NORTHERN UTILITIES, INC.

LONG RANGE INTEGRATED FORECAST AND SYSTEM GAS SUPPLY RESOURCE PLAN FOR THE MAINE DIVISION AND THE NEW HAMPSHIRE DIVISION

As submitted jointly to

The Public Utilities Commission of the State of Maine

The Public Utilities Commission of the State of New Hampshire

For the Purposes of Joint Hearing

June 30, 2006

NORTHERN UTILITIES, INC.
LONG RANGE INTEGRATED FORECAST AND
SYSTEM GAS SUPPLY RESOURCE PLAN

TABLE OF CONTENTS

I. INTRODUCTION

The purpose of this report is to present the long-range integrated resource plan ("IRP" or "Plan") for the period 2006/07 through 2011/12 of Northern Utilities, Inc. ("Northern" or the "Company"). This plan details Northern's resource planning process and presents the Company's resource strategies based on its current forecast of requirements and present market conditions.

An important focus of Northern's Plan is the effective management of resources in its portfolio, including the minimization of current and future fixed costs. In addition, a number of important resource decisions must be made during the term of the plan, including the potential renewal or replacement of several individual supply, transportation and storage resources that are currently part of the Northern portfolio.

Northern's IRP incorporates the combined demand requirements of its Maine Division and its New Hampshire Division reflecting the integrated resource portfolio planning Northern employs to reliably and economically serve the customers in its Maine and New Hampshire Divisions.

The Maine Public Utilities Commission ("Maine Commission" or "MPUC") and the New Hampshire Public Utilities Commission ("New Hampshire Commission" or "NHPUC")(jointly, the "Commissions") each approved a Stipulation and Settlement ("Settlement Agreement") that provided, *inter alia,* for the filing of an IRP by Northern once every three years[1]. In compliance with the Settlement Agreement, Northern's Plan presents a forward-looking review of its demand forecast, capacity and supply resource plans and

---

[1] See Northern Utilities Inc, *Petition for Approval of Proposed Delivery Service Terms and Conditions*, Docket No. 2005-87, MPUC Orders dated January 27, 2006 (Phase I) and April 26, 2006 (Part 2) and Northern Utilities, Inc., *Maine Public Utilities Commission Investigation for Review of Proportional Responsibility*

planning processes. Northern's IRP is an important tool to inform the Commissions in a timely manner of the Company's resource plans and anticipated decisions to contract or decontract capacity resources during the planning horizon.

Northern's IRP provides a complete description of the planning processes it does employ and has employed, enabling the Commissions to come to a full understanding of the methods used in practice and the results reached through the application of those methods to current circumstances. The Plan also demonstrates that Northern's planning standards are appropriate and that the resource strategies described herein are in the best interests of its customers and result in a best-cost long-range supply and capacity portfolio to meet the forecast demand of the customers of both of Northern's Divisions. The Plan adequately meets the Company's expected future design day, seasonal and annual loads, as well as loads that could be expected during a "cold snap." Further, while Northern's Plan reflects expected future conditions, it is a living document in the sense that it continues to be refined on an on-going basis in order to reasonably respond to the changing requirements of Northern's Maine Division customers, its New Hampshire Division customers and the marketplace.

The Commissions should be aware that a number of important resource decisions must be made during the five-year term of the Plan. While no major capacity contracts expire prior to October 31, 2008, some contracts require notice of renewal or termination by April 30, 2007. Analysis of renewal or replacement of specific expiring resources and other portfolio resources must take place earlier in order for Northern to appropriately evaluate all alternatives. In the context of its IRP filing, Northern has analyzed each of these future decisions as if it had to make these decisions today, using its well known and well tested

---

Formula, Docket No. 2005-273 (MPUC, April 26, 2006). See also Northern Utilities Inc., *Review of*

planning and resource acquisition standards that are detailed for the Commissions in this Plan. When the time comes to make each renewal or replacement decision, Northern will again use the planning and supply and capacity acquisition methods approved under this Plan to ensure that the decision making process employed is reasonable and the decision is based on the best information available to Northern at the time it is made.

Highlights of the specific potential resource decisions supported by this Plan include the following:

- Tennessee Gas Pipeline Company ("Tennessee") Transportation and Storage Capacity Renewals: The majority of the Company's Gulf Coast supplies are delivered via Tennessee long-haul transportation capacity. In addition, Northern holds market area storage capacity on the Tennessee system and associated short-haul transportation capacity to the interconnect with the Granite State Gas Transmission, Inc. ("Granite State"). Further, Northern holds short-haul Tennessee transportation capacity from the United States ("U.S.") border where it imports some of its Canadian supplies. At this time, Northern anticipates renewing all of its long-haul and short-haul transportation and storage capacity on the Tennessee system. For its long-haul and storage services, notice must be provided to Tennessee one year prior to the effective termination date of November 1, 2008. For its border service, the effective termination date is November 1, 2010 with the same one-year prior notice provision. The Tennessee capacity provides a competitively-priced service offering and important supply diversity benefits to the portfolio.

- Granite State Capacity Renewals: Northern holds transportation capacity on Granite State necessary to deliver supplies transported to it by other upstream pipelines. The Granite State capacity is critical to receive these upstream interstate supplies and Northern anticipates renewing all of its Granite State capacity effective November 1, 2008.

- Transcontinental Gas Pipe Line Company ("Transco") and Texas Eastern Transmission Company ("TETCo") Capacity: Northern holds six very small contracts for transportation on Transco and transportation and storage services on TETCo. This capacity totals less than 1,500 Dth per day. Supplies are delivered to Northern via Algonquin with an exchange via Granite State. The Company believes it will terminate all of these small contracts but will continue to assess whether to renew its Transco and TETCo contracts until its next decision is required by April 30, 2007.

Reasonableness of Proportional Responsibility Formula, Docket No. DG 05-080 (NHPUC, June 1, 2006).

- DTE Energy Capacity Renewal: Northern has an exchange agreement with DTE Energy (formerly CoEnergy Trading Company) that provides Northern with a virtual storage service from MCN facilities for up to 34,000 Dth per day for 151 days during the November through March winter period. At this time, Northern is beginning to evaluate whether it should renew this or a similar service that would continue to provide Northern and its customers with much-needed, flexible and economical storage service.

- Wells Replacement Capacity Resources: As a cost-effective alternative to the 20-year Wells LNG contract, Northern acquired a 10-year peaking service delivered to Granite State from Duke Energy Trading and Marketing ("DETM" or "Duke"), a 10-year combination LNG liquid and vapor service from Distrigas of Massachusetts ("DOMAC") and a 5-year peaking service from DOMAC. All three services commenced on November 1, 2001.

    - The DOMAC peaking service expires on October 31, 2006 without renewal rights. The DOMAC combination service allows the Company the option to take a peaking service or a liquid service that Northern utilizes to replenish its Lewiston LNG facility. Although there is no rollover provision in the DOMAC combination contract, Northern expects it will likely renegotiate a similar type service or portion thereof prior to expiration of the existing contract.

    - The DETM peaking supply agreement provides Northern with a stepped-up MDQ designed to meet the anticipated needs of Northern's Maine Division and New Hampshire Division customers from year to year. The initial contract MDQ was 8,000 Dth per day in 2001 and reaches a peak of 57,400 Dth per day in 2010. The contract does not provide Northern with rollover rights, and, as a result, Northern will require a replacement resource beginning November 1, 2011. Although termination of this contract is just beyond the planning horizon for the current resource plan, because the loss in volume is so significant and is directly impacted by other resource decisions that fall within the 5-year planning horizon, Northern must begin exploring all viable replacement alternatives well in advance of the 2011 expiration in order to have a suitable replacement service in place for the 2011/2012 Winter Period.

Northern's on-going evaluation of these resource strategies is reflected in its Resource Action Plan ("Action Plan"). The Action Plan highlights the results of Northern's resource assessments and the factors that Northern will continue to evaluate until each decision is made. Naturally, the Company will continue to assess the appropriate course of action with respect to each decision to contract or de-contract for capacity that will be made

in order to satisfy its obligation to ensure that each decision constitutes the best alternative available at the time a decision is made.

Since the planning process and resource decisions are made within a dynamic environment and marketplace and will be based on the best information known at the time, the above assessments and expected final decisions may change. All assessments, however, will be based upon the methodology set forth in the Plan.

