**January 17, 2020**

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**Re: December 18, 2019 Energy Efficiency Transition Stakeholder Meeting: Evaluation, Measurement, and Verification, Written Comment, Docket No. QO19010040.**

## Introduction

The Energy Efficiency Alliance of New Jersey ("EEA-NJ") is a trade association dedicated to expanding the market for energy efficiency in the Garden State. Together with its sister organization, the Keystone Energy Efficiency Alliance ("KEEA"), EEA-NJ has more than 60 business members who provide energy efficiency products and services across the state, and support an industry that accounts for more than 30,000 New Jersey jobs. Our membership is large and diverse, with experience designing and implementing a variety of demand-side management solutions and energy efficiency programs across the globe. Simply stated, our members understand what works and what does not when it comes to successful demand-side reduction programs.

EEA-NJ appreciates the opportunity to engage with the New Jersey Board of Public Utilities ("BPU" or "Board") on program cost recovery under the Clean Energy Act ("CEA"). With these comments, the joint comment submitted with partners across the state, and the individual comments of our member companies and partners, EEA-NJ hopes to provide the BPU with the information required to create a thriving market for energy efficiency in New Jersey. Over the course of this proceeding, EEA-NJ has submitted numerous comments that discuss Evaluation, Measurement, and Verification best practices and incorporates those comments by reference herein.

## Clean Energy Act and Evaluation, Measurement, and Verification

The Clean Energy Act mandates that New Jersey's electric and gas utilities reduce energy usage. Specifically, the CEA requires that each electric utility achieve a minimum 2% reduction in energy usage per year, while each natural gas utility must achieve a minimum .75% reduction per year.[1]

For Evaluation, Measurement, and Verification purposes, the Clean Energy Act mandates:

> The energy efficiency programs and peak demand reduction programs shall have a benefit-to-cost ratio greater than or equal to 1.0 at the portfolio level, **considering both**

[1] The Clean Energy Act, N.J.S.A. §48:3-87.9(a).

> **economic and environmental factors**, and shall be **subject to review during the stakeholder process** established by the board pursuant to subsection f. of this section. The methodology, assumptions, and data used to perform the benefit-to-cost analysis shall be based upon **publicly available sources and shall be subject to stakeholder review and comment.** A **program may have a benefit-to-cost ratio of less than 1.0 but may be appropriate to include** within the portfolio if implementation of the program is in the public interest, including, but not limited to, benefitting low-income customers or promoting emerging energy efficiency technologies.[2]

Below, EEA-NJ has outlined key considerations for a proper Evaluation, Measurement, and Verification program and answered the questions provided by the BPU where relevant.

1. **The State should establish one test, using the National Standards Practice Manual (NSPM) as guidance, which can account for all costs and benefits in the programs and portfolios used and allow for transparency and predictability in the process.**

Based on plain language of the Act, New Jersey must use a Societal Cost Test or other similar test that values the environmental impacts of energy efficiency (EE) investments:

> " energy efficiency programs and peak demand reduction programs shall have a benefit-to-cost ratio of greater than or equal to 1.0 at the portfolio level considering both economic **and environmental factors"**[3]

To fulfill this mandate, EEA-NJ recommends that the BPU should build the benefit-to-cost test for energy efficiency programs from first principles. EEA-NJ believes that creating one test will provide the simplicity and clarity that the market needs to appropriately respond to New Jersey's policy goals. The NSPM is the best tool to incorporate a jurisdiction's relevant policy goals into a cost-effectiveness test of utility customer-funded energy efficiency programs.[4] The NSPM provides a multi-step process—The Resource Value Framework— to establish a comprehensive primary cost-effectiveness test for a jurisdiction.[5] The Framework encompasses a "jurisdiction's applicable policy goals, assigns value to all relevant impacts (costs and benefits) related to those goals, and embodies a set of universal principles representing sound economic and regulatory practices." [6]

NSPM relies on six guiding principles:

1. Recognize that energy efficiency is a resource;
2. Account for applicable policy goals;
3. Account for all relevant costs and benefits, even if hard to quantify the impacts;
4. Ensure symmetry across all relevant costs and benefits;

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[2] N.J.S.A. §48:3-87.9((d)(2) (emphasis added).
[3] Id.
[4] More information available at: https://nationalefficiencyscreening.org/the-national-standard-practice-manual-for-energy-efficiency/.
[5] *See* National Efficiency Screening Project, Overview: National Standard Practice Manual, April 2019, availble at https://nationalefficiencyscreening.org/wp-content/uploads/2019/07/NSPM-3-pg-overview-7.31.19.pdf.
[6] *See* National Efficiency Screening Project, Overview: National Standard Practice Manual, April 2019, available at https://nationalefficiencyscreening.org/wp-content/uploads/2019/07/NSPM-3-pg-overview-7.31.19.pdf.

5. Conduct a forward-looking, long-term analysis that captures incremental impacts of energy efficiency; and
6. Ensure transparency in presenting the analysis and the results.[7]

**A single test will allow for a transparent program design and evaluation process.**

A single test that considers costs and benefits symmetrically across programs and values all communities equally will ensure transparency and equity. If additional policy initiatives or goals require a separate test, such tests should be used sparingly and only where needed.

EEA-NJ members' experience in states that use multiple tests has shown that this approach can lead to confusion among both utilities and program implementers as to which factors are prioritized and valued by the state in the program determination process. The presenters referenced California as the standard of cost-benefit tests, but experience has shown that California's multi-test approach creates an opaque process, making it difficult for utilities and other participants to design portfolios that meet the standard. A single test that incorporates all factors and measurements streamlines evaluations for different utilities and eases the process for third-party implementers who design programs for multiple utilities.

To ensure the test stays up-to-date, the state should review factors and measurements at least every 3 years with input from the advisory group and other stakeholders to account for changing technology, improvement in measurement methodologies, and changing state policy goals.[8]

The state should not require low-income and other specialized sector- focused programs, to meet a specific benefit-to-cost test. The Clean Energy Act specifically directs the BPU to allow a benefit-to-cost ratio of less than one for programs that are "in the public interest, including but not limited to, benefitting low-income customers or promoting emerging energy efficiency technologies."[9]

**Considering all costs and all benefits, as provided in the NSPM's Resource Value Framework, will benefit ratepayers more than the Ratepayer Impact (RIM) Test. Applying a narrow Test such as the RIM test will harm ratepayers.**

Protecting ratepayers should be a priority for Clean Energy Act Program implementation, but doing so through enacting a limited test such as the RIM test from California would be counterproductive. The RIM test and similar tests effectively limit energy efficiency programs and focus on costs but not the corresponding benefits of programs. Even if the BPU decides to limit the benefit-to-cost test to bill impacts, the BPU must consider all bill impacts to determine whether or not the program benefits ratepayers. When benefits that directly impact ratepayers are excluded from the test, such as price suppression effects, avoided distribution and transmission costs, and other grid benefits, programs that offer clear bill reductions may be excluded, and customers' bills will be higher as a result.

