

# **Value of Distributed Energy Resources Study**

## **Scope and Timeline Report**

**Docket DE 16-576, Development of New  
Alternative Net Metering Tariffs and/or Other  
Regulatory Mechanisms and Tariffs for  
Customer-Generators**

**May 8, 2018**

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## **I. Introduction and Background**

### **A. Introduction**

Commission Order No. 26,029 directed that Commission Staff (Staff), in collaboration with the parties, develop a scope and timeline for a New Hampshire-specific Value of Distributed Energy Resources (VDER) study. The Order specified certain general parameters for the VDER study scope with further details anticipated to be developed through the stakeholder working group process. This report describes a proposed VDER study scope and a preliminary timeline for completion of the full study. If approved by the Commission, the VDER study scope will serve as the scope of work specified in a request for proposals (RFP) for the Commission to engage an independent consultant to perform the VDER study and present the results of that study to the Commission.

### **B. Background**

House Bill 1116, 2016 N.H. Laws Chapter 31 (HB 1116), directed the Commission to develop a new alternative net metering tariff or tariffs that continue “to provide reasonable opportunities for electric customers to invest in and interconnect customer-generator facilities and receive fair compensation for such locally produced power while ensuring costs and benefits are fairly and transparently allocated among all customers.” As required under HB 1116, the Commission opened Docket DE 16-576 in May 2016. On June 23, 2017, the Commission issued Order No. 26,029, which approved the adoption of an interim net metering tariff, established pilot programs, and called for a New Hampshire-specific distributed energy resource (DER) valuation study. Working groups were established for each pilot program and for the VDER study.

### **C. VDER Study Scope Development Process**

The VDER study working group met several times between November 2017 and April 2018. The working group heard presentations from Lon Huber of Strategen Consulting, the consultant engaged to work with the Office of the Consumer Advocate in this docket, as well as Professor Amro M. Farid from the Thayer School of Engineering at Dartmouth College. Professor Farid discussed the components of a holistic technical and economic approach to a valuation study. Mr. Huber summarized value of solar studies completed in other states and provided a preliminary outline of a potential study approach for New Hampshire based primarily on a VDER analysis conducted in New York.

Based on the presentations and preliminary working group input, Staff prepared an initial draft outline for the scope of the VDER study. The outline highlighted components of the avoided cost “value stack” and served as the basis for discussion at two subsequent working group sessions. Those sessions focused on understanding the specified avoided cost value stack components and identifying methodologies by which to evaluate those avoided costs. After each working group session, written stakeholder comments were received and the outline was updated. Stakeholder collaboration and facilitated discussion of relevant issues resulted in preliminary consensus with respect to a number of study scope items.

Based on the working group process and additional stakeholder input, Staff submits this VDER study scope and timeline report to the Commission for its review and approval.

## **II. Study Purpose**

As directed in Order No. 26,029, the New Hampshire VDER study will examine the net present value of long-term avoided costs using marginal concepts and incorporating test criteria from standard energy efficiency (EE) benefit-cost analysis (BCA), including both Total Resource Cost (TRC) and Ratepayer Impact Measure (RIM) test criteria. In conjunction with the results of related studies and pilot programs, the VDER study will provide data and analysis to inform future rate design and tariff development for customer-generators with distributed generation (DG) eligible to participate in net energy metering (NEM).

The VDER study analysis will provide detailed information regarding costs avoided by net-metered DG under general conditions, as well as at specific times and at particular locations, and will evaluate respective benefits and costs from the perspective of the electric distribution utilities, customer-generators participating in NEM, and non-participating electric ratepayers. The study results are not intended to pre-determine future NEM tariff design or applicable rates, but rather to inform further NEM tariff development proceedings before the Commission.

