000	0	6000	6.4199
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	1250.5	2190.0	939.5			2.7673	3460	0	3460	2.7673

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	992.2	992.2	0.0							
Dracut 30	4352.2	10950.0	6597.8			5.9439	25869	0	25869	5.9439
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	18629.1						65587	14792	80379	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.2	241.2	0	0.0	12	95	0.0	0	54	55	1
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1759.8	1756.5	0	18.8	1482	95	0.0	-16	3017	3085	68
ENGDomion	103	100	108.7	106.6	0	2.1	103	100	0.0	0	212	218	7
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1376	1419	43
ENGHON	246	100	233.3	233.3	0	0.0	246	100	0.0	0	491	505	13
Total	2607	98	3224.7	3213.7	0	26.6	2591	97	5.6	-16	6129	6261	132

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2385.3	0.0	2385.3	7882.5	5497.2	0	5043	0	5043	2.1143
ENG TGP2Stg	106.3	2.2	104.1	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6127.1	0.0	6127.1	8698.1	2571.0	0	0	0	0	0.0000
ENG TGPBND	1146.0	7.1	1138.9	1139.5	0.7	98	267	0	365	0.3186
ENG TGPSshort	2806.0	23.9	2782.2	10262.0	7479.8	316	2688	0	3004	1.0705
TrCanCharges	1236.2	14.2	1222.0	1477.2	255.1	0	698	0	698	0.5643
IroqCharges	1222.0	7.6	1214.4	1460.0	245.6	108	640	0	748	0.6123
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.2	0.0	241.2	8654.9	8413.7	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3864.1	8.1	3856.0	10950.0	7094.0	168	4388	0	4556	1.1791
UnionCharges	1250.5	14.2	1236.2	1477.2	240.9	0	140	0	140	0.1120
Dracut 20	1426.8	3.0	1423.8	7300.0	5876.2	62	1134	0	1196	0.8380

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APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2279.0	63.5	2215.5	9125.0	6909.5	678	0	0	678	0.2976
Z4toTGPLH	3945.1	33.5	3911.6	7665.0	3753.4	444	0	0	444	0.1126
Z4toStg	2727.6	9.0	2718.6	7882.5	5163.9	135	0	0	135	0.0495
Engie2CG	409.8	1.1	408.7	1057.0	648.3	14	0	0	14	0.0334
██████████	958.2	2.0	956.2	8725.1	7768.9	42	0	0	42	0.0434
██████████	987.8	29.6	958.2	8743.4	7785.3	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	15.9	11.7	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.2	0.0	220.2	1057.0	836.8	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		220.1				2473	15309		17783	0.5269

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD

- Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	291815	Injection Cost	238	Transportation Cost	11963	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	230	Other Variable Cost	0	System Served	182.50
Other Variable Cost	135	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	182.50
Total Variable	291950	Total Variable	469	Total Variable	11963		
Demand/Reservation Co	73487	Demand Cost	3477	Demand Cost	76547		
Other Fixed Cost	472	Other Fixed Cost	4865	Other Fixed Cost	0		
Total Fixed	73959	Total Fixed	8343	Total Fixed	76547		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	365909	Net Storage Cost	8812	Net Trans Cost	88511	Total Gas Cost	463231
						Total Revenue	0
						Net Cost	463231

Avg Cost of Served Demand 5.431 USD/DT
(System Cost/Served Dem.)Avg Cost of Gas Purchased 4.230 USD/DT
(Supply Cost/LDC Purchase)

=====										
	Demand Summary									
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	85289.2	0.0	85289.2	0.0	85289.2	85289.2	0.0	0	182.5	0.0
Total	85289.2	0.0	85289.2	0.0	85289.2	85289.2	0.0	0	182.5	0.0
=====										

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	11931.4	91300.0	79368.6			2.8697	34239	0	34239	2.8697
ENGNiagara	5729.0	5839.5	110.6			2.2007	12608	0	12608	2.2007
ENGPNGTS	420.2	420.2	0.0			4.0214	1690	0	1690	4.0214
ENG3Winter	406.9	458.7	51.9			15.0000	6103	0	6103	15.0000
ENG-Z4	33217.6	33460.3	242.7			2.0872	69330	0	69330	2.0872
Dracut 20	2588.6	36520.0	33931.4			6.0658	15702	0	15702	6.0658
ENG3Summer	345.5	467.3	121.8			10.0000	3455	0	3455	10.0000
DLiqSummer	105.0	105.0	0.0							
ENG Dawn	5051.5	10956.0	5904.5			2.8499	14396	0	14396	2.8499

REDACTED

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	4960.8	4960.8	0.0							
Dracut 30	18597.6	54780.0	36182.4			5.8600	108983	0	108983	5.8600
Engie Combo	3150.0	3150.0	0.0							
C/G SUPPLY	0.0	75.0	75.0			0.0000	0	0	0	0.0000
Total	86504.1						291950	73959	365909	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	1206.3	1206.9	0	0.0	12	95	0.0	-1	130	55	-75
ENGPropane	77	100	752.3	752.3	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	8860.4	8765.5	0	94.8	1482	95	0.0	0	2573	3085	512
ENGDomion	103	100	544.9	534.3	0	10.6	103	100	0.0	0	178	218	40
ENGNGFG	671	100	3608.8	3580.3	0	28.5	671	100	28.3	0	1164	1419	255
ENGHON	246	100	1172.6	1172.6	0	0.0	246	100	0.0	0	427	505	78
Total	2592	97	16145.2	16011.9	0	133.9	2591	97	28.3	-1	5426	6261	836

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	11931.4	0.0	11931.4	39434.3	27502.9	0	25216	0	25216	2.1134
ENG TGP2Stg	533.1	10.9	522.2	39434.3	38912.1	137	0	0	137	0.2572
ENG TGPLong	30422.7	0.0	30422.7	43512.1	13089.3	0	0	0	0	0.0000
ENG TGPBND	5729.0	35.5	5693.5	5700.8	7.3	489	1337	0	1826	0.3187
ENG TGPSshort	14024.4	119.2	13905.2	51338.0	37432.8	1580	13438	0	15018	1.0708
TrCanCharges	4994.0	57.4	4936.5	7389.8	2453.3	0	3488	0	3488	0.6984
IroqCharges	4936.5	30.6	4905.9	7304.0	2398.1	438	3199	0	3637	0.7367
ENG PNGTS	420.2	4.2	416.0	1826.0	1410.0	1	1559	0	1560	3.7122
ENGLNG	1206.9	0.0	1206.9	43298.1	42091.3	0	0	0	0	0.0000
ENGPropane	752.3	0.0	752.3	31710.0	30957.7	0	0	0	0	0.0000
ENG C3Truck	752.3	0.0	752.3	21912.0	21159.7	752	0	0	752	1.0000
Dracut 30	16207.8	34.0	16173.7	54780.0	38606.3	704	21942	0	22645	1.3972
UnionCharges	5051.5	57.5	4994.0	7389.8	2395.9	0	700	0	700	0.1386
Dracut 20	4999.8	10.5	4989.3	36520.0	31530.7	217	5668	0	5885	1.1772

REDACTED

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	11398.3	317.7	11080.6	45650.0	34569.4	3392	0	0	3392	0.2976
Z4toTGPLH	19507.9	165.8	19342.1	38346.0	19003.9	2197	0	0	2197	0.1126
Z4toStg	13709.7	45.2	13664.4	39434.3	25769.9	679	0	0	679	0.0495
Engie2CG	2048.7	5.7	2043.0	5292.0	3249.0	68	0	0	68	0.0334
██████████	4790.7	10.1	4780.7	43649.3	38868.7	208	0	0	208	0.0434
██████████	4938.9	148.2	4790.7	43741.2	38950.5	0	0	0	0	0.0000
Repsol2Drac	21.9	0.7	21.3	79.5	58.3	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	188991.0	188991.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	14608.0	14608.0	0	0	0	0	0.0000
Engie2ENGLNG	1101.3	0.0	1101.3	5292.0	4190.7	1101	0	0	1101	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		1053.3				11963	76547		88511	0.5550

APPENDIX 6.C.1 HIGH GROWTH NORMAL YEAR RESOURCE MIX

Scen 1329 Base Case High Fix E RMix RD
- Draw 0

Ventyx
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RESOURCE MIX RESULTS

Units: MDT

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	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Supplies	DAWN	NOV 2017	OCT 2022	0.00	150.00	0.00
	Repsol 40	NOV 2017	OCT 2022	0.00	150.00	24.80
	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Segments		NOV 2017	OCT 2022	0.00	150.00	23.90
		NOV 2017	OCT 2022	0.00	150.00	23.95
	Repsol2Drac	NOV 2017	OCT 2022	0.00	50.00	0.11
	Dawn2Dracut	NOV 2017	OCT 2022	0.00	50.00	0.00
	DAWNTCPL	NOV 2017	OCT 2022	0.00	150.00	0.00
		NOV 2017	OCT 2022	0.00	150.00	0.00

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Forecast Demand													
ENGIDesign	1510.8	2440.0	2921.4	2615.3	2123.6	1217.8	707.8	424.1	321.0	319.4	404.5	777.2	15782.9
Total Demand	1510.8	2440.0	2921.4	2615.3	2123.6	1217.8	707.8	424.1	321.0	319.4	404.5	777.2	15782.9
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.3	32.8	36.4	35.1	26.0	12.2	7.6	4.8	4.2	4.2	4.7	8.6	201.0
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.2	4.1	5.0	5.1	4.3	1.9	26.8
Withdrawal	0.4	1.3	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7
Total Fuel	28.0	34.0	37.9	36.5	27.2	13.2	9.8	8.9	9.2	9.3	9.0	10.4	233.5
Storage Injections													
ENGLNG	2.9	35.8	68.7	67.0	45.3	0.0	7.1	2.9	0.0	0.0	8.7	2.3	240.7
ENGPropane	0.0	0.0	46.8	18.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	134.5
ENGFSMA	257.0	0.0	0.0	0.0	0.0	0.0	138.9	286.8	316.3	319.0	297.8	139.0	1755.0
ENGDominion	9.2	0.0	0.0	0.0	0.0	10.1	0.0	4.3	23.1	28.3	22.7	8.9	106.7
ENGNGFG	48.8	0.0	0.0	0.0	0.0	92.7	86.9	113.8	137.5	134.7	83.0	22.1	719.6
ENGHON	26.9	0.0	0.0	0.0	0.0	26.8	9.7	22.3	41.3	41.1	38.7	30.1	236.9
Total Inj	344.8	35.8	115.5	85.6	45.3	129.6	254.3	441.6	529.8	534.7	462.4	213.9	3193.4
Total Req	1883.7	2509.7	3074.8	2737.3	2196.2	1360.6	971.9	874.6	860.1	863.4	875.9	1001.5	19209.8
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	397.9	88.6	21.7	0.0	0.0	0.0	0.0	26.3	2382.3
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	46.8	18.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.4
ENG-Z4	249.0	257.3	257.3	232.4	257.3	756.4	787.6	759.6	744.9	748.2	754.5	787.6	6592.1
Dracut 20	12.9	8.4	59.0	40.5	71.8	19.0	0.0	0.0	0.0	0.0	0.0	0.0	211.7
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAWN	110.5	126.9	126.9	114.6	114.3	92.8	28.7	0.0	0.0	0.0	0.0	52.7	767.5
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	241.2	308.5	347.3	95.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	992.2
Dracut 30	528.8	552.2	614.6	547.8	501.9	299.7	9.9	0.0	0.0	0.0	0.0	14.5	3069.4
Engie Combo	2.9	149.4	185.4	188.2	104.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1616.9	1870.1	2134.4	1972.8	1649.5	1357.8	968.9	871.8	857.2	860.4	873.1	998.6	16031.4

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.8	67.0	35.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.3
ENGPropane	0.0	0.0	115.9	18.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	134.5
ENGFSMA	179.0	368.9	466.0	429.0	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1739.4
ENGDominion	9.2	22.4	29.0	25.3	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.7
ENGNGFG	48.8	158.6	189.0	170.7	152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	719.6
ENGHON	26.9	54.0	60.7	54.0	41.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	236.9
Total With	266.8	639.7	940.3	764.6	546.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3178.4
=====													
Total Supply	1883.7	2509.7	3074.8	2737.3	2196.2	1360.6	971.9	874.6	860.1	863.4	875.9	1001.5	19209.8
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	13	2	2	12	9	13	13	10	7	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1482	1560	1192	726	297	0	0	139	426	742	1061	1359	1482
ENGDominion	103	103	80	51	26	5	15	15	20	43	71	94	103
ENGNGFG	671	671	512	323	152	0	93	180	293	431	566	649	671
ENGHON	246	246	192	132	78	36	63	73	95	136	177	216	246
Total Inv	2592	2670	2066	1241	562	61	188	439	878	1405	1936	2396	2592
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Forecast Demand													
ENGIDesign	1565.1	2531.9	3023.3	2712.0	2201.1	1257.7	734.0	443.6	338.3	339.7	429.4	810.0	16386.1
Total Demand	1565.1	2531.9	3023.3	2712.0	2201.1	1257.7	734.0	443.6	338.3	339.7	429.4	810.0	16386.1
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.8	33.1	36.9	34.8	26.9	12.5	7.8	4.9	4.4	4.6	6.5	9.1	206.3
Injection	3.4	0.0	0.0	0.0	0.0	1.0	2.1	3.9	4.9	5.1	4.7	1.8	26.8
Withdrawal	0.4	1.2	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.5	34.3	38.4	36.1	28.1	13.5	10.0	8.8	9.2	9.7	11.3	10.9	238.8
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.0	45.3	0.0	7.1	2.9	0.0	0.0	8.7	2.3	241.4
ENGPropane	0.0	0.0	52.4	23.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	144.5
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	137.5	277.2	313.1	319.0	307.1	144.0	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	13.7	4.2	2.5	20.9	28.1	22.0	5.5	107.0
ENGNGFG	44.4	0.0	0.0	0.0	0.0	87.9	71.8	106.0	136.2	136.0	120.9	12.0	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	28.7	5.3	23.1	41.3	41.3	40.0	27.9	234.5
Total Inj	343.4	35.8	121.2	90.0	45.3	130.3	237.4	423.2	523.0	536.0	510.3	203.2	3199.1
Total Req	1937.0	2602.0	3182.9	2838.1	2274.6	1401.4	981.4	875.6	870.6	885.3	950.9	1024.1	19824.0
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	407.8	90.6	26.2	0.0	0.0	0.0	0.0	35.5	2407.8
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	52.4	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.4
ENG-Z4	249.0	257.3	257.3	232.4	257.3	759.2	787.6	760.6	755.4	762.3	758.5	787.6	6624.5
Dracut 20	13.3	17.2	93.5	66.0	89.0	27.7	0.0	0.0	0.0	0.0	0.0	0.0	306.6
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	126.0	98.0	29.6	0.0	0.0	7.8	71.0	59.3	882.9
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	244.8	318.2	328.9	100.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	992.2
Dracut 30	555.3	636.7	667.3	635.8	532.2	322.0	14.1	0.0	0.0	0.0	0.0	21.3	3384.8
Engie Combo	3.5	149.4	185.4	184.6	107.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1656.7	1967.0	2236.9	2068.7	1726.6	1398.6	978.5	872.8	867.6	882.4	948.0	1021.2	16624.8

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.4
ENGPropane	0.0	0.0	121.5	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	144.5
ENGFSMA	196.1	368.9	466.0	429.0	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	29.0	25.3	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.0
ENGNGFG	44.4	157.7	189.0	170.7	153.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	50.1	60.7	54.5	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	234.5
Total With	280.4	634.9	946.0	769.5	548.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3199.1
=====													
Total Supply	1937.0	2602.0	3182.9	2838.1	2274.6	1401.4	981.4	875.6	870.6	885.3	950.9	1024.1	19824.0
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	10	7	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	726	297	0	0	138	415	728	1047	1354	1498
ENGDominion	103	103	80	51	26	6	20	24	26	47	75	97	103
ENGNGFG	671	671	513	324	153	0	88	160	266	402	538	659	671
ENGHON	246	246	196	135	81	39	67	73	96	137	178	218	246
Total Inv	2607	2670	2071	1246	566	64	191	426	846	1366	1899	2407	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Forecast Demand													
ENGIDesign	1626.2	2611.6	3117.7	2859.6	2268.7	1305.1	764.6	466.2	357.7	363.6	457.1	861.9	17059.9
Total Demand	1626.2	2611.6	3117.7	2859.6	2268.7	1305.1	764.6	466.2	357.7	363.6	457.1	861.9	17059.9
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	25.0	33.3	37.1	35.4	26.9	12.9	10.3	6.6	5.1	4.6	5.0	8.6	210.7
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.5	4.1	5.1	5.0	4.1	1.7	26.8
Withdrawal	0.4	1.2	1.5	1.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.7	34.4	38.6	36.8	28.2	13.8	12.8	10.7	10.2	9.5	9.1	10.3	243.2
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.1	45.4	0.0	7.1	2.9	2.9	0.0	5.8	2.3	241.6
ENGPropane	0.0	0.0	56.2	26.7	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	152.0
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	160.8	281.9	319.0	319.0	295.1	122.1	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	9.1	1.9	2.7	28.3	28.0	21.4	6.0	107.6
ENGNGFG	44.4	0.0	0.0	0.0	0.0	90.6	96.9	127.6	137.5	122.5	62.1	33.7	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	29.2	32.0	38.7	41.3	36.6	17.3	12.6	234.5
Total Inj	343.4	35.8	124.9	93.8	45.4	129.0	310.2	465.2	540.7	517.7	413.2	188.1	3207.3
Total Req	1998.3	2681.8	3281.2	2990.2	2342.3	1447.9	1087.6	942.1	908.6	890.8	879.3	1060.3	20510.4
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	398.7	396.0	94.1	28.8	0.0	0.0	0.0	0.0	0.0	2380.4
ENGNiagara	94.2	97.4	97.4	91.1	97.4	92.0	97.4	93.5	97.4	97.4	93.0	97.4	1145.5
ENGPNGTS	8.3	11.0	12.2	10.8	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.3
ENG3Winter	0.0	0.0	56.2	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.9
ENG-Z4	249.0	257.3	257.3	240.7	257.3	762.2	787.6	762.2	764.1	775.6	762.2	787.6	6663.2
Dracut 20	24.2	39.8	154.0	96.6	106.2	42.8	0.0	0.0	0.0	0.0	0.0	0.0	463.6
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	0.0	5.8	2.3	21.0
ENGDAWN	122.8	126.9	126.9	118.7	126.9	103.5	125.8	65.7	26.4	0.0	0.0	69.1	1012.7
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	247.9	322.5	316.5	105.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	992.2
Dracut 30	605.6	706.6	711.1	702.4	584.3	343.5	21.5	0.0	0.0	0.0	0.0	83.2	3758.3
Engie Combo	3.5	142.7	185.4	188.1	110.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1717.9	2055.9	2349.1	2190.3	1793.5	1445.0	1084.6	939.3	905.7	887.9	876.5	1057.4	17303.1

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.1	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.6
ENGPropane	0.0	0.0	125.3	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	152.0
ENGFSMA	196.1	368.9	448.3	446.6	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	29.0	26.1	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.6
ENGNGFG	44.4	150.7	189.0	176.8	154.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	56.5	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	234.5
Total With	280.4	625.9	932.1	799.9	548.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3207.3
=====													
Total Supply	1998.3	2681.8	3281.2	2990.2	2342.3	1447.9	1087.6	942.1	908.6	890.8	879.3	1060.3	20510.4
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	10	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	743	297	0	0	161	443	762	1081	1376	1498
ENGDominion	103	103	80	51	25	5	14	16	19	47	75	97	103
ENGNGFG	671	671	520	331	154	0	91	187	315	453	575	637	671
ENGHON	246	246	198	137	81	39	68	100	138	180	216	234	246
Total Inv	2607	2670	2080	1273	567	63	189	497	959	1497	2011	2422	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Forecast Demand													
ENGIDesign	1696.4	2712.6	3225.3	2890.7	2346.7	1355.7	796.1	488.0	376.3	384.8	485.9	909.4	17667.9
Total Demand	1696.4	2712.6	3225.3	2890.7	2346.7	1355.7	796.1	488.0	376.3	384.8	485.9	909.4	17667.9
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	25.1	33.5	37.3	34.6	27.5	13.2	10.5	7.6	5.5	5.6	5.7	9.0	215.2
Injection	3.4	0.0	0.0	0.0	0.0	0.8	2.6	4.5	5.1	5.1	3.8	1.4	26.8
Withdrawal	0.4	1.2	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.8	34.7	38.8	35.9	28.7	14.0	13.1	12.1	10.6	10.7	9.6	10.4	247.7
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.0	45.3	0.0	7.1	2.9	2.9	2.9	2.9	2.3	241.4
ENGPropane	0.0	0.0	60.4	31.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.5
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	188.6	295.0	319.0	319.0	286.3	90.0	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	0.9	0.9	14.7	28.1	28.3	18.8	4.6	106.4
ENGNGFG	44.4	0.0	0.0	0.0	0.0	101.7	73.7	130.3	137.5	137.5	46.8	43.1	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	25.5	7.3	25.6	41.3	41.3	40.0	25.3	233.3
Total Inj	343.4	35.8	129.2	98.0	45.3	128.2	289.2	480.0	540.5	540.7	406.3	176.8	3213.4
Total Req	2068.7	2783.1	3393.3	3024.6	2420.7	1497.9	1098.5	980.1	927.5	936.2	901.8	1096.6	21129.0
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	399.4	97.3	31.2	0.0	0.0	0.0	0.0	0.0	2375.6
ENGNiagara	94.2	97.4	97.4	88.0	97.4	92.8	97.4	94.0	97.4	97.4	93.6	97.4	1144.3
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	60.4	31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.4
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	770.0	779.8	762.2	787.6	6665.0
Dracut 20	60.6	67.0	211.9	143.4	128.6	60.8	0.0	0.0	0.0	0.0	0.0	0.0	672.2
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	126.9	109.4	126.4	103.1	39.3	38.1	24.8	78.6	1137.9
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	248.0	322.5	307.7	113.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	992.2
Dracut 30	639.6	769.4	754.3	738.8	625.9	365.7	29.4	0.0	0.0	0.0	0.0	110.0	4032.9
Engie Combo	3.5	149.0	185.4	181.1	111.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1788.3	2152.3	2454.4	2232.4	1870.0	1495.0	1095.6	977.2	924.5	933.2	899.0	1093.7	17915.6

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APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.4
ENGPropane	0.0	0.0	129.5	31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.5
ENGFSMA	196.1	368.9	451.6	443.4	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	28.2	25.3	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.4
ENGNGFG	44.4	155.6	189.0	170.7	155.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	54.8	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.3
Total With	280.4	630.8	938.8	792.3	550.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3213.4
=====													
Total Supply	2068.7	2783.1	3393.3	3024.6	2420.7	1497.9	1098.5	980.1	927.5	936.2	901.8	1096.6	21129.0
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	740	297	0	0	189	484	803	1122	1408	1498
ENGDominion	103	103	80	52	27	6	7	8	23	51	79	98	103
ENGNGFG	671	671	515	326	155	0	102	175	306	443	581	628	671
ENGHON	246	246	198	137	83	40	65	73	98	140	181	221	246
Total Inv	2607	2670	2075	1265	571	66	191	477	954	1492	2030	2433	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 08:23:52

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Forecast Demand													
ENGIDesign	1768.8	2818.0	3347.1	2999.2	2435.0	1409.7	829.2	510.6	394.7	406.4	514.1	959.5	18392.4
Total Demand	1768.8	2818.0	3347.1	2999.2	2435.0	1409.7	829.2	510.6	394.7	406.4	514.1	959.5	18392.4
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	25.3	33.7	37.6	34.5	28.1	13.6	10.7	7.9	5.9	6.2	7.4	9.3	220.1
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.5	4.4	5.1	5.1	4.1	1.2	26.6
Withdrawal	0.4	1.2	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	29.0	34.9	39.1	35.9	29.3	14.5	13.2	12.3	11.0	11.3	11.5	10.5	252.4
Storage Injections													
ENGLNG	3.5	35.8	68.6	67.0	45.3	0.0	7.1	2.9	2.9	2.9	2.9	2.3	241.2
ENGPropane	0.0	0.0	57.1	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	216.1	308.8	318.7	318.4	266.3	54.1	1740.9
ENGDominion	10.1	0.0	0.0	0.0	0.0	3.0	2.7	15.0	28.0	28.2	16.8	2.9	106.6
ENGNGFG	44.4	0.0	0.0	0.0	0.0	106.4	17.9	93.8	135.9	137.5	106.8	72.4	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	18.7	12.2	32.9	41.3	41.3	37.3	22.7	233.3
Total Inj	343.4	35.8	125.7	101.6	45.3	128.0	267.6	464.8	538.5	540.0	441.6	165.9	3198.1
Total Req	2141.2	2888.7	3511.9	3136.7	2509.7	1552.2	1110.0	987.7	944.2	957.6	967.1	1135.9	21842.8
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	403.2	102.4	32.0	0.0	0.0	0.0	0.0	0.0	2385.3
ENGNiagara	94.2	97.4	97.4	88.0	97.4	93.6	97.4	94.2	97.4	97.4	94.2	97.4	1146.0
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	57.1	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	775.1	782.5	762.2	787.6	6672.7
Dracut 20	66.9	109.7	300.7	218.4	158.1	80.8	0.0	0.0	0.0	0.0	0.0	0.0	934.5
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	126.9	113.9	126.9	110.5	50.9	57.0	89.4	83.7	1250.5
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	248.0	322.5	297.6	124.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	992.2
Dracut 30	705.9	833.5	792.2	777.0	670.1	389.6	39.6	0.0	0.0	0.0	0.0	144.2	4352.2
Engie Combo	3.5	149.0	185.4	181.1	111.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1860.9	2259.2	2578.0	2339.1	1957.7	1549.3	1107.1	984.9	941.2	954.7	964.3	1132.9	18629.1