A. Background

Northern provides local distribution service to approximately 25,000 customers in its Maine Division and 27,000 customers in its New Hampshire Division. A significant portion of Northern's customer base is comprised of weather-sensitive residential heating customers. The remainder of Northern's customers are traditional commercial and industrial ("C&I") loads as well as some larger industrial customers. The aggregate design day load on Northern's system for the upcoming winter is approximately 126,000 Dth, while the design winter season load is approximately 9 Bcf. Annual normal load is almost 14 Bcf.

Northern's C&I customers in both its Maine Division and its New Hampshire Division have the option of purchasing supply from a competitive supplier and receiving transportation-only service from Northern pursuant to unbundled tariff options. The terms and conditions applicable to transportation service specify Northern's obligation to assign capacity to portions of the transportation customer loads in each Division. In addition, Northern maintains a capacity reserve calculated based on transportation loads to which Northern does not assign capacity. Therefore, Northern's resource planning process reflects its obligation to assign capacity and maintain a reliability reserve in conjunction with its unbundled service offerings, in addition to its sales service obligations.

Northern's current resource portfolio is comprised of long-haul transportation capacity, storage capacity and associated short-haul transportation capacity, peaking supplies and on-system peak-shaving facilities. The majority of Northern's long-haul transportation capacity is on the Tennessee system, while the majority of its storage capacity is delivered via the Portland Natural Gas Transmission System ("PNGTS"). Northern's peaking supplies include contracts with DOMAC and DETM. Northern operates an LNG storage and vaporization facility in Lewiston, Maine and an LPG facility in Portland, Maine. The combination of baseload, winter and peaking resources provides a diverse, reliable and cost-effective means of serving Northern's overall load profile.

B. Organization of the Current Plan

This report is organized in five sections including this introduction. Section II provides an overview of the Company's resource planning process including a description of the analytical methods and tools that are routinely utilized in the process. Section II also addresses the current resource planning environment, including characteristics of New England capacity markets that affect Northern's planning. Section III presents Northern's demand forecast methodology, model descriptions and results. The demand forecast includes scenario analyses and derives estimates of future design day, cold snap and design winter requirements based on the application of design-weather planning standards. Also, the demand forecast section describes the Company's estimate of the impact of demand-side management ("DSM") resources. Section IV describes in detail the Company's current resource planning process, including special considerations given today's planning environment and an evaluation of supply and capacity resource strategies based on current customer requirements and market conditions. Finally, Northern's Action Plan is

summarized in Section V. Included in this section is a description of how Northern manages its gas supply resources. Further, Northern provides a description of how it mitigates fixed capacity costs through various strategies available in today's marketplace.

II. OVERVIEW OF NORTHERN'S RESOURCE PLANNING PROCESS

Northern's resource planning process begins with the establishment of appropriate goals and objectives. The primary goal of Northern's planning process is to acquire and manage resources in a manner that achieves a best-cost resource portfolio for its customers. A best-cost portfolio appropriately balances lower costs with Northern's other planning objectives, which are to maintain supply security, enhance supplier viability and provide contract flexibility. Pursuit of a best-cost portfolio allows Northern to provide its customers with reliable service at the lowest possible cost. In addition, Northern's planning process incorporates the current status of market restructuring in natural gas markets.

A. Current Resource Planning Environment

Market and regulatory restructuring of wholesale and retail natural gas markets over the years has increased the complexity associated with acquiring and managing a best-cost resource portfolio. Virtually every aspect of local distribution company ("LDC") portfolio management has been transformed by industry changes. In the broadest of terms, the very markets that LDCs such as Northern participate in, 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 before. Market transformation has brought about many new opportunities and risks for all market participants, including LDCs, as they must continue to meet the dynamic and diverse 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 through an act of the United States Congress. Through a series of physical infrastructure, financial market, regulatory policy and technological advances, the manner in which gas supplies are traded and delivered to end-use customers has changed dramatically. 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 citygate stations is unbundled from supply and storage services. Large volumes of natural gas are traded at many different pooling points along the interstate pipeline transmission system at transparent prices. LDCs and even many end-users purchase supplies directly from marketing entities under flexible contract terms. Additionally, natural gas contracts are among the most actively traded futures and options in financial markets. Even interstate pipeline capacity and storage is actively traded under more flexible terms in primary and secondary release markets.

Historically, LDCs purchased all of their supplies from a limited number of pipelines serving their market area. To a large degree, LDCs relied upon FERC regulatory oversight to ensure that the bundled supplies were reliable and reasonably-priced. Moreover, LDC markets demonstrated reasonable stability from year-to-year, minimizing the market risks associated with the long-term contracts required by pipeline providers.

Restructuring of retail markets has also had a significant impact on Northern's planning process as customers avail themselves of opportunities to purchase supply from competitive suppliers pursuant to firm transportation options available to Northern's Maine

Division and New Hampshire Division C&I customers. During the period since firm transportation services were first offered, there has also been a significant turnover in suppliers serving Northern's markets, increasing market instability.

While these changes in natural gas markets have brought greater competition and customer choice, they have also introduced considerable uncertainty in the resource planning process. Even with the introduction of competition from marketers, the LDC remains responsible for ensuring the overall reliability of gas supply on its distribution system, and must be prepared to address any situation whereby one or more of its retail firm customers is without gas supply for any reason.

Lastly, with customers being served by either the LDC or another supplier, it is critical to ensure in a competitive market that cross-subsidies do not exist in price or service allowing one group of customers to benefit at the expense of another.

B. Northern's Unbundling Experience

Retail competition developed at different stages in different states and in ways that have varying impacts on resource planning. In many states, the state legislature or utility regulatory commissions required LDCs to offer unbundled services to their customers. In its Maine Division and in its New Hampshire Division, Northern elected to propose firm transportation services to meet the interests of its customers. These initial service offerings were implemented in mid-1990s in Northern's Maine and New Hampshire Divisions. These services were targeted at Northern's largest C&I customers, and only a few customers opted to purchase supplies from a competitive marketer.

Subsequently, Northern agreed to offer unbundled services to all C&I customers in its Maine Division in 1998. At that point in time, the concept and paradigm associated with

retail transportation services were still new and untried. Many of the details associated with the services still needed to be worked out, however, the initial offerings met a market need and allowed time for more permanent rules to be adopted. This was particularly true with respect to capacity disposition, including upstream and on-system, as well as contract renewal and supply planning responsibility. Naturally, the approach to these issues significantly alters Northern's approach to resource planning in an unbundled environment.

In its New Hampshire Division, Northern participated in a process initiated by the New Hampshire Commission to adopt permanent rules associated with unbundled service offerings. This culminated in the adoption of terms and conditions that provided for the mandatory assignment of capacity beginning in 1999. Customers who elected transportation service prior to March 14, 2000 were exempted from the capacity requirement.

With the continued migration of customers to transportation service in Maine, it became imperative to resolve outstanding capacity-related issues there as well. To that end, Northern had advocated a similar approach in its Maine Division as that used in its New Hampshire Division as early as 1999, however, new rules were not adopted. In February 2005, Northern made a comprehensive filing with a proposal to assign capacity to all firm transportation customers. This proceeding was ultimately resolved through the Settlement Agreement approved by the Commissions. The Settlement Agreement provides critical guidance regarding how reliability will be maintained in addition to Northern's capacity planning responsibilities.

The Settlement Agreement provides for the assignment of Northern's resources to suppliers serving firm transportation customers in its Maine Division except for those customers that never took firm sales service from the Company. Capacity is assigned to

suppliers to meet 50% of the design day requirements of their customers. In addition, the Settlement Agreement established a capacity reserve equal to 30% of the capacity exempt load in both the Maine Division and the New Hampshire Division. These attributes of the Settlement Agreement are fully integrated in this IRP filing.

The Settlement Agreement provides important clarity with respect to Northern's obligation to serve firm transportation customers and to ensure the ongoing reliability of its combined system. In particular, Northern is under no obligation to accept customers that desire to return to firm sales service above the level of their assigned capacity unless it has sufficient capacity available to do so, which applies to both Northern's Maine Division customers and its New Hampshire Division customers. With respect to reliability, Northern has the ability to recall capacity assigned to competitive suppliers in the event that they fail to deliver required volumes on behalf of their transporting customers. In addition, the capacity reserve provides Northern with an important tool to manage unexpected supplier delivery failures which inures as a reliability benefit to the combined system.

C. Northern's Planning Process

Northern's resource planning process employs analytical tools and assessment methods to perform long-range planning and to evaluate the individual resource decisions it must make. These tools and methods ensure that the planning process is thorough, and that it is objective in its pursuit of a best-cost portfolio. This section of the Plan provides an overview of the various elements of Northern's planning process, and how they interact. Each element is described in detail in the following sections of the Plan.