## **III. Study Approach**

### **A. Overview**

Because the VDER study will be performed within the context of the NEM proceeding, study analysis will focus on DG that is eligible for NEM and is interconnected to a New Hampshire regulated distribution utility (i.e., Eversource, Unitil, and Liberty Utilities). The study will focus on impacts within New Hampshire with consideration of regional energy market effects where appropriate. The study will assess the relative benefits and costs of net-metered DG from the perspectives of the utility system as a whole, participating NEM customer-generators, and other electric utility ratepayers. TRC test criteria will be used to analyze and measure the total net costs of net-metered DG to both participating customer-generators and to the electric utilities. RIM test criteria will be used to analyze and measure impacts on the utility ratepayers resulting from avoided costs, changes in utility revenues, and any costs associated with operating and administering the NEM.

Staff further notes that participant cost valuation criteria in particular may be used to evaluate how NEM crediting and compensation may affect reasonable opportunities to invest in DG and receive fair compensation, as contemplated by HB 1116. The VDER study may also include sensitivity analyses to determine the demonstrable and quantifiable net benefits associated with relevant

externalities, such as environmental benefits, while adequately mitigating the potential for double-counting of such externalities, as contemplated by Order No. 26,029.

The VDER study should maintain consistency with EE cost-effectiveness evaluation, including use of standard EE BCA criteria and the incorporation, where appropriate, of modeling tools, methods, criteria, and data from the New England Avoided Energy Supply Cost (AESC) report. The VDER study will calculate avoided costs over a 15-year time horizon, with 3-5 years of historic data reviewed, where possible, to verify and validate any forward projections. Net avoided costs will be presented on a net present value basis using appropriate discount rates.

Certain avoided costs contributing to the VDER are time and/or location dependent. The study will determine hourly avoided cost values, where applicable, thereby enabling a technology-neutral analysis of marginal avoided cost components. By mapping those hourly values to DG production curves, relatively more precise value estimates can be determined for various DG technologies, including in particular solar photovoltaic (PV) and hydroelectric facilities, as contemplated by Order No. 26,029.

Using data and analysis derived through a distribution-level valuation study (whether performed as a separate study or as a VDER study component), the VDER study will evaluate DG avoided cost values based on specific locations on the utility distribution system. That locational analysis may be used to more precisely ascertain the potential value of DG to avoid or defer distribution system upgrades and/or to reduce or mitigate distribution system operation and maintenance costs.

It is not proposed that the VDER study include sensitivity analyses based on a high DG penetration scenario, in view of the current level of DG penetration and available forecasts for DG deployment from ISO New England (ISO-NE). Staff notes that, if Senate Bill 446 is enacted in 2018, it may become necessary to include larger DG facilities (up to and including 5 MW in size) in the VDER study scope and to assume higher levels of DG penetration in the study.

In conclusion, the VDER study is expected to provide useful analysis to better understand the nature and amount of avoided costs, other net benefits, and costs associated with net-metered DG. It may also provide a flexible and accessible model which may be used to evaluate a number of additional technology capabilities, such as DG with storage or smart inverters, although those other capabilities will not be a primary focus of the study at this time.

## **B. Study Parameters and Avoided Cost Criteria (VDER “Value Stack”)**

Tables 1 and 2 below present a summary of the key study parameters and avoided cost criteria and study methodology, as developed through the working group process. In a number of instances, the working group participants reached consensus as to the recommended approach. In other cases, consensus was not achieved and Staff’s recommended approach is presented, with an indication of differing viewpoints noted. It is anticipated that the study scope criteria and methodology will be further refined and specified once an independent consultant has been engaged by the Commission to perform the VDER study and with the active assistance of that independent consultant.

**Table 1: Study Parameters**

The Position Summary column indicates whether or not consensus was reached among working group participants; if consensus was not achieved, a brief summary of parties' differing positions is provided.