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 (Continued) 08:23:52

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.7	67.0	35.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.2
ENGPropane	0.0	0.0	126.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	449.8	445.1	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	28.5	25.3	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.6
ENGNGFG	44.4	154.3	189.0	170.7	156.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	54.8	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.3
Total With	280.3	629.5	933.9	797.6	552.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3213.7
=====													
Total Supply	2141.2	2888.7	3511.9	3136.7	2509.7	1552.2	1110.0	987.7	944.2	957.6	967.1	1135.9	21842.8
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	742	297	0	0	216	525	844	1162	1428	1498
ENGDominion	103	103	80	52	26	6	9	12	27	55	83	100	103
ENGNGFG	671	671	516	327	157	0	106	124	218	354	492	598	671
ENGHON	246	246	198	137	83	40	58	71	104	145	186	224	246
Total Inv	2607	2670	2076	1268	572	65	190	455	917	1453	1990	2428	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Forecast Demand						
ENGIDesign	15782.9	16386.1	17059.9	17667.9	18392.4	85289.2
Total Demand	15782.9	16386.1	17059.9	17667.9	18392.4	85289.2
Forecast Rt Mrktr Imbalance						
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed						
Transport	201.0	206.3	210.7	215.2	220.1	1053.3
Injection	26.8	26.8	26.8	26.8	26.6	133.9
Withdrawal	5.7	5.6	5.6	5.6	5.6	28.3
Total Fuel	233.5	238.8	243.2	247.7	252.4	1215.5
Storage Injections						
ENGLNG	240.7	241.4	241.6	241.4	241.2	1206.3
ENGPropane	134.5	144.5	152.0	160.5	160.8	752.3
ENGFSMA	1755.0	1756.5	1756.5	1756.5	1740.9	8765.5
ENGDominion	106.7	107.0	107.6	106.4	106.6	534.3
ENGNFG	719.6	715.2	715.2	715.2	715.2	3580.3
ENGHON	236.9	234.5	234.5	233.3	233.3	1172.6
Total Inj	3193.4	3199.1	3207.3	3213.4	3198.1	16011.3
Total Req	19209.8	19824.0	20510.4	21129.0	21842.8	102516.0
=====						
Sources of Supply						
ENGUSGC	2382.3	2407.8	2380.4	2375.6	2385.3	11931.4
ENGNiagara	1146.6	1146.6	1145.5	1144.3	1146.0	5729.0
ENGPNGTS	84.0	84.0	84.3	84.0	84.0	420.2
ENG3Winter	65.4	75.4	82.9	91.4	91.7	406.9
ENG-Z4	6592.1	6624.5	6663.2	6665.0	6672.7	33217.6
Dracut 20	211.7	306.6	463.6	672.2	934.5	2588.6
ENG3Summer	69.1	69.1	69.1	69.1	69.1	345.5
DLiqSummer	21.0	21.0	21.0	21.0	21.0	105.0
ENGDAwn	767.5	882.9	1012.7	1137.9	1250.5	5051.5
DAWN	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	992.2	992.2	992.2	992.2	992.2	4960.8
Dracut 30	3069.4	3384.8	3758.3	4032.9	4352.2	18597.6
Engie Combo	630.0	630.0	630.0	630.0	630.0	3150.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	16031.4	16624.8	17303.1	17915.6	18629.1	86504.1

APPENDIX 6.C.2 HIGH GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1329 Base Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Storage Withdrawals						
ENGLNG	241.3	241.4	241.6	241.4	241.2	1206.9
ENGPropane	134.5	144.5	152.0	160.5	160.8	752.3
ENGFSMA	1739.4	1756.5	1756.5	1756.5	1756.5	8765.5
ENGDominion	106.7	107.0	107.6	106.4	106.6	534.3
ENGNGFG	719.6	715.2	715.2	715.2	715.2	3580.3
ENGHON	236.9	234.5	234.5	233.3	233.3	1172.6
Total With	3178.4	3199.1	3207.3	3213.4	3213.7	16011.9
Total Supply	19209.8	19824.0	20510.4	21129.0	21842.8	102516.0
=====						
Net Storage Inv. Adj.						
ENGLNG	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0
=====						
Start of Year Inventory						
ENGLNG	13	12	12	12	12	13
ENGPropane	77	77	77	77	77	77
ENGFSMA	1482	1498	1498	1498	1498	1482
ENGDominion	103	103	103	103	103	103
ENGNGFG	671	671	671	671	671	671
ENGHON	246	246	246	246	246	246
Total Inv	2592	2607	2607	2607	2607	2592
=====						
Unsupplied Demand						
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	57488	Injection Cost	47	Transportation Cost	2304	JAN 19, 2018	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	158.31
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	158.31
Total Variable	57514	Total Variable	91	Total Variable	2304		
Demand/Reservation Co	11722	Demand Cost	695	Demand Cost	20861		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11817	Total Fixed	1669	Total Fixed	20861		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	69331	Net Storage Cost	1760	Net Trans Cost	23165	Total Gas Cost	94256
						Total Revenue	0
						Net Cost	94256

Avg Cost of Served Demand 5.524 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.995 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17062.5	0.0	17062.5	0.0	17062.5	17062.5	0.0	0	158.3	0.0
Total	17062.5	0.0	17062.5	0.0	17062.5	17062.5	0.0	0	158.3	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2304.8	18250.0	15945.2			3.0171	6954	0	6954	3.0171
ENGNiagara	1146.6	1167.3	20.6			2.3679	2715	0	2715	2.3679
ENGPNGTS	84.0	84.0	0.0			4.2010	353	0	353	4.2010
ENG3Winter	53.3	91.7	38.5			15.0000	799	0	799	15.0000
ENG-Z4	6579.6	6690.4	110.8			2.3200	15265	0	15265	2.3200
Dracut 20	693.5	7300.0	6606.5			4.6878	3251	0	3251	4.6878
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	711.7	2190.0	1478.3			3.2109	2285	0	2285	3.2109

REDACTED

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD

- Draw 0

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1641.5	3137.5	1495.9			3.1692	5202	0	5202	3.1692
Repsol 40	717.0	717.0	0.0							
Dracut 30	2700.5	10950.0	8249.5			5.6956	15381	0	15381	5.6956
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	17352.7						57514	11817	69331	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	210.3	210.9	0	0.0	12	95	0.0	-1	130	57	-73
ENGPropane	77	100	122.4	122.4	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	1755.4	1721.0	0	18.8	1498	96	0.0	16	2573	3515	942
ENGDominion	103	100	108.9	106.8	0	2.1	103	100	0.0	0	178	244	66
ENGNGFG	671	100	698.3	692.8	0	5.5	671	100	5.5	0	1164	1593	429
ENGHON	246	100	243.6	243.6	0	0.0	246	100	0.0	0	427	553	126
Total	2592	97	3139.0	3097.5	0	26.4	2607	98	5.5	15	5426	6941	1515

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2338.5	0.0	2338.5	7882.5	5544.0	0	5043	0	5043	2.1566
ENG TGP2Stg	64.1	1.3	62.8	7882.5	7819.8	16	0	0	16	0.2572
ENG TGPLong	6005.5	0.0	6005.5	8698.1	2692.6	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPSHORT	2758.8	23.4	2735.3	10262.0	7526.7	311	2688	0	2998	1.0869
TrCanCharges	703.6	8.1	695.5	1477.2	781.6	0	698	0	698	0.9914
IroqCharges	695.5	4.3	691.2	1460.0	768.8	62	640	0	701	1.0086
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	177.2	0.0	177.2	8654.9	8477.7	0	0	0	0	0.0000
ENGPropane	122.4	0.0	122.4	6335.0	6212.6	0	0	0	0	0.0000
ENG C3Truck	122.4	0.0	122.4	4380.0	4257.6	122	0	0	122	1.0000
Dracut 30	2522.8	5.3	2517.5	10950.0	8432.5	110	4388	0	4498	1.7829
UnionCharges	711.7	8.1	703.6	1477.2	773.6	0	140	0	140	0.1967
Dracut 20	875.8	1.8	874.0	7300.0	6426.0	38	1134	0	1172	1.3378

REDACTED

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2274.4	63.4	2211.0	9125.0	6914.0	677	0	0	677	0.2976
Z4toTGPLH	3827.0	32.5	3794.5	7665.0	3870.5	431	0	0	431	0.1126
Z4toStg	2752.6	9.1	2743.5	7882.5	5139.0	136	0	0	136	0.0495
Engie2CG	440.7	1.2	439.4	1057.0	617.6	15	0	0	15	0.0334
██████████	2282.2	4.8	2277.4	9329.8	7052.4	99	0	0	99	0.0434
██████████	712.4	21.4	691.0	6308.2	5617.2	0	0	0	0	0.0000
Repsol2Drac	4.7	0.1	4.5	15.9	11.4	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	189.3	0.0	189.3	1057.0	867.7	189	0	0	189	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1641.5	26.1	1615.4	3087.6	1472.1	0	3118	0	3118	1.8997
██████████	1615.4	24.2	1591.2	3041.3	1450.0	0	██████████	██████████	██████████	██████████
Total		243.2				2304	██████████	██████████	██████████	██████████

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	58244	Injection Cost	47	Transportation Cost	2356	JAN 19, 2019	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	164.10
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	164.10
Total Variable	58271	Total Variable	91	Total Variable	2356		
Demand/Reservation Co	11722	Demand Cost	695	Demand Cost	20861		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11817	Total Fixed	1669	Total Fixed	20861		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	70088	Net Storage Cost	1760	Net Trans Cost	23217	Total Gas Cost	95065
						Total Revenue	0
						Net Cost	95065

Avg Cost of Served Demand 5.367 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.895 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17711.9	0.0	17711.9	0.0	17711.9	17711.9	0.0	0	164.1	0.0
Total	17711.9	0.0	17711.9	0.0	17711.9	17711.9	0.0	0	164.1	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2334.9	18250.0	15915.1			2.9094	6793	0	6793	2.9094
ENGNiagara	1146.6	1167.3	20.6			2.1649	2482	0	2482	2.1649
ENGPNGTS	84.0	84.0	0.0			4.0502	340	0	340	4.0502
ENG3Winter	61.2	91.7	30.6			15.0000	918	0	918	15.0000
ENG-Z4	6627.5	6690.4	62.9			2.1144	14013	0	14013	2.1144
Dracut 20	804.6	7300.0	6495.4			5.0100	4031	0	4031	5.0100
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	738.6	2190.0	1451.4			2.9649	2190	0	2190	2.9649

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1743.6	3137.5	1393.8			2.9177	5087	0	5087	2.9177
Repsol 40	717.0	717.0	0.0							
Dracut 30	3015.8	10950.0	7934.2			5.7416	17315	0	17315	5.7416
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	30.0	30.0			0.0000	0	0	0	0.0000
Total	17994.0						58271	11817	70088	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	213.5	212.8	0	0.0	13	100	0.0	1	57	58	1
ENGPropane	77	100	130.3	130.3	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1755.0	1736.2	0	18.8	1498	96	0.0	0	3515	3140	-375
ENGDominion	103	100	108.7	106.6	0	2.1	103	100	0.0	0	244	221	-23
ENGNGFG	671	100	697.1	691.6	0	5.5	671	100	5.5	0	1593	1430	-163
ENGHON	246	100	246.1	246.1	0	0.0	246	100	0.0	0	553	517	-36
Total	2607	98	3150.6	3123.6	0	26.4	2608	98	5.5	1	6941	6345	-596

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2368.5	0.0	2368.5	7882.5	5514.0	0	5043	0	5043	2.1293
ENG TGP2Stg	63.2	1.3	61.9	7882.5	7820.6	16	0	0	16	0.2572
ENG TGPLong	6081.6	0.0	6081.6	8698.1	2616.5	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPShort	2775.0	23.6	2751.4	10262.0	7510.5	313	2688	0	3000	1.0812
TrCanCharges	730.2	8.4	721.8	1477.2	755.3	0	698	0	698	0.9553
IroqCharges	721.8	4.5	717.4	1460.0	742.6	64	640	0	704	0.9750
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	179.2	0.0	179.2	8654.9	8475.7	0	0	0	0	0.0000
ENGPropane	130.3	0.0	130.3	6335.0	6204.7	0	0	0	0	0.0000
ENG C3Truck	130.3	0.0	130.3	4380.0	4249.7	130	0	0	130	1.0000
Dracut 30	2761.5	5.8	2755.7	10950.0	8194.3	120	4388	0	4508	1.6325
UnionCharges	738.6	8.4	730.2	1477.2	746.9	0	140	0	140	0.1896
Dracut 20	1063.4	2.2	1061.1	7300.0	6238.9	46	1134	0	1180	1.1095

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2305.3	64.3	2241.1	9125.0	6883.9	686	0	0	686	0.2976
Z4toTGPLH	3873.5	32.9	3840.5	7665.0	3824.5	436	0	0	436	0.1126
Z4toStg	2754.1	9.1	2745.0	7882.5	5137.6	136	0	0	136	0.0495
Engie2CG	437.5	1.2	436.3	1057.0	620.7	15	0	0	15	0.0334
	2381.3	5.0	2376.3	9329.8	6953.6	103	0	0	103	0.0434
	712.5	21.4	691.1	6308.2	5617.1	0	0	0	0	0.0000
Repsol2Drac	4.6	0.1	4.4	15.9	11.5	0	0	0	0	0.0000
	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	192.5	0.0	192.5	1057.0	864.5	192	0	0	192	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1743.6	27.7	1715.9	3087.6	1371.7	0	3118	0	3118	1.7885
	1715.9	25.7	1690.2	3041.3	1351.1	0				
Total		249.6				2356				

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	60388	Injection Cost	47	Transportation Cost	2400	JAN 19, 2020	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	169.45
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	169.45
Total Variable	60415	Total Variable	92	Total Variable	2400		
Demand/Reservation Co	11722	Demand Cost	695	Demand Cost	20861		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11817	Total Fixed	1669	Total Fixed	20861		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	72231	Net Storage Cost	1761	Net Trans Cost	23261	Total Gas Cost	97253
						Total Revenue	0
						Net Cost	97253

Avg Cost of Served Demand 5.266 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.851 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	18468.8		0.0	18468.8	0.0	18468.8	18468.8	0.0	0	169.4	0.0
Total	18468.8		0.0	18468.8	0.0	18468.8	18468.8	0.0	0	169.4	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2334.9	18300.0	15965.1			2.7945	6525	0	6525	2.7945
ENGNIagara	1147.1	1170.5	23.4			2.1354	2449	0	2449	2.1354
ENGPNGTS	84.3	84.3	0.0			3.9659	334	0	334	3.9659
ENG3Winter	66.1	91.7	25.6			15.0000	992	0	992	15.0000
ENG-Z4	6664.0	6698.7	34.7			1.9744	13158	0	13158	1.9744
Dracut 20	1047.8	7320.0	6272.2			5.2558	5507	0	5507	5.2558
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENGDAwn	761.2	2196.0	1434.8			2.8561	2174	0	2174	2.8561

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	1883.9	3146.1	1262.2			2.8096	5293	0	5293	2.8096
Repsol 40	717.0	717.0	0.0							
Dracut 30	3330.6	10980.0	7649.4			5.7336	19097	0	19097	5.7336
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	45.0	45.0			0.0000	0	0	0	0.0000
Total	18757.2						60415	11817	72231	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	215.4	215.4	0	0.0	13	100	0.0	0	58	58	-0
ENGPropane	77	100	135.2	135.2	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1757.0	1738.2	0	18.8	1498	96	0.0	0	3140	2993	-147
ENGDominion	103	100	109.5	107.4	0	2.1	103	100	0.0	0	221	210	-10
ENGNGFG	671	100	704.3	698.8	0	5.6	671	100	5.5	0	1430	1361	-69
ENGHON	246	100	245.5	245.5	0	0.0	246	100	0.0	0	517	490	-27
Total	2608	98	3166.9	3140.4	0	26.5	2608	98	5.5	0	6345	6091	-254

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPProd	2368.3	0.0	2368.3	7904.1	5535.8	0	5043	0	5043	2.1295
ENGTGP2Stg	73.1	1.5	71.6	7904.1	7832.5	19	0	0	19	0.2572
ENGTGPLong	6108.2	0.0	6108.2	8719.7	2611.5	0	0	0	0	0.0000
ENGTGPBND	1147.1	7.1	1140.0	1142.7	2.7	98	267	0	365	0.3184
ENGTGPShort	2784.3	23.7	2760.6	10290.1	7529.5	314	2688	0	3001	1.0779
TrCanCharges	752.6	8.7	743.9	1481.2	737.3	0	698	0	698	0.9270
IroqCharges	743.9	4.6	739.3	1464.0	724.7	66	640	0	706	0.9487
ENGPNGTS	84.3	0.8	83.5	366.0	282.5	0	312	0	312	3.6990
ENGLNG	182.1	0.0	182.1	8678.6	8496.5	0	0	0	0	0.0000
ENGPropane	135.2	0.0	135.2	6370.0	6234.8	0	0	0	0	0.0000
ENG3Truck	135.2	0.0	135.2	4392.0	4256.8	135	0	0	135	1.0000
Dracut 30	3067.0	6.4	3060.6	10980.0	7919.4	133	4388	0	4521	1.4742
UnionCharges	761.2	8.7	752.6	1481.2	728.6	0	140	0	140	0.1839
Dracut 20	1315.6	2.8	1312.8	7320.0	6007.2	57	1134	0	1191	0.9051

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2295.2	64.0	2231.2	9150.0	6918.8	683	0	0	683	0.2976
Z4toTGPLH	3910.2	33.2	3877.0	7686.0	3809.0	440	0	0	440	0.1126
Z4toStg	2753.8	9.1	2744.7	7904.1	5159.5	136	0	0	136	0.0495
Engie2CG	435.6	1.2	434.3	1064.0	629.7	15	0	0	15	0.0334
	2517.4	5.3	2512.1	9355.4	6843.2	109	0	0	109	0.0434
	712.7	21.4	691.3	6325.5	5634.2	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	16.0	11.8	0	0	0	0	0.0000
	0.0	0.0	0.0	37881.0	37881.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2928.0	2928.0	0	0	0	0	0.0000
Engie2ENGLNG	194.4	0.0	194.4	1064.0	869.6	194	0	0	194	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	1883.9	30.0	1853.9	3096.0	1242.1	0	3118	0	3118	1.6553
	1853.9	27.8	1826.1	3049.6	1223.5	0				
Total		256.3				2400				

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	64167	Injection Cost	47	Transportation Cost	2455	JAN 19, 2021	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	175.56
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	175.56
Total Variable	64195	Total Variable	93	Total Variable	2455		
Demand/Reservation Co	11722	Demand Cost	695	Demand Cost	20861		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11817	Total Fixed	1669	Total Fixed	20861		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	76011	Net Storage Cost	1762	Net Trans Cost	23315	Total Gas Cost	101088
						Total Revenue	0
						Net Cost	101088

Avg Cost of Served Demand 5.296 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.922 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	19088.2	0.0	19088.2	0.0	19088.2	19088.2	0.0	0	175.6	0.0
Total	19088.2	0.0	19088.2	0.0	19088.2	19088.2	0.0	0	175.6	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2334.5	18250.0	15915.5			2.8121	6565	0	6565	2.8121
ENGNiagara	1145.8	1167.3	21.5			2.1439	2457	0	2457	2.1439
ENGPNGTS	84.0	84.0	0.0			3.9597	332	0	332	3.9597
ENG3Winter	83.8	91.7	8.0			15.0000	1257	0	1257	15.0000
ENG-Z4	6665.5	6690.4	24.9			1.9829	13217	0	13217	1.9829
Dracut 20	1304.7	7300.0	5995.3			5.3470	6976	0	6976	5.3470
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	768.1	2190.0	1421.9			2.8533	2192	0	2192	2.8533

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	2010.9	3137.5	1126.6			2.7950	5620	0	5620	2.7950
Repsol 40	717.0	717.0	0.0							
Dracut 30	3547.7	10950.0	7402.3			5.8390	20715	0	20715	5.8390
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	19382.1						64195	11817	76011	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	225.4	225.4	0	0.0	13	100	0.0	0	58	58	0
ENGPropane	77	100	152.9	152.9	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1758.0	1739.2	0	18.8	1498	96	0.0	0	2993	3018	25
ENGDominion	103	100	111.7	109.5	0	2.2	103	100	0.0	0	210	212	2
ENGNGFG	671	100	713.4	707.8	0	5.6	671	100	5.6	0	1361	1374	12
ENGHON	246	100	246.0	246.0	0	0.0	246	100	0.0	0	490	491	1
Total	2608	98	3207.4	3180.8	0	26.6	2608	98	5.6	0	6091	6130	40

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2367.5	0.0	2367.5	7882.5	5515.0	0	5043	0	5043	2.1302
ENG TGP2Stg	87.3	1.8	85.5	7882.5	7797.1	22	0	0	22	0.2572
ENG TGPLong	6096.3	0.0	6096.3	8698.1	2601.8	0	0	0	0	0.0000
ENG TGPNBD	1145.8	7.1	1138.7	1139.5	0.8	98	267	0	365	0.3187
ENG TGPSshort	2796.9	23.8	2773.1	10262.0	7488.9	315	2688	0	3003	1.0736
TrCanCharges	759.4	8.7	750.6	1477.2	726.5	0	698	0	698	0.9186
IroqCharges	750.6	4.7	746.0	1460.0	714.0	67	640	0	706	0.9410
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	192.3	0.0	192.3	8654.9	8462.6	0	0	0	0	0.0000
ENGPropane	152.9	0.0	152.9	6335.0	6182.1	0	0	0	0	0.0000
ENG C3Truck	152.9	0.0	152.9	4380.0	4227.1	153	0	0	153	1.0000
Dracut 30	3234.7	6.8	3227.9	10950.0	7722.1	140	4388	0	4529	1.4001
UnionCharges	768.1	8.7	759.4	1477.2	717.8	0	140	0	140	0.1823
Dracut 20	1622.2	3.4	1618.8	7300.0	5681.2	70	1134	0	1204	0.7423

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APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2280.3	63.6	2216.7	9125.0	6908.3	679	0	0	679	0.2976
Z4toTGPLH	3912.8	33.3	3879.5	7665.0	3785.5	441	0	0	441	0.1126
Z4toStg	2752.7	9.1	2743.6	7882.5	5138.9	136	0	0	136	0.0495
Engie2CG	425.6	1.2	424.4	1057.0	632.6	14	0	0	14	0.0334
	2640.2	5.5	2634.7	9329.8	6695.1	115	0	0	115	0.0434
	712.4	21.4	691.0	6308.2	5617.2	0	0	0	0	0.0000
Repsol2Drac	4.7	0.1	4.5	15.9	11.4	0	0	0	0	0.0000
	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	204.4	0.0	204.4	1057.0	852.6	204	0	0	204	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	2010.9	32.0	1978.9	3087.6	1108.6	0	3118	0	3118	1.5508
	1978.9	29.7	1949.2	3041.3	1092.0	0				
Total		261.6				2455				

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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NOV 2021 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	69831	Injection Cost	47	Transportation Cost	2509	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	182.50
Other Variable Cost	28	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	182.50
Total Variable	69859	Total Variable	93	Total Variable	2509		
Demand/Reservation Co	11722	Demand Cost	695	Demand Cost	20861		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	11817	Total Fixed	1669	Total Fixed	20861		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	81676	Net Storage Cost	1761	Net Trans Cost	23370	Total Gas Cost	106807
						Total Revenue	0
						Net Cost	106807

Avg Cost of Served Demand 5.376 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.053 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	19867.9	0.0	19867.9	0.0	19867.9	19867.9	0.0	0	182.5	0.0
Total	19867.9	0.0	19867.9	0.0	19867.9	19867.9	0.0	0	182.5	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2346.7	18250.0	15903.3			2.8373	6658	0	6658	2.8373
ENGNiagara	1146.6	1167.3	20.6			2.1909	2512	0	2512	2.1909
ENGPNGTS	84.0	84.0	0.0			3.9303	330	0	330	3.9303
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6673.2	6690.4	17.2			2.0467	13658	0	13658	2.0467
Dracut 20	1594.0	7300.0	5706.0			5.7503	9166	0	9166	5.7503
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	780.2	2190.0	1409.8			2.8746	2243	0	2243	2.8746

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APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	2132.5	3137.5	1004.9			2.8083	5989	0	5989	2.8083
Repsol 40	717.0	717.0	0.0							
Dracut 30	3865.3	10950.0	7084.7			5.9615	23043	0	23043	5.9615
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	20151.4						69859	11817	81676	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	234.3	235.0	0	0.0	12	95	0.0	-1	58	55	-2
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1739.9	1736.9	0	18.6	1482	95	0.0	-16	3018	3087	69
ENGDominion	103	100	111.2	109.0	0	2.2	103	100	0.0	0	212	218	6
ENGNGFG	671	100	715.3	709.6	0	5.7	671	100	5.6	0	1374	1418	45
ENGHON	246	100	244.0	244.0	0	0.0	246	100	0.0	0	491	505	14
Total	2608	98	3205.6	3195.4	0	26.4	2591	97	5.6	-16	6130	6262	131

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2379.7	0.0	2379.7	7882.5	5502.9	0	5043	0	5043	2.1193
ENG TGP2Stg	86.1	1.8	84.3	7882.5	7798.2	22	0	0	22	0.2572
ENG TGPLong	6134.3	0.0	6134.3	8698.1	2563.8	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPSshort	2794.0	23.7	2770.2	10262.0	7491.8	315	2688	0	3002	1.0746
TrCanCharges	771.3	8.9	762.4	1477.2	714.7	0	698	0	698	0.9044
IroqCharges	762.4	4.7	757.7	1460.0	702.3	68	640	0	707	0.9278
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	202.0	0.0	202.0	8654.9	8452.8	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3666.4	7.7	3658.7	10950.0	7291.3	159	4388	0	4547	1.2403
UnionCharges	780.2	8.9	771.3	1477.2	705.9	0	140	0	140	0.1795
Dracut 20	1797.3	3.8	1793.6	7300.0	5506.4	78	1134	0	1212	0.6742