Schedule II-1 provides a simplified graphic representation of Northern's resource planning process. The process encompasses three major elements: (1) forecast of

requirements, (2) resource evaluation and (3) resource action plan. While Northern has employed the same general planning framework for a number of years, it continues to evaluate and refine its methods and to update relevant data, in order to shape and improve the process used to create a best-cost total portfolio.

Northern's planning process begins with an assessment of its customers' load requirements. Northern employs econometric modeling and other techniques to generate its base case forecast of combined Maine Division and New Hampshire Division sales and transportation load. Forecasts are generated for the residential and C&I groupings based on models that separately estimate the number of customers and use per customer. The development of forecast models relies on a number of important data series including historical customer count, usage and economic data. In addition to a base case forecast, Northern also prepares high and low customer load forecasts to establish a reasonable range of its potential requirements. The impact of projected DSM savings is deducted from Northern's forecast requirements as part of the Plan.

The primary design criterion that drives Northern's requirements is weather. Northern performs statistical analyses of historical weather data to derive planning standards related to normal, design winter, cold snap and design-day conditions. Resource adequacy is measured against design conditions derived from these planning standards.

The second aspect of Northern's planning process is its resource evaluation. Northern's resource evaluation encompasses a number of techniques that, acting together, comprise a thorough process. Resource evaluation begins with a determination of resource need. Determination of need is accomplished initially by comparing current resources to projected design day customer requirements. Further analysis is accomplished by simulating

Northern's portfolio utilizing the SENDOUT® (or "SENDOUT®") optimization model based on its current design winter requirements forecast. If a need for additional resources is determined, then Northern identifies potential resources to meet its requirements including renewal or restructuring of existing resources as well as potential incremental pipeline, storage, citygate and on-system resources.

Resource evaluation encompasses the assessment of both the cost and non-cost characteristics of potential resources. Sophisticated cost analysis is performed utilizing SENDOUT®, which evaluates the cost impact of changes to Northern's portfolio by simulating the daily dispatch of available resources under specified conditions over a period of time. SENDOUT® also possesses the capability to size a least-cost incremental resource or package of resources based on the total cost impact upon the existing portfolio including fixed costs. Cost analysis is performed based upon the base case and normal weather requirements forecast. Cost analysis can also be performed based upon high and low forecasts under normal weather, as well as under design weather and cold snap conditions. Separately, Northern evaluates the non-cost characteristics of alternative resources including supply security, contract flexibility and supplier viability. Non-cost evaluation is accomplished through appropriate assessment techniques and scoring.

The outcome of the resource evaluation process is translated into an Action Plan. The Action Plan encompasses both near-term and longer-term elements related to Northern's total portfolio resource strategies. The Action Plan details anticipated decisions to contract or de-contract individual resources. As the time for making a specific decision approaches, Northern performs final adjustments to its evaluation to ensure its assessment is based on the most current data and market conditions. The Action Plan described in this filing reflects

Northern's total portfolio resource evaluation based on the best information available to it at the present time. As Northern refines its analysis, some elements of the Action Plan may be refined or altered, resulting in changes to its future portfolio.

III. FORECAST OF TOTAL REQUIREMENTS

A. Customer Demand

The customer demand forecast is an important element of the Company's long-range planning process because it serves as the basis for the evaluation of capacity and supply resources and subsequent contracting decisions. This section includes a description of the customer demand forecasting method, the demand forecast models, and the forecasted requirements.

The customer demand forecast is developed by customer class: residential, C&I and special contract. The residential and C&I classes have separate customer and consumption per customer elements while the special contract class is forecasted customer by customer. Total demand volume by class is then separated into sales, capacity-exempt transportation and non-capacity-exempt transportation using projected ratios and program assumptions.

1. Residential Customers

The residential customer demand forecast for heat customers (those with space heating equipment) has two parts, customer additions and attrition. The customer additions forecast also has two parts, new construction customers and conversion customers; the later group reside in existing structures and convert to natural gas from another fuel. The first two years of forecasted residential customer additions are provided by the Company's sales group, which builds and sustains close contacts with building contractors and developers in

order to understand the marketplace, market demand and actual demand trends, and is therefore quite knowledgeable about the potential for local new construction and conversion opportunities. This specific knowledge of related industry forecasted activities is an important source of market intelligence and information that cannot be captured by the higher-level economic models used to forecast the longer-term trend.

After the first two years, the forecast of customer additions is derived from annual quantitative models of new construction and conversion customers. These annual models, summarized in Schedule III-1, entitled Heat Customer -Customer Models, explain new construction customer history and conversion customer history in terms of data selected from a set of potential explanatory variables: population, households, and employment.

The models are estimated using the technique of generalized least squares ("GLS"), which incorporates corrections for autocorrelation of the error term of the corresponding ordinary least squares ("OLS") equation. OLS regression in the presence of autocorrelated errors yields estimates that are unbiased but not minimum variance. Accounting for autocorrelation, the GLS technique is designed to yield estimates that are not only unbiased but minimum variance as well. More importantly, hypothesis testing based on GLS estimates yields unbiased results.

The type of autocorrelation correction applied is specified by the order: an order of '0' means that OLS errors were not measured to be autocorrelated and no correction was applied (in this case the estimation technique is equivalent to the technique of OLS); a correction order of '1' incorporates a relation between the current error term and the error term lagged one period; a correction order of '2' incorporates a relation between the current error term and the error terms lagged both one and two periods; and so on. The reported

Durbin-Watson ("DW") statistic is calculated from the final, corrected model and can be used to test the hypothesis of zero error autocorrelation: a DW statistic significantly less than 2.0 indicates positive autocorrelation; and a DW statistic that is significantly greater than 2.0 indicates negative autocorrelation. The DW statistics reported in Schedule III-1 do not indicate a presence of autocorrelation in the error terms in the final models.

The customer attrition forecast is based on history for Northern since 2000. Customer attrition is calculated by subtracting annual customer additions each year from the change in the December customer count. This method assumes that any customer who has been disconnected and intends to use gas service will be reconnected by the December billing cycle eliminating the impact of temporary customer disconnections. The formula for customer attrition is December customer count current year minus December customer count prior year minus gross customer additions. The absolute level of customer attrition is then stated as a percent of the customer base. The forecast customer attrition is set at an average level of 0.3% for both Divisions, which is also consistent with attrition demonstrated by other NiSource LDCs. For each year, the forecast of the December customer count is equal to the prior year December customer count minus 0.3% of prior year December customer count plus new construction customers plus conversion customers.

Annual residential consumption is based on a demand per customer for heat and non-heat customers. Heat customer demand is forecasted in two parts, base load and space heating load. The base load forecast is developed with an end-use model that is estimated with appliance saturations and consumption levels obtained from a base load model developed by North Star Energy Group ("North Star"), a utility consulting firm. The end use model forecasts base load by multiplying the forecasted count of appliances by the forecasted

volume per appliance and summing the results. The initial count for a given appliance is set by multiplying the customer count by the saturation rate for that appliance. In the forecasted years, existing appliances are replaced at the inverse of the appliance life (i.e., 1/12 per year for a 12-year life) and new appliances are added at estimated penetration rates multiplied by customer additions. In many instances, new appliances are more efficient and use less energy, resulting in a decreasing average consumption per appliance. This is shown in Schedule III-2, entitled Baseload Model Forecast Assumptions, as an increase in water heater efficiency of 6% and cooking range efficiency of 10%.

The appliances in the base load forecast include water heater, cooking range, clothes dryer and other. The regional data for New England (mostly derived from resources provided by the U.S. Department of Energy) was supplied by North Star and was calibrated to the annual level of base load per customer observed for Northern's customers. The Company's annual level of base load per customer is the average of the two lowest months with the lowest consumption per customer per day * 365 days. The major assumptions are listed in the aforementioned Schedule III-2. Note that there are distinct assumptions for three categories of customers: existing, new construction and conversion. Existing customers have an assumption of 100% replacement rates for all appliances with improved efficiencies for water heaters and cooking ranges. Marginal efficiency for clothes dryers is unchanged reflecting the assumption that the current stock has no pilots and new equipment has no significant efficiency improvement. These assumptions were obtained from U.S. Department of Energy, the Federal Energy Management Program, National Association of Home Inspectors, the American Gas Association, and North Star.