No	Item	Description	Position Summary
1	Time Scale	15 year forward-looking study, with 3 to 5 years of historic data reviewed, where possible, to verify and validate forward projections.	Consensus
2	Methodology	<p>Develop avoided costs and analyze using TRC and RIM test criteria. Maintain consistency with EE cost-effectiveness evaluation, including use of standard EE BCA criteria and consideration of modeling tools, methods, criteria, and data from the New England AESC, where appropriate.</p> <p>Determine avoided costs for DER attributable to associated Load Reduction Values (LRV). Calculate hourly load reduction values; including a model capable of mapping value to resource-specific production curves. Models should also provide flexibility in criteria values and other data inputs, to the extent possible, and cover all hours over the study period.</p> <p>Market Resource Value (MRV) – separate analysis to calculate monetizable values of aggregated DG resources participating directly in relevant wholesale power markets. Staff believes MRV alternative analysis should be included in study scope only if it can be conducted at a reasonable cost.</p>	Consensus
3	Technology	<p>The above methodological approach should require flexible Excel-based modeling tools which allow for investigation of value propositions by technology through different production or load reduction curve mapping; however, the main study focus should be on solar PV and hydroelectric generation.</p> <p>Models should analyze values associated with load reduction and, in the MRV alternative, with market participation as passive resources only. Tools should be able to model different generation configurations for both value types (e.g., for PV, consider 180 (south), 270 (west), dual access solar tracker, assumed AC-DC ratio). Solar PV with storage may be considered as a sensitivity analysis. Such analysis should assume optimal power injection to meet capacity commitment requirements for passive resource participation in ISO-NE market.</p>	Consensus

**Table 2: Avoided Cost Criteria and Study Methodologies**

Table 2 summarizes each avoided cost item to be evaluated in performing the VDER study and the methodology for analyzing that avoided cost item. The table provides a brief description of the avoided cost item, the data proposed to be analyzed, and the methodology under which that data will be evaluated. The summary provided in the “Proposed Data and Methodology” column represents the working group consensus approach where indicated and represents Staff’s recommended approach where consensus was not achieved. The “Position Summary” column indicates whether or not consensus was reached among working group participants; if consensus was not achieved, a brief summary of parties’ differing positions is provided.

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
1	Energy	ISO-NE LMPs, including congestion and losses (assuming embedded fuel cost, variable generation O&M, and environmental compliance costs (RGGI, NOx, SO <sub>2</sub> ))	Use forward projections of ISO-NE Locational Marginal Prices (LMPs) to calculate avoided costs associated with relevant load reductions using approach consistent with EE methodology.	Consensus
2	Capacity Market Costs	ISO-NE Forward Capacity Market (FCM) clearing prices	Use forward projections of FCM clearing prices to determine avoided costs associated with relevant peak load reductions using approach consistent with EE methodology (e.g., AESC).  Under MRV alternative, analyze ISO-NE capacity market revenue estimates for cleared resources and projected DG market participation to determine MRV value projections.	Consensus

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
3	Ancillary Services and Load Obligation Charges	Reserves, regulation, inadvertent energy, Net Commitment Period Compensation (NCPC), Auction Revenue Rights revenues, ISO-NE schedule expenses, NEPOOL expenses, etc. (as charged to wholesale load obligations)	<p>Use forward projections of cost-based service prices and of market prices for services met through market mechanisms to calculate avoided costs associated with relevant load reductions, using approach consistent with EE methodology (e.g., AESC). Forward projections should consider possible overall service cost increases in light of projections for slow growth in New Hampshire DG penetration levels.</p> <p>Because no New Hampshire net-metered DG resources currently participate in ISO-NE ancillary service markets, no additional market revenues will be considered at this time.</p>	Consensus
4	RPS Compliance	N.H. Renewable Portfolio Standard (RPS) compliance costs avoided due to customer load and retail sales reductions	Use forward projections of RPS compliance costs (REC prices and ACP levels) for New Hampshire to determine avoided costs associated with relevant retail energy sales reductions, using approach consistent with EE methodology (e.g., AESC).	Consensus
5	Transmission Charges	ISO-NE RNS and LNS charges avoided (through reallocation), due to reductions in metered wholesale energy load obligations	Use forward projections of RNS and LNS charges assessed by ISO-NE to determine avoided costs associated with relevant utility monthly coincident peak reductions. May need to consider projections of transmission use proportions for all New England States.	Consensus
6	Transmission Capacity	Avoidance or deferral of transmission capacity additions or upgrades due to load reductions resulting from N.H. DG deployment	<p>Analysis of potential future avoidance or deferral of transmission system capital costs, without double-counting of any avoided costs covered by future RNS and LNS projections.</p> <p>Staff recommends a qualitative-quantitative proxy estimate approach, potentially incorporating analysis consistent with EE methodology (e.g., AESC).</p>	<p>Consensus Not Achieved</p> <p>Certain parties suggest this criterion must be included with a value and propose that a qualitative-quantitative proxy estimate approach. See Section III.C.2 and 3 below. Other parties propose that this study item be deleted if a value cannot be determined with any precision at a reasonable cost.</p>

