STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

IN RE: INVESTIGATION INTO THE CHANGING ELECTRIC DISTRIBUTION SYSTEM AND THE MODERNIZATION OF RATES IN LIGHT OF THE CHANGING DISTRIBUTION SYSTEM	: DOCKET NO. 4600-A

NOTICE TO ACCEPT COMMENTS ON
DRAFT GUIDANCE DOCUMENT

Goals, Principles and Values for Matters Involving
The Narragansett Electric Company d/b/a National Grid

In its order in Docket No. 4600, In re: Investigation into the Changing Electric Distribution System and the Modernization of Rates in Light of the Changing Distribution System, the Public Utilities Commission (PUC) adopted several recommendations of a Stakeholder Report to incorporate into a guidance document in anticipation of future rate cases. A guidance document is a record of general applicability developed by an agency which lacks the force of law but states the agency's current approach to, or interpretation of, law or describes how and when the agency will exercise discretionary functions. The draft guidance document issued with this notice is intended to provide direction on how the PUC will apply the principles set forth in R.I. Gen. Laws § 39-26.6-24(b) in future filings for matters involving The Narragansett Electric Company d/b/a National Grid before the PUC based on the goals, rate design principles, and Benefit-Cost Framework adopted by the PUC in Order No. 22851, issued on July 31, 2017, http://www.ripuc.org/eventsactions/docket/4600-NGrid-Ord22851_7-31-17.pdf.

The guidance document is on file at the Commission Clerk's Office, 89 Jefferson Boulevard, Warwick, Rhode Island. A copy may be obtained in person, by mail, by calling 401-780-2107, or accessed under the Commission's Docket Menu, Docket No. 4600 at http://www.ripuc.org/eventsactions/docket/4600page.html. Interested persons wishing to offer data, views, or arguments on the proposed guidance document may file written comments no later than September 1, 2017 with the Commission Clerk to the following address: Luly E. Massaro, Commission Clerk, Public Utilities Commission, 89 Jefferson Boulevard, Warwick, Rhode Island 02888 or luly.massaro@puc.ri.gov.

Public Utilities Commission's Guidance on Goals, Principles and Values for Matters Involving The Narragansett Electric Company d/b/a National Grid

I. Introduction

In its order in Docket No. 4600, In re: Investigation into the Changing Electric Distribution System and the Modernization of Rates in Light of the Changing Distribution System, the Public Utilities Commission (PUC) adopted several recommendations of a Stakeholder Report to incorporate into a guidance document in anticipation of future rate cases.[1] A guidance document is a record of general applicability developed by an agency which lacks the force of law but states the agency's current approach to, or interpretation of, law or describes how and when the agency will exercise discretionary functions.[2] It has also been defined as an agency statement of general applicability and future effect that sets forth a policy on a statutory, regulatory, or technical issue. This guidance document is intended to provide direction on how the PUC will apply the principles set forth in R.I. Gen. Laws § 39-26.6-24(b).[3]

Pursuant to that section of the Renewable Energy Growth Program statute, the factors to be considered in rate design are: (1) The benefits of distributed-energy resources; (2) The

[1] Order No. 22851 (In re: Investigation into the Changing Distribution System and the Modernization of Rates in Light of the Changing Distribution System) (July 31, 2017).

[2] R.I. Gen. Laws § 42-35-1(9).

[3] R.I. Gen. Laws § 42-35-2.12 addresses the use of a guidance document:

> (c) A guidance document may contain binding instructions to agency staff members if, at an appropriate stage in the administrative process, the agency's procedures provide an affected person an adequate opportunity to contest the legality or wisdom of a position taken in the document.
> (d) If an agency proposes to act in a contested case at variance with a position expressed in a guidance document, it shall provide a reasonable explanation for the variance. If an affected person in a contested case may have relied reasonably on the agency's position, the explanation must include a reasonable justification for the agency's conclusion that the need for the variance outweighs the affected person's reliance interest.
> (e) An agency shall maintain an index of all of its effective guidance documents; publish the index on its website; make all guidance documents available to the public; and file the index annually with the secretary of state. The agency may not rely on a guidance document, or cite it as precedent against any party to a proceeding, unless the guidance document is published on its agency website.
> (f) A guidance document may be considered by a presiding officer or final decision maker in an agency contested case, but it does not bind the presiding officer or the final decision maker in the exercise of discretion.