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APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2293.6	63.9	2229.7	9125.0	6895.3	683	0	0	683	0.2976
Z4toTGPLH	3938.0	33.5	3904.6	7665.0	3760.4	444	0	0	444	0.1126
Z4toStg	2735.1	9.0	2726.1	7882.5	5156.5	135	0	0	135	0.0495
Engie2CG	416.7	1.2	415.5	1057.0	641.5	14	0	0	14	0.0334
	2758.2	5.8	2752.4	9329.8	6577.4	120	0	0	120	0.0434
	712.5	21.4	691.1	6308.2	5617.1	0	0	0	0	0.0000
Repsol2Drac	4.6	0.1	4.4	15.9	11.5	0	0	0	0	0.0000
	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	213.3	0.0	213.3	1057.0	843.7	213	0	0	213	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	2132.5	33.9	2098.6	3087.6	989.0	0	3118	0	3118	1.4623
	2098.6	31.5	2067.1	3041.3	974.1	0				
Total		267.7				2509				

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	310118	Injection Cost	235	Transportation Cost	12024	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	226	Other Variable Cost	0	System Served	182.50
Other Variable Cost	135	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	182.50
Total Variable	310253	Total Variable	461	Total Variable	12024		
Demand/Reservation Co	58612	Demand Cost	3477	Demand Cost	104304		
Other Fixed Cost	472	Other Fixed Cost	4865	Other Fixed Cost	0		
Total Fixed	59084	Total Fixed	8343	Total Fixed	104304		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	369337	Net Storage Cost	8804	Net Trans Cost	116329	Total Gas Cost	494470
						Total Revenue	0
						Net Cost	494470

Avg Cost of Served Demand 5.363 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.944 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	92199.3	0.0	92199.3	0.0	92199.3	92199.3	0.0	0	182.5	0.0
Total	92199.3	0.0	92199.3	0.0	92199.3	92199.3	0.0	0	182.5	0.0

Supply Summary

Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	11655.8	91300.0	79644.2			2.8737	33495	0	33495	2.8737
ENGNiagara	5732.8	5839.5	106.8			2.2006	12616	0	12616	2.2006
ENGPNGTS	420.2	420.2	0.0			4.0214	1690	0	1690	4.0214
ENG3Winter	356.1	458.7	102.7			15.0000	5341	0	5341	15.0000
ENG-Z4	33209.8	33460.3	250.5			2.0871	69311	0	69311	2.0871
Dracut 20	5444.7	36520.0	31075.3			5.3138	28932	0	28932	5.3138
ENG3Summer	345.5	467.3	121.8			10.0000	3455	0	3455	10.0000
DLiqSummer	105.0	105.0	0.0							
ENG Dawn	3759.9	10956.0	7196.1			2.9479	11084	0	11084	2.9479

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APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

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- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	9412.5	15695.9	6283.4			2.8889	27192	0	27192	2.8889
Repsol 40	3585.1	3585.1	0.0							
Dracut 30	16459.9	54780.0	38320.1			5.8051	95551	0	95551	5.8051
Engie Combo	3150.0	3150.0	0.0							
C/G SUPPLY	0.0	75.0	75.0			0.0000	0	0	0	0.0000
Total	93637.3						310253	59084	369337	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	1099.0	1099.6	0	0.0	12	95	0.0	-1	130	55	-75
ENGPropane	77	100	701.5	701.5	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	8765.3	8671.5	0	93.8	1482	95	0.0	0	2573	3087	514
ENGDomion	103	100	550.1	539.3	0	10.7	103	100	0.0	0	178	218	40
ENGNGFG	671	100	3528.4	3500.6	0	27.9	671	100	27.7	0	1164	1418	254
ENGHON	246	100	1225.2	1225.2	0	0.0	246	100	0.0	0	427	505	77
Total	2592	97	15869.5	15737.7	0	132.4	2591	97	27.7	-1	5426	6262	836

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	11822.5	0.0	11822.5	39434.3	27611.7	0	25216	0	25216	2.1329
ENG TGP2Stg	373.7	7.6	366.1	39434.3	39068.2	96	0	0	96	0.2572
ENG TGPLong	30425.9	0.0	30425.9	43512.1	13086.2	0	0	0	0	0.0000
ENG TGPBND	5732.8	35.5	5697.2	5700.8	3.5	489	1337	0	1826	0.3185
ENG TGPSshort	13908.9	118.2	13790.7	51338.0	37547.3	1567	13438	0	15005	1.0788
TrCanCharges	3717.0	42.7	3674.3	7389.8	3715.5	0	3488	0	3488	0.9384
IroqCharges	3674.3	22.8	3651.5	7304.0	3652.5	326	3199	0	3525	0.9593
ENG PNGTS	420.2	4.2	416.0	1826.0	1410.0	1	1559	0	1560	3.7122
ENGLNG	932.8	0.0	932.8	43298.1	42365.3	0	0	0	0	0.0000
ENGPropane	701.5	0.0	701.5	31710.0	31008.5	0	0	0	0	0.0000
ENG C3Truck	701.5	0.0	701.5	21912.0	21210.5	702	0	0	702	1.0000
Dracut 30	15252.4	32.0	15220.4	54780.0	39559.6	662	21942	0	22604	1.4820
UnionCharges	3759.9	42.8	3717.0	7389.8	3672.8	0	700	0	700	0.1862
Dracut 20	6674.3	14.0	6660.3	36520.0	29859.7	290	5668	0	5958	0.8927

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

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- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	11448.8	319.1	11129.7	45650.0	34520.3	3407	0	0	3407	0.2976
Z4toTGPLH	19461.6	165.4	19296.2	38346.0	19049.8	2192	0	0	2192	0.1126
Z4toStg	13748.3	45.4	13702.9	39434.3	25731.4	681	0	0	681	0.0495
Engie2CG	2156.0	6.0	2150.0	5292.0	3142.0	72	0	0	72	0.0334
██████████	12579.4	26.4	12552.9	46674.7	34121.7	546	0	0	546	0.0434
██████████	3562.4	106.9	3455.5	31558.3	28102.8	0	0	0	0	0.0000
Repsol2Drac	22.8	0.7	22.1	79.5	57.5	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	188991.0	188991.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	14608.0	14608.0	0	0	0	0	0.0000
Engie2ENGLNG	994.0	0.0	994.0	5292.0	4298.0	994	0	0	994	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	9412.5	149.7	9262.8	15446.3	6183.5	0	15592	0	15592	1.6566
██████████	9262.8	138.9	9123.9	15214.6	6090.8	0	████████████████████	████████████████████	████████████████████	████████████████████
Total		1278.5				12024	████████████████████	████████████████████	████████████████████	████████████████████

APPENDIX 6.D.1 HIGH GROWTH DESIGN YEAR RESOURCE MIX

Scen 1331 Design Case High Fix E RMix RD
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RESOURCE MIX RESULTS

Units: MDT

=====

	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Supplies	DAWN	NOV 2017	OCT 2022	0.00	150.00	8.60
	Repsol 40	NOV 2017	OCT 2022	0.00	150.00	17.93
	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Segments		NOV 2017	OCT 2022	0.00	150.00	25.56
		NOV 2017	OCT 2022	0.00	150.00	17.28
	Repsol2Drac	NOV 2017	OCT 2022	0.00	50.00	0.11
	Dawn2Dracut	NOV 2017	OCT 2022	0.00	50.00	0.00
	DAWNTCPL	NOV 2017	OCT 2022	0.00	150.00	8.46
		NOV 2017	OCT 2022	0.00	150.00	8.33

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Forecast Demand													
ENGIDesign	1636.9	2732.2	3229.5	2787.1	2348.3	1352.3	709.7	424.9	321.9	320.3	405.3	794.2	17062.5
Total Demand	1636.9	2732.2	3229.5	2787.1	2348.3	1352.3	709.7	424.9	321.9	320.3	405.3	794.2	17062.5
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	32.1	37.0	45.3	41.5	32.0	18.0	8.2	4.9	4.3	4.3	4.8	10.8	243.2
Injection	2.9	0.0	0.0	0.0	0.0	0.8	2.4	4.1	5.0	5.1	4.2	2.0	26.4
Withdrawal	0.2	1.3	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Total Fuel	35.2	38.4	46.8	42.8	33.2	18.8	10.5	9.0	9.3	9.4	9.0	12.8	275.1
Storage Injections													
ENGLNG	2.9	31.2	45.8	69.4	40.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	210.3
ENGPropane	0.0	0.0	28.4	24.8	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	122.4
ENGFSMA	238.7	0.0	0.0	0.0	0.0	0.0	205.8	306.4	318.6	316.1	255.3	95.7	1736.6
ENGDominion	6.4	0.0	0.0	0.0	0.0	4.8	1.8	7.7	25.0	28.0	22.8	10.3	106.8
ENGNGFG	22.0	0.0	0.0	0.0	0.0	90.8	13.6	73.3	135.1	137.5	123.4	97.0	692.8
ENGHON	30.1	0.0	0.0	0.0	0.0	14.7	12.6	39.0	39.3	41.3	40.0	26.7	243.6
Total Inj	300.1	31.2	74.2	94.3	40.0	110.3	252.4	440.8	529.5	534.5	461.8	243.5	3112.5
Total Req	1972.1	2801.7	3350.5	2924.2	2421.5	1481.4	972.6	874.7	860.8	864.1	876.1	1050.5	20450.2
=====													
Sources of Supply													
ENGUSGC	597.9	423.3	423.7	382.9	396.2	70.1	3.5	0.0	0.0	0.0	0.0	7.2	2304.8
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	28.4	24.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3
ENG-Z4	249.0	257.3	257.3	232.4	257.3	742.2	787.6	759.7	745.6	748.9	754.8	787.6	6579.6
Dracut 20	71.3	255.7	178.4	24.7	150.0	13.4	0.0	0.0	0.0	0.0	0.0	0.0	693.5
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAwn	114.6	126.9	126.9	114.6	118.7	77.8	7.0	0.0	0.0	0.0	0.0	25.1	711.7
DAWN	251.0	266.5	266.5	240.7	249.3	206.9	50.6	0.0	0.0	0.0	0.0	110.1	1641.5
Repsol 40	0.0	87.8	304.4	304.7	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	717.0
Dracut 30	360.8	474.3	568.2	544.4	485.7	267.1	0.0	0.0	0.0	0.0	0.0	0.0	2700.5
Engie Combo	2.9	160.4	175.6	193.3	97.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1750.1	2160.7	2438.8	2161.0	1882.2	1478.5	969.7	871.8	857.8	861.2	873.3	1047.5	17352.7

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1331 Design Case High Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	31.2	56.9	69.4	30.2	2.9	2.9	2.9	2.9	2.9	2.9	2.9	210.9
ENGPropane	0.0	0.0	97.5	24.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	122.4
ENGFSMA	160.7	357.8	478.6	427.4	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1721.0
ENGDominion	6.4	26.4	29.0	24.9	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.8
ENGNGFG	22.0	167.7	189.0	163.2	150.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	692.8
ENGHON	30.1	57.9	60.7	53.4	41.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.6
Total With	222.0	641.0	911.7	763.2	539.3	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3097.5
=====													
Total Supply	1972.1	2801.7	3350.5	2924.2	2421.5	1481.4	972.6	874.7	860.8	864.1	876.1	1050.5	20450.2
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	13	2	2	12	9	13	13	10	7	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1482	1560	1203	724	297	0	0	206	512	831	1147	1402	1482
ENGDominion	103	103	76	47	22	2	7	9	17	42	70	92	103
ENGNGFG	671	671	503	314	151	0	91	104	178	313	450	574	671
ENGHON	246	246	188	128	74	33	47	60	99	138	180	220	246
Total Inv	2592	2670	2060	1223	554	54	162	411	849	1376	1907	2366	2592
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Forecast Demand													
ENGIDesign	1695.6	2835.1	3342.4	2890.2	2433.9	1396.5	735.9	444.5	339.2	340.6	430.2	827.7	17711.9
Total Demand	1695.6	2835.1	3342.4	2890.2	2433.9	1396.5	735.9	444.5	339.2	340.6	430.2	827.7	17711.9
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	32.8	38.0	45.3	41.5	32.6	18.6	8.5	5.0	4.5	4.5	6.8	11.5	249.6
Injection	2.9	0.0	0.0	0.0	0.0	0.9	2.0	3.9	5.0	5.0	4.7	2.1	26.4
Withdrawal	0.2	1.4	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Total Fuel	35.8	39.3	46.8	42.8	33.8	19.5	10.5	9.0	9.4	9.5	11.4	13.6	281.5
Storage Injections													
ENGLNG	3.5	34.4	52.6	66.9	35.0	0.0	6.5	2.9	0.0	0.0	8.7	2.9	213.5
ENGPropane	0.0	0.0	31.7	29.5	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	130.3
ENGFSMA	238.3	0.0	0.0	0.0	0.0	0.0	116.0	290.7	319.0	318.0	299.2	155.0	1736.2
ENGDominion	5.6	0.0	0.0	0.0	0.0	9.1	5.8	10.5	23.2	24.9	21.9	5.5	106.6
ENGNGFG	20.8	0.0	0.0	0.0	0.0	88.2	74.2	74.1	136.1	136.1	124.0	38.0	691.6
ENGHON	31.4	0.0	0.0	0.0	0.0	30.7	21.2	32.6	32.7	37.7	40.0	19.9	246.1
Total Inj	299.6	34.4	84.3	96.4	35.0	128.0	235.3	422.2	522.5	528.2	505.4	232.9	3124.2
Total Req	2031.0	2908.9	3473.5	3029.4	2502.7	1544.1	981.6	875.7	871.2	878.2	947.1	1074.2	21117.6
=====													
Sources of Supply													
ENGUSGC	600.3	423.3	423.8	382.9	409.6	75.7	4.4	0.0	0.0	0.0	0.0	14.9	2334.9
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	31.7	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.2
ENG-Z4	249.0	257.3	257.3	232.4	257.3	760.7	787.6	760.7	756.0	763.0	758.7	787.6	6627.5
Dracut 20	68.5	264.8	242.5	57.5	149.9	21.4	0.0	0.0	0.0	0.0	0.0	0.0	804.6
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	6.5	2.9	0.0	0.0	8.7	2.9	21.0
ENGDAwn	122.8	126.9	126.9	114.6	122.8	80.8	10.0	0.0	0.0	0.0	0.0	33.8	738.6
DAWN	257.9	266.5	266.5	240.7	257.9	214.7	55.8	0.0	0.0	0.0	67.0	116.7	1743.6
Repsol 40	0.0	100.9	300.5	302.8	12.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	717.0
Dracut 30	390.0	503.1	629.6	637.1	568.4	286.8	0.5	0.0	0.0	0.0	0.0	0.2	3015.8
Engie Combo	3.5	160.0	175.6	190.8	100.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1794.5	2211.2	2563.9	2286.7	1986.0	1541.2	978.7	872.8	868.2	875.3	944.2	1071.3	17994.0

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	34.4	63.7	66.9	24.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	212.8
ENGPropane	0.0	0.0	100.8	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	130.3
ENGFSMA	175.9	402.4	466.5	410.5	281.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1736.2
ENGDominion	5.6	28.0	29.0	24.1	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.6
ENGNGFG	20.8	173.0	189.0	158.5	150.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	691.6
ENGHON	31.4	59.9	60.7	53.2	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	246.1
Total With	236.5	697.7	909.7	742.7	516.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3123.6
=====													
Total Supply	2031.0	2908.9	3473.5	3029.4	2502.7	1544.1	981.6	875.7	871.2	878.2	947.1	1074.2	21117.6
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	10	13	13	10	7	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1158	692	281	0	0	116	407	726	1044	1343	1498
ENGDominion	103	103	75	46	22	2	11	17	27	50	75	97	103
ENGNGFG	671	671	498	309	150	0	88	162	237	373	509	633	671
ENGHON	246	246	186	126	73	32	62	83	116	149	186	226	246
Total Inv	2607	2670	2007	1181	535	53	179	411	830	1350	1875	2378	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Forecast Demand													
ENGIDesign	1761.8	2924.2	3446.9	3082.8	2508.6	1449.1	766.5	467.1	358.6	364.5	457.9	880.7	18468.8
Total Demand	1761.8	2924.2	3446.9	3082.8	2508.6	1449.1	766.5	467.1	358.6	364.5	457.9	880.7	18468.8
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	33.2	37.8	46.0	42.5	32.6	19.2	13.7	5.1	4.6	4.7	5.1	11.9	256.3
Injection	2.9	0.0	0.0	0.0	0.0	0.9	3.5	3.6	5.0	4.9	3.8	1.9	26.5
Withdrawal	0.2	1.4	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Total Fuel	36.4	39.2	47.5	43.8	33.6	20.1	17.3	8.7	9.6	9.5	8.8	13.8	288.3
Storage Injections													
ENGLNG	2.9	45.1	48.5	66.9	31.0	0.0	6.5	2.9	2.9	0.0	5.8	2.9	215.4
ENGPropane	0.0	0.0	32.7	33.5	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	135.2
ENGFSMA	240.2	0.0	0.0	0.0	0.0	0.0	235.8	239.8	319.0	319.0	243.4	140.9	1738.2
ENGDominion	6.4	0.0	0.0	0.0	0.0	10.5	11.9	11.0	25.6	22.0	16.4	3.7	107.4
ENGNGFG	28.0	0.0	0.0	0.0	0.0	82.9	95.3	98.2	128.8	125.3	99.5	40.7	698.8
ENGHON	30.8	0.0	0.0	0.0	0.0	34.7	22.8	37.3	26.6	39.3	36.0	18.1	245.5
Total Inj	308.2	45.1	81.2	100.4	31.0	128.0	383.8	400.7	514.5	517.2	412.6	217.7	3140.4
Total Req	2106.4	3008.6	3575.6	3227.0	2573.2	1597.2	1167.5	876.5	882.7	891.2	879.4	1112.3	21897.6
=====													
Sources of Supply													
ENGUSGC	610.0	423.3	424.1	396.7	396.0	79.9	5.1	0.0	0.0	0.0	0.0	0.0	2334.9
ENGNiagara	94.2	97.4	97.4	91.1	97.4	93.5	97.4	93.5	97.4	97.4	93.0	97.4	1147.1
ENGPNGTS	8.3	11.0	12.2	10.8	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.3
ENG3Winter	0.0	0.0	32.7	33.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.1
ENG-Z4	249.0	257.3	257.3	240.7	257.3	762.2	787.6	762.2	764.5	776.0	762.2	787.6	6664.0
Dracut 20	96.0	299.3	302.4	102.2	211.4	36.5	0.0	0.0	0.0	0.0	0.0	0.0	1047.8
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	6.5	2.9	2.9	0.0	5.8	2.9	21.0
ENG3Dawn	122.8	126.9	126.9	118.7	122.8	84.2	15.2	0.0	0.0	0.0	0.0	43.7	761.2
DAWN	257.9	266.5	266.5	249.3	257.9	223.1	234.1	0.0	0.0	0.0	0.0	128.6	1883.9
Repsol 40	0.0	89.8	317.1	288.0	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	717.0
Dracut 30	419.5	564.9	667.3	728.6	608.7	308.2	2.3	0.0	0.0	0.0	0.0	31.3	3330.6
Engie Combo	2.9	161.4	172.4	188.1	105.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1860.6	2297.9	2676.1	2447.5	2088.6	1594.4	1164.6	873.7	879.7	888.3	876.5	1109.3	18757.2

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	45.1	59.6	66.9	20.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	215.4
ENGPropane	0.0	0.0	101.7	33.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	135.2
ENGFSMA	177.8	400.0	459.4	435.4	265.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1738.2
ENGDominion	6.4	28.0	29.0	24.1	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.4
ENGNGFG	28.0	178.8	189.0	164.6	138.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	698.8
ENGHON	30.8	58.7	60.7	55.0	40.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	245.5
Total With	245.8	710.7	899.5	779.5	484.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3140.4
=====													
Total Supply	2106.4	3008.6	3575.6	3227.0	2573.2	1597.2	1167.5	876.5	882.7	891.2	879.4	1112.3	21897.6
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	13	2	2	12	10	13	13	13	10	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1160	701	266	0	0	236	476	795	1114	1357	1498
ENGDominion	103	103	75	46	22	2	12	24	35	61	83	99	103
ENGNGFG	671	671	492	303	138	0	83	178	276	405	531	630	671
ENGHON	246	246	188	127	72	32	66	89	126	153	192	228	246
Total Inv	2608	2670	2004	1186	507	53	179	559	957	1469	1983	2393	2608
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1331 Design Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Forecast Demand													
ENGIDesign	1837.9	3037.4	3566.2	3080.6	2594.9	1505.3	798.1	488.9	377.3	385.7	486.8	929.2	19088.2
Total Demand	1837.9	3037.4	3566.2	3080.6	2594.9	1505.3	798.1	488.9	377.3	385.7	486.8	929.2	19088.2
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	33.5	38.9	46.5	40.2	33.0	19.8	14.7	6.7	5.8	4.8	5.3	12.5	261.6
Injection	3.1	0.0	0.0	0.0	0.0	0.8	3.6	3.9	5.1	4.8	3.5	1.9	26.6
Withdrawal	0.3	1.4	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	36.9	40.4	48.0	41.4	34.1	20.6	18.3	10.7	10.9	9.5	8.7	14.3	293.9
Storage Injections													
ENGLNG	2.9	49.2	48.3	66.9	37.1	0.0	6.5	2.9	2.9	2.9	2.9	2.9	225.4
ENGPropane	0.0	0.0	49.2	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	152.9
ENGFSMA	241.2	0.0	0.0	0.0	0.0	0.0	253.4	242.1	319.0	306.2	239.3	138.0	1739.2
ENGDominion	9.2	0.0	0.0	0.0	0.0	7.5	10.1	17.5	28.3	20.5	11.9	4.6	109.5
ENGNGFG	37.0	0.0	0.0	0.0	0.0	84.5	79.2	120.9	137.5	131.8	80.2	36.7	707.8
ENGHON	32.3	0.0	0.0	0.0	0.0	36.0	21.3	36.0	41.3	30.1	37.0	12.0	246.0
Total Inj	322.5	49.2	97.5	101.5	37.1	128.0	382.1	430.9	540.7	502.9	382.7	205.7	3180.8
Total Req	2197.3	3127.0	3711.8	3223.5	2666.0	1653.9	1198.4	930.4	928.9	898.2	878.2	1149.2	22562.8
=====													
Sources of Supply													
ENGUSGC	616.1	423.3	424.3	382.9	396.0	83.9	7.9	0.0	0.0	0.0	0.0	0.0	2334.5
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.0	97.4	97.4	93.6	97.4	1145.8
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	49.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.8
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	770.3	780.0	762.2	787.6	6665.5
Dracut 20	156.2	312.1	333.3	201.3	246.5	55.3	0.0	0.0	0.0	0.0	0.0	0.0	1304.7
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	6.5	2.9	2.9	2.9	2.9	2.9	21.0
ENGDAwn	122.8	126.9	126.9	114.6	122.8	87.1	18.7	0.0	0.0	0.0	0.0	48.3	768.1
DAWN	257.9	266.5	266.5	240.7	257.9	231.3	256.9	53.4	40.4	0.0	1.1	138.4	2010.9
Repsol 40	0.0	107.7	325.6	251.0	32.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	717.0
Dracut 30	429.8	593.7	714.6	773.8	647.6	330.2	4.0	0.0	0.0	0.0	0.0	53.8	3547.7
Engie Combo	2.9	157.7	175.2	174.1	120.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1937.2	2353.6	2782.4	2503.8	2188.1	1651.0	1195.4	927.6	925.9	895.2	875.4	1146.3	19382.1

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1331 Design Case High Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	51.5	57.1	66.9	26.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	225.4
ENGPropane	0.0	0.0	118.3	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	152.9
ENGFSMA	178.8	449.9	475.3	385.2	250.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1739.2
ENGDominion	9.2	28.2	29.0	23.1	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.5
ENGNGFG	37.0	183.1	189.0	158.5	140.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	707.8
ENGHON	32.3	60.7	60.7	51.3	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	246.0
Total With	260.1	773.4	929.3	719.6	478.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3180.8
=====													
Total Supply	2197.3	3127.0	3711.8	3223.5	2666.0	1653.9	1198.4	930.4	928.9	898.2	878.2	1149.2	22562.8
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	11	2	2	12	10	13	13	13	13	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1110	635	250	0	0	253	495	815	1121	1360	1498
ENGDominion	103	103	74	46	22	2	10	20	37	66	86	98	103
ENGNGFG	671	671	488	299	140	0	84	164	285	422	554	634	671
ENGHON	246	246	186	125	74	33	69	90	126	167	197	234	246
Total Inv	2608	2670	1946	1114	496	55	180	559	987	1525	2025	2405	2608
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1331 Design Case High Fix E RMix RD
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Forecast Demand													
ENGIDesign	1916.4	3155.4	3701.2	3196.2	2692.5	1565.3	831.2	511.5	395.6	407.3	514.9	980.3	19867.9
Total Demand	1916.4	3155.4	3701.2	3196.2	2692.5	1565.3	831.2	511.5	395.6	407.3	514.9	980.3	19867.9
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	33.8	40.0	45.6	40.2	33.7	20.3	15.1	9.2	6.3	4.9	5.5	13.1	267.7
Injection	3.1	0.0	0.0	0.0	0.0	0.8	3.3	4.6	5.1	4.7	3.3	1.7	26.4
Withdrawal	0.3	1.5	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	37.2	41.5	47.1	41.5	34.7	21.1	18.4	13.7	11.4	9.6	8.7	14.8	299.7
Storage Injections													
ENGLNG	2.9	49.9	51.8	66.9	41.9	0.0	7.1	2.9	2.9	2.9	2.9	2.3	234.3
ENGPropane	0.0	0.0	61.7	30.1	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	238.9	0.0	0.0	0.0	0.0	0.0	192.6	284.2	319.0	316.0	248.1	122.4	1721.3
ENGDominion	9.2	0.0	0.0	0.0	0.0	3.5	18.3	22.8	28.3	13.5	8.7	4.6	109.0
ENGNGFG	38.8	0.0	0.0	0.0	0.0	91.6	105.4	128.6	137.5	121.4	53.5	32.7	709.6
ENGHON	31.6	0.0	0.0	0.0	0.0	31.9	28.0	39.5	41.3	18.5	32.0	21.2	244.0
Total Inj	321.4	49.9	113.5	97.0	41.9	127.1	363.0	489.5	540.7	483.9	356.7	194.7	3179.1
Total Req	2274.9	3246.8	3861.8	3334.7	2769.1	1713.5	1212.6	1014.8	947.7	900.7	880.4	1189.7	23346.8
=====													
Sources of Supply													
ENGUSGC	620.1	423.3	424.4	382.9	396.0	87.8	12.2	0.0	0.0	0.0	0.0	0.0	2346.7
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	61.7	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	775.4	782.6	762.2	787.6	6673.2
Dracut 20	176.3	327.0	404.1	313.8	295.5	77.3	0.0	0.0	0.0	0.0	0.0	0.0	1594.0
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAwn	122.8	126.9	126.9	114.6	122.8	90.3	23.1	0.0	0.0	0.0	0.0	52.7	780.2
DAWN	257.9	266.5	266.5	240.7	257.9	238.9	259.9	137.5	54.2	0.0	2.7	150.0	2132.5
Repsol 40	0.0	130.9	282.4	249.9	53.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	717.0
Dracut 30	484.5	646.8	788.6	811.3	696.1	353.0	5.9	0.0	0.0	0.0	0.0	79.1	3865.3
Engie Combo	2.9	165.0	176.9	167.1	118.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	2016.0	2452.1	2898.3	2641.3	2304.6	1710.6	1209.7	1011.9	944.8	897.8	877.5	1186.8	20151.4