**In designing the test, the State should account for non-energy benefits realized through strong energy efficiency policy.**

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[7] National Efficiency Screening, National Standards Practice Manual, available at https://nationalefficiencyscreening.org/national-standard-practice-manual/.

[8] We chose three years because the Clean Energy Act states that QPIs should be evaluated every three years and that could coincide with a review of the state's benefit-to-cost test.

[9] The Clean Energy Act, (d)(2).

The test should account for all quantifiable benefits that are goals of the Clean Energy Act and other relevant state policies. Benefits that cannot be quantified or are too burdensome to determine should be reported as qualitative values to ensure consideration in portfolio and program design.

2. **Evaluation, Measurement, and Verification (EM&V) should be transparent and consistent across regulatory administration and programs.**

EEA-NJ has the following recommendations for an EM&V process:

- The State should manage an online database accessible to the public with all filings and decisions, and a public online filing system with access to all BPU decisions and utility filings.
- The BPU should publish reporting requirements and deadlines for the state, utility, and third-party implementers with uniform processes and reporting forms to the extent possible (depending on program goals and methods of execution).
- Utilities should have access to all relevant information and evaluation processes for predictability in program design and program implementation processes.
- BPU should provide clear program goals and evaluation metrics prior to program filing so that utilities and program implementers can better design portfolios prior to evaluations.
- Program metrics should be flexible, and evaluation should be done at the portfolio level to allow for innovation, flexibility in program design and delivery expectations as required in the Clean Energy Act. Flexibility will allow standards and metrics for evaluation to accommodate programs that need a ramp up period, programs that prioritize innovation, and programs that target certain underserved sectors or communities.

3. **The Evaluation, Measurement, and Verification should be structured to create a productive and innovative feedback loop between evaluators and implementers. Metrics should measure data built around the policy goals of New Jersey and work toward improving policy implementation.**

- **Better evaluation for improved program performance**. Having independent evaluators for each separate utility that work with the utilities directly and report to a state unified evaluator can ensure that programs are constantly evaluated and adjusted to achieve best performance. Separate evaluators for separate utilities can dedicate their resources to collecting, evaluating, and responding to the data collected and working with the statewide evaluator to assure program metrics and expectations are met. Further consistent evaluation of program implementation best practices can identify what is and is not working so that programs can adjust accordingly. This flexibility guarantees that programs will improve and policy goals will be realized.
- **Establish flexible metrics** that focus on end goals of programs and allow room for programs to respond to market factors. To see more information see EEA-NJs comment on the BPU's Program Administration Straw Proposal.
- **Define clear roles** between on the ground quality assurance and daily evaluations (utility and third party) and upper level (state evaluators) so that there is no repeat in data

collection or unnecessary extra reviews. While the State will take an oversight role, utility-specific program evaluators will oversee the collection and management of day-to-day data and be charged with the task of adjusting programs as needed. This will lower administrative burdens for the State and streamline process evaluations.

- **Reporting requirements should be integrated into the portfolio cycle to the extent possible.** State evaluators should have semiannual, annual, and other phased reporting as required, while utilities' own evaluators are collecting, monitoring, and adapting programs on an ongoing basis to meet and fulfill these program metrics. Limiting data captured to only that which is necessary can lower administrative costs.

4. **The BPU should establish a Stakeholder Group for interested participants to engage in the EM&V process.**

The Clean Energy Act Requires that the BPU "establish an independent advisory group to study the evaluation, measurement, and verification process for energy efficiency and peak demand reduction programs … to provide recommendations to the board for improvements to the programs."[10] The stakeholder group should continue to be involved in the process through implementation. Inclusion of a stakeholder group creates "a shift in the nature of decision-making from an adversarial process to collaborations"[11]and "shield[s] efficiency programs from short-term swings in political power and policy priorities."[12]

One state that employs a successful example of stakeholder group process and involvement is Illinois. The Illinois Energy Efficiency Stakeholder Advisory Groups (SAG) operates as an independent stakeholder group which reviews final program design; establishes agreed-upon performance metrics for measuring portfolio and program performance; reviews efficiency plans' progress against metrics and against statutory goals; reviews program additions or discontinuations; reviews new proposed programs for the next implementation cycle; and reviews budget shifts when the change is more than 20%.[13] Such a stakeholder group in New Jersey could provide proper guidance and outsider evaluations at various steps in the process.

**Meeting-Specific Questions**:

Question Set 1:

- What models do we see for who conducts, reviews, and approves each of those?
    - *There should be a statewide evaluator, as well as an evaluator for each utility.*
    - *The utility evaluators should conduct evaluations often, adjusting programs as data is available.*
    - *Statewide evaluations should be done at a minimum on a semi-annual report, annual report; and to the extent programs run in 3 – 5 year phases, final phase reports.*

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[10] N.J.S.A. 48:3-87.9(g).

[11] Daniel Sosland, et al., Collaboration that Counts: The Role of State Energy Efficiency Stakeholder Comments, at 8-299, available at https://aceee.org/files/proceedings/2012/data/papers/0193-000250.pdf.

[12] Id. at 8-302.

[13] Illinois Energy Efficiency Stakeholder Advisory Group, SAG Background, available at https://www.ilsag.info/background/ ; (ComEd Final Order, 07-0540 at 32; Ameren Final Order, 07-0539 at 24)

- How can stakeholders provide technical or on-the-ground expertise into the process? *See Above Section on Significance of an Active and Informed Stakeholder Group.*
- What model(s) for program evaluators should New Jersey consider? *Illinois, Massachusetts, Connecticut*

Question Set 2:

- How should the EM&V process intersect with filing requirements? What types of information are needed when, and from whom? *To the extent possible, state level EM&V protocol should overlap with filing requirements*.

Question Set 3:

- Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended? *New Jersey should follow the Resource Value Framework and, to the extent practicable, establish one test. The Test should have updates on 3 or 5 year timeline to align with portfolio filings.*
- What are the costs and benefits that you would recommend for consideration in a single benefit-cost test? *As previously stated, EEA-NJ recommends that the BPU utilize the NSPM to evaluate what specific costs and benefits to consider based on relevant policy goals of the State.*
    - Are there indirect or non-energy related costs or benefits that should be considered? *The test should include factors that account for non energy benefits and other benefits and costs that capture state policies and EE. These include, but are not limited to, carbon reduction, health benefits, and customer satisfaction.*
    - If so, how can they be estimated? *Utilize NSPM methods and where able to quantify them. If they cannot be quantified, then they should be qualitatively measured in a separate section so that they are at least accounted for in the process and valued in some way.*

Question Set 4:

- What are the most important factors to address in measurement and verification of energy savings? *See above comments on EM&V*
- Should programs be evaluated based on gross or net savings? *Whether or not gross or net savings are appropriate depends upon the specific goals and circumstances of the program or initiative.*
    - For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings? *If the state is to use these measures it should incorporate actual versus metered savings in a multistep process where data can be protected and used in a reliable and valuable way (both for consumers and industry) .*

The approach will ensure that New Jersey surpasses the energy reduction goals in the Clean Energy Act.