distribution services being provided to net-metered customers when the distributed generation is not producing electricity; (3) Simplicity, understandability, and transparency of rates to all customers, including non-net metered and net-metered customers; (4) Equitable ratemaking principles regarding the allocation of the costs of the distribution system; (5) Cost causation principles; (6) The General Assembly's legislative purposes in creating the distributed-generation growth program; and (7) Any other factors the PUC deems relevant and appropriate in establishing a fair rate structure. The statute is also clear on the breadth of options before the PUC in considering and balancing these factors, and that the PUC "may consider any reasonable rate design options, including without limitation, fixed charges, minimum-monthly charges, demand charges, volumetric charges, or any combination thereof, with the purpose of assuring recovery of costs fairly across all rate classes."[4] The application of this section of the law currently only applies to The Narragansett Electric Company d/b/a National Grid (National Grid).

To guide its review of future cases that affect National Grid electric rates, the PUC adopted goals, updated rate design principles, and a new Rhode Island Benefit-Cost Framework, recognizing that further work needs to be done on the Framework. This guidance document will discuss application of each. The goals, principles, and framework will apply to all parties to cases that affect National Grid's electric rates, not just to the utility.[5] Any proponent of a rate, rate design, or program proposal with associated cost recovery will need to meet the same standards. As noted below, opponents should also reference the goals, principles, and framework in their opposition.

[4] R.I. Gen. Laws § 39-26.6-24(b).

[5] This does not include the calculation of any periodically approved factor that is based on a previously approved methodology that has been subjected to the goals, principles, and framework. For example, while the design of the annual Infrastructure, Safety, and Reliability recovery factors would be subject to the goals, the annual reconciling factor would not.

II. Goals that all proposals should address

The Stakeholder Report posed the following question: What can and should the new electric system be able to accomplish? The Stakeholder Report then presented a list of goals that the PUC has adopted as a guide for reviewing any proposal filed with the PUC.[6] It is always incumbent upon the proponent of any proposal to meet its burden of proof. To this end, the proposing party must provide accompanying evidence that addresses how the proposal advances, detracts from, or is neutral to each of the stated goals of the electric system. Likewise, an opponent to a proposal should also refer to these goals in developing its rationale.

The goals are as follows:

- Provide reliable, safe, clean, and affordable energy to Rhode Island customers over the long term (this applies to all energy use, not just regulated fuels);
- Strengthen the Rhode Island economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures;
- Address the challenge of climate change and other forms of pollution;
- Prioritize and facilitate increasing customer investment in their facilities (efficiency, distributed generation, storage, responsive demand, and the electrification of vehicles and heating) where that investment provides recognizable net benefits
- Appropriately compensate distributed energy resources for the value they provide to the electricity system, customers, and society;

[6] *See* footnote 5. For example, while the design of the annual Infrastructure, Safety, and Reliability recovery factors would be subject to the goals, the annual reconciling factor would not.

- Appropriately charge customers for the cost they impose on the grid;
- Appropriately compensate the distribution utility for the services it provides;
- Align distribution utility, customer, and policy objectives and interests through the regulatory framework, including rate design, cost recovery, and incentives.

The PUC recognizes that any given proposal may not advance all of the goals listed above, but each goal should be addressed so that the PUC can appropriately balance the interests of all parties in setting just and reasonable rates across rate classes and programs.