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
7	Distribution Capacity	Avoidance or deferral of N.H. utility distribution system capacity additions or upgrades due to DG deployment and/or DG customer upgrade cost payments	Study and analysis of potential future avoidance or deferral of distribution system capital costs, informed by separate distribution-level locational value study to be performed in lieu of NWA pilot programs (or as a separate component of the VDER study).	Consensus
8	Distribution System Operating Expenses	Reduction or deferral of distribution system operating expenses, through equipment life extension, lower maintenance and labor costs, etc.	Study and analysis of potential future reduction or deferral of distribution system operating expenses. Staff recommends a qualitative-quantitative proxy estimate approach, if it can be conducted at a reasonable cost by the independent consultant.	Consensus Not Fully Achieved  Parties agree the criterion is in-scope, but disagree regarding depth of research, with some parties recommending a qualitative review only with no assigned value while others suggest investigating a proxy value.
8	Trans. Line Losses	High voltage (PTF) and local transmission system line loss reductions due to N.H. DG deployment	Study and analysis of avoided transmission system line losses, without double-counting any losses included in relevant ISO-NE LMPs for avoided energy analysis, to make use of existing studies to the extent relevant.	Consensus
10	Dist. Line Losses	N.H. utility distribution system line losses avoided due to N.H. DG deployment	Study and analysis of avoided distribution system line losses, possibly including N.H. utility recalculation of average system line losses, to make use of existing studies to the extent relevant.	Consensus
11	Wholesale Market Price Suppression	Electric and natural gas wholesale market demand reduction induced price effects (DRIPE)	Forward projections of various DRIPE impacts, using approach consistent with EE methodology (e.g., AESC).  In the MRV alternative, capacity DRIPE only would be based on EE study methodology based on forward FCM price projections.	Consensus

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
12	Hedging/Wholesale Risk Premium	Avoidance of risk premium applicable to retail sales relative to wholesale market price exposure, as included in default service bids	<p>Assumption of applicable wholesale risk premium such as 8% AESC study assumption, or NH-specific study and analysis of risk premiums included in periodic default service supply bids. Hedging and other premiums represent risk-associated costs and profit margins of wholesale energy marketers that are included in default service contract bids to retail electric utilities. Wholesale risk premiums represent an additional energy cost not included in LMPs and should be considered as a cost avoided through reductions in total energy purchases.</p> <p>Staff recommends a qualitative-quantitative proxy estimate approach be used, if it can be conducted at a reasonable cost by the independent consultant.</p>	<p>Consensus Not Achieved</p> <p>Certain parties propose that a qualitative-quantitative proxy estimate approach be used in conducting the study.</p> <p>Utility party stated it does not hedge, so DER does not impact its market risk exposure.</p>
13	Distribution Utility Admin Costs and Expenses	Administrative costs avoided or incurred by N.H. distribution utilities due to DG deployment and NEM (e.g., metering and billing, credit and collections, program administration, distribution system analyses, etc.)	Analysis of utility marginal administrative costs attributable to DG deployment, which may be either a positive or negative benefit on a net basis for different cost categories through a qualitative review and/or quantitative proxy estimate approach using N.H. utility expense information, to be further developed by independent consultant within applicable study budget constraints.	Consensus
14	T & D System Upgrades Required	Actual or potential increases in transmission and/or distribution system capital or operating costs due to N.H. DG deployment (may be a cost not avoided)	Study and analysis of utility transmission and/or distribution system cost increases attributable to DG installation and operation, to the extent not covered by directly-assigned costs paid by DG owners. To be assessed through a qualitative review or a qualitative-quantitative proxy estimate approach, to be further developed by independent consultant within applicable study budget constraints.	Consensus