Sincerely,

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**RE:** New Jersey Energy Efficiency (sometimes abbreviated herein as "EE") Transition Comments of Atlantic City Electric Company on Evaluation, Measurement and Verification

Dear Secretary Camacho-Welch:

On behalf of Atlantic City Electric Company ("ACE" or the "Company"), please accept these comments as a complement to the Stakeholder Meeting on Evaluation, Measurement and Verification ("EM&V") that took place December 18, 2019. The stakeholder meeting continued engagement on the energy efficiency transition and included a discussion regarding "how programs will be selected for inclusion in the portfolio of new and existing State and utility-run programs, how energy savings will be determined in each program, and how reported savings will be verified to be counted towards meeting the goals of the Clean Energy Act (the "Act") and assessing any associated returns, rewards, or penalties, as well as determining programs' continued inclusion in subsequent program year portfolios."[1] ACE appreciated the opportunity to participate in that stakeholder meeting and provides these additional comments for consideration.

## Background

The Act states that: "[e]ach electric public utility shall be required to achieve annual reductions in the use of electricity of two percent of the average annual usage in the prior three years within five years of implementation of its electric energy efficiency program. Each natural gas public utility shall be required to achieve annual reductions in the use of natural gas of 0.75 percent of the average annual usage in the prior three years within five years of implementation of its gas energy efficiency program. The amount of reduction mandated by the [New Jersey Board

[1] BPU Notice dated November 26, 2019.

of Public Utilities [the "Board" or "BPU"] that exceeds two percent of the average annual usage for electricity and 0.75 percent of the average annual usage for natural gas for the prior three years shall be determined pursuant to the study conducted pursuant to subsection b. of this section until the reduction in energy usage reaches the full economic, cost-effective potential in each service territory, as determined by the [B]oard."[2]

## Overview

The Company recognizes the importance of EM&V to understanding the success of the proposed energy efficiency programs, including methods to verify reported energy savings in compliance with the Act. As has been demonstrated in Maryland and other states, "[d]etermining and validating electricity savings and related impacts is a critical component of Energy Efficiency and Demand Response programs. The process of EM&V of resulting program savings is particularly important in determining the effectiveness of program delivery, the factors driving or impeding customer participation in programs, characteristics of participants and non-participant customers, determinants of equipment decisions, and customer satisfaction with program delivery."[3] In this light, the Company's answers to the BPU-asked questions regarding EM&V are below.

## EM&V

**Question Set 1:**

- **What types of evaluations and studies (BCA, baseline, process, impact) are necessary, in what cadence and frequency?**

  In addition to cost benefit analysis ("CBA"), impact evaluations should be a top priority to determine program effectiveness, as these evaluations "can determine direct and indirect performance of an energy efficiency program."[4] Impact evaluations support cost-effectiveness analyses[5] by determining program-specific induced effects.[6] Program

[2] N.J.S.A. 48:3-87.9
[3] Public Service Commission of Maryland, The EmPOWER Maryland Energy Efficiency Act Report of 2019 (July 2019), p. 19, *available at* https://www.psc.state.md.us/wp-content/uploads/2019-EmPOWER-Maryland-Energy-Efficiency-Act-Standard-Report.pdf
[4] SEE Action, SEE Action Guide for States: Evaluation, Measurement, and Verification Frameworks—Guidance for Energy Efficiency Portfolios Funded by Utility Customers (January 2018), p. 12, *available at* https://emp.lbl.gov/sites/default/files/emv_framework_final2_1.12.18.pdf
[5] SEE Action, SEE Action Guide for States: Evaluation, Measurement, and Verification Frameworks—Guidance for Energy Efficiency Portfolios Funded by Utility Customers (January 2018), p. 12, *available at* https://emp.lbl.gov/sites/default/files/emv_framework_final2_1.12.18.pdf
[6] SEE Action, Energy Efficiency Program Impact Evaluation Guide (December 2012), p. 3-1, *available at* https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf

impacts can include energy and demand savings and non-energy benefits such as avoided emissions, job creation/local economic development, and water savings.[7]

Impact evaluations are used for determining achieved program effects. Savings cannot be directly measured, only indirectly determined by comparing energy use and demand after a program is implemented to what they would have been had the program not been implemented (i.e., the baseline). According to a 2012 SEE Action Report, "[s]uccessful evaluations harmonize the costs incurred with the value of the information received; in other words, they appropriately balance risk management, uncertainty, and cost considerations."[8] Effective use of impact analysis is to apply the findings prospectively when preparing for a new program cycle. This way, the results and learnings of the implemented programs can be applied to improve future programs.

In general, a good evaluation process follows these basic steps:

- set the program evaluation objectives in the context of the program policy objectives;
- select an impact evaluation savings determination approach;
- determine energy and demand savings;
- determine non-energy benefits;
- report the evaluation results; and
- work with program administrators to implement recommendations for future program improvements.

In a three-year program cycle, each program should generally be evaluated once. However, this is also based on specific programs. For instance, if a program is based on deemed values determined by a technical resource manual and those values have been consistent and there have been no significant changes in technology, then an annual desk review of the program may be adequate. If there have been technology advancements or if more granular meter or system data is available, then a more routine and robust review should be applied. Finally, evaluations should be managed so that they are not conducted concurrently to manage budgets, resources, and reduce program impacts.

- **What models do we see for who conducts, reviews, and approves each of those?**

  In Maryland, the utility as the program administrator files program plans with the Public Service Commission ("PSC") that include cost-benefit analysis. Certain thresholds must be achieved for program approval.

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[7] SEE Action, SEE Action Guide for States: Evaluation, Measurement, and Verification Frameworks—Guidance for Energy Efficiency Portfolios Funded by Utility Customers (January 2018), p. 12, *available at* https://emp.lbl.gov/sites/default/files/emv_framework_final2_1.12.18.pdf

[8] SEE Action, Energy Efficiency Program Impact Evaluation Guide (December 2012), p. 3-2, *available at* https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf

Program filings also include budgets for evaluation, measurement and verification. In Maryland, the utility as program administrator works with a third-party vendor to oversee each program's EM&V process. This work is also overseen by the State's EM&V vendor, which verifies the validity of the evaluation process and the results and approves the work to proceed.

- **How can stakeholders provide technical or on-the-ground expertise into the process?**

  Maintaining stakeholder engagement throughout EM&V can be helpful, as EM&V continues through planning, implementation, and evaluation, with the idea that programs will be updated over time.[9] Ongoing engagement can be especially important for programs that do not use deemed values or deemed algorithms. Upfront, proactive communication is key; it can be particularly helpful to communicate upfront with stakeholders about planned EM&V practices, including, for example, deemed savings values that will be used for evaluation purposes during the program cycle; net-to-gross ratios; avoided costs; and how and when changes based on EM&V results are incorporated.