III. Rate Design Principles

The PUC has adopted certain principles to be applied in assessing the reasonableness of rate design. A proposed rate design may be found reasonable if it does the following:

- Ensures safe, reliable, affordable, and environmentally responsible electricity service today and in the future;
- Promotes economic efficiency over the short and long term;
- Provides efficient price signals that reflect long-run marginal cost;
- Identifies future rates and rate structures that appropriately addresses "externalities" that are not adequately counted in current rate structures;
- Empowers consumers to manage their costs;
- Enables a fair opportunity for utility cost recovery of prudently incurred costs and revenue stability;
- Ensures that all parties should provide fair compensation for value and services received and should receive fair compensation for value and benefits delivered;
- Constitutes a design that is transparent and understandable to all customers;

- Ensures that any changes in rate structures are be implemented with due consideration to the principle of gradualism in order to allow ample time for customers (including DER customers) to understand new rates and to lessen immediate bill impacts;
- Provides opportunities to reduce energy burden, and address low income and vulnerable customers' needs;
- Ensures consistency with policy goals (e.g. environmental, climate (Resilient Rhode Island Act), energy diversity, competition, innovation, power/data security, least cost procurement, etc.);
- Evaluates rate structures based on whether they encourage or discourage appropriate investments that enable the evolution of the future energy system.

Because the proponent of a rate or rate design proposal always has the burden of proving that the proposal is just, reasonable, and appropriately balances the interests of the ratepayers and the utility, when a party proposes a specific rate design the accompanying evidence that addresses how the proposal advances, detracts from, or is neutral to each of the stated rate design principles, listed above. Likewise, an opponent to a rate design proposal should also refer to these principles in developing its rationale. The PUC recognizes that no one rate design proposal may advance each principle listed above, but each should be addressed so that the PUC can appropriately balance the interests of all parties in setting just and reasonable rates across rate classes and programs. Adoption of these principles is intended to augment the PUC's role in ensuring just and reasonable rates for all classes of customers.

IV. Benefit-Cost Framework

The PUC adopted the Benefit-Cost Framework presented in the Stakeholder Report, which is attached as Appendix A and incorporated herein.[7] While there is still significant work still left to be done so that the Framework can be applied in a fully quantitative manner, it can now, and should be used, to provide the basis for qualitative assessments of proposals. In the next National Grid electric distribution rate filing, any rate design proposal should, at the very least, reference each category within the first two columns of the Report: Mixed Cost-Benefit, Cost, or Benefit Category and System Attribute Benefit/Cost Driver (Categories and Drivers, respectively).[8] In proposing any new rate design proposal, the proponent should discuss how each of the Categories and Drivers was considered and how the rate design will affect each. Where the costs and benefits can be quantified, the proponent should provide such information and the basis for the conclusion reached. Where quantification is not possible or not practical, the proponent should so explain. Regardless of whether the quantification can be fully completed, a qualitative analysis should be included. Likewise, opponents to any rate design proposal should reference the framework Categories and Drivers as part of their opposition. In addition, in any case that proposes new programs or capital investment that will affect National Grid's electric distribution rates, the impact of any increased ratepayer recovery should also reference the goals, rate design principles, and Benefit-Cost Framework.

As stated in the PUC's Order No. 22851, the Benefit-Cost Framework will not be the exclusive measure of whether a specific proposal should be approved. For example, there may be outside factors that need to be considered by the PUC regardless of whether a specific proposal is

[7] Appendix A to this Guidance Document is titled Appendix B: Benefit-Cost Framework as it is from the Stakeholder Report.

[8] *See* footnote 5. For example, while the design of the annual Infrastructure, Safety, and Reliability recovery factors would be subject to the Benefit-Cost Framework, the annual reconciling factor would not.

determined to be cost-effective or not. This may include statutory mandates or other qualitative considerations. This is consistent with the PUC's broad regulatory authority in setting just and reasonable rates. The PUC notes that the Rhode Island Supreme Court has oft held that the PUC is not held to any one specific formula in setting rates, but is expected to use its expertise in setting rates.[9] This does not mean that a proposal can avoid the cost-effectiveness test. Rather, if persuasive evidence is presented where a proposal does not pass the screening but it is nonetheless found to be beneficial to the system and further state energy goals, it may be approved. Conversely, if a proposal passes the cost-effectiveness test, it will not automatically be approved if persuasive evidence is presented that, for example, it will be too burdensome on customers in the short term. However, the Framework should serve as a starting point in the making of a business case for a proposal. As further technological advances and investment provide additional visibility on the electric system and allow for additional quantitative measures to be developed, the framework will become a more robust tool for evaluating various proposals.