Because appliance penetration and/or saturation rates for new and conversion

customers were not readily available for Northern's Maine Division and New Hampshire Division, they were assumed to be and were set as equal to those measured for Northern's LDC affiliate, Columbia Gas of Pennsylvania ("CPA"). CPA was chosen because, like Northern, it serves one of the colder service territories in the NiSource system. Conversion customer appliance saturations grow over the course of the forecast as their saturations approach those of new construction customers. This is based on the assumption that conversion customers do not begin service with a full complement of appliances and that their desired complement over the long term is the same as that for new construction customers. This assumption is born out from an analysis of Northern's affiliated Midwest utilities.

The space heating consumption models are created in two steps: monthly volume per customer is normalized for weather, summed to an annual level and then modeled with economic and end-use independent variables. The weather normalization procedure is a "base load-temperature sensitive" method where the observed summer consumption per customer is subtracted from total consumption per customer from each of the months with heating consumption to yield temperature-sensitive consumption. Temperature-sensitive consumption is then scaled by the ratio of normal Effective Degree Days ("EDD") to actual EDD to derive normal temperature-sensitive consumption. This method is used in the Cost of Gas Adjustment and other regulatory filings for Northern's Maine Division and its New Hampshire Division.

Annual weather-normalized residential consumption per heat customer for space heating (temperature-sensitive use per customer) is modeled as a function of explanatory variables selected from a set of potential variables including average real price, average

furnace efficiency, and binary variables that account for shifts in the intercept term of an equation. A single model is used for each division, and these models are described in Schedule III-3, entitled Heat Customer Consumption Models.

The average furnace efficiency variable was calculated assuming 55% average furnace efficiency for the furnace stock in 1979, a 19-year average furnace life and average efficiency for new furnaces equal to the national average as reported by the Gas Appliance Manufacturer's Association.

The real price terms are average annual dollars per MCF adjusted for inflation. Asymmetric price terms refer to variable constructions that allow for a different consumption response for price increases than for price decreases. When it is present in a model, the asymmetric term allows the model to yield an estimate of the magnitude of price response that is smaller for price decreases than for price increases and is consistent with the notion that conservation and efficiency measures are not likely to be fully reversed. Attic insulation is an example. When the available data do not make it possible to include an asymmetric price term in a model, the resulting price term estimate is the same for both upward and downward price changes.

Residential volumes for non-heat customers (those without space heating) are forecasted for each Division by multiplying the forecasts derived from a pair of equations: a single model of number of customers and a single model of use per customer. These models are estimated from a set of monthly data, and their characteristics are described in Schedule IV-4, entitled Residential Non-Heat Customer Models. This category represents about 8% of the residential volume in Northern's Maine Division and 2% in Northern's New Hampshire Division. With the exception of an instance of a reassignment of heat customers to non-heat

status, the relative stability in the customer counts are well-represented by a constant for Northern's New Hampshire Division and a minor trend in Northern's Maine Division. The stability of both customers and consumption per customer is reflected in the forecast where in both divisions by 2010/11 the volume is 1 MMCF (MDth) less than in 2006/07.

2. C&I Customers

The C&I forecast method is generally the same as that for residential customers. Unlike the residential customer class, commercial base load (non-temperature-sensitive) use per customer is derived from an econometric model. Also, unlike the residential class, no distinction is made between heat and non-heat customers. A description of the forecasting models for the commercial class is contained in the aforementioned Schedule III-1.

3. Special Contract Customers

There are a handful of large special contract customers whose forecast is set by Northern's sales personnel based on their expertise and business judgment as well as direct communication with these customers. Northern sales personnel routinely survey Northern's Maine Division and New Hampshire Division customers about their future energy needs in order to determine changes to total portfolio demand and, accordingly, Northern adjusts its forecast to reflect the information it receives as part of these responses.

4. Sales Versus Transportation Volumes

The C&I transportation program in Northern's New Hampshire Division is relatively mature with a slowing growth rate. The fitted curve in Schedule III-5, entitled Transportation Graph, shows the transportation volume leveling off at about 1,100 MDth, the level that appears in the forecast.

Northern's Maine Division transportation program is in a growth phase although a

recent change is the initiation of 50% capacity assignment. The annual consumption level of customers who were new to transportation service in early 2006 is added to the current level of Northern's Maine Division transportation consumption and the longer term growth is trended to a level (approximately 66% of C&I throughput) that is midway between the levels experienced by two other NiSource utilities that have transportation programs with less than full capacity assignment.

Residential transportation is not offered in either Northern's Maine Division or New Hampshire Division service territory and special contract customers have 100% capacity-exempt transportation service.

5. Summary of Annual Volume

Six years of Northern's history and six years of forecast volume are summarized in Schedule III-6, entitled Volume Summary. History shows that rising natural gas prices likely contributed to significant conservation from 2000-2005. Weather normalized residential consumption per customer has decreased by 9% in Northern's Maine Division and 12% in Northern's New Hampshire Division over this period. In fact, weather normalized residential volume decreased in both jurisdictions despite rising customer counts. The C&I market managed to grow over the period, although there were years of decline, and current levels are below historical peaks. Forecasted load growth comes primarily from customer growth as conservation continues at a slower pace due to the forecasted falling real price of natural gas.

6. Alternate Cases: High and Low Scenarios

In addition to the base case, there are two alternate cases, low and high growth. These cases are based on an analysis of past growth rates. The growth rates were determined by considering the consistent history for growth in customers and volume per customer that

are available for the period 1994-2005. The minimum and maximum 5-year compound average growth rates are used for all concepts except for residential volume per customer, which is allowed to remain constant in the high case. The high and low cases are depicted graphically in Schedule III-7, entitled Alternate Cases.

B. Planning Standards and Forecast under Design Conditions

Northern's primary planning standards for its combined system are weather-related. In particular, Northern plans to meet its customers' needs for both Divisions, jointly, under design weather conditions. Design weather planning standards are established through statistical methods using a weather database of division-specific EDD purchased from Meteorlogix, a weather consulting firm. This database contains daily EDD beginning January 1967 through 2005.

As a normal year condition, Northern calculates the mean number of EDD in each month and for each of its divisions using the 35-year period from November 1967 through December 2005. The mean monthly EDD are summed by Division to arrive at the normal year EDD. The Maine Commission and the New Hampshire Commission have approved the use of shorter periods for determining normal weather for non-resource planning purposes, such as for the design of Northern's rates.

Northern has updated its design planning standards for design day and design winter to incorporate a 1-in-33 probability of occurrence. These reflect a small change from the 1-in-25 year standards that were used previously. Northern believes that the revised design criteria are appropriate in view of the limited pipeline interconnections serving the Company and the overall lack of liquidity in the region. The 1-in-33 standard is also more consistent with those used by other LDCs in the region. Finally, the change is supported by actual peak

weather conditions that have been experienced in recent periods. In Northern's New Hampshire Division, the actual peak day exceeded the 1-in-33 year standard as recently as January 2004.

Northern uses the t-distribution to determine the design EDD at the 1-in-33 year probability of occurrence. This calculation is restricted to the January degree days reflected in the weather database. The result is 83 EDD for the Maine Division and 82 EDD for the New Hampshire Division meaning that the probability that the actual EDD will meet or exceed these levels is once every 33 years or 3.3 percent.

Northern calculates the design day requirements of its customers based on the maximum observed baseload during the summer months plus the heating use calculated at the design degree day levels. The Company uses the maximum level of base load that was actually observed because customers have already demonstrated the capability to pull this base load volume and could do so again on a design day.

The design day heating use model uses linear regression to estimate a factor for volume per EDD over the course of the previous year, in this case April 1, 2005 – March 31, 2006. Daily data is regressed against EDD for all days having more than 5 EDD and an indicator variable for weekends. The models for both of Northern's divisions have R-Squares in excess of .96. The strong relationship for values in excess of 5 EDD is clearly illustrated in Schedule III-8, entitled Design Day Model and Graph.

1. Summary of Design Day Customer Demand

The design day customer demand forecast follows the growth path indicated in the forecast of annual volume. Capacity-exempt status is assigned to 50 percent of transportation design-day volume for Northern's Maine Division. Capacity-exempt status in Northern's

New Hampshire Division is set at the level measured in the most recent twelve months. The total design day load for sales and transportation customers is detailed along with forecasted capacity- and non-capacity-exempt status in Schedule III-9, entitled Design Day Forecast.

2. Design Winter and Cold Snap EDD

In order to develop design winter conditions, Northern uses a similar methodology as used to calculate the design day. For each month of the winter season November through March, Northern calculates the degree days at a 1-in-33 year probability of occurrence using the t-distribution. Schedule III-10, entitled Design Winter, provides the monthly EDD values for each Division. As indicated in this schedule, the total design winter EDD are 11-12% over average normal levels.