- **What model(s) for program evaluators should New Jersey consider?**

  Maryland developed an evaluation process that uses a Guidance Document to outline the roles and responsibilities of participating entities, as well as timelines, budget allocations for EM&V, stakeholder processes and coordination. The process is supported by a State vendor serving as an independent third party that participates in working groups and ensures consistency through all vendors evaluating the utility programs.

  Pennsylvania takes a different approach. There, each utility offering an energy efficiency program hires its own EM&V vendor and then reports to the state.

**<u>Question Set 2</u>:**

- **How should the EM&V process intersect with filing requirements? What types of information are needed when, and from whom?**

  EM&V should be part of each program's initial filing requirement. An EM&V schedule and budget should be defined as part of the program design and costs. Adequate resources for EM&V are typically 4% of the program budget but can be higher or lower depending on the age, size and complexity of the program. According to a 2017 report from the American Council for an Energy Efficient Economy ("ACEEE"), "[r]esearch has shown that utilities spend about 3–5% of efficiency portfolios on EM&V. However, it is worth noting that, while the percentages are within a similar range, the absolute amounts vary significantly due to the wide differences in portfolio budgets."[10]

[9] ACEEE (2017), *available at* https://aceee.org/sites/default/files/va-scc-emv-072817.pdf
[10] [NEED TO ADD A CITATION FOR THIS QUOTE]

- **What is needed in this transition period (through launch of new programs) and the long term (~5-year goal and beyond)?**

  A consistent and transparent EM&V process for all program administrators should be established. This process should be documented and referenced when reviewing program filings and throughout program implementation to keep evaluations on schedule. Such schedule will depend on the type of program.

- **Should New Jersey evolve towards a unified framework for all distributed energy resources?**

  ACE has no comment on this question at this time but reserves the right to comment as the proceeding develops.

**Question Set 3:**

- **Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended?**

  New Jersey currently develops and considers all five tests of the California Standard Practice Manual (Participant Cost Test, Program Administration Cost Test, Ratepayer Impact Measure Test, Total Resource Cost Test ("TRC") and Societal Cost Test). While this information may be helpful, it is not clear how each test is being considered with the others, and if any one test takes particular precedence over the other. Therefore, ACE suggests that New Jersey determine the primary cost test that meets its key policy initiatives and properly accounts for the non-energy benefits the State is working to support. The Company suggests the Societal Cost Test (SCT) is most appropriate as it quantifies the non-energy benefits delivered by the energy efficiency programs. However, as energy savings become more difficult to achieve, the State will need to consider other ways to evaluate program impacts such as greenhouse gas emissions, health impacts, and economic value. Therefore, ACE may be supportive of investigating a National Standard Practice Manual ("NSPM") approach in the next program cycle if it can assist in meeting statewide goals. The NSPM allows for jurisdictions to consider policy and societal implications when defining cost-effectiveness. The result is often considered a "modified TRC." While Maryland has not specifically identified the NSPM as a guiding document, the state does use a modified TRC when evaluating program and portfolio cost-effectiveness.

- **What are the costs and benefits that you would recommend for consideration in a single benefit-cost test?**

  Any benefit-cost test should evaluate the incremental cost of the measures against the avoided energy costs and the customer realized energy savings, such as:
  - Electric Energy and Demand Savings;
  - Electricity Demand Reduction Induced Price Effects (DRIPE);

- Participant Fuel Savings (including natural gas, oil and propane);
- Participant Water Savings;
- Avoided Lamp Replacement Costs;
- Participant Comfort;
- Reduced Electric Bill Arrearages; and
- Air Emissions.

- **Are there indirect or non-energy related costs or benefits that should be considered? If so, how can they be estimated?**
  - GHG reductions – system-wide reductions per avoided kWh;
  - water savings – gallons saved per EE device installed; and
  - health and safety factors – monetize avoided health expenses via a deemed value adder determined by BPU Staff and Stakeholders prior to utility program filings.
  - *See also* the first response above in Question Set 1 regarding impact evaluations, which help determine other benefits of energy efficiency programs.

**Question Set 4:**

- **What are the most important factors to address in measurement and verification of energy savings?**
  - It is important to balance rigor with flexibility when considering evaluation parameters and reporting requirements. The analytic framework for utility EE programs should articulate the most important goals and metrics to provide transparency and confidence in results but should not create unnecessary burdens or restrictions on program design, administration, and implementation, nor unnecessarily increase cost. In general, the greater the granularity of program goals and the stricter the reporting and performance requirements, the more expensive and constrained the program will be at achieving its goals.
  - Defining the rules and processes upfront is important to align expectations and send the right signals to all program actors. This includes utility representatives, the third-party evaluator, and implementation contractors. It has proven beneficial elsewhere (specifically in the Pepco and Delmarva Power & Light Company service territories in Maryland), that upfront communication in which deemed savings values that will be used for evaluation purposes during the program cycle are defined, net-to-gross ratios are defined, avoided costs are established, and other EM&V planned practices, such as when any EM&V findings are to be incorporated in program planning and applied to new programs, are communicated to all parties.
  - Following standard practices used across the industry leverages lessons learned and provides ready-to-use frameworks for determining and verifying savings.
  - Filing requirements should be uniform for all EE programs statewide and based on five-year program cycles to match the Clean Energy Act time horizon. Program results and certainty is ensured when consistent deemed values are applied to the entire program

cycle. Program goals and reporting should be at the gross wholesale level, and program results should be reported annually within a minimum of 75 days of program-year end.

- **Should programs be evaluated based on gross or net savings?**

  For goal achievement and reporting purposes, the gross savings level should be used. This allows for comparisons across programs and territories that may have different net-to-gross ratios and provides a true picture of customer-realized savings. Further, gross values provide the real impact on the grid sales that are taking place. "Gross Market Savings: The change in energy consumption and/or demand that results from energy efficiency programs, codes and standards, and naturally occurring adoption, which have a long-lasting savings effect. Gross market savings generally do not include temporary reductions in energy use from changes in weather, income, energy prices, and other structural economic changes such as in industry composition."[11]

- **For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings?**

  Deemed savings approaches are standard practice for midstream and upstream programs as their cost-effectiveness if technical resource manual assumptions are periodically reviewed and updated by multiple stakeholders. End-use metering is sometimes used to improve deemed savings estimates. Midstream and upstream programs also require surveys of program actors, including distributors, contractors and customers to assess free-ridership and spillover. "The deemed savings approach is most commonly used for programs that involve simple new construction, or for retrofit energy efficiency measures with well-defined applications and savings calculations that have been verified with data."[12]