V. Pilots

A pilot is a small scale, targeted program that is limited in scope, time, and spending and is designed to test the feasibility of a future program or rate design. Ideally, a pilot can provide net benefits and achieve goals, but the primary design and value of a pilot is to test rather than to achieve. As such, the PUC recognizes that it is reasonable for pilots to face a lower, but not less

[9] In re Island Hi-Speed Ferry, LLC, 746 A.2d 1240, 1246 (R.I. 2000), *stating* that:

> [T]his Court's review of decisions of the Commission is extremely deferential in light of the fact that *the Commission possesses a unique, specialized expertise and the ability to consider the complex social, economical, and technical information required to set public utility rates that are fair and reasonable*. Further, we reiterate that the Commission has exclusive jurisdiction to make such orders as it deems necessary to protect consumers and to ensure the economic viability of the utility. It is important to further note that this Court has held that "[n]o particular formula binds the commission in formulating its rate decision; the sole requirement is that the ultimate rate be fair and reasonable." (citations omitted) (emphasis added).

formal, standard than programs, so long as that standard is aligned with the elements adopted above.

If a pilot does not yield net benefits per the Benefit-Cost Framework it still could be approved if the proponent can show that the pilot nevertheless provides value. For example, a pilot that is not net beneficial can be approved if the proponent can show that the pilot is designed to demonstrate how to overcome specific barriers to achieving one or more of the goals for the system. Similarly, a pilot that is not net beneficial can be approved if the proponent can show that the pilot is designed to demonstrate how to overcome specific barriers to fair application of specific rate design principles. Finally, the proponent can prove value if the pilot addresses a specific barrier to achieving specific benefits in the Benefit-Cost Framework.

For example, a time of use rate might be proposed, but it may not be transparent, understandable, or appropriately empower consumers to manage their costs. A pilot investment proposal may be designed to determine how to overcome those barriers to meet the goals of appropriately charging customers for the cost they impose on the grid and appropriately compensating the distribution utility for the services it provides. Likewise, a party could propose a rate designed to incent beneficial siting of distributed energy resources, but for which net benefits cannot be established on the Rhode Island system. The rate could be approved as a pilot if the proponent can establish that the quantifiable benefit of the pilot plus the value of the information the pilot will provide regarding, for example, if the rate is transparent and understandable to customers is greater than the cost of the pilot.

VI. Delayed Applicability

The effect of this document is immediate upon adoption by the PUC. The PUC recognizes that some forthcoming proposals will be in development when this guidance document is formally

adopted, or will represent the continuation of a practice that has previously been through a review process similar to the new guidance the PUC has described above. For these reasons, the PUC exempts the following program filings from the effects of this guidance document for the year listed:

1. 2019 Standard Offer Service Procurement Plan and 2019 Renewable Energy Standard Procurement Plan