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
15	Utility Lost Revenues	<p>N.H. distribution utility shortfalls in revenue requirement collection, due to DG system net metering (potentially offset by reduced customer account arrearages)</p>	<p>Study and analysis of distribution utility net lost revenues, collected from other customers through rate adjustments, to determine potential cost-shifting effects through RIM and/or rate or bill impact tests.</p> <p>Staff recommends not including a separate analysis of how increased electric usage caused by DG adoption may impact lost revenues because:</p> <p>(1) it is difficult and costly to measure as it requires studying many different customer behaviors; and</p> <p>(2) it may have second order impacts on load reduction values associated with other elements of the study.</p> <p>Macro-level “high load growth” general study sensitivity, including consideration of effects regarding this criterion, may be conducted subject to further development by the independent consultant within study budget constraints.</p>	<p>Consensus Not Fully Achieved</p> <p>Parties agree that utility lost revenues are within scope to examine cost-shifting.</p> <p>Certain parties maintain that the beneficial effects of electrification by DG owners should be included within this study scope item because it could demonstrate reduced estimates for lost revenue and associated cost-shifting (parties cite NHEC research as a possible source of relevant information).</p> <p>Other parties recommend that the study scope not include increased electric usage, because of difficulty studying customer behavior (e.g. EV charging times, usage for new appliances, etc.), as well as the implications of increased electric usage for load reduction assumptions used to calculate other criteria values.</p>

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
16	Externality Benefits	<p>Study may include consideration of “demonstrable and quantifiable net benefits associated with relevant externalities (such as environmental or public health benefits), provided that the potential for double-counting of such externalities is adequately mitigated.” Order 26,029 at 60.</p>	<p>Staff recommends that avoided environmental externalities not already included in energy prices be analyzed as a study sensitivity. Study methodologies to depend on relevant externality benefits to be included in the study scope. Items to review for sensitivity may include RGGI market price projections to determine embedded CO<sub>2</sub> costs, AESC non-embedded environmental costs and methodologies, AVERT model to determine any non-embedded NO<sub>x</sub>, SO<sub>2</sub>, and particulate matter impacts, U.S. EPA social cost of carbon, and review of non-embedded methane emissions impacts.</p>	<p>Consensus Not Achieved</p> <p>Some parties suggested that environmental externalities be studied quantitatively as sensitivities to the primary study.</p> <p>Certain parties cite HB 1116 as expressly referencing environmental benefits as a state policy driver behind NEM, and support quantitative assessment sensitivity study as a reasonable starting point for further research.</p> <p>One party suggests that, when embedded price and/or market mechanisms already exist, unnecessary to reflect other valuation approaches (quoting NARUC DER Manual: ... “determinations of value should attempt to reflect actual, market value of trait as identified and valued by that jurisdiction.”)</p> <p>Other parties maintain no externality benefits should be included, as such matters are policy issues to be determined through the legislature.</p>