Northern also determines requirements under a cold snap period to test the adequacy of its combined portfolio to meet an extended period of cold weather. The Company cold snap is based on actual EDD experienced in each division from January 7 through January 30, 2004. This was the coldest 24-day period from 1967-2005.

3. Demand Side Management Impacts

On March 10, 2006, Northern filed with the New Hampshire Commission an energy efficiency program proposal covering the period May 1, 2006 through April 30, 2009, which was docketed DG 06-036. On April 21, 2006, a settlement was filed and on June 8, 2006, the New Hampshire Commission issued Order No. 24,630 approving the settlement and implementing a three-year energy efficiency program.

The Company's approved three-year energy efficiency program plan assumes that under normal weather conditions for each year that the program is offered, 214,619 therms savings will be achieved across all customer classes in the New Hampshire Division.

Assuming 7,219 normal annual EDDs in the New Hampshire Division, this annual therm savings translates into 29.7 therms saved per EDD.

$$\frac{214{,}619 therms}{7{,}219 EDD} = 29.7\ {}^{Therms}/_{EDD} = 2.97\ {}^{Dth}/_{EDD}$$

Accordingly, the Company projects the following energy conservation impact over the next five years.

2006/07	2.97 Dth/EDD; cumulative = 2.97/EDD
2007/08	2.97 Dth/EDD; cumulative = 5.94/EDD
2008/09	2.97 Dth/EDD; cumulative = 8.91/EDD
2009/10	2.97 Dth/EDD; cumulative = 11.88/EDD
2010/11	2.97 Dth/EDD; cumulative = 14.85/EDD

In 2005, the Maine Legislature enacted 35-A M.R.S.A. §4711, directing the Maine Commission to adopt rules requiring the implementation of conservation programs by LDCs that serve more than 5,000 customers. On September 12, 2005, Northern filed its first set of interim energy efficiency programs in Docket No. 2005-466. On September 21, 2005, the Maine Commission issued an Order approving early implementation of Northern's interim programs for the 2005-2006 heating season: a Rebate Program to offset the incremental costs of installing high efficiency natural gas fired equipment, and weatherization and other services to assist low-income customers. On March 13, 2006, the Maine Commission issued a Notice of Rulemaking (NOR) in Docket No. 2006-129, proposing a new Chapter 480 to govern implementation of cost effective conservation and efficiency programs offered by natural gas utilities. Northern filed comments on May 1, 2006, and looks forward to the final promulgation of permanent conservation program rules for implementation later this year.

From its experience in other jurisdictions, there will be a lag from the time that fully developed programs are available to customers and the program's impact on design day

throughput. Considering such a lag, Northern forecast the impact of future energy efficiency programs in its Maine Division with respect to reducing design day throughput.

The Company expects that there will be no measurable impact in the 2006/07 heating season. In subsequent years, the impact will grow until it reaches the same level of impact as in its New Hampshire Division. Using the same approach as that for the New Hampshire Division, the Company has developed the following estimate of potential impact per EDD for its Maine Division:

2006/07	0.00 Dth/EDD; cumulative = 0.00/EDD
2007/08	0.50 Dth/EDD; cumulative = 0.50/EDD
2008/09	1.06 Dth/EDD; cumulative = 1.56/EDD
2009/10	2.29 Dth/EDD; cumulative = 3.85/EDD
2010/11	2.97 Dth/EDD; cumulative = 6.82/EDD

Assuming Design Day conditions of 82 effective degree days in Northern's New Hampshire Division and 83 effective degree days in Northern's Maine Division, the Company projects the cumulative impact of energy efficiency programs over the next five years to be the following:

Heating Season	**Dth reduction to estimated customer demand on design day**
2006/07	(2.97x82)+(0.00x83) = 244
2007/08	(5.94x82)+(0.50x83) = 529
2008/09	(8.91x82)+(1.06x83) = 819
2009/10	(11.88x82)+(3.85x83) = 1,294
2010/11	(14.85x82)+(6.82x83) = 1,784

Northern has adjusted downward its forecasted customer loads in this IRP by the above DSM effects.

IV. RESOURCE PORTFOLIO ANALYSES

A. Northern's Decision-Making Process

1. Northern's Planning Goals

Northern's decision-making process begins with the establishment of appropriate goals and objectives. The primary goal of Northern's planning process is to acquire and manage resources in a manner that achieves a best-cost resource portfolio for its customers. A best-cost portfolio appropriately balances lower costs with other important non-cost criteria such as reliability and flexibility. Pursuit of a best-cost portfolio allows Northern to provide its customers with reliable service at a reasonable cost. The Company's overall portfolio objective is supported by a number of specific resource planning objectives, which are summarized as follows:

(1) reduce portfolio costs;

(2) maintain supply security (which includes enhancing diversity across pipelines and supply basins);

(3) provide contract flexibility; and

(4) acquire viable supplier resources.

Northern's resource planning process employs analytic tools including the SENDOUT® cost optimization model and various assessment methods to perform long-range planning and to evaluate the individual resource decisions it must make. Non-cost resource evaluation is typically performed using spreadsheet-based assessment tools. Combined, these tools and methods ensure that the planning process is thorough, and that it remains objective in its pursuit of a best-cost portfolio.

2. Northern's Planning Process

Effective resource planning requires both an excellent understanding of an LDC's own customers and markets, as well as insights into opportunities and developments in wholesale markets. Through its resource planning process, Northern seeks to match its long-term resource needs with available market opportunities.

On an ongoing basis, Northern performs long and short-range analyses of its potential need to adjust its portfolio to achieve its planning objectives. Additionally, the Company performs comprehensive analysis any time a decision to modify the portfolio of resources under contract is being considered. This analysis includes a determination of need and an evaluation of potential resource options.

a. Northern's Most Recent Incremental City Gate Modification

The last significant incremental city-gate deliverability modification to Northern's portfolio occurred in 1999 when it contracted for two DOMAC supplies and a peaking supply from DETM. These contracts were acquired as cost-effective replacements for the Wells LNG capacity Northern had previously acquired. Moreover, the maximum term of these replacement contracts was ten years, compared with twenty years for the Wells LNG capacity contract. The Commissions performed a comprehensive evaluation of Northern's decision to enter into the Wells replacement contract resources in 1999.[2] More recently, these capacity resources were further addressed in the Settlement Agreement, which provides

[2] The Maine and New Hampshire Commissions conducted investigations in order to review the appropriateness of the DOMAC and DETM contracts in conjunction with Northern's decision to terminate its LNG agreement with Granite State which was to build the Wells LNG facility. See MPUC Docket No. 99-259 and NHPUC Docket DG 99-050. A related proceeding before the FERC in Docket No. CP99-238 also evaluated the reasonableness of replacing the Wells LNG capacity with the DETM and DOMAC supplies. The FERC proceeding was resolved pursuant to a stipulation of settlement among parties that included Northern, the Maine Commission, the New Hampshire Commission and the consumer advocates of both Maine and New Hampshire. The settlement stated that these contracts would not be subject to further inquiry by or before the Commissions.

for the mandatory assignment of a portion of the supplies to marketers serving Northern's firm transportation customers in Northern's Maine Division.

b. Northern's Decision Making Process to Modify its Portfolio

Any decision to modify Northern's portfolio begins with a determination of need based on the current total resources under contract and current demand forecasts. Northern's planning standards, which are driven by design weather conditions and anticipated total customer additions, determine the requirements of its customers for both Divisions. The planning standards are reflected in forecasts of annual, peak season, cold snap and design day requirements developed using the models described in Section III, above. Comparison of the customer demand forecasts to the existing total portfolio establishes whether Northern's combined portfolio is projected to be adequate over the planning horizon, and if not, the quantity and duration of any deficiency. Similarly, this comparison also indicates whether there are unutilized resources in the portfolio, which may be released, decontracted, or sold in wholesale markets.

If a need is established, Northern compiles a comprehensive set of alternative portfolio options that could meet the anticipated need. Northern is an active participant in regional capacity markets both for the purchase and sale of capacity resources on a bundled and unbundled basis. Northern's market participation provides important market intelligence on developments in wholesale markets and is relied upon, in part, to compile resource alternatives. Northern also specifies the criteria to be used in the evaluation of the array of resource options, which entails selecting the appropriate weighting among the price and non-price evaluation criteria incorporated in the planning process. Consistent with its portfolio goals, the resource evaluation criteria employed by Northern are (1) price, (2) supply

security, (3) contract flexibility and (4) supplier viability, which criteria take on varying degrees of importance depending on the type of resource decision being made and anticipated market conditions. For a description of the non-price criteria see Schedule IV-1.