2. Report and Recommendations Relating to the 2018 Renewable Energy Growth Classes, Ceiling Prices, and Capacity Targets

3. Docket No. 4290 LIHEAP Enhancement Fund Charge Filing for Calendar Year 2018

Appendix B: Benefit-Cost Framework

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Power System Level	Energy Supply & Transmission Operating Value of Energy Provided or Saved (Time- & Location-specific LMP)	Bids, Offers, Marginal Losses, Constraints, & Scarcity in Time & Location specific LMP (+ Reactive Power requirements & Impacts on Distribution Assets in DLMP)	AESC Seasonal On- & Off-Peak Energy Price Forecasts	
			Expected Time- & Location-specific Bulk Power LMP for forecast period of resource operation	Requires interval or advanced metering functionality & Tracking of ISO Nodal Prices
			Expected Time-, Location-, & Product-specific Distribution LMP for forecast period of resource operation	Requires interval or advanced metering functionality & analysis of actual power flows
	Renewable Energy Credit Cost / Value	Cost of REC Obligation or REC Revenue Received	AESC Forecast of REC prices	
	Retail Supplier Risk Premium	Differential between retail prices and ISO market prices * retail purchases	Absent AMI + dynamic retail pricing, AESC estimate or risk adjusted observed differentials	Quantitative estimation requires detailed economic modeling
	Forward Commitment: Capacity Value	Whether an FCM Qualified Resource &, if so, FCA bid and Provision of Qualified Capacity	Estimate of likely FCA Auction bid capacity from FCM Qualified Resources	Quantitative estimation requires detailed economic modeling
		Change in Demand reflected (~4 yr. later) in a Revision of FCM forecast Capacity Requirements	Review of FCM capacity requirements & estimate of likely future impacts (Same as Capacity DRIPE below)	Quantitative estimation requires detailed economic modeling
	Forward Commitment: Avoided Ancillary Services Value	Whether it is a Qualified Ancillary Service Resource &, if so, Qualified Capacity	Forecasts of AS requirements / Provision of AS net of Energy supplied * Forecast AS prices	
	Utility / Third Party Developer Renewable Energy, Efficiency, or DER costs	Direct Cost of New Non-customer Resources (Capital & Operating costs of resources) + Customer Program costs (Participant recruitment, administrative, incentive and EM&V costs)	Cost Estimates	

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Power System Level	Electric Transmission Capacity Costs / Value	Change in transmission capacity requirements associated in change in resource mix	Annualized statewide transmission capacity value associated with load growth * change in net demand (ICF)	
			Forecast impacts of specific resources on transmission planning requirements	Requires detailed planning studies
	Electric transmission infrastructure costs for Site Specific Resources	Cost to develop new transmission (For peak output + any contingency requirement)	Direct cost estimates for remotely sited resources (e.g. offshore wind)	Requires detailed planning studies
	Net risk benefits to utility system operations (generation, transmission, distribution) from 1) Ability of flexible resources to adapt, and 2) Resource diversity that limits impacts, taking into account that DER need to be studied to determine if they reduce or increase utility system risk based on their locational, resource, and performance diversity	Flexible DERs (storage, flexible demand) can reduce risk by enabling the system to respond to disruptive events	Use proxy value for ability of system to respond to disruptive events	
			Model system with additional flexible resources	Quantitative estimation requires detailed economic modeling
		DERs need to be studied to determine if they reduce or increase utility system risk based on their locational, resource, and performance diversity.	Use proxy values for size and locational and resource diversity.	
			Portfolio analysis with risk assessment technique	Quantitative estimation requires detailed economic modeling

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Power System Level	Option value of individual resources	Impacts of individual resources on the cost of other potential resources	Estimates of impacts of one resource on the costs of others	Quantitative estimation requires detailed economic modeling
			Option value calculation based on scenario analysis of potential future resource choices	Quantitative estimation requires detailed economic modeling
			Portfolio analysis - comparison of alternative portfolios	Quantitative estimation requires detailed economic modeling
	Investment under Uncertainty: Real Options Cost / Value	Impacts of reduced flexibility / discovery of new information	Scenario analysis: calculation of real option value associated with different decision times & resources	Quantitative estimation requires detailed economic modeling
	Energy Demand Reduction Induced Price Effect	Change in Energy price, Net of Any Capacity Cost Change from Net CONE	AESC Estimate of DRIPE (Need to clarify whether accounts for impact on Net CONE)	
			Estimate of Energy Price change with an adjustment of impacts on Net CONE in ISO FCM	Quantitative estimation requires detailed economic modeling