  Deemed savings approaches are also standard practice for prescriptive programs, along with customer and contractor interviews. Programs delivering projects with unique baselines, e.g., Commercial & Industrial custom and Home Audit and Retrofit, often require engineering calculations, simulation or end use metering to estimate ex-post savings for each project. Billing analysis is also used for Home Audit and Retrofit type programs (where there is a single utility meter per dwelling). "It should be noted that the term billing analysis is often used generically to describe any analytic methodology used to determine project or program energy savings based on the use of the energy consumption data contained in consumer billing data. It compares billing data from program participants

[11] SEE Action, Energy Efficiency Program Impact Evaluation Guide (December 2012), p. A-7, *available at* https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf
[12] SEE Action, Energy Efficiency Program Impact Evaluation Guide (December 2012), p. 4-12, *available at* https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf

over a period of time before the energy efficiency measures are installed at customer sites to billing data for a comparable period of time afterward."[13]

- **How should advanced M&V (automated data processing/increased data granulation) be integrated into EM&V?**

  Advanced M&V may be appropriate for certain programs. However, in some cases, like Home Performance with Energy Star ("HPwES"), more data is not necessarily better. In Maryland, the PSC requested quarterly evaluations for HPwES to ensure that the incentives aligned with savings. (The program was previously evaluated using a year-over-year billing analysis.) The additional M&V did not yield statically significant results.

  Advanced M&V may be appropriate for commercial programs, however, as energy efficiency measures for buildings are variable and dependent on specific systems. Granular data can help to benchmark buildings against each other and determine the best energy-saving processes and results.

- **When should it be incorporated?**

  Advanced Metering Infrastructure ("AMI") is necessary for advanced M&V so deployment of AMI meters will be necessary before advanced practices can be applied to program EM&V.

- **What are best practices related to accuracy/confidence/reporting?**

  When program administrators report results from several programs, it is important to have a common template so all data can be compiled into the same format and compared across programs. This format could be in an Excel spreadsheet or input directly to a database.

  Projects that are unique in nature, like custom installations and new processes and technologies, often implemented by large energy use customers, require specific comparisons of the energy use prior and after the measures were installed. Other tried-and-true energy-saving measures, like prescriptive lighting, appliances, and other resources that have been measured, can use a deemed savings approach. There is confidence in each practice as it is appropriate for the specific end use and the routine nature of the technology.

[13] SEE Action, Energy Efficiency Program Impact Evaluation Guide (December 2012), p. 4-6, *available at* https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf

ACE appreciates the opportunity to comment on this important matter and looks forward to its continued participation in this proceeding.

Respectfully submitted,

Philip J. Passanante
An Attorney at Law of the
State of New Jersey

**To:** **Aida Camacho-Welch, Secretary of the New Jersey Board of Public Utilities (EnergyEfficiency@bpu.nj.gov)**
**From:** **Kara Saul Rinaldi, Vice President of Government Affairs, Policy and Programs Building Performance Association**
**Re:** **Energy Efficiency EM&V and Filing & Reporting**
**Date:** **January 17, 2020**

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Thank you for the opportunity to engage with the New Jersey Board of Public Utilities ("NJBPU" or "Board") on the state's Evaluation, Measurement & Verification (EM&V) process. The Building Performance Association (BPA) is a 501(c)6 industry association dedicated to advancing the home and building performance industry by ultimately delivering improved energy efficiency, health, safety, and environmental performance of buildings. BPA was created to combine the expertise and resources of the Home Performance Coalition, Efficiency First, and Home Energy Magazine.

As leaders in the residential energy efficiency industry, we appreciate your consideration of the following comments in response to the questions put forth by the NJBPU as the Board considers its EM&V processes. BPA hopes to provide the NJBPU with information and guidance for undertaking a process to develop a cost test that is based on sound economic principles and best meets the needs and values of the state. This response links to several studies and resources to assist the Board.

**Question Set 3:**

**Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended?**

The BPA urges NJBPU to follow the Resource Value Framework and the specific process outlined in the National Standard Practice Manual to develop a "New Jersey" test that is based on sound economic principles and best meets the needs and values of the state. The May 2017 National Standard Practice Manual (NSPM), available on the National Efficiency Screening Project's website, provides an implementation guide for reforming cost-benefit analysis methods. The NSPM builds and expands upon the decades old California Standard Practice Manual and provides current experience and best practices.

We commend the NJBPU for including a presentation on the NSPM at the December 18, 2019 Energy Efficiency EM&V and Filing & Reporting Stakeholder Meeting on Evaluation, Measurement, and Verification.

As you know, the NSPM offers a framework that is based on a set of core principles that focuses on ensuring alignment of testing practices with a jurisdiction's applicable policy goals.

It addresses the importance of treating energy efficiency as a resource and the range of associated utility system impacts that should be considered in any cost-effectiveness analysis. The NSPM further emphasizes the principle of symmetrical treatment of relevant costs and benefits, and provides a range of approaches that can be used to account for applicable hard-to-monetize costs and benefits (such as non-energy impacts). The guidance covers a wide range of fundamental aspects of cost-benefit analyses (including data, assumptions, and methodology) and on the adequate consideration of all relevant costs and benefits for both the utility system and the non-utility system.

We believe the NSPM framework and its step-by-step approach would provide NJBPU an opportunity to determine whether its current cost-effectiveness testing reflects New Jersey's own energy goals and policies. BPA and other members of the National Efficiency Screening Project would be pleased to brief the NJBPU or other state Agencies on how a "New Jersey" test could be developed to best meet the needs of the policymakers and ratepayers in New Jersey.

The NSPM sets forth broad principles for accomplishing these goals:

## National Standard Practice Manual Principles

| | |
|---|---|
| **Efficiency as a Resource** | EE is one of many resources that can be deployed to meet customers' needs, and therefore should be compared with other energy resources (both supply-side and demand-side) in a consistent and comprehensive manner. |
| **Policy Goals** | A jurisdiction's primary cost-effectiveness test should account for its energy and other applicable policy goals and objectives. These goals and objectives may be articulated in legislation, commission orders, regulations, advisory board decisions, guidelines, etc., and are often dynamic and evolving. |
| **Hard-to-Quantify Impacts** | Cost-effectiveness practices should account for all relevant, substantive impacts (as identified based on policy goals,) even those that are difficult to quantify and monetize. Using best-available information, proxies, alternative thresholds, or qualitative considerations to approximate hard-to-monetize impacts is preferable to assuming those costs and benefits do not exist or have no value. |
| **Symmetry** | Cost-effectiveness practices should be symmetrical, where both costs and benefits are included for each relevant type of impact. |
| **Forward-Looking Analysis** | Analysis of the impacts of resource investments should be forward- looking, capturing the difference between costs and benefits that would occur over the life of the subject resources as compared to the costs and benefits that would occur absent the resource investments. |

| | |
|---|---|
| **Transparency** | Cost-effectiveness practices should be completely transparent, and should fully document all relevant inputs, assumptions, methodologies, and results. |

It is also important that the development of a primary cost test be forward-looking and support the integration of other distributed energy resources (DERs) going forward—including demand response, distributed generation, distributed storage, electric vehicles, and strategic electrification technologies. The core concepts of the NSPM can be applied to other types of resources as well. The cost-effectiveness principles described in Chapter 1, and the Resource Value Framework described in Chapter 2, can be used to assess the cost-effectiveness of supply-side resources or DERs. Additionally, the NSPM is actively being expanded to address benefit-cost analysis for a host of DERs and will be available in Summer 2020. For general information about this effort, see: https://nationalefficiencyscreening.org/the-national-standard-practice-manual-for-ders/.