Supply security is scored according to two separate components related to reliability and portfolio diversity. These components are usually set at maximum of around 30 and 5 points, respectively. Contract flexibility is scored according to the aforementioned criteria with a maximum score typically of 20 points. Supplier viability is scored usually according to the financial integrity of the entity with a maximum of 15 points. As indicated, the remaining 30 out of a total of 100 points is graded relative to the price of the resource.

Once the full range of resource options has been analyzed, Northern selects the best alternative or alternatives to pursue. In selecting the best alternative, Northern evaluates present and future market conditions as well as risks associated with its decision. Depending on the type of resource, there can be a long lead-time between the decision point and the in-service date. This typically occurs when incremental capacity resources are required, which would be taken into consideration in the Company's Action Plan.

3. Analytical Tools

Northern utilizes important analytical tools to improve its ability to evaluate its total portfolio resource decisions. Central among these is the use of Northern's SENDOUT® model that simulates the utilization of all resources in the portfolio to satisfy the Company's requirements under design and normal weather patterns, ensuring that Northern's planning techniques for its combined portfolio result in best-cost decisions. SENDOUT® can also select and size the lowest cost mix of resources from among an array of specified options. Northern also employs other analytic techniques, such as the use of spreadsheet models to

enhance the evaluation of resource options. These types of models aid in the assessment of non-price criteria when there are a number of similar options, such as is typically the case for shorter-term supply contracts.

B. Capacity Reserve

The increased uncertainty in wholesale and retail markets requires a heightened importance in contingency planning to ensure adequate and reliable resources to meet the requirements of Northern's customers, satisfying Northern's obligation to serve. In some regions of the country, capacity markets are sufficiently liquid to allow LDCs to rely upon a market-based contingency reserve. In contrast to this, however, the continued lack of liquidity in peak-period New England capacity markets minimizes opportunities to correct for any deficiency in delivered volumes to Northern's citygates. Moreover, changing dynamics in the electric generation markets are driving the use of natural gas to fire electric generation in the region further tightening market fundamentals.

The Commissions approved a system-wide reliability reserve in conjunction with the Settlement Agreement. Pursuant to the Settlement Agreement, the reliability reserve equals 30% of Northern's total capacity-exempt firm transportation load and represents an important tool for Northern to employ in order to maintain reliability in an unbundled environment. The Settlement Agreement also provided that the Commissions would examine the reasonableness of continuing the reserve at the 30% level in this IRP.

Northern requires deliveries from upstream pipelines in order to maintain reliability. For firm sales and firm capacity-assigned transportation loads, Northern acquires primary firm upstream capacity to ensure that it is able to maintain reliability pursuant to the planning process described in this IRP. By virtue of the fact that there is no Northern primary firm

capacity rights associated with capacity-exempt transportation loads, Northern is subject to operational risks in the event that these customers take unauthorized volumes on a critical day. The potential harm created by such action cannot be limited to capacity-exempt customers due to the integrated nature of Northern's system operations.

The capacity reserve established in the Settlement Agreement allows Northern to maintain access to a level of required capacity that would substantially limit the increased operational risks of capacity-exempt firm transportation service. The significant consequences of unserved demand for Northern's customers necessitate careful contingency planning. Given the anticipated inability to acquire incremental capacity resources on short-notice, Northern believes that the approved reserve is a critical and cost-effective tool for the reliable operation of its system. These risks are significantly greater than any risks that Northern's own system supply service presents. The costs of the capacity relied upon to meet this planning standard would be recovered through charges established separately by each of the Commissions.[3] The capacity utilized by Northern to meet the new planning standard would be sold in secondary markets when it is not utilized by Northern, thereby mitigating the overall cost of maintaining the reliability reserve.

Northern believes that the level of the capacity reserve should be maintained at 30% of capacity-exempt loads based upon a combination of analytical results and reasoned business and operational judgment. Northern reviewed the historic performance of competitive suppliers serving daily-metered customers over the period November 2001 through December 2005. The results of this review indicate that Northern experienced substantial supplier delivery failures in each Division on a number of days during this period.

Schedule IV-2 provides an analysis of the top daily supplier overtakes during the period. These data indicate that on three separate occasions in the four-year period analyzed, and as recently as January 18, 2005, supplier overtakes exceeded 30 percent in one of the Company's divisions. This is a very high incidence rate compared to the Northern's 1-in-33-year planning standard applicable to design weather. Moreover, these data are post-imbalance trading whereby a supplier could reduce its overtake by trading with a supplier that had an undertake on the same day. The observed level of overtakes by individual suppliers would have been even greater if daily imbalance trading had been excluded. The fact that some suppliers had significant overtakes prior to daily imbalance trading is a strong indication that such overtakes could occur in the future on a day when a corresponding daily imbalance trade with a supplier who undertakes may not be possible. The primary concern with unauthorized overtakes by capacity-exempt customer loads is the possibility that they may occur on a design day when Northern's resources are fully utilized and upstream pipelines are stressed. Northern did not experience a design day during the analysis period, however, many of the most significant overtakes occurred on cold-weather days when pipeline operations are typically more constrained and secondary deliveries are more likely to be curtailed.

A final factor that Northern considered was the allocation of risk across suppliers serving its capacity-exempt customers. Presently, all suppliers in both of Northern's Divisions have capacity-exempt customers in their pools. The 30 percent of capacity-exempt design day load held in reserve will be available to cover some performance failures by these suppliers. While Northern would not be able to redress the concurrent failure of all supplies

[3] Pursuant to the terms of the Settlement Agreement, Northern seeks to recover the costs of the capacity reserve.

to capacity-exempt customers, the Company believes that the majority of the existing operational risks is mitigated under the approved capacity reserve.

Northern will reserve a portion of its LNG and propane assets to provide the necessary capacity to fulfill the capacity reserve requirement. These assets serve a dual purpose of providing distribution system pressure support as well as providing a source of supply. They are preferable for this type of reserve because they are under the direct control of Northern, are located on the distribution system, and most importantly, can be dispatched on a no-notice basis to satisfy changing demand requirements attributable to weather and/or upstream supply disruptions.

Northern analyzes its resource needs on the basis of the design weather requirements of its sales and non-capacity-exempt transportation customers. The capacity reserve contributes to a resource need applicable to a limited portion of the requirements of capacity-exempt firm transportation customers in addition to Northern's other total portfolio resource needs. This need is factored into Northern's IRP process increasing the quantity of capacity necessary to maintain reliable service. Based on existing levels of combined Division customer loads, the incremental planning standard would translate into a calculated capacity reserve of 6,856 Dth for the 2006-2007 Winter Period. The total reserve will change over the forecast period to the extent that there is any change in the level of capacity-exempt loads.

C. Description of the Current Resource Portfolio

1. Overview of Supply-Side Resources

Northern's upstream resource portfolio is made up of over 30 long-term supply, transportation, and storage contracts that serve the combined system. These contracts are

---

See MPUC Docket No. 2006-114 and NHPUC Docket DG06-033.

grouped into resource paths, which show the flow of gas from the supply source to the Company's city gates. Northern's firm capacity paths are shown on Schedule IV-3, representing all of the Company's firm transportation and storage resources. Northern's long-term contracts as of November 1, 2006 for these services are summarized in Schedule IV-4. Northern's portfolio downstream of the city gate is made up of an LNG facility located in Lewiston, Maine and a propane facility located in Portland, Maine.

As noted, Northern's two operating Divisions are combined for system capacity and supply planning purposes. Northern utilizes an integrated resource approach that combines resource needs of both Divisions in order to more cost-efficiently and reliably meet the requirements of the customers in each Division.

Northern's supply-side resources are typically grouped into four categories: supply, transportation, storage, and peaking. Each group is discussed in greater detail below.

a. Supply Resources

Northern's long-term supply contracts have historically been U.S and Canadian contracts delivered via the Tennessee, Iroquois and PNGTS systems. However, as these supply contracts have come up for renewal, the Company has entered into shorter-term contracts. On November 1, 2006, Northern will have only one non-peaking supply contract that has a duration longer than one year. This contract is delivered from Niagara, New York via Tennessee and expires on March 31, 2007. Northern will continue to evaluate the benefits of short- versus long-term supply contracts prior to renewing or replacing this contract.