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Power System Level	Greenhouse gas compliance costs	Forecast prices under RGGI and other market-based regulations (e.g. Clean Power Plan) + changes other compliance costs under likely environmental regulations	Forecasts of RGGI and CPP prices + estimates of likely compliance costs under any other GHG regulation	Quantitative estimation requires detailed economic modeling
		Forecast compliance costs associated with meeting the GHG emission targets in the Resilient Rhode Island Act	Estimates of likely compliance costs under RI GHG regulation	Quantitative estimation requires detailed economic modeling
		Net marginal emissions or emissions avoided from changes in resource use	Forecast of net emissions impacts from change in regional dispatch and resource mix	Quantitative estimation requires detailed economic modeling
	Criteria air pollutant and other environmental compliance costs	Changes in forecast compliance costs under air pollution or other environmental regulations	Forecasts of the costs of compliance under affected environmental regulations	Quantitative estimation requires detailed economic modeling
		Net marginal emissions or emissions avoided from changes in resource use	Forecast of net environmental impacts from change in regional dispatch and resource mix	Quantitative estimation requires detailed economic modeling
	Innovation and Learning by Doing	Experimentation Costs	Direct costs of innovation / demonstration programs	

		Anticipated rate of cost reduction or performance improvement	Qualitative assessment	
Power System Level	**Mixed Cost-Benefit, Cost, or Benefit Category**	**System Attribute Benefit/Cost Driver**	**Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)**	**Potential Visibility Requirements**
	Distribution capacity costs	Change in distribution capacity requirements generally with change in resources	Annualized statewide distribution capacity value associated with load growth * change in net demand (ICF)	
		Forecasted change peak distribution circuit requirements	Distribution planning studies	Requires detailed planning studies
		Location-specific DER hosting capacity	Analysis of capability to host DER with existing and already-planned facilities	Requires detailed planning studies
		Impacts on system performance, thermal and reactive power constraints, and associated investment and operating costs	Distribution planning studies	Requires detailed planning studies
	Distribution delivery costs	Location-specific distribution constraints, losses, equipment cycling, DLMP	Dynamic, multi-layered forecasts as a basis for circuit specific DER and Distribution System Plans	Requires interval or advanced metering functionality, modeling, and planning studies
			Analysis of time-, location-, and product-specific DLMP value, potentially leading toward DLMP markets	Requires interval or advanced metering functionality & analysis of actual power flows

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Power System Level	Distribution system safety loss/gain	Changes in risks, real-time information on system conditions, and training	Qualitative Assessment, Tracking and Assessment of Safety Metrics	Distribution system safety loss/gain
	Distribution system performance	Performance metrics include: voltage stability and equalization, conservation voltage reduction, operational flexibility, fault current / arc flash avoidance, and effective asset management	Distribution planning and benchmarking to best practices	Requires advanced metering functionality and / or distribution sensors
	Utility low income	Energy efficiency impacts on reducing utility arrearage carrying costs, uncollectibles, customer service and collection costs Incremental utility costs for low income efficiency programs net of system energy cost savings Expected impacts on customer voltages and power quality	Marginal impacts on arrearages, uncollectibles, and other utility costs Direct costs net of system general system benefits Voltage and power quality measurement and assessments	Requires advanced metering functionality and / or distribution sensors

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Power System Level	Distribution system and customer reliability / resilience impacts	Customer-specific & critical facility outage costs and value of uninterrupted service Expected impacts on the probability of outage Expected impacts on the duration of outages Expected impacts on customer voltages and power quality Costs of distribution improvements & microgrids	US DOE Interruption Cost Estimator Customer value of uninterrupted service studies Distribution system risk assessment studies Distribution system / microgrid resilience studies Voltage and power quality measurement and assessments Distribution planning and costing	Requires customer surveys Requires detailed planning studies Requires detailed planning studies Requires advanced metering functionality and / or distribution sensors Requires detailed planning studies
	Distribution system safety loss/gain	Changes in risks, real-time information on system conditions, and training	Qualitative Assessment, Tracking and Assessment of Safety Metrics	