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
17	Distribution Grid Support Services (other side of 14)	Frequency regulation and voltage regulation, i.e., volt/VAR optimization, and related power factor correction and conservation voltage management (efficiency gains from average voltage reduction) [related to Item 8]	<p>Analysis through a qualitative review or a qualitative-quantitative proxy estimate approach, to be further developed by independent consultant within applicable study budget constraints.</p> <p>Research may include review of EPRI, U.S. DOE National Laboratories, and other analyses of DER capabilities to provide power quality and grid support services, such as ancillary services at the distribution level, particularly with the use of smart inverters, as well as utility system and City of Lebanon pilot meter data on power quality (frequency, voltage, power factor, reactive power - both kVA demand and kVAR consumption), and the possible piloting of smart inverters.</p>	Consensus
18	Resilience Services	Capability to support operation of micro-grids and emergency generation	Dependent on potential costs and study budget constraints, a literature review and qualitative analysis of potential resilience services, possibly including information available through N.H. projects such as the City of Lebanon RTP pilot, Liberty battery storage pilot, etc., will be conducted through the study.	Consensus

No.	Avoided Cost	Description of Avoided Cost	Proposed Data and Methodology	Position Summary
19	Customer Installed Net Costs	Customer Installed Costs Determined on a Net Basis	<p>Staff recommends the study include a review and analysis of the customer installed costs of various types of solar PV projects, such as residential (8 kW), small commercial (50 kW), and large group host (1,000 kW). Customer system installed costs to be determined net of all available incentives and subsidies, including state incentive programs and federal tax benefits. Independent consultant to assist in identifying appropriate tests and methods for performing this study component.</p>	<p>Consensus Not Achieved</p> <p>Certain parties argue the study not address customer installed costs at all, claiming that the study scope should be limited to DER benefits and values, taking into account utility costs associated with DG integration.</p> <p>Other parties maintain that any TRC testing should include the full net costs incurred by DG owners. The customer's LCOE should be determined based on full installed costs, net of all available subsidy programs, preferential tax treatment, etc., as well as the value of Class II RECs</p>

## C. Boundaries, Assumptions, and Data Inputs

### 1. Use of Energy Efficiency Study Methodology

The VDER study test criteria and methodology are designed to make maximum use of EE study methodology and results where appropriate. For example, EE study methodology and results provide avoided cost values for energy and capacity for New Hampshire. The VDER study scope proposes to use the research methodology relied upon in evaluating these costs and benefits of EE programs in New Hampshire. In particular, the New England AESC study<sup>1</sup> analyzes many relevant avoided costs on both a regional and state-specific basis, and the VDER study will rely on the methodology and results of that study whenever it is appropriate to do so. The use of the AESC study furthers the twin goals of consistent analysis in analogous contexts and the effective and efficient use of both financial and human resources.

### 2. Qualitative Analysis

Qualitative review consists of literature review and synthesis of primary research relating to a criterion without assigning a quantitative value. It can act as a placeholder until further research is available and/or to inform the study of a value or cost which cannot currently be quantified to a level of precision and rigor considered necessary for monetary valuation, but that is potentially significant and should be considered in application of the research.

Certain parties suggested that qualitative study of an element does not provide a value and therefore should not be included in the VDER study. In the view of those parties, if a value cannot be quantified, the study should not spend resources or include those criteria for consideration.

Other parties offered a number of reasons to include qualitative criteria in the VDER study, as well as suggestions for proxy or estimated values when original research would be cost-prohibitive and other research may already be available. The reasons to consider qualitative criteria include:

- The inability, with current resources, to arrive at a value estimate through original research does not mean that the criteria have no value; some of these criteria may have substantial value that would remain unknown unless they are included in the study;
- Inclusion of criteria through qualitative assessment can provide a current “placeholder” for future quantitative research; and
- Qualitative analysis can educate stakeholders and decision makers regarding the criteria and can inform future tariff design efforts.

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<sup>1</sup> New England AESC study 2018 is available at:  
<http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/AESC%202018.pdf>.