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1331 Design Case High Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	54.1	58.7	66.9	32.1	2.9	2.9	2.9	2.9	2.9	2.9	2.9	235.0
ENGPropane	0.0	0.0	130.8	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	176.5	465.5	496.7	364.9	233.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1736.9
ENGDominion	9.2	28.2	28.0	23.2	20.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.0
ENGNGFG	38.8	186.3	188.7	158.5	137.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	709.6
ENGHON	31.6	60.7	60.5	49.8	41.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	244.0
Total With	259.0	794.8	963.4	693.4	464.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3195.4
=====													
Total Supply	2274.9	3246.8	3861.8	3334.7	2769.1	1713.5	1212.6	1014.8	947.7	900.7	880.4	1189.7	23346.8
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	9	2	2	12	9	13	13	13	13	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1095	598	233	0	0	193	477	796	1112	1360	1498
ENGDominion	103	103	74	46	23	3	6	25	48	76	89	98	103
ENGNGFG	671	671	485	296	137	0	92	197	326	463	585	638	671
ENGHON	246	246	186	125	75	34	66	94	133	175	193	225	246
Total Inv	2608	2670	1925	1075	479	56	180	540	1027	1565	2046	2400	2608
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Forecast Demand						
ENGIDesign	17062.5	17711.9	18468.8	19088.2	19867.9	92199.3
Total Demand	17062.5	17711.9	18468.8	19088.2	19867.9	92199.3
Forecast Rt Mrktr Imbalance						
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed						
Transport	243.2	249.6	256.3	261.6	267.7	1278.5
Injection	26.4	26.4	26.5	26.6	26.4	132.4
Withdrawal	5.5	5.5	5.5	5.6	5.6	27.7
Total Fuel	275.1	281.5	288.3	293.9	299.7	1438.5
Storage Injections						
ENGLNG	210.3	213.5	215.4	225.4	234.3	1099.0
ENGPropane	122.4	130.3	135.2	152.9	160.8	701.5
ENGFSMA	1736.6	1736.2	1738.2	1739.2	1721.3	8671.5
ENGDominion	106.8	106.6	107.4	109.5	109.0	539.3
ENGNGFG	692.8	691.6	698.8	707.8	709.6	3500.6
ENGHON	243.6	246.1	245.5	246.0	244.0	1225.2
Total Inj	3112.5	3124.2	3140.4	3180.8	3179.1	15737.1
Total Req	20450.2	21117.6	21897.6	22562.8	23346.8	109375.0
=====						
Sources of Supply						
ENGUSGC	2304.8	2334.9	2334.9	2334.5	2346.7	11655.8
ENGNiagara	1146.6	1146.6	1147.1	1145.8	1146.6	5732.8
ENGPNGTS	84.0	84.0	84.3	84.0	84.0	420.2
ENG3Winter	53.3	61.2	66.1	83.8	91.7	356.1
ENG-Z4	6579.6	6627.5	6664.0	6665.5	6673.2	33209.8
Dracut 20	693.5	804.6	1047.8	1304.7	1594.0	5444.7
ENG3Summer	69.1	69.1	69.1	69.1	69.1	345.5
DLiqSummer	21.0	21.0	21.0	21.0	21.0	105.0
ENGDAwn	711.7	738.6	761.2	768.1	780.2	3759.9
DAWN	1641.5	1743.6	1883.9	2010.9	2132.5	9412.5
Repsol 40	717.0	717.0	717.0	717.0	717.0	3585.1
Dracut 30	2700.5	3015.8	3330.6	3547.7	3865.3	16459.9
Engie Combo	630.0	630.0	630.0	630.0	630.0	3150.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	17352.7	17994.0	18757.2	19382.1	20151.4	93637.3

APPENDIX 6.D.2 HIGH GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1331 Design Case High Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 (Continued) 08:10:05

Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Storage Withdrawals						
ENGLNG	210.9	212.8	215.4	225.4	235.0	1099.6
ENGPropane	122.4	130.3	135.2	152.9	160.8	701.5
ENGFSMA	1721.0	1736.2	1738.2	1739.2	1736.9	8671.5
ENGDominion	106.8	106.6	107.4	109.5	109.0	539.3
ENGNGFG	692.8	691.6	698.8	707.8	709.6	3500.6
ENGHON	243.6	246.1	245.5	246.0	244.0	1225.2
Total With	3097.5	3123.6	3140.4	3180.8	3195.4	15737.7
Total Supply	20450.2	21117.6	21897.6	22562.8	23346.8	109375.0
=====						
Net Storage Inv. Adj.						
ENGLNG	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0
=====						
Start of Year Inventory						
ENGLNG	13	12	13	13	13	13
ENGPropane	77	77	77	77	77	77
ENGFSMA	1482	1498	1498	1498	1498	1482
ENGDominion	103	103	103	103	103	103
ENGNGFG	671	671	671	671	671	671
ENGHON	246	246	246	246	246	246
Total Inv	2592	2607	2608	2608	2608	2592
=====						
Unsupplied Demand						
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 15-Sep-2017
Report 9B 08:10:05

Peak Subperiod Demand Forecast by Class

JAN 19, 2018	Daily System Activity	Units: MDT
=====		
AREA	ENGIDesign	
ENGIDemand	158.3	
ThirtyDay		
TOTAL	158.3	

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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SENDOUT® Version 14.1.1 REP 9C 15-Sep-2017
Report 9C 08:10:05

Peak Subperiod Demand Summary

JAN 19, 2018

Daily System Activity

Units: MDT

AREA	FORECAST	TOTAL SERVED	TOTAL UNSERVED
	TOTAL DEMAND		
ENGIDemand	158.3	158.3	0.0
ThirtyDay	0.0	0.0	0.0
TOTAL	158.3	158.3	0.0

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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SENDOUT® Version 14.1.1 REP 9D 15-Sep-2017
Report 9D 08:10:05

JAN 19, 2018

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	158.3		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane		28.60					ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			957	61	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			59	57	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		387	58	ENGTGPShort	28.11	0.24
			Dracut 20		ENGHON		1.96			151	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	8.60								ENGPropane	34.60	
			Repsol 40	17.93								ENG3Truck	6.00	
			Dracut 30	22.82								Dracut 30	22.88	0.05
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20		
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													25.56	0.05
													17.28	0.53
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	8.46	0.14
													8.33	0.13
Total	158.3		Total	92.02	Total		68.10	0.05		1556		Total		1.76

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 15-Sep-2017
Report 9B 08:10:05

Peak Subperiod Demand Forecast by Class

JAN 19, 2019		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	164.1		
ThirtyDay			
TOTAL	164.1		

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 15-Sep-2017
Report 9C 08:10:05

Peak Subperiod Demand Summary

JAN 19, 2019		Daily System Activity			Units: MDT
=====					
AREA	FORECAST				
	TOTAL	TOTAL	TOTAL		
	DEMAND	SERVED	UNSERVED		
ENGIDemand	164.1	164.1	0.0		
ThirtyDay	0.0	0.0	0.0		
=====					
TOTAL	164.1	164.1	0.0		

REDACTED

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD

- Draw 0

Ventyx

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Report 9D

08:10:05

JAN 19, 2019

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	164.1		ENGUSGC	13.75	ENGLNG					2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane							ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA					925	59	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion					57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG			0.05		382	57	ENGTGPShort	28.11	0.24
			Dracut 20		ENGHON					149	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	8.60								ENGPropane	34.60	
			Repsol 40	17.93								ENG3Truck	6.00	
			Dracut 30	28.62								Dracut 30	28.66	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20		
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													25.56	0.05
													17.28	0.53
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	8.46	0.14
													8.33	0.13
Total	164.1		Total	97.82	Total			68.10	0.05	1515		Total		1.77

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 15-Sep-2017
Report 9B 08:10:05

Peak Subperiod Demand Forecast by Class

JAN 19, 2020	Daily System Activity	Units: MDT
=====		
AREA	ENGIDesign	
ENGIDemand	169.4	
ThirtyDay		
TOTAL	169.4	

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 15-Sep-2017
Report 9C 08:10:05

Peak Subperiod Demand Summary			
JAN 19, 2020			
Daily System Activity			Units: MDT
=====			
AREA	FORECAST		
	TOTAL	TOTAL	TOTAL
	DEMAND	SERVED	UNSERVED
ENGIDemand	169.4	169.4	0.0
ThirtyDay	0.0	0.0	0.0
=====			
TOTAL	169.4	169.4	0.0

REDACTED

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD

- Draw 0

Ventyx

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Report 9D

08:10:05

JAN 19, 2020

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	169.4		ENGUSGC	13.75	ENGLNG					2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane					5	6	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA					934	60	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion					57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG			0.05		376	56	ENGTGPShort	28.11	0.24
			Dracut 20	3.98	ENGHON					150	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	8.60								ENGPropane	34.60	
			Repsol 40	17.93								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	4.01	0.01
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													25.56	0.05
													17.28	0.53
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	8.46	0.14
													8.33	0.13
Total	169.4		Total	103.1	Total					1524		Total		1.78

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 15-Sep-2017
Report 9B 08:10:05

Peak Subperiod Demand Forecast by Class

JAN 19, 2021		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	175.6		
ThirtyDay			
TOTAL	175.6		

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 15-Sep-2017
Report 9C 08:10:05

Peak Subperiod Demand Summary

JAN 19, 2021		Daily System Activity			Units: MDT
=====					
AREA	FORECAST				
	TOTAL DEMAND	TOTAL SERVED	TOTAL UNSERVED		
ENGIDemand	175.6	175.6	0.0		
ThirtyDay	0.0	0.0	0.0		
=====					
TOTAL	175.6	175.6	0.0		

REDACTED

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD

- Draw 0

Ventyx

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Report 9D

08:10:05

JAN 19, 2021

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	175.5		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane		28.60			12	16	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			868	56	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		372	55	ENGTGPShort	28.11	0.24
			Dracut 20	10.11	ENGHON		1.96			148	60	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	8.60								ENGPropane	34.60	
			Repsol 40	17.93								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	10.13	0.02
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													25.56	0.05
													17.28	0.53
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	8.46	0.14
													8.33	0.13
Total	175.5		Total	109.3	Total		68.10	0.05		1459		Total		1.80

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 15-Sep-2017
Report 9B 08:10:05

Peak Subperiod Demand Forecast by Class

JAN 19, 2022		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	182.5		
ThirtyDay			
TOTAL	182.5		

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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SENDOUT® Version 14.1.1 REP 9C 15-Sep-2017
Report 9C 08:10:05

Peak Subperiod Demand Summary

JAN 19, 2022

Daily System Activity

Units: MDT

AREA	FORECAST	TOTAL SERVED	TOTAL UNSERVED
	TOTAL DEMAND		
ENGIDemand	182.5	182.5	0.0
ThirtyDay	0.0	0.0	0.0
TOTAL	182.5	182.5	0.0

APPENDIX 6.D.3 HIGH GROWTH DESIGN DAY

Scen 1331 Design Case High Fix E RMix RD
- Draw 0

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Report 9D 08:10:05

JAN 19, 2022

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	182.5		ENGUSGC	13.75	ENGLNG		8.16			5	38	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane		28.60			21	27	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			831	53	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			58	56	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		369	55	ENGTGPShort	28.11	0.24
			Dracut 20	20.00	ENGHON		1.96			149	60	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	8.16	
			DAWN	8.60								ENGPropane	34.60	
			Repsol 40	17.93								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	20.00	0.04
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													25.56	0.05
													17.28	0.53
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	8.46	0.14
													8.33	0.13
Total	182.5		Total	119.2	Total		65.16	0.05		1432		Total		1.82

REDACTED

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

Ventyx

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Report 1

08:27:10

NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	57331	Injection Cost	48	Transportation Cost	2312	JAN 19, 2018	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	155.33
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	155.33
Total Variable	57358	Total Variable	94	Total Variable	2312		
Demand/Reservation Co	7777	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7871	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	65229	Net Storage Cost	1762	Net Trans Cost	17622	Total Gas Cost	84614
						Total Revenue	0
						Net Cost	84614

Avg Cost of Served Demand 5.464 USD/DT
(System Cost/Served Dem.)Avg Cost of Gas Purchased 4.151 USD/DT
(Supply Cost/LDC Purchase)

=====											
	Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved	
ENGIDesign	15485.3	0.0	15485.3	0.0	15485.3	15485.3	0.0	0	155.3	0.0	
Total	15485.3	0.0	15485.3	0.0	15485.3	15485.3	0.0	0	155.3	0.0	
=====											

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2374.7	18250.0	15875.3			3.0113	7151	0	7151	3.0113
ENGNiagara	1146.6	1167.3	20.6			2.3679	2715	0	2715	2.3679
ENGPNGTS	84.0	84.0	0.0			4.2010	353	0	353	4.2010
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6547.9	6690.4	142.5			2.3201	15192	0	15192	2.3201
Dracut 20	225.7	7300.0	7074.3			7.8552	1773	0	1773	7.8552
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	760.6	2190.0	1429.4			3.1719	2412	0	2412	3.1719

REDACTED

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

Ventyx

Page 2

SENDOUT® Version 14.1.1 REP 1 15-Sep-2017

Report 1 (Continued)

08:27:10

NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	352.2	352.2	0.0							
Dracut 30	3409.8	10950.0	7540.2			6.5083	22192	0	22192	6.5083
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	15713.3						57358	7871	65229	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	240.9	241.5	0	0.0	12	95	0.0	-1	130	57	-73
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	1774.0	1739.4	0	19.0	1498	96	0.0	16	2573	3509	936
ENGDomion	103	100	108.8	106.7	0	2.1	103	100	0.0	0	178	242	64
ENGNGFG	671	100	725.3	719.6	0	5.7	671	100	5.7	0	1164	1599	434
ENGHON	246	100	236.9	236.9	0	0.0	246	100	0.0	0	427	552	125
Total	2592	97	3246.7	3204.9	0	26.8	2607	98	5.7	15	5426	6937	1512

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2374.7	0.0	2374.7	7882.5	5507.8	0	5043	0	5043	2.1237
ENG TGP2Stg	107.8	2.2	105.6	7882.5	7777.0	28	0	0	28	0.2572
ENG TGPLong	5970.8	0.0	5970.8	8698.1	2727.3	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPSHORT	2796.9	23.8	2773.1	10262.0	7488.9	315	2688	0	3003	1.0736
TrCanCharges	751.9	8.6	743.2	1477.2	733.9	0	698	0	698	0.9278
IroqCharges	743.2	4.6	738.6	1460.0	721.4	66	640	0	706	0.9495
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.5	0.0	241.5	8654.9	8413.4	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	2958.3	6.2	2952.1	10950.0	7997.9	128	4388	0	4517	1.5268
UnionCharges	760.6	8.7	751.9	1477.2	725.3	0	140	0	140	0.1841
Dracut 20	681.6	1.4	680.1	7300.0	6619.9	30	1134	0	1163	1.7068

REDACTED

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary

Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2266.9	63.2	2203.7	9125.0	6921.3	675	0	0	675	0.2976
Z4toTGPLH	3799.4	32.3	3767.1	7665.0	3897.9	428	0	0	428	0.1126
Z4toStg	2748.5	9.1	2739.4	7882.5	5143.1	136	0	0	136	0.0495
Engie2CG	410.1	1.1	409.0	1057.0	648.0	14	0	0	14	0.0334
	337.3	0.7	336.6	3072.2	2735.6	15	0	0	15	0.0434
	347.7	10.4	337.3	3078.7	2741.4	0	0	0	0	0.0000
Repsol2Drac	4.4	0.1	4.3	15.9	11.6	0	0	0	0	0.0000
	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	219.9	0.0	219.9	1057.0	837.1	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		180.5				2312	15309		17622	0.6061

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0

Ventyx
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NOV 2018 thru OCT 2019

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	56411	Injection Cost	48	Transportation Cost	2336	JAN 19, 2019	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	157.91
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	157.91
Total Variable	56437	Total Variable	94	Total Variable	2336		
Demand/Reservation Co	7777	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7871	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	64309	Net Storage Cost	1762	Net Trans Cost	17645	Total Gas Cost	83716
						Total Revenue	0
						Net Cost	83716

Avg Cost of Served Demand 5.309 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.024 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved	
ENGIDesign	15767.4	0.0	15767.4	0.0	15767.4	15767.4	0.0	0	157.9	0.0	
Total	15767.4	0.0	15767.4	0.0	15767.4	15767.4	0.0	0	157.9	0.0	

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2390.7	18250.0	15859.3			2.9039	6942	0	6942	2.9039
ENGNiagara	1146.6	1167.3	20.6			2.1649	2482	0	2482	2.1649
ENGPNGTS	84.0	84.0	0.0			4.0502	340	0	340	4.0502
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6604.0	6690.4	86.4			2.1147	13966	0	13966	2.1147
Dracut 20	272.0	7300.0	7028.0			7.9203	2154	0	2154	7.9203
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	796.6	2190.0	1393.4			2.9339	2337	0	2337	2.9339

REDACTED

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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NOV 2018 thru OCT 2019

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	352.2	352.2	0.0							
Dracut 30	3524.8	10950.0	7425.2			6.4651	22788	0	22788	6.4651
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	30.0	30.0			0.0000	0	0	0	0.0000
Total	15982.7						56437	7871	64309	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.5	241.5	0	0.0	12	95	0.0	0	57	55	-2
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	3509	3140	-369
ENGDominion	103	100	109.1	107.0	0	2.1	103	100	0.0	0	242	221	-21
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1599	1435	-163
ENGHON	246	100	234.5	234.5	0	0.0	246	100	0.0	0	552	518	-34
Total	2607	98	3242.4	3215.5	0	26.8	2607	98	5.6	0	6937	6349	-589

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2390.7	0.0	2390.7	7882.5	5491.9	0	5043	0	5043	2.1095
ENG TGP2Stg	106.4	2.2	104.2	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6047.0	0.0	6047.0	8698.1	2651.1	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPSshort	2807.6	23.9	2783.7	10262.0	7478.3	316	2688	0	3004	1.0699
TrCanCharges	787.6	9.1	778.5	1477.2	698.7	0	698	0	698	0.8858
IroqCharges	778.5	4.8	773.7	1460.0	686.3	69	640	0	709	0.9105
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.5	0.0	241.5	8654.9	8413.4	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3040.8	6.4	3034.5	10950.0	7915.5	132	4388	0	4520	1.4865
UnionCharges	796.6	9.1	787.6	1477.2	689.6	0	140	0	140	0.1758
Dracut 20	760.2	1.6	758.6	7300.0	6541.4	33	1134	0	1167	1.5346

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APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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NOV 2018 thru OCT 2019

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2284.3	63.7	2220.7	9125.0	6904.3	680	0	0	680	0.2976
Z4toTGPLH	3859.1	32.8	3826.3	7665.0	3838.7	435	0	0	435	0.1126
Z4toStg	2744.9	9.1	2735.9	7882.5	5146.7	136	0	0	136	0.0495
Engie2CG	409.5	1.1	408.4	1057.0	648.6	14	0	0	14	0.0334
██████████	337.3	0.7	336.6	3072.2	2735.6	15	0	0	15	0.0434
██████████	347.7	10.4	337.3	3078.7	2741.4	0	0	0	0	0.0000
Repsol2Drac	4.4	0.1	4.3	15.9	11.6	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.5	0.0	220.5	1057.0	836.5	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		182.9				2336	15309		17645	0.5978

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0

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NOV 2019 thru OCT 2020

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	56040	Injection Cost	48	Transportation Cost	2350	JAN 19, 2020	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	159.92
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	159.92
Total Variable	56067	Total Variable	94	Total Variable	2350		
Demand/Reservation Co	7777	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7871	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	63938	Net Storage Cost	1762	Net Trans Cost	17660	Total Gas Cost	83361
						Total Revenue	0
						Net Cost	83361

Avg Cost of Served Demand 5.178 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.918 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	16100.4	0.0	16100.4	0.0	16100.4	16100.4	0.0	0	159.9	0.0
Total	16100.4	0.0	16100.4	0.0	16100.4	16100.4	0.0	0	159.9	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2368.2	18300.0	15931.8			2.7917	6611	0	6611	2.7917
ENGNiagara	1141.4	1170.5	29.1			2.1359	2438	0	2438	2.1359
ENGPNGTS	84.3	84.3	0.0			3.9659	334	0	334	3.9659
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6642.9	6698.7	55.8			1.9746	13117	0	13117	1.9746
Dracut 20	328.0	7320.0	6992.0			7.7627	2546	0	2546	7.7627
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	873.5	2196.0	1322.5			2.8158	2460	0	2460	2.8158

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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NOV 2019 thru OCT 2020

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	352.2	352.2	0.0							
Dracut 30	3715.9	10980.0	7264.1			6.2667	23286	0	23286	6.2667
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	45.0	45.0			0.0000	0	0	0	0.0000
Total	16318.2						56067	7871	63938	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.5	241.5	0	0.0	12	95	0.0	0	55	54	-0
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	3140	2991	-149
ENGDominion	103	100	109.7	107.6	0	2.1	103	100	0.0	0	221	210	-11
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1435	1364	-71
ENGHON	246	100	234.5	234.5	0	0.0	246	100	0.0	0	518	491	-27
Total	2607	98	3243.0	3216.1	0	26.8	2607	98	5.6	0	6349	6090	-259

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2368.2	0.0	2368.2	7904.1	5535.9	0	5043	0	5043	2.1296
ENG TGP2Stg	106.4	2.2	104.2	7904.1	7800.0	27	0	0	27	0.2572
ENG TGPLong	6063.1	0.0	6063.1	8719.7	2656.6	0	0	0	0	0.0000
ENG TGPBND	1141.4	7.1	1134.3	1142.7	8.3	97	267	0	365	0.3196
ENG TGPSshort	2808.2	23.9	2784.3	10290.1	7505.8	316	2688	0	3004	1.0697
TrCanCharges	863.5	9.9	853.6	1481.2	627.6	0	698	0	698	0.8078
IroqCharges	853.6	5.3	848.3	1464.0	615.7	76	640	0	716	0.8382
ENG PNGTS	84.3	0.8	83.5	366.0	282.5	0	312	0	312	3.6990
ENGLNG	241.5	0.0	241.5	8678.6	8437.1	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6370.0	6209.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4392.0	4231.2	161	0	0	161	1.0000
Dracut 30	3172.1	6.7	3165.4	10980.0	7814.6	138	4388	0	4526	1.4268
UnionCharges	873.5	9.9	863.5	1481.2	617.7	0	140	0	140	0.1603
Dracut 20	876.0	1.8	874.2	7320.0	6445.8	38	1134	0	1172	1.3376

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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NOV 2019 thru OCT 2020

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2261.9	63.0	2198.8	9150.0	6951.2	673	0	0	673	0.2976
Z4toTGPLH	3897.4	33.1	3864.3	7686.0	3821.7	439	0	0	439	0.1126
Z4toStg	2745.5	9.1	2736.5	7904.1	5167.7	136	0	0	136	0.0495
Engie2CG	409.5	1.1	408.4	1064.0	655.6	14	0	0	14	0.0334
██████████	337.4	0.7	336.7	3080.6	2743.9	15	0	0	15	0.0434
██████████	347.8	10.4	337.4	3087.1	2749.7	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	16.0	11.8	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37881.0	37881.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2928.0	2928.0	0	0	0	0	0.0000
Engie2ENGLNG	220.5	0.0	220.5	1064.0	843.5	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		185.3				2350	15309		17660	0.5887

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0

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NOV 2020 thru OCT 2021

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	57698	Injection Cost	48	Transportation Cost	2362	JAN 19, 2021	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	162.49
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	162.49
Total Variable	57725	Total Variable	94	Total Variable	2362		
Demand/Reservation Co	7777	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7871	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	65596	Net Storage Cost	1762	Net Trans Cost	17671	Total Gas Cost	85030
						Total Revenue	0
						Net Cost	85030