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Customer Level	Program participant / prosumer benefits / costs	Direct participant / prosumer cost of technology, investment, and/or program participation costs Participant indirect costs (includes required behavioral changes and inconvenience costs) Participant non-energy impacts (includes value of improvements in quality of life)	Estimates of net direct costs Qualitative assessment Willingness to accept / pay estimates (observation or surveys) Qualitative value Deemed Benefits Not Reflected in Other Categories - Efficiency Technical Reference Manual Willingness to pay estimates (observation or surveys)	Requires customer surveys
	Participant non-energy costs/benefits: Oil, Gas, Water, Waste Water	Value of Energy and Water Savings / Requirements	AESC Estimate of Avoided Natural Gas, Oil, and Other Fuel Costs	
			Estimate of Net Costs or Cost Savings	Requires customer surveys

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Customer Level	Low-Income Participant Benefits	Improved comfort, reduced noise, increased property value, increased property durability, lower maintenance costs, improved health, and reduced tenant complaints.	Begin with values from Rhode Island EE cost-effectiveness analyses.	May require interval or advanced metering functionality
	Consumer Empowerment & Choice	Retail Competition, Facilitation of Flexible Demand, Integration of Commodity & Energy Services, Development of Platform Market, & Third Party DER Development	Qualitative Assessment	
	Non-participant (equity) rate and bill impacts	Utility revenue requirements, cost allocation and rate design	Long-term rate and bill analysis	
			Analysis of non-participant usage, price elasticity, and income patterns	May require interval or advanced metering functionality

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Societal Level	Greenhouse gas externality costs	GHG Externality Value net of RGGI costs	Customer willingness to pay for reductions in excess of compliance levels (observation or WTP surveys)	Requires customer surveys
			Societal cost estimates	
		Net marginal emissions or emissions avoided from changes in the use of resources	Forecast of net emissions impacts from change in regional dispatch and resource mix	Quantitative estimation requires detailed economic modeling
	Criteria air pollutant and other environmental externality costs	Criteria Pollutant (e.g. Fine Particulates) and other Environmental Externality Value Net of any Emission Allowance / Emission Credit Value	Customer willingness to pay for reductions in excess of compliance levels (observation or WTP surveys)	Requires customer surveys
			Societal cost estimates	
		Net marginal emissions or emissions avoided from changes in the use of resources	Forecast of net environmental impacts from change in regional dispatch and resource mix	Quantitative estimation requires detailed economic modeling
	Conservation and community benefits	Land use impacts (net of property costs for resource deployments): Loss of sink, habitat, historical value, sense of place	Value of carbon sink per acre	
			Environmental and historical conservation easement cost	
		Equity in distribution of harmful or nuisance infrastructure	Qualitative assessment	
			MW of infrastructure per acre, $ of infrastructure per value of property	

	Mixed Cost-Benefit, Cost, or Benefit Category	System Attribute Benefit/Cost Driver	Candidate Methodologies (Includes options with increasing specificity where multiple methods per driver)	Potential Visibility Requirements
Societal Level	Non-energy costs/benefits: Economic Development	Estimate of Impacts on State Product or Employment, Effects of land use change on property tax revenue	Qualitative Assessment	
			Economic modeling (e.g. input / output life-cycle analysis, property tax base studies)	Quantitative estimation requires detailed economic modeling
	Innovation and knowledge spillover (Related to demonstration projects and other RD&D preceding larger scale deployment)	RD&D, Strength of innovation eco-system, knowledge capture & sharing from public / utility/private sector funded initiatives	Qualitative Assessment	
	Societal Low-Income Impacts	Poverty alleviation, reduced energy burden, reduced involuntary disconnections from service, reductions in the cost of other social services, local economic benefits, etc.	Qualitative assessment or Adder	
			Direct estimate of cost savings	
			Alternate input factor in modeling of local economic impacts	Quantitative estimation requires detailed economic modeling
	Public Health	Indoor air quality, heating, cooling, and noise impacts of efficiency programs (Additional environmental and economic impacts on vulnerable customers addressed elsewhere)	Qualitative Assessment	
	National Security and US international influence	Impacts on oil imports	Analysis of oil imports into Rhode Island and the region	