Staff believes it may be worthwhile to include qualitative analysis of certain relevant issues in the VDER study, provided that the cost of such analysis is not excessive. Staff recommends that prospective independent consultants provide a separate cost estimate for certain avoided cost analyses that would be based on a qualitative review or analysis.

### **3. Proxy Values and Secondary Research Estimates**

In some cases there may be a body of research performed to a high standard of rigor that is reflective of similar parameters and circumstances relevant to the value study criteria which can be used as an approximation, or “proxy value,” with a reasonable level of confidence for its precision and accuracy in regard to New Hampshire-specific valuation issues. Similarly, national, regional, or state-specific studies relating to specific criteria may be available for review and appropriate for qualitative or quantitative inclusion in place of primary research. Where multiple studies exist, literature review and analysis may be used to calculate an estimated value reflective of the research available in the field, without the need for original data collection or analysis. Proxy values or estimates based on secondary research may include a discount factor to account for uncertainty.

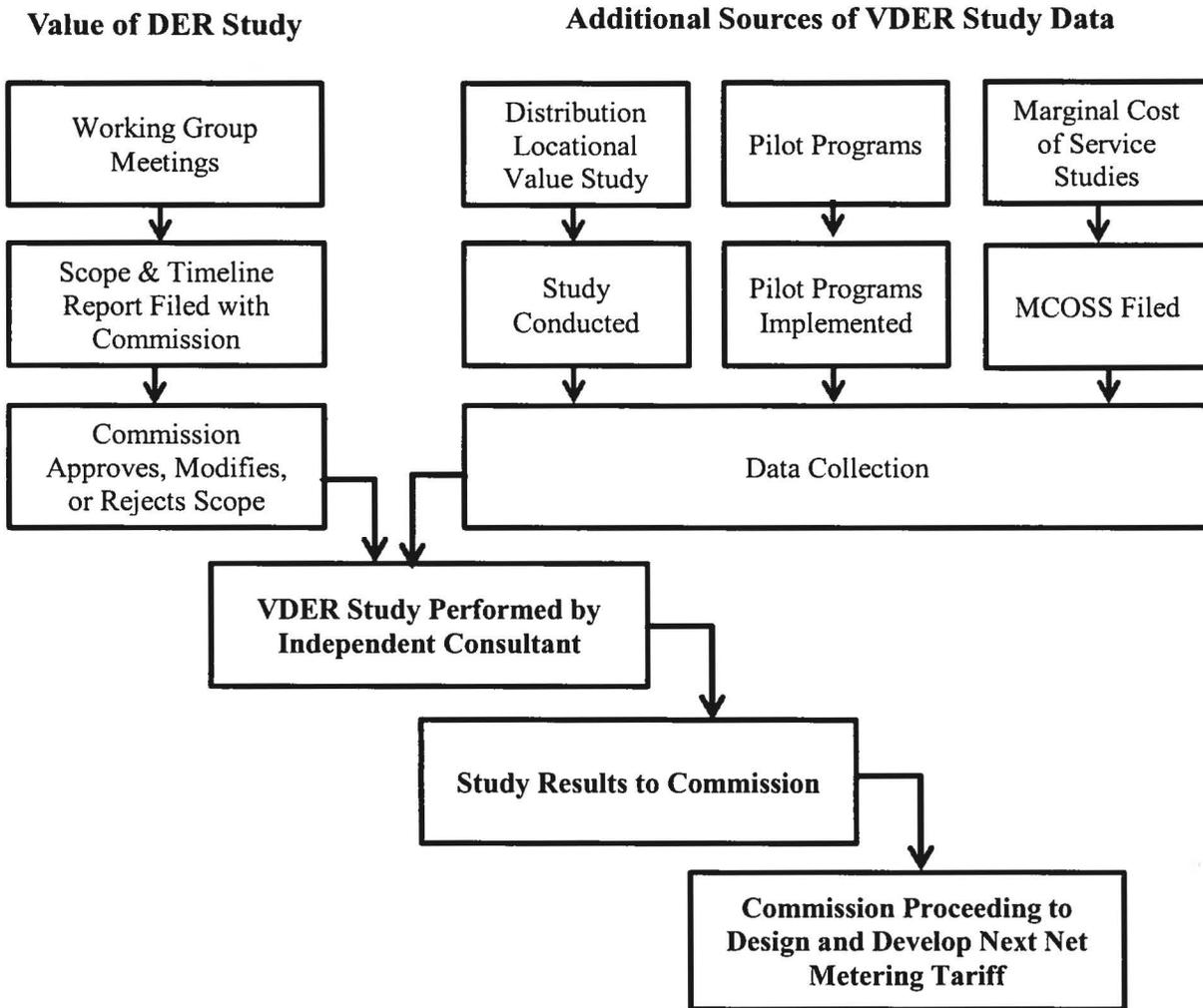
### **4. Discount Rates**

Where necessary, the VDER study will utilize an appropriate discount rate or rates which will be determined with input from the independent consultant to be engaged by the Commission.

## **IV. Study Timeline**

The pilot programs, data collection, and studies initiated under Order No. 26,029 are intended in part to inform the VDER study. The goal is to organize complementary efforts by incorporating learning and results from other NEM docket projects. The VDER study timeline therefore should be considered from within the broader NEM docket process. Figure 1 below shows the DE 16-576 process with specific focus on its relation to the VDER study. Table 3 presents a preliminary timeline for the VDER study.

**Figure 1: DE 16-576 Pilot Programs, Data Collection, and Study Process**



**Table 3: VDER Study Preliminary Timeline**

	Quarters 2-3, 2018	Quarters 3-4, 2018	Calendar Year 2019	Calendar Year 2020
<b>Pilot Programs</b>				