Since the release of the NSPM in May 2017, the National Efficiency Screening Project (NESP) has worked with numerous states to provide briefings, host webinars and conduct workshops to examine ways to incorporate the NSPM principles and related step-by-step planning process into existing state approaches towards cost-effectiveness testing. Rhode Island, New Hampshire, Arkansas, and Minnesota are examples of states that have applied the NSPM framework in their state planning and regulatory review processes on cost-effectiveness. In New Hampshire, a stakeholder working group applied the NSPM at the direction of the NH Public Utilities Commission, which resulted in a report including the recommendation to use a NH-specific Granite State Test. The Commission approved the recommendation in Order 26,322. This state experience shows how application of the NSPM framework, and the underlying principles, can lead to a state revising its existing test to better align with its applicable state policies and also ensure symmetry in the treatment of costs and benefits. See the NESP New Hampshire Case Study and other state case studies at https://nationalefficiencyscreening.org/resources/case-studies/.

The Building Performance Association and other members of the National Efficiency Screening Project would be pleased to brief the NJBPU or other state Agencies on how a "New Jersey" test could be developed to best meet the needs of the policymakers and ratepayers in New Jersey.

**What are the costs and benefits that you would recommend for consideration in a single benefit-cost test?**

- **Are there indirect or non-energy related costs or benefits that should be considered?**
- **If so, how can they be estimated?**

We recommend that the NJBPU follow the principles of the NSPM, listed in the section above, when considering which cost and benefits to include in a single "New Jersey" benefit-cost test. These are discussed in greater detail on pages 9-14 of the manual. To summarize, treating efficiency as a resource, a core principle, requires that utility system impacts (costs and benefits) be fully accounted for in benefit-cost analysis. In the case of participant impacts, if

participant costs are included, then all substantive benefits should also be included (even if hard to quantify[1]). In the case of societal impacts, these should be accounted for to the extent they align with New Jersey's applicable policies. The NSPM process can help the state identify and articulate such relevant goals, and associated impacts.

***Indirect or non-energy related costs or benefits that should be considered[2]***

Health benefits are a critical externality that should be accounted for when the NJBPU considers the non-energy benefits associated with energy efficiency. The health benefits associated with indoor air quality have been well-documented. Occupant Health Benefits of Residential Energy Efficiency, released in November 2016 by E4TheFuture, reviews national and international studies that demonstrate the high price of inefficient homes. Energy efficiency home improvements lead to fewer asthma symptoms and emergency room visits in addition to better overall physical and mental health.

Energy efficiency also reduces air pollution emissions, including greenhouse gasses that contribute to adverse climate change impacts, and "criteria" pollutants regulated under the Clean Air Act and NJ law. These criteria pollutants have direct impacts on human health and the ability of NJ to meet National Ambient Air Quality Standards (NAAQS). ACEEE's February 2018 report Saving Energy, Saving Lives: The Health Impacts of Avoiding Power Plant Pollution with Energy Efficiency addresses the health impacts of poor air quality and the benefits that could be shown across the country with a 15% reduction in annual electric consumption. ACEEE ranked the states based on the potential dollar value of avoided health harms and New Jersey was ranked 12th out of the fifty states. Beyond the health and environmental impacts, NAAQS nonattainment could also represent additional costs to the state. Non-attainment could lead to additional environmental regulatory requirements that the state and utilities would need to address. Furthermore, such environmental concerns could constrain opportunities for industrial location and expansion.

NJ has been a leader, following Superstorm Sandy, in supporting energy resilience of critical facilities. The NJBPU recognizes that increased energy efficiency lowers many other costs associated with energy use—from water, waste water, and land impacts associated with energy extraction and power generation to reducing stresses on the grid that reduces the time for outages that support hospitals and emergency responders to allowing the grid to operate better through demand response and DER integration.[3] All these non-energy benefits should

[1] A recent blog post by Advanced Energy Economy discusses the symmetry issue, available here: https://blog.aee.net/why-a-bandage-fix-for-cost-effectiveness-testing-isnt-enough?hs_preview=LxjeOvIV-24379606963.

[2] Participant and societal non-energy impacts deserve consideration in energy planning. Participants deem non-energy costs and benefits from the programs while NJ laws add societal value including such as the Global Warming Solutions Fund Act of 2008, the New Jersey Indoor Air Quality Standard of 2007, and the Air Pollution Control Act, among others.

[3] https://www.renewjerseystronger.org/wp-content/uploads/2015/06/Sandy_5_Years_After_10_13_17_v3-2.pdf

be considered in the state's benefit-cost test; as outlined in the NSPM, alignment with state policies is appropriate.

The value of economic development and job creation are additional non-energy benefits that New Jersey should consider. New Jersey is underperforming in energy efficiency job creation and ranks 47th in the nation among states in per capita employment in this critical clean job creation category (see Appendix A). Ensuring adequate consideration for job creation benefits in cost-benefit tests could help develop more robust energy efficiency industry investment levels in New Jersey. Many jurisdictions are increasingly interested in accounting for the broader economic development and job-creation benefits from energy efficiency investments that use ratepayer funds, and a few states have included these broader economic benefits of energy efficiency investments in their cost–benefit tests. Rhode Island, for example, has explicitly included a specific valuation for increased local economic growth in its Rhode Island Test for evaluating utility plans (Rhode Island PUC 2017). The American Council for an Energy-Efficient Economy (ACEEE) has created a State Policy Toolkit on Measuring the Economic Development Benefits of Energy Efficiency that provides guidance on methods that jurisdictions can use to estimate these economic impacts.

***How they can be estimated***

As detailed in the NSPM, there are a variety of ways to develop estimates of impacts that are reasonable enough to inform investment decisions (see discussion in Chapter 7). *Using "best available" information to approximate hard-to- quantify impacts is preferable to assuming that those costs and benefits do not exist or have no value.* In a worst-case scenario, excluding substantive impacts from efficiency resource assessment will lead to results that are inaccurate and misleading. Chapter 7 of the NSPM discusses using studies from within or outside of a jurisdiction to develop monetary values, as well as approaches for addressing hard-to-monetize impacts including use of proxies (adders) and/or alternative thresholds. Further guidance on estimating a range of impacts can be found in the Database on State Efficiency Screening Practices (DSESP) at https://nationalefficiencyscreening.org/state-database-dsesp/.