Avg Cost of Served Demand 5.200 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.958 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	16352.3	0.0	16352.3	0.0	16352.3	16352.3	0.0	0	162.5	0.0
Total	16352.3	0.0	16352.3	0.0	16352.3	16352.3	0.0	0	162.5	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2358.3	18250.0	15891.7			2.8102	6627	0	6627	2.8102
ENGNiagara	1140.8	1167.3	26.4			2.1443	2446	0	2446	2.1443
ENGPNGTS	84.0	84.0	0.0			3.9597	332	0	332	3.9597
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6647.9	6690.4	42.5			1.9830	13183	0	13183	1.9830
Dracut 20	406.0	7300.0	6894.0			7.8791	3199	0	3199	7.8791
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	936.0	2190.0	1254.0			2.7996	2620	0	2620	2.7996

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APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary

Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	352.2	352.2	0.0							
Dracut 30	3834.9	10950.0	7115.1			6.2711	24049	0	24049	6.2711
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	16572.0						57725	7871	65596	

Storage Summary

Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.4	241.4	0	0.0	12	95	0.0	0	54	54	0
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1775.5	1756.5	0	19.0	1498	96	0.0	0	2991	3018	26
ENGDomion	103	100	108.8	106.7	0	2.1	103	100	0.0	0	210	212	2
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1364	1374	10
ENGHON	246	100	233.3	233.3	0	0.0	246	100	0.0	0	491	491	-0
Total	2607	98	3240.8	3214.0	0	26.8	2607	98	5.6	0	6090	6128	38

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2358.3	0.0	2358.3	7882.5	5524.2	0	5043	0	5043	2.1385
ENG TGP2Stg	106.4	2.2	104.2	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6060.5	0.0	6060.5	8698.1	2637.6	0	0	0	0	0.0000
ENG TGPBND	1140.8	7.1	1133.7	1139.5	5.8	97	267	0	365	0.3197
ENG TGPSHORT	2806.1	23.9	2782.2	10262.0	7479.7	316	2688	0	3004	1.0704
TrCanCharges	925.3	10.6	914.7	1477.2	562.5	0	698	0	698	0.7539
IroqCharges	914.7	5.7	909.0	1460.0	551.0	81	640	0	721	0.7882
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.4	0.0	241.4	8654.9	8413.5	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3334.9	7.0	3327.9	10950.0	7622.1	145	4388	0	4533	1.3593
UnionCharges	936.0	10.7	925.3	1477.2	551.8	0	140	0	140	0.1496
Dracut 20	910.3	1.9	908.4	7300.0	6391.6	40	1134	0	1173	1.2888

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APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary

Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2252.0	62.8	2189.2	9125.0	6935.8	670	0	0	670	0.2976
Z4toTGPLH	3904.5	33.2	3871.3	7665.0	3793.7	440	0	0	440	0.1126
Z4toStg	2743.4	9.1	2734.4	7882.5	5148.2	136	0	0	136	0.0495
Engie2CG	409.6	1.1	408.5	1057.0	648.5	14	0	0	14	0.0334
	337.4	0.7	336.7	3072.2	2735.5	15	0	0	15	0.0434
	347.8	10.4	337.4	3078.7	2741.3	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	15.9	11.7	0	0	0	0	0.0000
	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.4	0.0	220.4	1057.0	836.6	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		187.3				2362	15309		17671	0.5821

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	60337	Injection Cost	48	Transportation Cost	2381	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	165.66
Other Variable Cost	28	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	165.66
Total Variable	60365	Total Variable	94	Total Variable	2381		
Demand/Reservation Co	7777	Demand Cost	695	Demand Cost	15309		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7871	Total Fixed	1669	Total Fixed	15309		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	68236	Net Storage Cost	1762	Net Trans Cost	17690	Total Gas Cost	87689
						Total Revenue	0
						Net Cost	87689

Avg Cost of Served Demand 5.252 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.037 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved	
ENGIDesign	16695.7	0.0	16695.7	0.0	16695.7	16695.7	0.0	0	165.7	0.0	
Total	16695.7	0.0	16695.7	0.0	16695.7	16695.7	0.0	0	165.7	0.0	

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2361.9	18250.0	15888.1			2.8362	6699	0	6699	2.8362
ENGNiagara	1142.1	1167.3	25.2			2.1912	2503	0	2503	2.1912
ENGPNGTS	84.0	84.0	0.0			3.9303	330	0	330	3.9303
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6656.6	6690.4	33.8			2.0468	13625	0	13625	2.0468
Dracut 20	484.0	7300.0	6816.0			8.1957	3966	0	3966	8.1957
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	993.3	2190.0	1196.7			2.8127	2794	0	2794	2.8127

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	352.2	352.2	0.0							
Dracut 30	4016.2	10950.0	6933.8			6.2651	25162	0	25162	6.2651
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	16902.1						60365	7871	68236	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	241.1	241.1	0	0.0	12	95	0.0	0	54	55	1
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1759.8	1756.5	0	18.8	1482	95	0.0	-16	3018	3086	69
ENGDominion	103	100	108.7	106.6	0	2.1	103	100	0.0	0	212	219	7
ENGNGFG	671	100	720.9	715.2	0	5.7	671	100	5.6	0	1374	1417	44
ENGHON	246	100	233.3	233.3	0	0.0	246	100	0.0	0	491	505	14
Total	2607	98	3224.6	3213.6	0	26.6	2591	97	5.6	-16	6128	6262	134

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPPProd	2361.9	0.0	2361.9	7882.5	5520.7	0	5043	0	5043	2.1353
ENG TGP2Stg	106.3	2.2	104.1	7882.5	7778.4	27	0	0	27	0.2572
ENG TGPLong	6088.4	0.0	6088.4	8698.1	2609.7	0	0	0	0	0.0000
ENG TGPBND	1142.1	7.1	1135.0	1139.5	4.5	97	267	0	365	0.3194
ENG TGPSshort	2806.0	23.9	2782.2	10262.0	7479.8	316	2688	0	3004	1.0705
TrCanCharges	982.0	11.3	970.7	1477.2	506.5	0	698	0	698	0.7104
IroqCharges	970.7	6.0	964.7	1460.0	495.3	86	640	0	726	0.7478
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	241.1	0.0	241.1	8654.9	8413.8	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3496.0	7.3	3488.7	10950.0	7461.3	152	4388	0	4540	1.2986
UnionCharges	993.3	11.3	982.0	1477.2	495.2	0	140	0	140	0.1410
Dracut 20	1008.4	2.1	1006.3	7300.0	6293.7	44	1134	0	1177	1.1677

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary

Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2255.6	62.9	2192.7	9125.0	6932.3	671	0	0	671	0.2976
Z4toTGPLH	3929.0	33.4	3895.6	7665.0	3769.4	443	0	0	443	0.1126
Z4toStg	2727.6	9.0	2718.6	7882.5	5163.9	135	0	0	135	0.0495
Engie2CG	409.9	1.1	408.7	1057.0	648.3	14	0	0	14	0.0334
██████████	337.4	0.7	336.7	3072.2	2735.5	15	0	0	15	0.0434
██████████	347.8	10.4	337.4	3078.7	2741.3	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	15.9	11.7	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	220.1	0.0	220.1	1057.0	836.9	220	0	0	220	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		189.7				2381	15309		17690	0.5737

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	287817	Injection Cost	238	Transportation Cost	11741	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	230	Other Variable Cost	0	System Served	165.66
Other Variable Cost	135	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	165.66
Total Variable	287952	Total Variable	469	Total Variable	11741		
Demand/Reservation Co	38885	Demand Cost	3477	Demand Cost	76547		
Other Fixed Cost	472	Other Fixed Cost	4865	Other Fixed Cost	0		
Total Fixed	39357	Total Fixed	8343	Total Fixed	76547		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	327309	Net Storage Cost	8812	Net Trans Cost	88288	Total Gas Cost	424409
						Total Revenue	0
						Net Cost	424409

Avg Cost of Served Demand 5.279 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.017 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	80401.0		0.0	80401.0	0.0	80401.0	80401.0	0.0	0	165.7	0.0
Total	80401.0		0.0	80401.0	0.0	80401.0	80401.0	0.0	0	165.7	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	11853.8	91300.0	79446.2			2.8709	34031	0	34031	2.8709
ENGNiagara	5717.6	5839.5	122.0			2.2010	12584	0	12584	2.2010
ENGPNGTS	420.2	420.2	0.0			4.0214	1690	0	1690	4.0214
ENG3Winter	458.7	458.7	0.0			15.0000	6881	0	6881	15.0000
ENG-Z4	33099.4	33460.3	360.9			2.0871	69081	0	69081	2.0871
Dracut 20	1715.7	36520.0	34804.3			7.9495	13639	0	13639	7.9495
ENG3Summer	345.5	467.3	121.8			10.0000	3455	0	3455	10.0000
DLiqSummer	105.0	105.0	0.0							
ENG Dawn	4359.9	10956.0	6596.1			2.8953	12623	0	12623	2.8953

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APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Repsol 40	1760.8	1760.8	0.0							
Dracut 30	18501.6	54780.0	36278.4			6.3496	117477	0	117477	6.3496
Engie Combo	3150.0	3150.0	0.0							
C/G SUPPLY	0.0	75.0	75.0			0.0000	0	0	0	0.0000
Total	81488.2						287952	39357	327309	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	1206.4	1206.9	0	0.0	12	95	0.0	-1	130	55	-75
ENGPropane	77	100	804.2	804.2	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	8860.4	8765.5	0	94.8	1482	95	0.0	0	2573	3086	513
ENGDomion	103	100	545.2	534.6	0	10.6	103	100	0.0	0	178	219	41
ENGNGFG	671	100	3608.8	3580.3	0	28.5	671	100	28.3	0	1164	1417	253
ENGHON	246	100	1172.6	1172.6	0	0.0	246	100	0.0	0	427	505	78
Total	2592	97	16197.5	16064.1	0	133.9	2591	97	28.3	-1	5426	6262	836

Transportation Summary											
Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost	
ENGTGPProd	11853.8	0.0	11853.8	39434.3	27580.5	0	25216	0	25216	2.1273	
ENGTGP2Stg	533.1	10.9	522.2	39434.3	38912.1	137	0	0	137	0.2572	
ENGTGPLong	30229.8	0.0	30229.8	43512.1	13282.3	0	0	0	0	0.0000	
ENGTGPBND	5717.6	35.4	5682.1	5700.8	18.6	488	1337	0	1825	0.3191	
ENGTGPShort	14024.7	119.2	13905.5	51338.0	37432.5	1580	13438	0	15018	1.0708	
TrCanCharges	4310.3	49.6	4260.7	7389.8	3129.1	0	3488	0	3488	0.8092	
IroqCharges	4260.7	26.4	4234.3	7304.0	3069.7	378	3199	0	3577	0.8395	
ENGPNGTS	420.2	4.2	416.0	1826.0	1410.0	1	1559	0	1560	3.7122	
ENGLNG	1206.9	0.0	1206.9	43298.1	42091.2	0	0	0	0	0.0000	
ENGPropane	804.2	0.0	804.2	31710.0	30905.8	0	0	0	0	0.0000	
ENG C3Truck	804.2	0.0	804.2	21912.0	21107.8	804	0	0	804	1.0000	
Dracut 30	16002.1	33.6	15968.5	54780.0	38811.5	695	21942	0	22636	1.4146	
UnionCharges	4359.9	49.7	4310.3	7389.8	3079.5	0	700	0	700	0.1606	
Dracut 20	4236.5	8.9	4227.6	36520.0	32292.4	184	5668	0	5852	1.3814	

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APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

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Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	11320.7	315.5	11005.1	45650.0	34644.9	3369	0	0	3369	0.2976
Z4toTGPLH	19389.4	164.8	19224.6	38346.0	19121.4	2184	0	0	2184	0.1126
Z4toStg	13709.9	45.2	13664.7	39434.3	25769.6	679	0	0	679	0.0495
Engie2CG	2048.6	5.7	2042.9	5292.0	3249.1	68	0	0	68	0.0334
██████████	1686.7	3.5	1683.2	15369.4	13686.2	73	0	0	73	0.0434
██████████	1738.9	52.2	1686.7	15401.7	13715.0	0	0	0	0	0.0000
Repsol2Drac	21.9	0.7	21.3	79.5	58.3	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	188991.0	188991.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	14608.0	14608.0	0	0	0	0	0.0000
Engie2ENGLNG	1101.4	0.0	1101.4	5292.0	4190.6	1101	0	0	1101	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
Total		925.6				11741	76547		88288	0.5894

APPENDIX 6.E.1 LOW GROWTH NORMAL YEAR RESOURCE MIX

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0

Ventyx

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RESOURCE MIX RESULTS

Units: MDT

=====

	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Supplies	DAWN	NOV 2017	OCT 2022	0.00	150.00	0.00
	Repsol 40	NOV 2017	OCT 2022	0.00	150.00	8.80
	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Segments		NOV 2017	OCT 2022	0.00	150.00	8.42
		NOV 2017	OCT 2022	0.00	150.00	8.43
	Repsol2Drac	NOV 2017	OCT 2022	0.00	50.00	0.11
	Dawn2Dracut	NOV 2017	OCT 2022	0.00	50.00	0.00
	DAWNTCPL	NOV 2017	OCT 2022	0.00	150.00	0.00
		NOV 2017	OCT 2022	0.00	150.00	0.00

APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 08:27:10

Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Forecast Demand													
ENGIDesign	1482.3	2393.9	2866.3	2566.0	2083.6	1194.9	694.5	416.1	315.0	313.3	396.8	762.5	15485.3
Total Demand	1482.3	2393.9	2866.3	2566.0	2083.6	1194.9	694.5	416.1	315.0	313.3	396.8	762.5	15485.3
=====													
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
=====													
Fuel Consumed													
Transport	24.2	28.1	30.4	27.8	24.3	11.9	7.4	4.8	4.2	4.2	4.7	8.4	180.5
Injection	3.4	0.0	0.0	0.0	0.0	0.7	2.3	4.1	5.0	5.1	4.4	1.9	26.8
Withdrawal	0.4	1.3	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7
Total Fuel	28.0	29.3	31.9	29.1	25.5	12.6	9.7	8.9	9.2	9.3	9.1	10.3	213.0
=====													
Storage Injections													
ENGLNG	2.9	35.8	68.8	67.0	45.4	0.0	7.1	2.9	0.0	0.0	8.7	2.3	240.9
ENGPropane	0.0	0.0	59.9	31.9	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	257.0	0.0	0.0	0.0	0.0	0.0	139.8	276.0	317.8	319.0	304.0	141.3	1755.0
ENGDominion	9.2	0.0	0.0	0.0	0.0	6.5	1.0	4.8	23.7	28.3	24.3	8.9	106.7
ENGNGFG	48.8	0.0	0.0	0.0	0.0	67.4	92.4	127.9	137.5	135.9	80.3	29.2	719.6
ENGHON	26.9	0.0	0.0	0.0	0.0	24.0	11.3	25.9	41.1	41.3	39.7	26.7	236.9
Total Inj	344.8	35.8	128.6	98.9	45.4	97.9	263.2	449.0	531.6	536.2	468.6	219.8	3219.9
=====													
Total Req	1855.2	2459.0	3026.9	2694.0	2154.5	1305.4	967.4	873.9	855.8	858.8	874.5	992.7	18918.1
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	396.7	87.3	19.6	0.0	0.0	0.0	0.0	23.4	2374.7
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	59.9	31.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	723.1	787.6	758.9	740.6	743.6	753.1	787.6	6547.9
Dracut 20	10.9	5.2	80.4	52.4	61.7	15.1	0.0	0.0	0.0	0.0	0.0	0.0	225.7
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAWN	110.5	126.9	126.9	114.6	113.7	89.9	28.4	0.0	0.0	0.0	0.0	49.5	760.6
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	88.0	114.5	107.3	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	352.2
Dracut 30	502.3	657.8	713.2	705.9	524.9	286.0	7.9	0.0	0.0	0.0	0.0	11.8	3409.8
Engie Combo	2.9	149.4	185.4	188.2	104.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1588.4	1819.4	2073.4	1916.2	1607.7	1302.5	964.5	871.1	852.9	855.9	871.7	989.7	15713.3

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APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.5
ENGPropane	0.0	0.0	129.0	31.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	179.0	368.9	466.0	429.0	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1739.4
ENGDominion	9.2	22.4	29.0	25.3	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.7
ENGNGFG	48.8	158.6	189.0	170.7	152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	719.6
ENGHON	26.9	54.0	60.7	54.0	41.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	236.9
Total With	266.8	639.7	953.5	777.8	546.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3204.9
=====													
Total Supply	1855.2	2459.0	3026.9	2694.0	2154.5	1305.4	967.4	873.9	855.8	858.8	874.5	992.7	18918.1
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	13	2	2	12	9	13	13	10	7	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1482	1560	1192	726	297	0	0	140	416	734	1053	1357	1482
ENGDominion	103	103	80	51	26	5	12	13	18	41	70	94	103
ENGNGFG	671	671	512	323	152	0	67	160	288	425	561	642	671
ENGHON	246	246	192	132	78	36	60	72	98	139	180	220	246
Total Inv	2592	2670	2066	1241	562	61	156	416	862	1391	1924	2390	2592
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Forecast Demand													
ENGIDesign	1506.0	2436.3	2909.2	2609.6	2118.0	1210.2	706.3	426.9	325.5	326.8	413.1	779.5	15767.4
Total Demand	1506.0	2436.3	2909.2	2609.6	2118.0	1210.2	706.3	426.9	325.5	326.8	413.1	779.5	15767.4
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.7	28.2	30.5	27.8	24.9	12.2	7.5	4.8	4.3	4.3	5.0	8.6	182.9
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.2	4.1	5.0	5.1	4.4	1.9	26.8
Withdrawal	0.4	1.3	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.4	29.4	32.0	29.2	26.1	13.1	9.8	8.9	9.2	9.4	9.3	10.5	215.3
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.0	45.4	0.0	7.1	2.9	0.0	0.0	8.7	2.3	241.5
ENGPropane	0.0	0.0	57.9	33.8	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	134.3	278.0	316.8	319.0	302.3	147.6	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	8.0	0.0	4.7	22.4	28.0	24.1	9.6	107.0
ENGNGFG	44.4	0.0	0.0	0.0	0.0	93.3	98.3	122.3	136.3	132.6	77.4	10.7	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	30.7	3.9	19.7	41.3	41.3	39.3	31.4	234.5
Total Inj	343.4	35.8	126.7	100.8	45.4	131.9	255.2	439.0	528.3	532.5	463.3	213.1	3215.5
Total Req	1877.8	2501.5	3067.9	2739.7	2189.6	1355.2	971.3	874.8	863.0	868.7	885.8	1003.1	19198.3
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	406.4	88.3	21.5	0.0	0.0	0.0	0.0	26.9	2390.7
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	57.9	33.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	758.3	787.6	759.8	747.8	753.5	756.1	787.6	6604.0
Dracut 20	8.6	11.0	92.6	71.7	70.4	17.7	0.0	0.0	0.0	0.0	0.0	0.0	272.0
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAwn	122.8	126.9	126.9	114.6	123.4	91.8	28.7	0.0	0.0	0.0	8.3	53.2	796.6
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	88.0	114.5	106.7	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	352.2
Dracut 30	500.8	698.4	744.2	730.9	530.8	295.1	9.7	0.0	0.0	0.0	0.0	15.0	3524.8
Engie Combo	3.5	149.4	185.4	187.6	104.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1597.5	1865.7	2114.5	1961.2	1642.3	1352.3	968.4	872.0	860.1	865.7	883.0	1000.1	15982.7

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APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.5
ENGPropane	0.0	0.0	127.0	33.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	467.8	427.1	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	29.0	25.3	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.0
ENGNGFG	44.4	158.6	189.0	170.7	152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	50.1	60.7	54.5	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	234.5
Total With	280.4	635.8	953.3	778.5	547.3	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3215.5
=====													
Total Supply	1877.8	2501.5	3067.9	2739.7	2189.6	1355.2	971.3	874.8	863.0	868.7	885.8	1003.1	19198.3
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	10	7	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	724	297	0	0	134	412	729	1048	1350	1498
ENGDominion	103	103	80	51	26	6	14	14	19	41	69	93	103
ENGNGFG	671	671	512	323	152	0	93	192	314	450	583	660	671
ENGHON	246	246	196	135	81	39	69	73	93	134	176	215	246
Total Inv	2607	2670	2070	1243	566	64	193	445	881	1407	1936	2397	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Forecast Demand													
ENGIDesign	1534.7	2464.7	2942.3	2698.8	2141.1	1231.7	721.6	440.0	337.6	343.2	431.4	813.5	16100.4
Total Demand	1534.7	2464.7	2942.3	2698.8	2141.1	1231.7	721.6	440.0	337.6	343.2	431.4	813.5	16100.4
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.8	28.2	30.5	28.8	24.6	12.3	9.4	4.9	4.4	4.4	4.9	8.2	185.3
Injection	3.4	0.0	0.0	0.0	0.0	0.9	2.8	4.0	4.9	5.0	4.2	1.7	26.8
Withdrawal	0.4	1.2	1.5	1.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.5	29.4	32.0	30.2	25.8	13.3	12.1	8.9	9.2	9.4	9.0	10.0	217.8
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.1	45.3	0.0	7.1	2.9	2.9	0.0	5.8	2.3	241.5
ENGPropane	0.0	0.0	72.0	19.7	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	177.9	279.3	316.3	318.8	295.1	110.6	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	6.2	3.7	2.7	19.9	27.4	24.6	12.9	107.6
ENGNGFG	44.4	0.0	0.0	0.0	0.0	101.7	96.8	114.2	134.4	128.2	60.1	35.4	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	23.4	16.6	16.0	41.3	41.3	39.7	29.3	234.5
Total Inj	343.4	35.8	140.8	86.8	45.3	131.3	313.6	426.6	526.3	527.3	436.8	202.1	3216.1
Total Req	1906.6	2529.8	3115.1	2815.8	2212.3	1376.2	1047.3	875.4	873.1	879.9	877.2	1025.6	19534.3
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	398.7	393.2	89.3	24.2	0.0	0.0	0.0	0.0	0.0	2368.2
ENGNiagara	94.2	97.4	97.4	91.1	97.4	91.1	97.4	92.5	97.4	97.4	90.8	97.4	1141.4
ENGPNGTS	8.3	11.0	12.2	10.8	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.3
ENG3Winter	0.0	0.0	72.0	19.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	240.7	257.3	762.0	787.6	762.2	755.0	764.7	762.2	787.6	6642.9
Dracut 20	10.6	19.4	118.4	81.6	76.4	21.5	0.0	0.0	0.0	0.0	0.0	0.0	328.0
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	0.0	5.8	2.3	21.0
ENGDAWN	122.8	126.9	126.9	118.7	124.1	94.6	99.6	0.0	0.0	0.0	0.0	59.8	873.5
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	88.0	114.5	106.9	42.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	352.2
Dracut 30	527.5	727.0	771.7	751.6	560.3	308.0	12.0	0.0	0.0	0.0	0.0	57.7	3715.9
Engie Combo	3.5	148.8	185.4	188.1	104.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1626.3	1902.1	2182.0	2008.0	1665.4	1373.4	1044.4	872.6	870.2	877.0	874.3	1022.6	16318.2

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APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.1	35.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.5
ENGPropane	0.0	0.0	126.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	448.3	446.6	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	29.0	26.1	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.6
ENGNGFG	44.4	152.5	189.0	176.8	152.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	56.5	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	234.5
Total With	280.4	627.7	933.1	807.8	546.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3216.1
=====													
Total Supply	1906.6	2529.8	3115.1	2815.8	2212.3	1376.2	1047.3	875.4	873.1	879.9	877.2	1025.6	19534.3
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	10	13	12
ENGPropane	77	77	77	23	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	743	297	0	0	178	457	773	1092	1387	1498
ENGDominion	103	103	80	51	25	5	11	15	18	38	65	90	103
ENGNGFG	671	671	518	329	152	0	102	198	313	447	575	635	671
ENGHON	246	246	198	137	81	39	62	79	95	136	177	217	246
Total Inv	2607	2670	2078	1286	565	63	192	502	926	1449	1974	2408	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Forecast Demand													
ENGIDesign	1570.1	2510.6	2985.1	2675.4	2171.9	1254.7	736.8	451.7	348.3	356.1	449.7	841.7	16352.3
Total Demand	1570.1	2510.6	2985.1	2675.4	2171.9	1254.7	736.8	451.7	348.3	356.1	449.7	841.7	16352.3
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.9	28.3	30.7	28.0	24.8	12.5	10.1	5.2	4.9	4.5	5.0	8.4	187.3
Injection	3.4	0.0	0.0	0.0	0.0	1.0	3.1	4.0	5.1	4.9	3.8	1.6	26.8
Withdrawal	0.4	1.2	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.6	29.5	32.2	29.3	26.0	13.5	13.2	9.2	10.0	9.4	8.7	10.0	219.7
Storage Injections													
ENGLNG	3.5	35.8	68.8	67.0	45.3	0.0	7.1	2.9	2.9	2.9	2.9	2.3	241.4
ENGPropane	0.0	0.0	57.1	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	247.2	300.9	319.0	304.3	237.8	88.6	1756.5
ENGDominion	10.1	0.0	0.0	0.0	0.0	8.5	4.0	5.4	28.3	27.5	14.4	8.2	106.7
ENGNGFG	44.4	0.0	0.0	0.0	0.0	101.8	42.3	77.9	137.5	137.5	113.0	60.6	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	20.0	15.7	27.6	41.3	41.3	38.0	22.5	233.3
Total Inj	343.4	35.8	125.9	101.6	45.3	130.4	327.9	426.2	540.7	525.2	417.6	193.8	3214.0
Total Req	1942.1	2575.9	3143.2	2806.3	2243.3	1398.6	1078.0	887.1	899.0	890.8	876.1	1045.6	19785.9
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	393.7	90.5	26.4	0.0	0.0	0.0	0.0	0.0	2358.3
ENGNiagara	94.2	97.4	97.4	88.0	97.4	91.2	97.4	93.0	97.4	97.4	92.7	97.4	1140.8
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	57.1	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	760.2	772.6	762.2	787.6	6647.9
Dracut 20	33.9	28.6	130.2	104.1	82.3	26.9	0.0	0.0	0.0	0.0	0.0	0.0	406.0
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	125.1	97.6	125.3	11.1	20.7	0.0	0.0	65.0	936.0
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	88.0	114.5	105.6	44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	352.2
Dracut 30	539.7	757.6	785.7	764.1	580.0	320.5	14.8	0.0	0.0	0.0	0.0	72.6	3834.9
Engie Combo	3.5	149.4	185.4	186.0	105.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1661.7	1942.5	2193.0	2024.9	1695.1	1395.7	1075.0	884.3	896.1	887.8	873.3	1042.6	16572.0

APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.9	67.0	35.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.4
ENGPropane	0.0	0.0	126.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	466.0	429.0	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	28.5	25.3	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.7
ENGNGFG	44.4	158.2	189.0	170.7	152.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	54.8	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.3
Total With	280.4	633.4	950.2	781.4	548.2	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3214.0
=====													
Total Supply	1942.1	2575.9	3143.2	2806.3	2243.3	1398.6	1078.0	887.1	899.0	890.8	876.1	1045.6	19785.9
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	726	297	0	0	247	548	867	1172	1409	1498
ENGDominion	103	103	80	52	26	6	15	19	24	52	80	94	103
ENGNGFG	671	671	513	324	153	0	102	144	222	360	497	610	671
ENGHON	246	246	198	137	83	40	60	75	103	144	186	224	246
Total Inv	2607	2670	2072	1248	568	65	193	518	941	1479	2001	2416	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Forecast Demand													
ENGIDesign	1605.7	2558.1	3038.3	2722.5	2210.4	1279.7	752.7	463.5	358.3	368.9	466.6	871.0	16695.7
Total Demand	1605.7	2558.1	3038.3	2722.5	2210.4	1279.7	752.7	463.5	358.3	368.9	466.6	871.0	16695.7
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	24.9	28.4	30.8	28.1	24.9	12.7	10.2	6.3	5.1	4.6	5.1	8.7	189.7
Injection	3.4	0.0	0.0	0.0	0.0	1.0	3.1	4.2	5.1	4.8	3.6	1.5	26.6
Withdrawal	0.4	1.2	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	28.6	29.6	32.3	29.4	26.1	13.6	13.3	10.5	10.2	9.4	8.6	10.2	222.0
Storage Injections													
ENGLNG	3.5	35.8	68.5	67.0	45.3	0.0	7.1	2.9	2.9	2.9	2.9	2.3	241.1
ENGPropane	0.0	0.0	57.1	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	258.6	0.0	0.0	0.0	0.0	0.0	254.5	306.3	319.0	304.4	214.6	83.6	1740.9
ENGDominion	10.1	0.0	0.0	0.0	0.0	11.2	2.1	11.3	28.3	25.2	13.9	4.6	106.6
ENGNGFG	44.4	0.0	0.0	0.0	0.0	93.1	33.8	89.1	137.5	131.5	123.0	62.7	715.2
ENGHON	26.9	0.0	0.0	0.0	0.0	25.2	8.5	33.3	41.3	41.3	35.6	21.2	233.3
Total Inj	343.4	35.8	125.6	101.6	45.3	129.5	317.5	454.3	540.7	517.0	401.4	186.0	3198.0
Total Req	1977.7	2623.5	3196.2	2853.6	2281.9	1422.8	1083.5	928.4	909.2	895.3	876.7	1067.1	20115.7
=====													
Sources of Supply													
ENGUSGC	610.3	426.2	426.2	385.0	394.1	92.2	27.8	0.0	0.0	0.0	0.0	0.0	2361.9
ENGNiagara	94.2	97.4	97.4	88.0	97.4	91.6	97.4	93.4	97.4	97.4	93.2	97.4	1142.1
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	57.1	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	764.3	777.1	762.2	787.6	6656.6
Dracut 20	20.6	38.6	168.4	129.8	91.8	34.6	0.0	0.0	0.0	0.0	0.0	0.0	484.0
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	126.3	100.3	125.6	51.9	26.7	0.0	0.1	71.1	993.3
DAWN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	0.0	88.0	114.5	105.6	44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	352.2
Dracut 30	588.6	795.7	800.8	787.5	605.0	332.0	18.6	0.0	0.0	0.0	0.0	87.9	4016.2
Engie Combo	3.5	149.4	185.4	184.1	107.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1697.4	1990.6	2246.3	2072.1	1733.1	1419.9	1080.5	925.5	906.3	892.4	873.8	1064.1	16902.1

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APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.8	79.6	67.0	35.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	241.1
ENGPropane	0.0	0.0	126.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	196.1	368.9	466.0	429.0	296.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1756.5
ENGDominion	10.1	22.4	28.5	25.3	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.6
ENGNGFG	44.4	157.6	189.0	170.7	153.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.2
ENGHON	26.9	48.2	60.7	54.8	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.3
Total With	280.3	632.8	950.0	781.4	548.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3213.6
=====													
Total Supply	1977.7	2623.5	3196.2	2853.6	2281.9	1422.8	1083.5	928.4	909.2	895.3	876.7	1067.1	20115.7
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1192	726	297	0	0	254	561	880	1184	1399	1498
ENGDominion	103	103	80	52	26	6	17	19	31	59	84	98	103
ENGNGFG	671	671	513	324	153	0	93	127	216	354	485	608	671
ENGHON	246	246	198	137	83	40	65	73	107	148	189	225	246
Total Inv	2607	2670	2073	1249	569	65	192	506	958	1496	2010	2408	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 08:27:10

Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Forecast Demand						
ENGIDesign	15485.3	15767.4	16100.4	16352.3	16695.7	80401.0
Total Demand	15485.3	15767.4	16100.4	16352.3	16695.7	80401.0
Forecast Rt Mrktr Imbalance						
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed						
Transport	180.5	182.9	185.3	187.3	189.7	925.6
Injection	26.8	26.8	26.8	26.8	26.6	133.9
Withdrawal	5.7	5.6	5.6	5.6	5.6	28.3
Total Fuel	213.0	215.3	217.8	219.7	222.0	1087.8
Storage Injections						
ENGLNG	240.9	241.5	241.5	241.4	241.1	1206.4
ENGPropane	160.8	160.8	160.8	160.8	160.8	804.2
ENGFSMA	1755.0	1756.5	1756.5	1756.5	1740.9	8765.5
ENGDominion	106.7	107.0	107.6	106.7	106.6	534.6
ENGNFG	719.6	715.2	715.2	715.2	715.2	3580.3
ENGHON	236.9	234.5	234.5	233.3	233.3	1172.6
Total Inj	3219.9	3215.5	3216.1	3214.0	3198.0	16063.5
Total Req	18918.1	19198.3	19534.3	19785.9	20115.7	97552.4
=====						
Sources of Supply						
ENGUSGC	2374.7	2390.7	2368.2	2358.3	2361.9	11853.8
ENGNiagara	1146.6	1146.6	1141.4	1140.8	1142.1	5717.6
ENGPNGTS	84.0	84.0	84.3	84.0	84.0	420.2
ENG3Winter	91.7	91.7	91.7	91.7	91.7	458.7
ENG-Z4	6547.9	6604.0	6642.9	6647.9	6656.6	33099.4
Dracut 20	225.7	272.0	328.0	406.0	484.0	1715.7
ENG3Summer	69.1	69.1	69.1	69.1	69.1	345.5
DLiqSummer	21.0	21.0	21.0	21.0	21.0	105.0
ENGDAwn	760.6	796.6	873.5	936.0	993.3	4359.9
DAWN	0.0	0.0	0.0	0.0	0.0	0.0
Repsol 40	352.2	352.2	352.2	352.2	352.2	1760.8
Dracut 30	3409.8	3524.8	3715.9	3834.9	4016.2	18501.6
Engie Combo	630.0	630.0	630.0	630.0	630.0	3150.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	15713.3	15982.7	16318.2	16572.0	16902.1	81488.2

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APPENDIX 6.E.2 LOW GROWTH NORMAL YEAR MONTHLY REQUIREMENTS

Scen 1330 Base Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
Report 13 (Continued) 08:27:10

Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Storage Withdrawals						
ENGLNG	241.5	241.5	241.5	241.4	241.1	1206.9
ENGPropane	160.8	160.8	160.8	160.8	160.8	804.2
ENGFSMA	1739.4	1756.5	1756.5	1756.5	1756.5	8765.5
ENGDominion	106.7	107.0	107.6	106.7	106.6	534.6
ENGNGFG	719.6	715.2	715.2	715.2	715.2	3580.3
ENGHON	236.9	234.5	234.5	233.3	233.3	1172.6
Total With	3204.9	3215.5	3216.1	3214.0	3213.6	16064.1
Total Supply	18918.1	19198.3	19534.3	19785.9	20115.7	97552.4
=====						
Net Storage Inv. Adj.						
ENGLNG	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0
=====						
Start of Year Inventory						
ENGLNG	13	12	12	12	12	13
ENGPropane	77	77	77	77	77	77
ENGFSMA	1482	1498	1498	1498	1498	1482
ENGDominion	103	103	103	103	103	103
ENGNGFG	671	671	671	671	671	671
ENGHON	246	246	246	246	246	246
Total Inv	2592	2607	2607	2607	2607	2592
=====						
Unsupplied Demand						
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 1 15-Sep-2017
Report 1 08:29:31

NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	60955	Injection Cost	47	Transportation Cost	2321	JAN 19, 2018	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	155.33
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	155.33
Total Variable	60982	Total Variable	93	Total Variable	2321		
Demand/Reservation Co	7371	Demand Cost	695	Demand Cost	17678		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7465	Total Fixed	1669	Total Fixed	17678		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	68447	Net Storage Cost	1761	Net Trans Cost	19999	Total Gas Cost	90207
						Total Revenue	0
						Net Cost	90207

Avg Cost of Served Demand 5.388 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 4.028 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	16741.0	0.0	16741.0	0.0	16741.0	16741.0	0.0	0	155.3	0.0
Total	16741.0	0.0	16741.0	0.0	16741.0	16741.0	0.0	0	155.3	0.0

Supply Summary

Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2371.2	18250.0	15878.8			3.0122	7143	0	7143	3.0122
ENGNiagara	1146.6	1167.3	20.6			2.3679	2715	0	2715	2.3679
ENGPNGTS	84.0	84.0	0.0			4.2010	353	0	353	4.2010
ENG3Winter	81.0	91.7	10.7			15.0000	1216	0	1216	15.0000
ENG-Z4	6538.1	6690.4	152.3			2.3201	15169	0	15169	2.3201
Dracut 20	918.0	7300.0	6382.0			5.5446	5090	0	5090	5.5446
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	760.0	2190.0	1430.0			3.1802	2417	0	2417	3.1802

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2018

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	718.4	1338.4	620.0			3.1590	2269	0	2269	3.1590
Repsol 40	314.6	314.6	0.0							
Dracut 30	3340.1	10950.0	7609.9			6.1474	20533	0	20533	6.1474
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	16992.2						60982	7465	68447	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	207.1	207.7	0	0.0	12	95	0.0	-1	130	57	-73
ENGPropane	77	100	150.1	150.1	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	1755.2	1720.8	0	18.8	1498	96	0.0	16	2573	3508	935
ENGDominion	103	100	111.4	109.2	0	2.2	103	100	0.0	0	178	245	66
ENGNGFG	671	100	713.3	707.7	0	5.6	671	100	5.6	0	1164	1596	432
ENGHON	246	100	246.2	246.2	0	0.0	246	100	0.0	0	427	555	128
Total	2592	97	3183.3	3141.7	0	26.6	2607	98	5.6	15	5426	6939	1514

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2371.2	0.0	2371.2	7882.5	5511.3	0	5043	0	5043	2.1268
ENG TGP2Stg	82.5	1.7	80.8	7882.5	7801.7	21	0	0	21	0.2572
ENG TGPLong	5976.5	0.0	5976.5	8698.1	2721.6	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPSshort	2778.3	23.6	2754.7	10262.0	7507.3	313	2688	0	3001	1.0800
TrCanCharges	751.4	8.6	742.7	1477.2	734.4	0	698	0	698	0.9284
IroqCharges	742.7	4.6	738.1	1460.0	721.9	66	640	0	706	0.9501
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	207.7	0.0	207.7	8654.9	8447.2	0	0	0	0	0.0000
ENGPropane	150.1	0.0	150.1	6335.0	6184.9	0	0	0	0	0.0000
ENG C3Truck	150.1	0.0	150.1	4380.0	4229.9	150	0	0	150	1.0000
Dracut 30	2978.7	6.3	2972.5	10950.0	7977.5	129	4388	0	4518	1.5166
UnionCharges	760.0	8.7	751.4	1477.2	725.8	0	140	0	140	0.1842
Dracut 20	1283.8	2.7	1281.1	7300.0	6018.9	56	1134	0	1189	0.9265

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2288.7	63.8	2224.9	9125.0	6900.1	681	0	0	681	0.2976
Z4toTGPLH	3783.7	32.2	3751.6	7665.0	3913.4	426	0	0	426	0.1126
Z4toStg	2754.4	9.1	2745.3	7882.5	5137.2	136	0	0	136	0.0495
Engie2CG	443.9	1.2	442.7	1057.0	614.3	15	0	0	15	0.0334
██████████	997.1	2.1	995.0	4034.9	3039.9	43	0	0	43	0.0434
██████████	310.0	9.3	300.7	2746.1	2445.3	0	0	0	0	0.0000
Repsol2Drac	4.6	0.1	4.4	15.9	11.5	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	186.1	0.0	186.1	1057.0	870.9	186	0	0	186	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	718.4	11.4	707.0	1317.1	610.1	0	1330	0	1330	1.8517
██████████	707.0	10.6	696.4	1297.4	601.0	0	████████████████████	████████████████████	████████████████████	████████████████████
Total		203.9				2321	████████████████████	████████████████████	████████████████████	████████████████████

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2018 thru OCT 2019

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	59938	Injection Cost	47	Transportation Cost	2358	JAN 19, 2019	
Penalty Cost	0	Withdrawal Cost	45	Other Variable Cost	0	System Served	157.91
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	157.91
Total Variable	59965	Total Variable	93	Total Variable	2358		
Demand/Reservation Co	7371	Demand Cost	695	Demand Cost	17678		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7465	Total Fixed	1669	Total Fixed	17678		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	67430	Net Storage Cost	1761	Net Trans Cost	20036	Total Gas Cost	89227
						Total Revenue	0
						Net Cost	89227

Avg Cost of Served Demand 5.235 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.902 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17043.3	0.0	17043.3	0.0	17043.3	17043.3	0.0	0	157.9	0.0
Total	17043.3	0.0	17043.3	0.0	17043.3	17043.3	0.0	0	157.9	0.0

Supply Summary

Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2393.9	18250.0	15856.1			2.9049	6954	0	6954	2.9049
ENGNiagara	1146.6	1167.3	20.6			2.1649	2482	0	2482	2.1649
ENGPNGTS	84.0	84.0	0.0			4.0502	340	0	340	4.0502
ENG3Winter	89.5	91.7	2.2			15.0000	1343	0	1343	15.0000
ENG-Z4	6604.0	6690.4	86.4			2.1147	13965	0	13965	2.1147
Dracut 20	990.0	7300.0	6310.0			5.6490	5592	0	5592	5.6490
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	774.2	2190.0	1415.8			2.9458	2281	0	2281	2.9458

REDACTED

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD

- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	727.7	1338.4	610.7			2.9292	2132	0	2132	2.9292
Repsol 40	314.6	314.6	0.0							
Dracut 30	3437.2	10950.0	7512.8			6.0903	20934	0	20934	6.0903
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	30.0	30.0			0.0000	0	0	0	0.0000
Total	17281.8						59965	7465	67430	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	211.2	211.2	0	0.0	12	95	0.0	0	57	55	-2
ENGPropane	77	100	158.6	158.6	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1756.2	1737.4	0	18.8	1498	96	0.0	0	3508	3139	-369
ENGDominion	103	100	111.4	109.2	0	2.2	103	100	0.0	0	245	221	-23
ENGNGFG	671	100	708.7	703.1	0	5.6	671	100	5.6	0	1596	1434	-162
ENGHON	246	100	248.1	248.1	0	0.0	246	100	0.0	0	555	517	-38
Total	2607	98	3194.1	3167.6	0	26.6	2607	98	5.6	0	6939	6345	-594

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2393.9	0.0	2393.9	7882.5	5488.7	0	5043	0	5043	2.1067
ENG TGP2Stg	80.7	1.6	79.0	7882.5	7803.5	21	0	0	21	0.2572
ENG TGPLong	6065.6	0.0	6065.6	8698.1	2632.5	0	0	0	0	0.0000
ENG TGPBND	1146.6	7.1	1139.5	1139.5	0.0	98	267	0	365	0.3185
ENG TGPShort	2792.2	23.7	2768.5	10262.0	7493.5	314	2688	0	3002	1.0752
TrCanCharges	765.4	8.8	756.6	1477.2	720.6	0	698	0	698	0.9114
IroqCharges	756.6	4.7	751.9	1460.0	708.1	67	640	0	707	0.9343
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	211.2	0.0	211.2	8654.9	8443.7	0	0	0	0	0.0000
ENGPropane	158.6	0.0	158.6	6335.0	6176.4	0	0	0	0	0.0000
ENG C3Truck	158.6	0.0	158.6	4380.0	4221.4	159	0	0	159	1.0000
Dracut 30	3106.9	6.5	3100.4	10950.0	7849.6	135	4388	0	4523	1.4559
UnionCharges	774.2	8.8	765.4	1477.2	711.7	0	140	0	140	0.1808
Dracut 20	1324.5	2.8	1321.7	7300.0	5978.3	57	1134	0	1191	0.8993

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2313.2	64.5	2248.7	9125.0	6876.3	688	0	0	688	0.2976
Z4toTGPLH	3849.6	32.7	3816.9	7665.0	3848.1	434	0	0	434	0.1126
Z4toStg	2754.4	9.1	2745.3	7882.5	5137.2	136	0	0	136	0.0495
Engie2CG	439.8	1.2	438.6	1057.0	618.4	15	0	0	15	0.0334
██████████	1006.3	2.1	1004.2	4034.9	3030.7	44	0	0	44	0.0434
██████████	310.2	9.3	300.9	2746.1	2445.1	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	15.9	11.7	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	190.2	0.0	190.2	1057.0	866.8	190	0	0	190	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	727.7	11.6	716.1	1317.1	601.0	0	1330	0	1330	1.8281
██████████	716.1	10.7	705.4	1297.4	592.0	0	████████████████████	████████████████████	████████████████████	████████████████████
Total		206.3				2358	████████████████████	████████████████████	████████████████████	████████████████████

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2019 thru OCT 2020

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	60015	Injection Cost	47	Transportation Cost	2377	JAN 19, 2020	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	159.92
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	159.92
Total Variable	60042	Total Variable	93	Total Variable	2377		
Demand/Reservation Co	7371	Demand Cost	695	Demand Cost	17678		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7465	Total Fixed	1669	Total Fixed	17678		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	67507	Net Storage Cost	1762	Net Trans Cost	20055	Total Gas Cost	89323
						Total Revenue	0
						Net Cost	89323

Avg Cost of Served Demand 5.124 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.820 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before	DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17430.8		0.0	17430.8	0.0	17430.8	17430.8	0.0	0	159.9	0.0
Total	17430.8		0.0	17430.8	0.0	17430.8	17430.8	0.0	0	159.9	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2367.9	18300.0	15932.1			2.7928	6613	0	6613	2.7928
ENGNiagara	1142.8	1170.5	27.7			2.1359	2441	0	2441	2.1359
ENGPNGTS	84.3	84.3	0.0			3.9659	334	0	334	3.9659
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6644.3	6698.7	54.4			1.9745	13119	0	13119	1.9745
Dracut 20	1094.1	7320.0	6225.9			5.5333	6054	0	6054	5.5333
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	785.4	2196.0	1410.6			2.8478	2237	0	2237	2.8478

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2019 thru OCT 2020

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	796.1	1342.1	546.0			2.8134	2240	0	2240	2.8134
Repsol 40	314.6	314.6	0.0							
Dracut 30	3630.7	10980.0	7349.3			6.0132	21832	0	21832	6.0132
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	45.0	45.0			0.0000	0	0	0	0.0000
Total	17672.1						60042	7465	67507	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	213.9	213.9	0	0.0	12	95	0.0	0	55	54	-0
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1755.7	1736.9	0	18.8	1498	96	0.0	0	3139	2991	-148
ENGDominion	103	100	112.0	109.8	0	2.2	103	100	0.0	0	221	210	-11
ENGNGFG	671	100	715.3	709.6	0	5.7	671	100	5.6	0	1434	1363	-71
ENGHON	246	100	248.1	248.1	0	0.0	246	100	0.0	0	517	490	-27
Total	2607	98	3205.7	3179.1	0	26.6	2607	98	5.6	0	6345	6088	-258

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPPProd	2367.9	0.0	2367.9	7904.1	5536.2	0	5043	0	5043	2.1298
ENGTGP2Stg	87.4	1.8	85.6	7904.1	7818.5	22	0	0	22	0.2572
ENGTGPLong	6073.7	0.0	6073.7	8719.7	2646.0	0	0	0	0	0.0000
ENGTGPBND	1142.8	7.1	1135.7	1142.7	6.9	98	267	0	365	0.3193
ENGTGPShort	2798.8	23.8	2775.0	10290.1	7515.1	315	2688	0	3003	1.0729
TrCanCharges	776.5	8.9	767.6	1481.2	713.7	0	698	0	698	0.8984
IroqCharges	767.6	4.8	762.8	1464.0	701.2	68	640	0	708	0.9222
ENGPNGTS	84.3	0.8	83.5	366.0	282.5	0	312	0	312	3.6990
ENGLNG	213.9	0.0	213.9	8678.6	8464.7	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6370.0	6209.2	0	0	0	0	0.0000
ENG3Truck	160.8	0.0	160.8	4392.0	4231.2	161	0	0	161	1.0000
Dracut 30	3363.5	7.1	3356.4	10980.0	7623.6	146	4388	0	4534	1.3481
UnionCharges	785.4	8.9	776.5	1481.2	704.7	0	140	0	140	0.1783
Dracut 20	1365.4	2.9	1362.6	7320.0	5957.4	59	1134	0	1193	0.8737

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2280.5	63.6	2217.0	9150.0	6933.0	679	0	0	679	0.2976
Z4toTGPLH	3889.8	33.1	3856.7	7686.0	3829.3	438	0	0	438	0.1126
Z4toStg	2754.5	9.1	2745.4	7904.1	5158.7	136	0	0	136	0.0495
Engie2CG	437.1	1.2	435.9	1064.0	628.1	15	0	0	15	0.0334
██████████	1072.8	2.3	1070.5	4046.0	2975.5	47	0	0	47	0.0434
██████████	310.4	9.3	301.0	2753.6	2452.5	0	0	0	0	0.0000
Repsol2Drac	4.2	0.1	4.1	16.0	11.9	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37881.0	37881.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2928.0	2928.0	0	0	0	0	0.0000
Engie2ENGLNG	192.9	0.0	192.9	1064.0	871.1	193	0	0	193	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	796.1	12.7	783.5	1320.7	537.3	0	1330	0	1330	1.6710
██████████	783.5	11.8	771.7	1300.9	529.2	0	██████████	██████████	██████████	██████████
Total		209.1				2377	██████████	██████████	██████████	██████████

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	61364	Injection Cost	47	Transportation Cost	2389	JAN 19, 2021	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	162.49
Other Variable Cost	27	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	162.49
Total Variable	61391	Total Variable	93	Total Variable	2389		
Demand/Reservation Co	7371	Demand Cost	695	Demand Cost	17678		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7465	Total Fixed	1669	Total Fixed	17678		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	68856	Net Storage Cost	1762	Net Trans Cost	20067	Total Gas Cost	90684
						Total Revenue	0
						Net Cost	90684

Avg Cost of Served Demand 5.133 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.844 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary										
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved
ENGIDesign	17666.8	0.0	17666.8	0.0	17666.8	17666.8	0.0	0	162.5	0.0
Total	17666.8	0.0	17666.8	0.0	17666.8	17666.8	0.0	0	162.5	0.0

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2362.6	18250.0	15887.4			2.8108	6641	0	6641	2.8108
ENGNiagara	1142.4	1167.3	24.8			2.1442	2450	0	2450	2.1442
ENGPNGTS	84.0	84.0	0.0			3.9597	332	0	332	3.9597
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6648.8	6690.4	41.6			1.9830	13184	0	13184	1.9830
Dracut 20	1223.4	7300.0	6076.6			5.7143	6991	0	6991	5.7143
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	789.0	2190.0	1401.0			2.8470	2246	0	2246	2.8470

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	854.3	1338.4	484.1			2.7965	2389	0	2389	2.7965
Repsol 40	314.6	314.6	0.0							
Dracut 30	3679.5	10950.0	7270.5			5.9770	21992	0	21992	5.9770
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	17910.4						61391	7465	68856	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	216.6	216.6	0	0.0	12	95	0.0	0	54	54	0
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1755.0	1736.2	0	18.8	1498	96	0.0	0	2991	3018	27
ENGDominion	103	100	112.8	110.6	0	2.2	103	100	0.0	0	210	212	2
ENGNGFG	671	100	716.4	710.7	0	5.7	671	100	5.6	0	1363	1373	10
ENGHON	246	100	247.6	247.6	0	0.0	246	100	0.0	0	490	491	0
Total	2607	98	3209.2	3182.6	0	26.6	2607	98	5.6	0	6088	6127	39