Due to the heat-sensitive nature of Northern's customers, the majority of supply contracts are winter-only and extend from November through March or December through

February. In the summer, supply purchases are used primarily for upstream underground storage refill. Purchases for storage refill are typically contracted for on a month-to-month basis or for the entire summer period through ratable supply storage refill agreements.

b. Transportation Resources

Northern has 15 upstream transportation paths that deliver supply to its citygates. These paths bring in supply from the U.S. Gulf Coast, Eastern and Western Canada, the Chicago Hub, underground storage facilities located in Pennsylvania, West Virginia and Michigan, and DOMAC LNG in Massachusetts. The upstream pipelines that transport supply to Northern are Granite State, PNGTS, Tennessee, Algonquin, Iroquois, Transco, Texas Eastern, TransCanada, Union and Vector.

Northern's current portfolio of transportation contracts expire at various times. Those that expire during the forecast period, November 2006 through October 2011, include Tennessee long-haul (13,155 Dth per day in 2008), Tennessee short-haul from storage (2,653 Dth per day in 2008), TCPL (33,000 Dth per day in 2008) and Tennessee - Niagara (2,335 Dth per day in 2010).

c. Storage Resources

Northern currently has contracted for capacity associated with three off-system underground storage services. They include services with Tennessee, TETCo and MCN. MCN is an exchange contract with DTE Energy (formerly CoEnergy Trading Company) that provides Northern with a virtual storage service provided out of the MichCon storage facilities located in Michigan. During the forecast period, Tennessee (2,640 Dth per day with 259,337 Dth of storage space) and MCN (34,000 Dth per day with 5,134,000 Dth of storage space) both terminate in 2008. The TETCo storage service provides only 85 Dth of

withdrawal rights and approximately 5,000 Dth of storage space. These two capacity contracts expire in April 2012 and 2013 but, have a five-year prior notice.

d. Peaking Resources

Peaking resources can be separated into on-system and off-system. Off-system resources are those that are delivered to Northern's citygate and include DETM (currently 35,820 Dth per day) and DOMAC (4,975 Dth per day) as well as and any other city-gate purchases the Company may make. On-system resources are those that Northern controls within its service territories and are comprised of LNG and propane facilities. Northern has the capability to dispatch up to 10,000 Dth per day from its Lewiston LNG facility and up to 4,000 Dth per day from its Portland propane facility on the design day.

It should be noted that Northern's DETM and DOMAC supplies expire immediately following the forecast period and will comprise almost 50 percent of Northern's maximum daily deliverability. Their termination is mentioned here because the expiration of these contracts will create a need for a significant replacement(s) for the 2011/2012 year and beyond, and the decisions regarding these resources, which will impact the total portfolio, will be made during the forecast period.

D. Cost Analysis Utilizing SENDOUT®

In order to assess the cost implications of various resource alternatives, Northern performs optimization analyses using SENDOUT®. Northern supplements these cost analyses with assessment of non-cost characteristics to support its various resource decisions. This section of Northern's long-range forecast and supply plan presents current SENDOUT® analyses based on its long-range forecast of requirements, existing resources and potential

new supply resources. The results of these analyses form the basis of the Company's present Action Plan.[4]

The SENDOUT® model is a linear programming software package designed for LDCs to minimize the cost of serving demand. Specifically, SENDOUT® incorporates the monthly demand forecast, converts this forecast into a daily interval, and then satisfies daily demand by utilizing the lowest cost resources from among those specified in the available network.

SENDOUT® assumes that all demand costs are fixed and all supplies are dispatched based on variable costs. However, SENDOUT® can evaluate certain selected resources on a total cost basis. This evaluation is referred to as the Resource Mix option, and is used to test whether a new contract should be entered into or whether an existing contract should be renewed. The Resource Mix option determines the optimal size of a resource alternative when given a maximum and minimum range from which to select. SENDOUT® is capable of handling several supply, transportation, and storage resources placed into the Resource Mix at one time.

Northern continuously determines whether or not its current total resource portfolio is adequate to meet its combined Division current and future customer loads. The initial determination of need performed by the Company is a comparison of its design-day load forecast, by year, against its current total capacity portfolio. If a need or deficiency is determined, alternatives are investigated and acquired. If no need is determined in this initial review, Northern then compares its design year combined load forecast against its current

[4] Northern considers its inputs to and outputs from SENDOUT® to be confidential due to the identification of proprietary and confidential resource pricing data. The SENDOUT® model results are included in a separate tab to this IRP, entitled CONFIDENTIAL SENDOUT® Model.

annual supply total resource portfolio to see if the existing total resource portfolio is adequate to satisfy a design year and a cold snap scenario.

Schedule IV-5 summarizes Northern's initial comparison for the forecast period. The comparison shows there are adequate resources currently available to meet expected design day demands until the 2008/2009 Winter Period. At that time, because Tennessee and DTE/MCN storage services terminate, Northern will need to either replace or renew these contracts in order to meet design day customer demands for the remainder of the forecast period. This schedule also indicates that in the year after the forecast period, 2011/12, Northern will require another significant capacity addition in order to meet its design day load. This is due to the termination of both the DETM and DOMAC peaking supply contracts.

It is important to recognize that Northern's evaluation of whether to rollover the contracts expiring in 2008/09 must take into consideration the significant capacity that will expire in 2011/12. Further, Northern does not have the ability to rollover the DETM peaking contract as Duke has indicated that it is in the process of downsizing its trading business. Therefore, a replacement will be required for the 2011/12 period.

For purposes of performing the SENDOUT® analyses for this IRP, Northern evaluated various potential resources to meet its future requirements. Specifically, Northern included all contracts with rollover rights in a Resource Mix so that the cost impact of rolling over each contract could be evaluated. In addition, Northern evaluated the potential of acquiring a replacement contract in lieu of rollover of existing capacity contracts. At the present time, new capacity options are very limited for Northern. The only alternative included in the Resource Mix for 2008 was the potential acquisition of capacity on Maritimes

and Northeast Pipeline ("M&NE") with gas purchased at a Dracut index price. The M&NE option was available to be selected in both 2008/09 or 2011/12 to replace other resource options in those years. A replacement DOMAC option was made available upon expiration of the existing combined liquid and vapor contract also in 2011/12.

In order to appropriately capture the impact of the contracts expiring in 2011/12 on contract decisions that must be made during the five-year planning horizon of the IRP, Northern performed a 10-year Resource Mix for the period 2006/07 through 2015/16 in order to determine the optimal portfolio of resources. A 10-year analysis is consistent with the type of analysis that Northern performs whenever an incremental capacity option is considered. Table IV-1 below lists the contract quantities included in the Resource Mix as well as the quantities selected in a portfolio of optimal cost.

Table IV-1
SENDOUT Model
Resource Mix Parameters and Results

Resource	Effective Date	Minimum MDQ	Maximum MDQ	Selected Quantity
Tennessee Long-Haul	10/1/08	0	13,155	13,155
Tennessee Short-Haul	10/1/08	0	2,653	2,653
MCN Storage/TCPL	10/1/08	0	33,000	33,000
Maritimes - 2008	10/1/08	0	50,000	0
DOMAC	10/1/11	0	5,000	3,000
Maritimes – 2011	10/1/11	0	50,000	40,654

NOTE: The maximum MDQ and Selected Quantity differ slightly from the amount delivered to Northern due to fuel retention upstream of the city gate.

The detailed SENDOUT® results are shown in CONFIDENTIAL SENDOUT Model, Run -1. The analysis indicates that the most cost-effective resource options are the rollover of existing capacity contracts. This is indicated on the last page of the SENDOUT® results where the resulting MDQ is equal to the maximum level for all resources available, except for M&NE in 2008 and M&NE and DOMAC in 2011. This is generally consistent with expectations that existing capacity resources are of a lower cost than new or incremental options and are optimal in a long-term capacity portfolio. As the time approaches for individual resource decisions, additional and updated SENDOUT® analyses will be performed.

It is expected that Northern will be required to contract for a new incremental capacity resource for the 2011/12 winter. Northern would perform 10-year SENDOUT® analyses prior to determining which option should be performed. A 10-year analysis is consistent with the contract terms presently offered for capacity on new pipeline projects in the region. In addition, Northern would continue to explore what alternative capacity options are available to meet its total resource requirements and include any additional options in its analyses. The specific resource strategies related to the total resource options evaluated in the IRP are discussed in further detail in the Action Plan presented in the following section.