Thank you for this opportunity to submit comments. Please do not hesitate to contact me with questions.

Sincerely,

Kara Saul Rinaldi
Vice President of Government Affairs, Policy, and Programs
Building Performance Association
kara.saul-rinaldi@building-performance.org; 202.276.1773
www.building-performance.org

## Appendix A

# US Energy Efficiency (EE) Per Capita

| State | Gross EE Jobs | Population | EE Jobs Per Capita | Per Capita Rank | Gross Jobs Rank |
|---|---|---|---|---|---|
| DC | 12,807 | 702,455 | 0.0182 | 1 | 36 |
| VT | 11,035 | 626,299 | 0.0176 | 2 | 41 |
| WY | 7,528 | 577,737 | 0.0130 | 3 | 45 |
| DE | 12,514 | 967,171 | 0.0129 | 4 | 38 |
| MA | 86,473 | 6,902,149 | 0.0125 | 5 | 7 |
| RI | 12,773 | 1,057,315 | 0.0121 | 6 | 37 |
| MD | 70,530 | 6,042,718 | 0.0117 | 7 | 11 |
| WI | 63,141 | 5,813,568 | 0.0109 | 8 | 14 |
| OR | 42,547 | 4,190,713 | 0.0102 | 9 | 20 |
| UT | 31,798 | 3,161,105 | 0.0101 | 10 | 25 |
| CT | 35,597 | 3,572,665 | 0.0100 | 11 | 23 |
| VA | 78,670 | 8,517,685 | 0.0092 | 12 | 10 |
| NH | 11,733 | 1,356,458 | 0.0086 | 13 | 39 |
| MI | 85,061 | 9,995,915 | 0.0085 | 14 | 8 |
| SD | 7,496 | 882,235 | 0.0085 | 15 | 46 |
| WA | 63,877 | 7,535,591 | 0.0085 | 16 | 13 |
| NC | 86,559 | 10,383,620 | 0.0083 | 17 | 6 |
| IN | 55,090 | 6,691,878 | 0.0082 | 18 | 16 |
| MN | 46,191 | 5,611,179 | 0.0082 | 19 | 18 |
| MT | 8,673 | 1,062,305 | 0.0082 | 20 | 43 |
| CA | 318,542 | 39,557,045 | 0.0081 | 21 | 1 |
| TN | 53,006 | 6,770,010 | 0.0078 | 22 | 17 |
| ND | 5,425 | 760,077 | 0.0071 | 23 | 50 |
| IL | 89,469 | 12,741,080 | 0.0070 | 24 | 5 |
| NE | 13,533 | 1,929,268 | 0.0070 | 25 | 35 |
| OH | 81,676 | 11,689,442 | 0.0070 | 26 | 9 |
| MO | 41,845 | 6,126,452 | 0.0068 | 27 | 21 |
| IA | 20,587 | 3,156,145 | 0.0065 | 28 | 30 |
| ME | 8,647 | 1,338,404 | 0.0065 | 29 | 44 |

| | | | | | |
|---|---|---|---|---|---|
| NY | 123,292 | 19,542,209 | 0.0063 | 30 | 3 |
| AL | 30,821 | 4,887,871 | 0.0063 | 31 | 26 |

| State | Gross EE Jobs | Population | EE Jobs Per Capita | Per Capita Rank | Gross Jobs Rank |
|---|---|---|---|---|---|
| AK | 4,617 | 737,438 | 0.0063 | 32 | 51 |
| AZ | 43,418 | 7,171,646 | 0.0061 | 33 | 19 |
| CO | 34,342 | 5,695,564 | 0.0060 | 34 | 24 |
| KS | 17,287 | 2,911,505 | 0.0059 | 35 | 31 |
| SC | 29,984 | 5,084,127 | 0.0059 | 36 | 27 |
| GA | 61,193 | 10,519,475 | 0.0058 | 37 | 15 |
| KY | 25,530 | 4,468,402 | 0.0057 | 38 | 28 |
| TX | 162,816 | 28,701,845 | 0.0057 | 39 | 2 |
| FL | 118,412 | 21,299,325 | 0.0056 | 40 | 4 |
| PA | 68,820 | 12,807,060 | 0.0054 | 41 | 12 |
| MS | 15,403 | 2,986,530 | 0.0052 | 42 | 32 |
| AR | 15,147 | 3,013,825 | 0.0050 | 43 | 33 |
| ID | 8,747 | 1,754,208 | 0.0050 | 44 | 42 |
| LA | 22,152 | 4,659,978 | 0.0048 | 45 | 29 |
| HI | 5,850 | 1,420,491 | 0.0041 | 46 | 48 |
| **NJ** | **36,206** | **8,908,520** | **0.0041** | **47** | **22** |
| WV | 6,844 | 1,805,832 | 0.0038 | 48 | 47 |
| NV | 11,155 | 3,034,392 | 0.0037 | 49 | 40 |
| OK | 14,372 | 3,943,079 | 0.0036 | 50 | 34 |
| NM | 5,636 | 2,095,428 | 0.0027 | 51 | 49 |

Sources: Energy Efficiency Jobs in America published September 2019. Population numbers are US Census estimations for 2018

Unless otherwise stated, all data are from the 2019 U.S. Energy and Employment Report (March 2019), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP). The methodology for this report was adopted by the U.S. Dept. of Energy for its 2017 U.S. Energy and Employment Report (USEER), approved by the Office of Management and Budget and grounded on data collected by the Bureau of Labor Statistics.

*Methodology Notes from the USEER Report* - A key component of the USEER employer survey is the ENERGY STAR program. In addition to identifying jobs that manufacture ENERGY STAR labeled products, the USEER identifies employment in building design and contracting services that provide insulation, improve natural lighting, and reduce overall energy consumption across homes and businesses.

The USEER Energy Efficiency employment figures include only work with Energy Star efficient technologies or building design and retrofits. The report does not capture employment related to energy-efficient manufacturing

processes. It does capture employment associated with CHP and waste-heat to power. Demand growth for efficient technology and building upgrades has driven expansion across many traditional industries, including construction trades, appliance manufacturing, building materials, lighting, and other energy-saving goods and services. As such, Energy Efficiency workers are found across many other subsets of traditional industries.

**CORE METRICS** www.coremetricsenergy.com

235 Van Winkle St., East Rutherford, NJ 07073 (201) 340-4541

COMMENTS ON ENERGY EFFICIENCY EM&V SUBMITTED TO

NEW JERSEY'S BOARD OF PUBLIC UTILITIES, JANUARY 17, 2020

*About Core Metrics*

Franklin Neubauer is Principal at Core Metrics in East Rutherford, NJ. He has fifteen years' experience in energy resource planning, energy modeling and economic research. Franklin's experience began in transportation demand modeling and end-use forecasting for California agencies. In the Pacific Northwest, he provided on-site consulting to Bonneville Power Administration to model energy efficiency policies and impacts to the region. He identified deficiencies in the Christie Administration's Energy Master Plan, and contributed to RGGI program reviews. Franklin is a member of the Association of Energy Services Professionals and has expertise in cost-effectiveness analysis and energy-economic modeling. He has an M.S. in Engineering & Economic Systems from Stanford and a Certificate in Computational Finance from Oregon Graduate Institute.