<b>Time of Use</b> (Unitil and Eversource), <b>Real Time Pricing</b> (City of Lebanon), and <b>Low/Moderate Income Pilots</b>	Implementation plans developed and filed by respective utilities for approval, modification, or rejection by Commission (Docketed Process)	Pilots approved for implementation	Programs implemented for at least one year. Data collection for input into the Value of DER Study	Evaluation study of the pilots to determine data inputs for VDER study
<b>Studies</b>				
<b>Distribution Locational Value Study</b>	Study Scope developed during Quarters 2-3, 2018. Scope approved by Commission and consultant engaged.	With independent consultant, complete study development and begin data collection.	Consultant conduct study and prepare report and findings.	
<b>Marginal Cost of Service Study</b> (Eversource)	Report due from Eversource by June 23, 2018. Submitted for review by Commission. (Liberty Utilities and Unitil MCOSS already on file)	MCOSS study results used in VDER study by independent consultant.	MCOSS study results used in VDER study by the independent consultant.	
<b>Value of DER Study</b>	Study Scope and Timeline Report filed with the Commission for approval, modification, or rejection.	Commission approve, modify, or reject VDER study scope. RFP issued for independent consultant selection.	With an independent consultant, complete study development and begin data collection and analysis.	Consultant conduct study and prepare report and findings.

## V. Conclusion

Staff recommends that the Commission review and approve the VDER study scope and timeline as set forth in this report, including the approaches subject to stakeholder consensus and the approaches recommended by Staff in the absence of such consensus. If deemed necessary or appropriate, the Commission may schedule a public comment hearing and/or receive written comments from parties and interested stakeholders prior to acting on the proposed study scope and timeline.

Once approved, the defined study scope and timeline will represent the scope of work specified in an RFP issued for the Commission to engage an independent consultant to perform the VDER study. That consultant will receive input from the working group to further refine the study scope and methodology, and will then collect the required data and perform the necessary research and analysis to complete the VDER study and present a report containing the findings of that study to the Commission.