In addition to the base case SENDOUT® analyses, Northern also performs analyses of its resource requirements under its high and low demand forecasts. Northern also utilizes SENDOUT® to test the adequacy of Northern's total resource portfolio, including any required incremental resources, under various normal and design conditions. As described earlier, Northern's design conditions include design day, design winter and cold-snap weather conditions. Northern's total portfolio of resources, including the resources identified

above, is sufficient to satisfy Northern's combined Division demand under normal and all of its design conditions.

Detailed SENDOUT results showing the resources utilized to meet normal requirements in the base case are provided in CONFIDENTIAL SENDOUT Model, Run – 2. Summaries of other SENDOUT model runs are found in Schedules IV-6, IV-7 and IV-8. They provide the summer and winter dispatch results for the base case, low case and high case based on normal year requirements, respectively. Schedules IV-9 and IV-10 provide the winter dispatch results for the design winter and cold snap requirements, respectively.

E. Non-Cost Analyses

As mentioned above, in addition to cost analysis, Northern evaluates the non-cost attributes of potential resources including contract security, flexibility, and supplier viability. Non-cost evaluation is accomplished through appropriate assessment techniques and scoring, and is integrated with cost-considerations in order to arrive at final resource decisions.

For the purposes of this IRP, Northern did not perform a complete non-cost evaluation of the various potential and future alternatives input to SENDOUT®; however, a comprehensive analysis of both cost and non-cost considerations associated with available alternatives will be completed prior to finalizing any future resource decisions.

V. NORTHERN'S ACTION PLAN

Based on its current forecast and supply plan, Northern faces a number of important resource decisions in order to continue its obligation to provide safe, reliable and best cost service to its customers. Some of these decisions will be made as early as April 30, 2007 when notice is due with respect to rollover of Northern's existing storage contracts on

TETCo. A more significant decision must be made by October 31, 2007 with respect to Northern's existing contracts on Tennessee. In addition, a critical capacity decision must be made before the DETM contract expires on October 31, 2011. Northern will require incremental capacity at that time and must plan several years ahead to ensure that the required capacity is available to be utilized. This section of Northern's long-range forecast and supply plan summarizes the Company's current strategies related to each of these specific major resource decisions.

- Tennessee Long-Haul Capacity: The SENDOUT® model selected the maximum quantity of the Tennessee long-haul capacity indicating that it is cost-effective to rollover. Tennessee also provides important supply diversity benefits as it is Northern's primary means of accessing U.S. Gulf Coast supplies. In addition, Northern utilizes its Tennessee long-haul capacity to fill its storage off of the Tennessee system. Therefore, subject to ensuring the renewal constitutes the best alternative available at the time of contracting pursuant to the Plan, Northern anticipates extending this contract effective November 1, 2008.

- Tennessee Storage and Short-Haul Capacity: Northern's SENDOUT® analyses also indicate that extending Northern's Tennessee storage and associated short-haul capacity is appropriate. This decision will be evaluated in conjunction with other contracts expiring at the same time and will be subject to ensuring the renewal constitutes the best alternative available at the time of contracting pursuant to the Plan. Northern anticipates that it will renew this capacity as well.

- Granite State Renewals: Since Northern is interconnected to Granite State, all economical alternatives will require Granite State to deliver upstream supplies to Northern. Subject to ensuring the renewal constitutes the best alternative available at the time of contracting pursuant to the Plan, Northern anticipates it will need to renew and continue with these firm transportation services.

- DTE/MCN Storage: Northern relies on DTE/MCN storage as a supply feed for its PNGTS capacity. While the PNGTS capacity continues through the year 2019, Northern must renegotiate this contract or pursue an alternative source of supply to feed its PNGTS capacity segment. A storage service fits well with Northern's load curve and provides important cost flexibility due to the ability to purchase supplies during the summer injection season. Therefore, subject to ensuring the renewal constitutes the best alternative available at the time of contracting pursuant to the Plan, Northern anticipates that it will negotiate a new contract and

services with DTE/MCN storage or a similar storage provider to utilize in conjunction with its PNGTS capacity.

- DOMAC: Northern regards LNG as a vital resource in its portfolio. LNG provides key peak-shaving capabilities and additional supply diversity. Moreover, Northern utilizes its on-system LNG facility to manage sudden swings in demand on Northern's system and to support distribution system pressures. Additionally, LNG can act as a reliable no-notice back-up supply when other supplies are unavailable or when suppliers of capacity-exempt customers fail to or under deliver to Northern's city gates. Although the SENDOUT® resource mix did not select the maximum DOMAC MDQ, the SENDOUT® model does not take into consideration non-price criteria previously mentioned in Section II. Also, for operational reasons, Northern must rely on DOMAC for liquid supplies to refill the Lewiston LNG facility when needed. Subject to ensuring the renewal constitutes the best alternative available at the time of contracting pursuant to the Plan, Northern intends to negotiate with DOMAC on the terms of a potential replacement contract and will evaluate its final decision based on a range of available alternatives.

In addition to these resource decisions, Northern is faced with the need for significant resources beginning in 2011/2012. Presently, there are limited alternatives to address the expiration of Northern's Duke peaking contract, which is the primary driver of the resource need. Northern will continue to seek to expand upon its options over the next couple of years. However, subject to ensuring the renewal constitutes the best alternative available at the time of contracting pursuant to the Plan, it is likely that Northern will need to make a commitment to a quantity of capacity approximately three years ahead or in the 2008 timeframe. The longer lead time is due to the fact that FERC approvals and construction may be required for Northern to obtain service from a provider.

A. Managing the Resource Portfolio

After Northern contracts for its optimal total resource portfolio it manages its gas supplies and capacity resources in the best manner possible.

1. Gas Supplies

In purchasing seasonal and short-term gas supplies, Northern attempts to match projected minimum loads with monthly contracts. As a result, Northern will enter into both November through March and December through February contracts in order to meet higher minimum day loads during the peak winter months. In order to handle swings above these minimum load levels, the Company will use a combination of spot, storage and peaking supplies.

For the most part, Northern relies on short-term and spot gas supply purchases during off-peak months of the year.

2. Capacity Cost Mitigation

Even though primary capacity markets in the Northeast are not liquid, FERC has undertaken efforts to enable markets to operate more efficiently. Principle among these is the creation of a secondary market in which market participants may buy and sell capacity. In particular, capacity release and off-system sales permit Northern to recoup a portion of its fixed cost commitments of near-term imbalances in its portfolio and otherwise under-utilized resources. To the extent that such a portfolio imbalance can be anticipated to be permanent in nature, Northern may be able to assess opportunities that may permit it to restructure or permanently release certain portfolio resources.

During times when supply and demand are not in balance, Northern may release or rebundle and resell capacity resources to others who require capacity to meet their own system needs. At such times, Northern actively participates in secondary capacity markets, primarily through capacity release transactions. Even when Northern is not actively selling into these markets, it continues to monitor activity so that it can capitalize on market

opportunities to generate additional value for its customers. Northern monitors market activity and performs price discovery daily through the use of the Intercontinental Exchange, Inc., an electronic energy trading system, and through traditional telephone discussions with more than thirty-approved trading counterparties.

During recent years, almost all of Northern's mitigation efforts have relied upon capacity release transactions as compared to off-system sales that bundle gas supply with capacity. The financial ramifications of the collapse of Enron and other wholesale market disruptions include significantly greater credit risks for off-system sales transactions. As a result, Northern has forgone some high-risk opportunities offering potentially higher mitigation revenues through off-system sales in order to minimize transaction risk and protect customers from potential credit problems. While Northern's preference continues to favor capacity release transactions to mitigate fixed cost commitments, market conditions have stabilized to a point where some off-system sales are likely to be pursued to the extent that credit risks can be reduced to acceptable levels.

The degree of incremental margins Northern is able to generate through these efforts is a function of the desirability placed on its resources by the market from time-to-time. At times, the value of resources in the secondary market can be far less than Northern's cost. When this occurs, it is important to preserve opportunities to extract future value from a resource rather than forfeit them through long-term releases in a buyer's market when resources are potentially undervalued. Schedule V-1 provides a table showing revenues derived by Northern through capacity release and off-system sales for the past five calendar years. As shown in this schedule, Northern has been able to increase capacity mitigation revenues each year with a dramatic increase over the past two years. This dramatic increase

is due in part to the increased value placed on capacity resources in New England as a result of the tightening supply and demand balance as well as increased capacity planning clarity stemming from the recent Settlement Agreement.

Also, on Schedule V-1, Northern has indicated its progress toward meeting the $1 million goal in capacity mitigation revenue for the 12-months ended October 31, 2006, per the terms of the Settlement Agreement.