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENG TGPProd	2362.6	0.0	2362.6	7882.5	5519.9	0	5043	0	5043	2.1346
ENG TGP2Stg	90.0	1.8	88.2	7882.5	7794.4	23	0	0	23	0.2572
ENG TGPLong	6072.2	0.0	6072.2	8698.1	2625.9	0	0	0	0	0.0000
ENG TGPBND	1142.4	7.1	1135.3	1139.5	4.2	98	267	0	365	0.3194
ENG TGPSHORT	2799.6	23.8	2775.8	10262.0	7486.2	315	2688	0	3003	1.0727
TrCanCharges	780.0	9.0	771.0	1477.2	706.2	0	698	0	698	0.8944
IroqCharges	771.0	4.8	766.2	1460.0	693.8	68	640	0	708	0.9185
ENG PNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	216.6	0.0	216.6	8654.9	8438.3	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG C3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3402.4	7.1	3395.3	10950.0	7554.7	148	4388	0	4536	1.3332
UnionCharges	789.0	9.0	780.0	1477.2	697.2	0	140	0	140	0.1775
Dracut 20	1505.0	3.2	1501.8	7300.0	5798.2	65	1134	0	1199	0.7967

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2020 thru OCT 2021

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2272.6	63.3	2209.3	9125.0	6915.7	676	0	0	676	0.2976
Z4toTGPLH	3896.1	33.1	3862.9	7665.0	3802.1	439	0	0	439	0.1126
Z4toStg	2752.7	9.1	2743.6	7882.5	5138.9	136	0	0	136	0.0495
Engie2CG	434.4	1.2	433.2	1057.0	623.8	15	0	0	15	0.0334
██████████	1128.8	2.4	1126.4	4034.9	2908.5	49	0	0	49	0.0434
██████████	309.9	9.3	300.6	2746.1	2445.4	0	0	0	0	0.0000
Repsol2Drac	4.7	0.1	4.5	15.9	11.4	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	195.6	0.0	195.6	1057.0	861.4	196	0	0	196	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	854.3	13.6	840.8	1317.1	476.4	0	1330	0	1330	1.5571
██████████	840.8	12.6	828.2	1297.4	469.2	0	██████████	██████████	██████████	██████████
Total		211.4				2389	██████████	██████████	██████████	██████████

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2021 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	64285	Injection Cost	47	Transportation Cost	2411	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	46	Other Variable Cost	0	System Served	165.66
Other Variable Cost	28	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	165.66
Total Variable	64313	Total Variable	93	Total Variable	2411		
Demand/Reservation Co	7371	Demand Cost	695	Demand Cost	17678		
Other Fixed Cost	94	Other Fixed Cost	973	Other Fixed Cost	0		
Total Fixed	7465	Total Fixed	1669	Total Fixed	17678		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	71778	Net Storage Cost	1762	Net Trans Cost	20089	Total Gas Cost	93628
						Total Revenue	0
						Net Cost	93628

Avg Cost of Served Demand 5.191 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.930 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved	
ENGIDesign	18035.1	0.0	18035.1	0.0	18035.1	18035.1	0.0	0	165.7	0.0	
Total	18035.1	0.0	18035.1	0.0	18035.1	18035.1	0.0	0	165.7	0.0	

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	2369.6	18250.0	15880.4			2.8365	6721	0	6721	2.8365
ENGNiagara	1143.7	1167.3	23.6			2.1912	2506	0	2506	2.1912
ENGPNGTS	84.0	84.0	0.0			3.9303	330	0	330	3.9303
ENG3Winter	91.7	91.7	0.0			15.0000	1376	0	1376	15.0000
ENG-Z4	6657.2	6690.4	33.2			2.0468	13626	0	13626	2.0468
Dracut 20	1363.7	7300.0	5936.3			5.9464	8109	0	8109	5.9464
ENG3Summer	69.1	93.5	24.4			10.0000	691	0	691	10.0000
DLiqSummer	21.0	21.0	0.0							
ENG Dawn	796.2	2190.0	1393.8			2.8702	2285	0	2285	2.8702

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	904.2	1338.4	434.2			2.8097	2541	0	2541	2.8097
Repsol 40	314.6	314.6	0.0							
Dracut 30	3820.7	10950.0	7129.3			6.0226	23010	0	23010	6.0226
Engie Combo	630.0	630.0	0.0							
C/G SUPPLY	0.0	0.0	0.0			0.0000	0	0	0	0.0000
Total	18265.7						64313	7465	71778	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	12	95	219.9	219.9	0	0.0	12	95	0.0	0	54	55	1
ENGPropane	77	100	160.8	160.8	0	0.0	77	100	0.0	0	979	979	0
ENGFSMA	1498	96	1738.4	1735.4	0	18.6	1482	95	0.0	-16	3018	3087	69
ENGDominion	103	100	112.7	110.5	0	2.2	103	100	0.0	0	212	219	7
ENGNGFG	671	100	716.4	710.8	0	5.7	671	100	5.6	0	1373	1417	44
ENGHON	246	100	248.4	248.4	0	0.0	246	100	0.0	0	491	505	14
Total	2607	98	3196.6	3185.8	0	26.5	2591	97	5.6	-16	6127	6262	135

Transportation Summary

Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPProd	2369.6	0.0	2369.6	7882.5	5512.9	0	5043	0	5043	2.1283
ENGTGP2Stg	90.5	1.9	88.7	7882.5	7793.9	23	0	0	23	0.2572
ENGTGPLong	6103.2	0.0	6103.2	8698.1	2594.9	0	0	0	0	0.0000
ENGTGPBND	1143.7	7.1	1136.6	1139.5	3.0	98	267	0	365	0.3191
ENGTGPShort	2799.5	23.8	2775.7	10262.0	7486.3	315	2688	0	3003	1.0727
TrCanCharges	787.1	9.1	778.1	1477.2	699.1	0	698	0	698	0.8862
IroqCharges	778.1	4.8	773.3	1460.0	686.7	69	640	0	709	0.9109
ENGPNGTS	84.0	0.8	83.1	365.0	281.9	0	312	0	312	3.7155
ENGLNG	219.9	0.0	219.9	8654.9	8435.0	0	0	0	0	0.0000
ENGPropane	160.8	0.0	160.8	6335.0	6174.2	0	0	0	0	0.0000
ENG3Truck	160.8	0.0	160.8	4380.0	4219.2	161	0	0	161	1.0000
Dracut 30	3572.6	7.5	3565.1	10950.0	7384.9	155	4388	0	4543	1.2717
UnionCharges	796.2	9.1	787.1	1477.2	690.0	0	140	0	140	0.1758
Dracut 20	1616.0	3.4	1612.6	7300.0	5687.4	70	1134	0	1204	0.7450

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2021 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	2279.1	63.5	2215.6	9125.0	6909.4	678	0	0	678	0.2976
Z4toTGPLH	3921.0	33.3	3887.6	7665.0	3777.4	442	0	0	442	0.1126
Z4toStg	2736.3	9.0	2727.3	7882.5	5155.3	136	0	0	136	0.0495
Engie2CG	431.1	1.2	429.9	1057.0	627.1	14	0	0	14	0.0334
██████████	1177.4	2.5	1175.0	4034.9	2860.0	51	0	0	51	0.0434
██████████	310.2	9.3	300.9	2746.1	2445.1	0	0	0	0	0.0000
Repsol2Drac	4.3	0.1	4.2	15.9	11.7	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	37777.5	37777.5	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	2920.0	2920.0	0	0	0	0	0.0000
Engie2ENGLNG	198.9	0.0	198.9	1057.0	858.1	199	0	0	199	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	904.2	14.4	889.8	1317.1	427.3	0	1330	0	1330	1.4712
██████████	889.8	13.3	876.5	1297.4	420.9	0	██████████	██████████	██████████	██████████
Total		214.1				2411	██████████	██████████	██████████	██████████

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Costs		Storage Costs		Transportation Costs		Peak Subperiod	
-----		-----		-----		-----	
Commodity Cost	306557	Injection Cost	237	Transportation Cost	11857	JAN 19, 2022	
Penalty Cost	0	Withdrawal Cost	228	Other Variable Cost	0	System Served	165.66
Other Variable Cost	135	Carrying Cost	0			System Unserved	0.00
		Other Variable Cost	0			Total	165.66
Total Variable	306692	Total Variable	465	Total Variable	11857		
Demand/Reservation Co	36853	Demand Cost	3477	Demand Cost	88388		
Other Fixed Cost	472	Other Fixed Cost	4865	Other Fixed Cost	0		
Total Fixed	37326	Total Fixed	8343	Total Fixed	88388		
Sup Release Revenue	0	Sto Release Revenue	0	Cap Release Revenue	0		
Net Supply Cost	344018	Net Storage Cost	8807	Net Trans Cost	100245	Total Gas Cost	453070
						Total Revenue	0
						Net Cost	453070

Avg Cost of Served Demand 5.213 USD/DT
(System Cost/Served Dem.)

Avg Cost of Gas Purchased 3.904 USD/DT
(Supply Cost/LDC Purchase)

Demand Summary											
Class	Demand Before DSM	DSM Impact	Net Demand	Imbal. Served	Demand After Unb.	Served	Unserved	Revenue	Peak Served	Peak Unserved	
ENGIDesign	86917.0	0.0	86917.0	0.0	86917.0	86917.0	0.0	0	165.7	0.0	
Total	86917.0	0.0	86917.0	0.0	86917.0	86917.0	0.0	0	165.7	0.0	

Supply Summary										
Source	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
ENGUSGC	11865.3	91300.0	79434.7			2.8716	34072	0	34072	2.8716
ENGNiagara	5722.2	5839.5	117.4			2.2009	12594	0	12594	2.2009
ENGPNGTS	420.2	420.2	0.0			4.0214	1690	0	1690	4.0214
ENG3Winter	445.8	458.7	12.9			15.0000	6687	0	6687	15.0000
ENG-Z4	33092.4	33460.3	367.9			2.0870	69064	0	69064	2.0870
Dracut 20	5589.1	36520.0	30930.9			5.6961	31836	0	31836	5.6961
ENG3Summer	345.5	467.3	121.8			10.0000	3455	0	3455	10.0000
DLiqSummer	105.0	105.0	0.0							
ENG Dawn	3904.9	10956.0	7051.1			2.9363	11466	0	11466	2.9363

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

Supply Summary										
Source (cont)	Total Take	Max Take	Surplus	Take Under Daily Min	Take Under Other Min	Av Comm Cost	Total Var Cost	Total Fix Cost	Net Cost	Average Net Cost
DAWN	4000.8	6695.8	2695.0			2.8921	11571	0	11571	2.8921
Repsol 40	1572.9	1572.9	0.0							
Dracut 30	17908.1	54780.0	36871.9			6.0476	108301	0	108301	6.0476
Engie Combo	3150.0	3150.0	0.0							
C/G SUPPLY	0.0	75.0	75.0			0.0000	0	0	0	0.0000
Total	88122.1						306692	37326	344018	

Storage Summary													
Storage	Starting Balance	% Full	Total Inj.	Total With.	NetInv Adj.	Inj Fuel	Final Balance	% Full	With. Fuel	Diff in Balance	Start Value	Final Value	Diff in Value
ENGLNG	13	100	1068.6	1069.2	0	0.0	12	95	0.0	-1	130	55	-75
ENGPropane	77	100	791.3	791.3	0	0.0	77	100	0.0	0	953	979	26
ENGFSMA	1482	95	8760.5	8666.7	0	93.7	1482	95	0.0	0	2573	3087	514
ENGDominion	103	100	560.3	549.3	0	10.9	103	100	0.0	0	178	219	41
ENGNGFG	671	100	3570.1	3541.9	0	28.2	671	100	28.0	0	1164	1417	253
ENGHON	246	100	1238.3	1238.3	0	0.0	246	100	0.0	0	427	505	78
Total	2592	97	15989.1	15856.8	0	132.9	2591	97	28.0	-1	5426	6262	836

Transportation Summary											
Segment	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost	
ENGTGPPProd	11865.3	0.0	11865.3	39434.3	27569.0	0	25216	0	25216	2.1252	
ENGTGP2Stg	431.2	8.8	422.3	39434.3	39012.0	111	0	0	111	0.2572	
ENGTGPLong	30291.2	0.0	30291.2	43512.1	13220.8	0	0	0	0	0.0000	
ENGTGPBND	5722.2	35.5	5686.7	5700.8	14.1	488	1337	0	1825	0.3189	
ENGTGPSshort	13968.3	118.7	13849.6	51338.0	37488.4	1573	13438	0	15012	1.0747	
TrCanCharges	3860.4	44.4	3816.0	7389.8	3573.8	0	3488	0	3488	0.9035	
IroqCharges	3816.0	23.7	3792.3	7304.0	3511.7	339	3199	0	3537	0.9270	
ENGPNGTS	420.2	4.2	416.0	1826.0	1410.0	1	1559	0	1560	3.7122	
ENGLNG	1069.2	0.0	1069.2	43298.1	42228.9	0	0	0	0	0.0000	
ENGPropane	791.3	0.0	791.3	31710.0	30918.7	0	0	0	0	0.0000	
ENG C3Truck	791.3	0.0	791.3	21912.0	21120.7	791	0	0	791	1.0000	
Dracut 30	16424.1	34.5	16389.6	54780.0	38390.4	713	21942	0	22655	1.3794	
UnionCharges	3904.9	44.5	3860.4	7389.8	3529.4	0	700	0	700	0.1793	
Dracut 20	7094.6	14.9	7079.7	36520.0	29440.3	308	5668	0	5976	0.8424	

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APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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NOV 2017 thru OCT 2022

Cost and Flow Summary

Units: MDT, USD (000)

=====										
Transportation Summary										
Segment (cont)	Total Flow	Fuel Consumed	Delivered	Max Flow	Surplus	Var Cost	Fix Cost	Cap Rel Revenue	Net Cost	Average Net Cost
ENGTGPZ4	11434.1	318.7	11115.4	45650.0	34534.6	3402	0	0	3402	0.2976
Z4toTGPLH	19340.2	164.4	19175.8	38346.0	19170.2	2178	0	0	2178	0.1126
Z4toStg	13752.2	45.4	13706.8	39434.3	25727.4	681	0	0	681	0.0495
Engie2CG	2186.4	6.1	2180.2	5292.0	3111.8	73	0	0	73	0.0334
██████████	5382.4	11.3	5371.1	20185.8	14814.7	234	0	0	234	0.0434
██████████	1550.8	46.5	1504.3	13737.8	12233.5	0	0	0	0	0.0000
Repsol2Drac	22.1	0.7	21.5	79.5	58.1	0	0	0	0	0.0000
██████████	0.0	0.0	0.0	188991.0	188991.0	0	0	0	0	0.0000
LNGtoLNG	0.0	0.0	0.0	14608.0	14608.0	0	0	0	0	0.0000
Engie2ENGLNG	963.6	0.0	963.6	5292.0	4328.4	964	0	0	964	1.0000
Dawn2Dracut	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0.0000
DAWNTCPL	4000.8	63.6	3937.2	6589.3	2652.1	0	6652	0	6652	1.6626
██████████	3937.2	59.1	3878.1	6490.5	2612.3	0	██████████	██████████	██████████	██████████
Total		1044.9				11857	██████████	██████████	██████████	██████████

APPENDIX 6.F.1 LOW GROWTH DESIGN YEAR RESOURCE MIX



Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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RESOURCE MIX RESULTS

Units: MDT

=====

	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Supplies	DAWN	NOV 2017	OCT 2022	0.00	150.00	3.67
	Repsol 40	NOV 2017	OCT 2022	0.00	150.00	7.86
	Contract	Start Date	End Date	Min Level	Max Level	Result MDQ
	-----	-----	-----	-----	-----	-----
Segments		NOV 2017	OCT 2022	0.00	150.00	11.05
		NOV 2017	OCT 2022	0.00	150.00	7.52
	Repsol2Drac	NOV 2017	OCT 2022	0.00	50.00	0.11
	Dawn2Dracut	NOV 2017	OCT 2022	0.00	50.00	0.00
	DAWNTCPL	NOV 2017	OCT 2022	0.00	150.00	3.61
		NOV 2017	OCT 2022	0.00	150.00	3.55

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Forecast Demand													
ENGIDesign	1606.1	2680.7	3168.6	2734.6	2304.0	1326.8	696.3	416.9	315.9	314.2	397.7	779.2	16741.0
Total Demand	1606.1	2680.7	3168.6	2734.6	2304.0	1326.8	696.3	416.9	315.9	314.2	397.7	779.2	16741.0
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	28.1	31.3	35.4	31.3	27.3	15.1	7.7	4.8	4.2	4.2	4.7	9.9	203.9
Injection	3.0	0.0	0.0	0.0	0.0	0.6	2.0	4.0	5.1	5.1	4.4	2.3	26.6
Withdrawal	0.3	1.4	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	31.4	32.6	36.9	32.5	28.5	15.7	9.7	8.8	9.3	9.3	9.1	12.3	236.1
Storage Injections													
ENGLNG	2.9	35.4	46.5	67.0	34.3	0.0	7.1	2.9	0.0	0.0	8.7	2.3	207.1
ENGPropane	0.0	0.0	46.4	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	150.1
ENGFSMA	238.5	0.0	0.0	0.0	0.0	0.0	118.9	280.4	316.3	319.0	293.9	169.4	1736.4
ENGDominion	8.2	0.0	0.0	0.0	0.0	6.4	1.8	6.5	27.3	28.3	21.5	9.1	109.2
ENGNGFG	36.9	0.0	0.0	0.0	0.0	58.4	89.1	110.2	137.3	135.9	98.3	41.6	707.7
ENGHON	31.5	0.0	0.0	0.0	0.0	16.0	33.3	36.8	39.0	41.2	34.0	14.4	246.2
Total Inj	318.0	35.4	92.9	101.6	34.3	80.8	261.8	448.3	531.4	536.0	468.0	248.3	3156.8
Total Req	1955.4	2748.7	3298.5	2868.7	2366.8	1423.3	967.9	874.1	856.5	859.5	874.7	1039.8	20133.9
=====													
Sources of Supply													
ENGUSGC	613.7	426.2	426.2	385.0	398.7	86.0	7.8	0.0	0.0	0.0	0.0	27.5	2371.2
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	46.4	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.0
ENG-Z4	249.0	257.3	257.3	232.4	257.3	711.6	787.6	759.0	741.3	744.3	753.3	787.6	6538.1
Dracut 20	99.7	263.5	265.6	95.0	168.7	25.5	0.0	0.0	0.0	0.0	0.0	0.0	918.0
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAWN	117.4	126.9	126.9	114.6	118.7	89.0	19.9	0.0	0.0	0.0	0.0	46.6	760.0
DAWN	107.8	113.7	113.7	102.7	106.3	96.6	25.7	0.0	0.0	0.0	0.0	52.0	718.4
Repsol 40	0.0	46.1	141.0	111.4	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.6
Dracut 30	422.5	556.4	721.5	746.1	574.2	310.8	3.0	0.0	0.0	0.0	0.0	5.6	3340.1
Engie Combo	2.9	161.0	172.9	190.8	102.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1715.5	2059.6	2381.1	2110.9	1849.6	1420.4	964.9	871.2	853.6	856.6	871.9	1036.8	16992.2

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	OCT 2018	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	35.4	57.6	67.0	24.5	2.9	2.9	2.9	2.9	2.9	2.9	2.9	207.7
ENGPropane	0.0	0.0	115.5	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.1
ENGFSMA	160.5	393.4	465.6	420.3	281.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1720.8
ENGDominion	8.2	28.0	29.0	24.1	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.2
ENGNGFG	36.9	172.4	189.0	158.5	150.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	707.7
ENGHON	31.5	59.9	60.7	53.2	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	246.2
Total With	239.9	689.1	917.4	757.8	517.2	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3141.7
=====													
Total Supply	1955.4	2748.7	3298.5	2868.7	2366.8	1423.3	967.9	874.1	856.5	859.5	874.7	1039.8	20133.9
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	13	13	13	2	2	12	9	13	13	10	7	13	13
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1482	1560	1167	701	281	0	0	119	399	716	1035	1329	1482
ENGDominion	103	103	75	46	22	2	8	10	16	44	72	94	103
ENGNGFG	671	671	498	309	151	0	58	147	258	395	531	629	671
ENGHON	246	246	186	126	73	32	48	81	118	157	198	232	246
Total Inv	2592	2670	2016	1192	536	53	131	389	835	1363	1896	2362	2592
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Forecast Demand													
ENGIDesign	1631.6	2728.1	3216.3	2781.1	2342.0	1343.8	708.1	427.7	326.4	327.7	414.0	796.5	17043.3
Total Demand	1631.6	2728.1	3216.3	2781.1	2342.0	1343.8	708.1	427.7	326.4	327.7	414.0	796.5	17043.3
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	28.5	31.5	35.3	31.2	28.1	15.4	7.8	4.8	4.3	4.3	4.8	10.2	206.3
Injection	3.0	0.0	0.0	0.0	0.0	0.9	2.3	4.0	5.0	5.1	4.2	2.2	26.6
Withdrawal	0.3	1.4	1.5	1.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	31.7	32.9	36.8	32.5	29.3	16.3	10.1	8.9	9.2	9.4	8.9	12.4	238.4
Storage Injections													
ENGLNG	3.5	39.6	45.2	67.0	34.8	0.0	7.1	2.9	0.0	0.0	8.7	2.3	211.2
ENGPropane	0.0	0.0	54.9	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	158.6
ENGFSMA	239.4	0.0	0.0	0.0	0.0	0.0	124.5	267.9	315.7	319.0	299.2	171.6	1737.4
ENGDominion	8.2	0.0	0.0	0.0	0.0	11.9	6.8	6.7	22.6	27.8	15.3	9.8	109.2
ENGNGFG	32.3	0.0	0.0	0.0	0.0	78.6	98.3	125.0	136.9	132.6	80.0	19.3	703.1
ENGHON	33.4	0.0	0.0	0.0	0.0	34.5	5.3	24.2	41.3	41.3	40.0	28.0	248.1
Total Inj	316.8	39.6	100.1	101.6	34.8	125.0	253.6	438.3	528.1	532.3	454.8	242.6	3167.6
Total Req	1980.2	2800.7	3353.2	2915.2	2406.1	1485.1	971.8	874.9	863.7	869.3	877.7	1051.5	20449.3
=====													
Sources of Supply													
ENGUSGC	615.2	426.2	426.2	385.0	412.5	87.1	8.9	0.0	0.0	0.0	0.0	32.7	2393.9
ENGNiagara	94.2	97.4	97.4	88.0	97.4	94.2	97.4	94.2	97.4	97.4	94.2	97.4	1146.6
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENGCSWinter	0.0	0.0	54.9	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.5
ENG-Z4	249.0	257.3	257.3	232.4	257.3	756.8	787.6	759.8	748.5	754.1	756.3	787.6	6604.0
Dracut 20	98.9	267.8	297.6	136.2	158.6	30.9	0.0	0.0	0.0	0.0	0.0	0.0	990.0
ENGCSSummer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	0.0	0.0	8.7	2.3	21.0
ENGDAwn	122.8	126.9	126.9	114.6	122.8	90.1	22.0	0.0	0.0	0.0	0.0	48.0	774.2
DAWN	110.0	113.7	113.7	102.7	110.0	98.2	25.7	0.0	0.0	0.0	0.0	53.7	727.7
Repsol 40	0.0	47.2	136.5	110.1	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.6
Dracut 30	424.5	574.5	741.4	769.0	597.1	318.1	3.6	0.0	0.0	0.0	0.0	9.0	3437.2
Engie Combo	3.5	157.6	172.9	190.8	105.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1726.4	2079.5	2437.0	2173.7	1891.5	1482.2	968.9	872.0	860.7	866.4	874.8	1048.6	17281.8

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2018	DEC 2018	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 2019	JUN 2019	JUL 2019	AUG 2019	SEP 2019	OCT 2019	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	39.6	56.3	67.0	25.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	211.2
ENGPropane	0.0	0.0	124.0	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	158.6
ENGFSMA	177.0	418.1	457.2	404.1	281.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1737.4
ENGDominion	8.2	28.0	29.0	24.1	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.2
ENGNGFG	32.3	175.5	189.0	158.5	147.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	703.1
ENGHON	33.4	59.9	60.7	53.2	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	248.1
Total With	253.8	721.1	916.2	741.5	514.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3167.6
=====													
Total Supply	1980.2	2800.7	3353.2	2915.2	2406.1	1485.1	971.8	874.9	863.7	869.3	877.7	1051.5	20449.3
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	10	7	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1142	685	281	0	0	124	392	708	1027	1326	1498
ENGDominion	103	103	75	46	22	2	14	20	27	50	78	93	103
ENGNGFG	671	671	495	306	148	0	79	177	302	439	571	651	671
ENGHON	246	246	186	126	73	32	66	71	96	137	178	218	246
Total Inv	2607	2670	1988	1172	533	53	175	425	861	1386	1915	2367	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Forecast Demand													
ENGIDesign	1662.8	2759.9	3253.2	2909.6	2367.6	1367.7	723.4	440.8	338.4	344.1	432.2	831.2	17430.8
Total Demand	1662.8	2759.9	3253.2	2909.6	2367.6	1367.7	723.4	440.8	338.4	344.1	432.2	831.2	17430.8
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	28.6	31.5	35.0	32.6	27.8	15.6	9.7	4.9	4.4	4.4	4.9	9.7	209.1
Injection	3.1	0.0	0.0	0.0	0.0	0.9	2.7	3.8	4.9	5.0	4.1	2.1	26.6
Withdrawal	0.3	1.4	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	32.0	32.9	36.5	33.9	28.9	16.5	12.4	8.8	9.2	9.5	9.0	11.7	241.3
Storage Injections													
ENGLNG	3.5	42.9	44.0	67.0	35.5	0.0	7.1	2.9	2.9	0.0	5.8	2.3	213.9
ENGPropane	0.0	0.0	57.1	34.6	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	238.9	0.0	0.0	0.0	0.0	0.0	176.1	257.0	313.1	319.0	293.6	139.1	1736.9
ENGDominion	8.2	0.0	0.0	0.0	0.0	10.4	5.5	2.7	20.6	28.3	22.4	11.8	109.8
ENGNGFG	38.8	0.0	0.0	0.0	0.0	88.3	85.9	127.6	136.5	126.8	65.1	40.5	709.6
ENGHON	33.4	0.0	0.0	0.0	0.0	29.3	14.7	24.3	41.3	41.3	37.7	26.1	248.1
Total Inj	322.9	42.9	101.1	101.6	35.5	128.0	300.8	425.9	526.0	527.0	436.1	231.2	3179.1
Total Req	2017.6	2835.8	3390.8	3045.1	2431.9	1512.2	1036.6	875.5	873.6	880.5	877.3	1074.2	20851.2
=====													
Sources of Supply													
ENGUSGC	617.7	426.2	426.2	398.7	398.7	88.9	11.3	0.0	0.0	0.0	0.0	0.0	2367.9
ENGNiagara	94.2	97.4	97.4	91.1	97.4	92.3	97.4	92.5	97.4	97.4	90.9	97.4	1142.8
ENGPNGTS	8.3	11.0	12.2	10.8	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.3
ENG3Winter	0.0	0.0	57.1	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	240.7	257.3	762.2	787.6	762.2	755.5	765.3	762.2	787.6	6644.3
Dracut 20	116.9	281.5	317.3	141.2	198.7	38.5	0.0	0.0	0.0	0.0	0.0	0.0	1094.1
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	0.0	5.8	2.3	21.0
ENGDAWN	122.8	126.9	126.9	118.7	122.8	92.6	23.9	0.0	0.0	0.0	0.0	50.8	785.4
DAWN	110.0	113.7	113.7	106.3	110.0	99.7	85.4	0.0	0.0	0.0	0.0	57.3	796.1
Repsol 40	0.0	47.8	124.8	118.0	24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.6
Dracut 30	435.3	604.6	770.1	814.8	615.1	328.3	4.5	0.0	0.0	0.0	0.0	58.0	3630.7
Engie Combo	3.5	160.6	170.4	188.1	107.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1757.8	2127.0	2473.4	2263.1	1941.2	1509.4	1033.7	872.7	870.7	877.6	874.5	1071.2	17672.1

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2019	DEC 2019	JAN 2020	FEB 2020	MAR 2020	APR 2020	MAY 2020	JUN 2020	JUL 2020	AUG 2020	SEP 2020	OCT 2020	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	42.9	55.0	67.0	25.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	213.9
ENGPropane	0.0	0.0	126.2	34.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	176.5	401.5	457.5	435.8	265.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1736.9
ENGDominion	8.2	28.0	29.0	25.0	19.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.8
ENGNGFG	38.8	177.6	189.0	164.6	139.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	709.6
ENGHON	33.4	58.7	60.7	55.0	40.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	248.1
Total With	259.8	708.7	917.4	782.1	490.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3179.1
=====													
Total Supply	2017.6	2835.8	3390.8	3045.1	2431.9	1512.2	1036.6	875.5	873.6	880.5	877.3	1074.2	20851.2
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	10	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1159	701	266	0	0	176	433	746	1065	1359	1498
ENGDominion	103	103	75	46	21	1	12	17	20	40	69	91	103
ENGNGFG	671	671	493	304	140	0	88	174	302	438	565	630	671
ENGHON	246	246	188	127	72	32	61	76	100	141	182	220	246
Total Inv	2607	2670	2004	1188	507	52	177	475	898	1421	1945	2379	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Forecast Demand													
ENGIDesign	1701.0	2811.3	3300.6	2851.2	2401.6	1393.2	738.7	452.5	349.2	357.0	450.6	860.0	17666.8
Total Demand	1701.0	2811.3	3300.6	2851.2	2401.6	1393.2	738.7	452.5	349.2	357.0	450.6	860.0	17666.8
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	28.8	31.8	35.2	31.4	28.0	15.8	10.6	5.2	5.0	4.5	5.0	9.9	211.4
Injection	3.1	0.0	0.0	0.0	0.0	0.9	2.9	4.0	5.1	4.9	3.8	1.9	26.6
Withdrawal	0.3	1.4	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	32.2	33.3	36.7	32.7	29.1	16.8	13.5	9.3	10.1	9.4	8.7	11.8	243.6
Storage Injections													
ENGLNG	3.5	46.4	42.3	67.0	36.4	0.0	7.1	2.9	2.9	2.9	2.9	2.3	216.6
ENGPropane	0.0	0.0	61.6	30.1	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	238.2	0.0	0.0	0.0	0.0	0.0	227.8	301.3	319.0	305.4	235.3	109.1	1736.2
ENGDominion	9.6	0.0	0.0	0.0	0.0	10.1	2.9	9.4	28.3	26.0	15.5	8.8	110.6
ENGNGFG	39.9	0.0	0.0	0.0	0.0	93.1	47.6	71.3	137.5	137.5	114.1	69.7	710.7
ENGHON	34.0	0.0	0.0	0.0	0.0	24.9	19.7	27.5	41.3	41.3	37.6	21.3	247.6
Total Inj	325.3	46.4	103.9	97.1	36.4	128.0	316.6	423.8	540.7	524.8	416.9	222.7	3182.6
Total Req	2058.5	2890.9	3441.2	2981.0	2467.1	1538.0	1068.8	885.6	900.0	891.2	876.2	1094.6	21093.0
=====													
Sources of Supply													
ENGUSGC	621.3	426.2	426.2	385.0	398.7	90.8	14.2	0.0	0.0	0.0	0.0	0.0	2362.6
ENGNiagara	94.2	97.4	97.4	88.0	97.4	92.7	97.4	93.1	97.4	97.4	92.7	97.4	1142.4
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	61.6	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	760.6	773.0	762.2	787.6	6648.8
Dracut 20	152.2	297.3	329.8	184.5	212.7	46.9	0.0	0.0	0.0	0.0	0.0	0.0	1223.4
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	122.8	95.4	25.2	0.0	0.0	0.0	0.0	54.4	789.0
DAWN	110.0	113.7	113.7	102.7	110.0	101.2	112.5	9.5	21.2	0.0	0.0	59.9	854.3
Repsol 40	0.0	50.8	125.5	110.1	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.6
Dracut 30	434.9	617.4	793.3	792.9	624.1	339.1	5.4	0.0	0.0	0.0	0.0	72.3	3679.5
Engie Combo	3.5	162.5	172.0	181.1	110.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1796.3	2160.6	2516.0	2231.8	1971.8	1535.1	1065.8	882.7	897.0	888.2	873.3	1091.6	17910.4

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0Ventyx
SENDOUT® Version 14.1.1 REP 13 15-Sep-2017
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	46.4	53.4	67.0	26.6	2.9	2.9	2.9	2.9	2.9	2.9	2.9	216.6
ENGPropane	0.0	0.0	130.7	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	175.8	416.0	462.5	416.4	265.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1736.2
ENGDominion	9.6	28.2	29.0	23.9	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.6
ENGNGFG	39.9	180.9	189.0	158.5	142.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	710.7
ENGHON	34.0	58.8	60.7	53.2	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	247.6
Total With	262.2	730.3	925.2	749.2	495.3	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3182.6
=====													
Total Supply	2058.5	2890.9	3441.2	2981.0	2467.1	1538.0	1068.8	885.6	900.0	891.2	876.2	1094.6	21093.0
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1144	682	266	0	0	228	529	848	1154	1389	1498
ENGDominion	103	103	74	46	22	2	12	15	24	52	78	94	103
ENGNGFG	671	671	490	301	142	0	93	141	212	349	487	601	671
ENGHON	246	246	187	127	74	33	57	77	105	146	187	225	246
Total Inv	2607	2670	1986	1165	513	54	179	493	914	1451	1973	2387	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Forecast Demand													
ENGIDesign	1739.6	2864.3	3359.7	2901.4	2444.1	1420.9	754.6	464.3	359.1	369.8	467.4	889.9	18035.1
Total Demand	1739.6	2864.3	3359.7	2901.4	2444.1	1420.9	754.6	464.3	359.1	369.8	467.4	889.9	18035.1
Forecast Rt Mrktr Imbalance													
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed													
Transport	28.9	32.2	35.3	31.2	28.2	16.1	10.8	6.4	5.3	4.6	5.1	10.2	214.1
Injection	3.1	0.0	0.0	0.0	0.0	1.0	2.9	4.2	5.1	4.8	3.5	1.8	26.5
Withdrawal	0.3	1.4	1.5	1.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Total Fuel	32.3	33.7	36.8	32.4	29.3	17.1	13.7	10.6	10.4	9.4	8.5	12.0	246.2
Storage Injections													
ENGLNG	3.5	48.7	42.1	67.0	37.6	0.0	7.1	2.9	2.9	2.9	2.9	2.3	219.9
ENGPropane	0.0	0.0	61.7	30.1	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	160.8
ENGFSMA	237.4	0.0	0.0	0.0	0.0	0.0	219.6	305.8	319.0	309.5	222.6	105.8	1719.8
ENGDominion	10.1	0.0	0.0	0.0	0.0	15.5	12.6	13.7	28.3	17.9	3.3	9.1	110.5
ENGNGFG	40.0	0.0	0.0	0.0	0.0	87.1	39.2	83.4	137.5	134.6	125.2	63.7	710.8
ENGHON	34.8	0.0	0.0	0.0	0.0	25.3	16.1	33.2	41.3	40.0	35.3	22.5	248.4
Total Inj	325.8	48.7	103.8	97.1	37.6	127.9	306.1	450.5	540.7	516.4	400.8	214.9	3170.2
Total Req	2097.7	2946.7	3500.3	3030.8	2511.0	1565.9	1074.3	925.5	910.2	895.5	876.7	1116.8	21451.4
=====													
Sources of Supply													
ENGUSGC	623.7	426.2	426.2	385.0	398.7	92.9	16.9	0.0	0.0	0.0	0.0	0.0	2369.6
ENGNiagara	94.2	97.4	97.4	88.0	97.4	93.1	97.4	93.4	97.4	97.4	93.2	97.4	1143.7
ENGPNGTS	8.3	11.0	12.2	10.4	9.7	6.8	4.9	3.6	3.3	3.4	4.0	6.3	84.0
ENG3Winter	0.0	0.0	61.7	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
ENG-Z4	249.0	257.3	257.3	232.4	257.3	762.2	787.6	762.2	764.7	777.4	762.2	787.6	6657.2
Dracut 20	151.9	308.3	369.4	245.3	231.8	57.0	0.0	0.0	0.0	0.0	0.0	0.0	1363.7
ENG3Summer	0.0	0.0	0.0	0.0	0.0	0.0	11.5	11.5	11.5	11.5	11.5	11.5	69.1
DLiqSummer	0.0	0.0	0.0	0.0	0.0	0.0	7.1	2.9	2.9	2.9	2.9	2.3	21.0
ENGDAWN	122.8	126.9	126.9	114.6	122.8	97.8	26.5	0.0	0.0	0.0	0.0	57.9	796.2
DAWN	110.0	113.7	113.7	102.7	110.0	102.8	112.8	49.0	27.3	0.0	0.1	62.1	904.2
Repsol 40	0.0	55.2	124.1	103.9	31.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.6
Dracut 30	471.5	635.6	806.2	820.3	641.2	350.4	6.7	0.0	0.0	0.0	0.0	88.8	3820.7
Engie Combo	3.5	156.7	172.9	181.1	115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	1835.0	2188.3	2567.8	2313.8	2016.2	1563.0	1071.4	922.6	907.2	892.6	873.9	1113.9	18265.7

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APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

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Natural Gas Supply VS. Requirements

Units: MDT

	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022	AUG 2022	SEP 2022	OCT 2022	Total
=====													
Storage Withdrawals													
ENGLNG	2.9	48.7	53.2	67.0	27.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9	219.9
ENGPropane	0.0	0.0	130.8	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	160.8
ENGFSMA	175.0	438.2	469.9	386.8	265.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1735.4
ENGDominion	10.1	28.1	29.0	23.2	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.5
ENGNGFG	40.0	182.9	189.0	158.5	140.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	710.8
ENGHON	34.8	60.5	60.7	51.5	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	248.4
Total With	262.7	758.4	932.5	717.1	494.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3185.8
=====													
Total Supply	2097.7	2946.7	3500.3	3030.8	2511.0	1565.9	1074.3	925.5	910.2	895.5	876.7	1116.8	21451.4
=====													
Net Storage Inv. Adj.													
ENGLNG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0	0	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0	0	0	0	0	0	0	0
=====													
Start of Month Inventory													
ENGLNG	12	13	13	2	2	12	9	13	13	13	13	13	12
ENGPropane	77	77	77	8	8	8	8	19	31	42	54	65	77
ENGFSMA	1498	1560	1122	652	266	0	0	220	525	844	1154	1377	1498
ENGDominion	103	103	75	46	22	2	18	30	44	72	90	94	103
ENGNGFG	671	671	488	299	140	0	87	126	210	347	482	607	671
ENGHON	246	246	186	125	74	33	58	74	107	149	188	224	246
Total Inv	2607	2670	1960	1131	511	54	179	483	930	1468	1981	2379	2607
=====													
Unsupplied Demand													
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Forecast Demand						
ENGIDesign	16741.0	17043.3	17430.8	17666.8	18035.1	86917.0
Total Demand	16741.0	17043.3	17430.8	17666.8	18035.1	86917.0
Forecast Rt Mrktr Imbalance						
Total Imbal	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Consumed						
Transport	203.9	206.3	209.1	211.4	214.1	1044.9
Injection	26.6	26.6	26.6	26.6	26.5	132.9
Withdrawal	5.6	5.6	5.6	5.6	5.6	28.0
Total Fuel	236.1	238.4	241.3	243.6	246.2	1205.7
Storage Injections						
ENGLNG	207.1	211.2	213.9	216.6	219.9	1068.6
ENGPropane	150.1	158.6	160.8	160.8	160.8	791.3
ENGFSMA	1736.4	1737.4	1736.9	1736.2	1719.8	8666.7
ENGDominion	109.2	109.2	109.8	110.6	110.5	549.3
ENGNFG	707.7	703.1	709.6	710.7	710.8	3541.9
ENGHON	246.2	248.1	248.1	247.6	248.4	1238.3
Total Inj	3156.8	3167.6	3179.1	3182.6	3170.2	15856.2
Total Req	20133.9	20449.3	20851.2	21093.0	21451.4	103978.9
=====						
Sources of Supply						
ENGUSGC	2371.2	2393.9	2367.9	2362.6	2369.6	11865.3
ENGNiagara	1146.6	1146.6	1142.8	1142.4	1143.7	5722.2
ENGPNGTS	84.0	84.0	84.3	84.0	84.0	420.2
ENG3Winter	81.0	89.5	91.7	91.7	91.7	445.8
ENG-Z4	6538.1	6604.0	6644.3	6648.8	6657.2	33092.4
Dracut 20	918.0	990.0	1094.1	1223.4	1363.7	5589.1
ENG3Summer	69.1	69.1	69.1	69.1	69.1	345.5
DLiqSummer	21.0	21.0	21.0	21.0	21.0	105.0
ENGDAwn	760.0	774.2	785.4	789.0	796.2	3904.9
DAWN	718.4	727.7	796.1	854.3	904.2	4000.8
Repsol 40	314.6	314.6	314.6	314.6	314.6	1572.9
Dracut 30	3340.1	3437.2	3630.7	3679.5	3820.7	17908.1
Engie Combo	630.0	630.0	630.0	630.0	630.0	3150.0
C/G SUPPLY	0.0	0.0	0.0	0.0	0.0	0.0
Total Take	16992.2	17281.8	17672.1	17910.4	18265.7	88122.1

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APPENDIX 6.F.2 LOW GROWTH DESIGN YEAR MONTHLY REQUIREMENTS

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0Ventyx
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Natural Gas Supply VS. Requirements

Units: MDT

	2017	2018	2019	2020	2021	Total
=====						
Storage Withdrawals						
ENGLNG	207.7	211.2	213.9	216.6	219.9	1069.2
ENGPropane	150.1	158.6	160.8	160.8	160.8	791.3
ENGFSMA	1720.8	1737.4	1736.9	1736.2	1735.4	8666.7
ENGDominion	109.2	109.2	109.8	110.6	110.5	549.3
ENGNGFG	707.7	703.1	709.6	710.7	710.8	3541.9
ENGHON	246.2	248.1	248.1	247.6	248.4	1238.3
Total With	3141.7	3167.6	3179.1	3182.6	3185.8	15856.8
Total Supply	20133.9	20449.3	20851.2	21093.0	21451.4	103978.9
=====						
Net Storage Inv. Adj.						
ENGLNG	0	0	0	0	0	0
ENGPropane	0	0	0	0	0	0
ENGFSMA	0	0	0	0	0	0
ENGDominion	0	0	0	0	0	0
ENGNGFG	0	0	0	0	0	0
ENGHON	0	0	0	0	0	0
Total Inv Adj	0	0	0	0	0	0
=====						
Start of Year Inventory						
ENGLNG	13	12	12	12	12	13
ENGPropane	77	77	77	77	77	77
ENGFSMA	1482	1498	1498	1498	1498	1482
ENGDominion	103	103	103	103	103	103
ENGNGFG	671	671	671	671	671	671
ENGHON	246	246	246	246	246	246
Total Inv	2592	2607	2607	2607	2607	2592
=====						
Unsupplied Demand						
ENGIDesign	0.0	0.0	0.0	0.0	0.0	0.0
Total Unsupp	0.0	0.0	0.0	0.0	0.0	0.0

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Peak Subperiod Demand Forecast by Class

JAN 19, 2018		Daily System Activity		Units: MDT
=====				
AREA	ENGIDesign			
ENGIDemand	155.3			
ThirtyDay				
TOTAL	155.3			

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Peak Subperiod Demand Summary

JAN 19, 2018		Daily System Activity		Units: MDT
=====				
AREA	FORECAST	TOTAL SERVED	TOTAL UNSERVED	
	TOTAL DEMAND			
ENGIDemand	155.3	155.3	0.0	
ThirtyDay	0.0	0.0	0.0	
=====				
TOTAL	155.3	155.3	0.0	

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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JAN 19, 2018

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	155.3		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane		28.60			9	11	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			934	60	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		383	57	ENGTGPShort	28.11	0.24
			Dracut 20	4.37	ENGHON		1.96			149	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	3.67								ENGPropane	34.60	
			Repsol 40	7.86								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	4.40	0.01
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													11.05	0.02
													7.52	0.23
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	3.61	0.06
													3.55	0.05
Total	155.3		Total	88.58	Total		68.10	0.05		1534		Total		1.30

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Peak Subperiod Demand Forecast by Class

JAN 19, 2019	Daily System Activity	Units: MDT
=====		
AREA	ENGIDesign	
ENGIDemand	157.9	
ThirtyDay		
TOTAL	157.9	

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Peak Subperiod Demand Summary

JAN 19, 2019		Daily System Activity		Units: MDT
=====				
AREA	FORECAST			
	TOTAL DEMAND	TOTAL SERVED	TOTAL UNSERVED	
ENGIDemand	157.9	157.9	0.0	
ThirtyDay	0.0	0.0	0.0	
=====				
TOTAL	157.9	157.9	0.0	

REDACTED

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Report 9D 08:29:31

JAN 19, 2019

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	157.9		ENGUSGC	13.75	ENGLNG			11.10		2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane			28.60		11	14	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA			19.42		918	59	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion			0.93		57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG			6.10	0.05	379	57	ENGTGPShort	28.11	0.24
			Dracut 20	6.95	ENGHON			1.96		149	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	3.67								ENGPropane	34.60	
			Repsol 40	7.86								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	6.98	0.01
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													11.05	0.02
													7.52	0.23
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	3.61	0.06
													3.55	0.05
Total	157.9		Total	91.16	Total			68.10	0.05	1516		Total		1.31

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 15-Sep-2017
Report 9B 08:29:31

Peak Subperiod Demand Forecast by Class

JAN 19, 2020		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	159.9		
ThirtyDay			
TOTAL	159.9		

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 15-Sep-2017
Report 9C 08:29:31

Peak Subperiod Demand Summary

JAN 19, 2020

Daily System Activity

Units: MDT

AREA	FORECAST	TOTAL SERVED	TOTAL UNSERVED
	TOTAL DEMAND		
ENGIDemand	159.9	159.9	0.0
ThirtyDay	0.0	0.0	0.0
TOTAL	159.9	159.9	0.0

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

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Report 9D 08:29:31

JAN 19, 2020

Daily System Activity

Units: MDT

=====													
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv. Fuel

--- Served ---													
ENGIDesign	159.9		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75
			ENGNiagara	3.14	ENGPropane		28.60			13	17	ENGTGP2Stg	
			ENGPNGTS	0.39	ENGFSMA		19.42			934	60	ENGTGPLong	21.60
			ENG3Winter	6.00	ENGDominion		0.93			57	55	ENGTGPBND	3.12 0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		377	56	ENGTGPShort	28.11 0.24
			Dracut 20	8.97	ENGHON		1.96			150	61	TrCanCharges	4.00 0.05
			ENG3Summer									IroqCharges	3.98 0.02
			DLiqSummer									ENGPNGTS	0.39 0.00
			ENGDAwn	4.09								ENGLNG	11.10
			DAWN	3.67								ENGPropane	34.60
			Repsol 40	7.86								ENG3Truck	6.00
			Dracut 30	30.00								Dracut 30	30.00 0.06
			Engie Combo	7.00								UnionCharges	4.05 0.05
			C/G SUPPLY									Dracut 20	8.99 0.02
												ENGTGPZ4	13.37 0.38
												Z4toTGPLH	8.23 0.07
												Z4toStg	
												Engie2CG	6.98 0.02
													11.05 0.02
													7.52 0.23
												Repsol2Drac	0.11 0.00
												LNGtoLNG	
												Engie2ENGLNG	
												Dawn2Dracut	
												DAWNTCPL	3.61 0.06
													3.55 0.05
Total	159.9	Total	93.18	Total			68.10	0.05		1534	Total		1.31

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9B 15-Sep-2017
Report 9B 08:29:31

Peak Subperiod Demand Forecast by Class

JAN 19, 2021	Daily System Activity	Units: MDT
=====		
AREA	ENGIDesign	
ENGIDemand	162.5	
ThirtyDay		
TOTAL	162.5	

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9C 15-Sep-2017
Report 9C 08:29:31

Peak Subperiod Demand Summary				
JAN 19, 2021	Daily System Activity			Units: MDT
=====				
AREA	FORECAST TOTAL DEMAND	TOTAL SERVED	TOTAL UNSERVED	
ENGIDemand	162.5	162.5	0.0	
ThirtyDay	0.0	0.0	0.0	
=====				
TOTAL	162.5	162.5	0.0	

REDACTED

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9D 15-Sep-2017
Report 9D 08:29:31

JAN 19, 2021

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	162.4		ENGUSGC	13.75	ENGLNG		11.10			2	15	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane		28.60			15	20	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA		19.42			915	59	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion		0.93			57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG		6.10	0.05		374	56	ENGTGPShort	28.11	0.24
			Dracut 20	11.54	ENGHON		1.96			150	61	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	11.10	
			DAWN	3.67								ENGPropane	34.60	
			Repsol 40	7.86								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	11.56	0.02
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													11.05	0.02
													7.52	0.23
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	3.61	0.06
													3.55	0.05
Total	162.4		Total	95.75	Total		68.10	0.05		1513		Total		1.31

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Peak Subperiod Demand Forecast by Class

JAN 19, 2022		Daily System Activity	Units: MDT
=====			
AREA	ENGIDesign		
ENGIDemand	165.7		
ThirtyDay			
TOTAL	165.7		

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Peak Subperiod Demand Summary

JAN 19, 2022		Daily System Activity		Units: MDT
=====				
AREA	FORECAST			
	TOTAL DEMAND	TOTAL SERVED	TOTAL UNSERVED	
ENGIDemand	165.7	165.7	0.0	
ThirtyDay	0.0	0.0	0.0	
=====				
TOTAL	165.7	165.7	0.0	

REDACTED

APPENDIX 6.F.3 LOW GROWTH DESIGN DAY

Scen 1332 Design Case Low Fix E RMix RD
- Draw 0

Ventyx
SENDOUT® Version 14.1.1 REP 9D 15-Sep-2017
Report 9D 08:29:31

JAN 19, 2022

Daily System Activity

Units: MDT

=====														
Demand	Suppl.	Unsup.	Supplies	Take	Storages	Adj (-With)	With. (-Inj)	With Fuel	Inj Fuel	Ending Inv.	% Full	Transport	Deliv.	Fuel

--- Served ---														
ENGIDesign	165.6		ENGUSGC	13.75	ENGLNG			10.91		2	16	ENGTGPPProd	13.75	
			ENGNiagara	3.14	ENGPropane			23.52		27	35	ENGTGP2Stg		
			ENGPNGTS	0.39	ENGFSMA			19.42		885	57	ENGTGPLong	21.60	
			ENG3Winter	6.00	ENGDominion			0.93		57	55	ENGTGPBND	3.12	0.02
			ENG-Z4	8.30	ENGNGFG			6.10	0.05	372	55	ENGTGPShort	28.11	0.24
			Dracut 20	20.00	ENGHON			1.96		149	60	TrCanCharges	4.00	0.05
			ENG3Summer									IroqCharges	3.98	0.02
			DLiqSummer									ENGPNGTS	0.39	0.00
			ENGDAwn	4.09								ENGLNG	10.91	
			DAWN	3.67								ENGPropane	29.52	
			Repsol 40	7.86								ENG3Truck	6.00	
			Dracut 30	30.00								Dracut 30	30.00	0.06
			Engie Combo	7.00								UnionCharges	4.05	0.05
			C/G SUPPLY									Dracut 20	20.00	0.04
												ENGTGPZ4	13.37	0.38
												Z4toTGPLH	8.23	0.07
												Z4toStg		
												Engie2CG	6.98	0.02
													11.05	0.02
													7.52	0.23
												Repsol2Drac	0.11	0.00
												LNGtoLNG		
												Engie2ENGLNG		
												Dawn2Dracut		
												DAWNTCPL	3.61	0.06
													3.55	0.05
Total	165.6		Total	104.2	Total			62.83	0.05	1492		Total		1.33