*Introduction*

I am pleased to submit these comments in response to the BPU's request for comments on evaluation, measurement and verification of energy efficiency (EE) and peak demand reduction programs. My comments focus on cost-effectiveness, based on the expectation that New Jersey will transition from the current cost-benefit framework to a new framework guided by the National Standard Practice Manual (NSPM). In 2019, I was in close contact with the National Efficiency Screening Project (NESP), which oversees the development and implementation of NSPM. I provided training on NSPM and an overview of related tools for the Association of Energy Services Professionals, an international organization of EE professionals in October.

I dealt with cost-effectiveness issues almost daily for six years, working as a consultant for Bonneville Power Administration. That experience relied on the traditional cost-effectiveness tests from the California Standard Practice Manual. I monitored developments and trends in cost-effectiveness analysis and cost-benefit testing since 2011, years before NSPM emerged as a new standard. Recent interest in NSPM by many states is creating a bandwagon effect. Nevertheless, California's traditional approach to cost-effectiveness still has some advantages, such as simplicity and the complementary nature of its five tests, which should be acknowledged by regulators. Simplicity and familiarity are virtues when saving time is essential. Given the urgent need to mitigate climate change, saving time is essential so long as New Jersey's next phase of utility programs remains on the sidelines.

*Implementing NSPM for the Advantages Stakeholders Have Come to Expect*

The merits of an NSPM-based, primary cost-effectiveness test over the standard cost-effectiveness tests from California have been publicized to EE stakeholders in comments to the

BPU and at stakeholder meetings since 2018. However, stakeholders' views of NSPM's principles have not been tempered by complete awareness of the complex, time consuming implementation process and extent of stakeholder interactions needed when a state adopts NSPM's guidance and the Resource Value Framework for cost-effectiveness.

As I pointed out at the December 18 hearing, full NSPM implementation involves its own technical stakeholder process lasting at least six months in the experience of other states.[1] The evolution of NSPM to include other distributed resources will increase the process' complexity and is likely to increase the time needed to complete that process. Lesser reforms would give stakeholders fewer advantages than they expect from NSPM, and could leave stakeholders very confused and frustrated over the lack of progress on energy efficiency. In addition, cost-effectiveness reforms can trigger a wide range of consequences that leave EE stakeholders unprepared to launch programs quickly; for example, under a new cost-effectiveness framework, New Jersey might need a new EE potential study, delaying program planning and implementation by an extra year or more. For these and other reasons, it is more sensible to defer implementation of NSPM's reforms until after the BPU rules on the next phase of EE programs, so that programs to save energy are no longer sidelined while stakeholder meetings proceed. The process to implement NSPM's reforms can proceed concurrently with deployment of traditional programs based on more traditional cost-benefit testing.

Cost-effectiveness plays a central role in program evaluation, program design and program success. Many stakeholders pay attention to how cost-effectiveness is measured. Stakeholders include program administrators, evaluators, program participants, utilities, ratepayer groups, Division of Rate Counsel, DEP and state agencies, engineering firms, advocacy groups and outside analysts. It is largely because so many stakeholders hold narrow views on the implications of cost-effectiveness that updating cost-effectiveness methods is challenging. The implications of cost-effectiveness are far reaching, but many stakeholders cannot see the forest for the trees. It is incumbent on the BPU to see the proverbial forest, even when individual stakeholders and EE specialists cannot.

Thank you for the opportunity to submit comments on issues concerning EM&V. I am available to respond to questions you may have concerning these comments, and would welcome further discussions with BPU staff.

Yours truly,

Franklin Neubauer
Principal
neubauer@coremetricsenergy.com

[1] Personal communication with Julie Michals, Project Coordinator for the National Efficiency Screening Project (NESP), October 2019.

References

National Efficiency Screening Project (May 18, 2017). National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources, Edition 1. https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_May-2017_final.pdf

Governor's Office of Planning and Research, State of California (July 2002). California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. http://www.calmac.org/events/SPM_9_20_02.pdf

**From:** Barbara Cuthbert [mailto:bwestcuth@gmail.com]
**Sent:** Friday, January 10, 2020 4:27 PM
**To:** publiccomments@njcleanenergy.com
**Subject:** [EXTERNAL] Energy Efficiency Transition – EM&V and Filing/Reporting (issued on 12/18/2019)

Re: Energy Efficiency Transition – EM&V and Filing/Reporting (issued on 12/18/2019)

Dear NJ Clean Energy:

New Jersey is tasked with a massive challenge to shift 100% from fossil fuels to renewable clean energy by 2050. To truly have evaluation, measurement and verification (EM&V), methods for collection and public availability of all data measurements from energy sourcing, distributing, supplying and consuming, there needs to be need scrutiny and oversight of agencies, businesses and organizations working collaboratively toward a common goal.

It appears that references to energy measurements on webites of NJ agencies and utilities use EIA which, by their own admission, uses gross estimates rather than actual data at endpoints of suppliers, distributors and consumers. With meters read every month by utility companies, and bills providing comparisons to last year's usage, the data certainly exists.

It is absurd to see NJ EMP, IEP, energy forecasts and sales all point to EIA.gov estimate data - which is always several years out of date - as the basis of determining current policy.

- There is no way to accurately evaluate losses, inefficiencies or issues with this type of false enumeration.
- There is no way to truly complete a cost-benefit assessment without actual data.
- Cost projections also need to incorporate the constantly-changing threat from climate change such that it is considered and updated on an annual basis.
- There is a need to assess future health and environment costs as well as market, public and governmental resistance to change.

Utilities are deemed as a public service and granted markets where competition is not practical, in other words, there are no competitors. That privilege must also be associated with the responsibility for providing all data of utility energy related infrastructure to be publicly available. Please do not take this as something disparaging against current utilities. I highly regard and value the utility that servers me.

It is critical that New Jersey provides and uses open data transparency for energy measurement at the sourcing, gathering, supplying, sales and consumption – at all levels that are available in New Jersey. This data should be required to be provided and publicly available on a website (suggesting NJ Clean Energy) and updated at least monthly since current data is already collected on a monthly basis. Personal identifying information must, of course, be protected.

It appears that there is a lot of data not currently available to state agencies that could help in planning New Jersey's transition from fossil fuels to clean energy. It also appears that the electric infrastructure needs to continue to reinvent itself in adjusting to accommodate distributed energy generation and usage model (such as microgrids) to more effectively integrate distributed renewable energy generation. This also, by default, will reduce inherent loss in the current grid that without data, agencies are not aware of.

The state agencies, working with the utilities, need to identify loss areas in the grid and use those as opportunities for creating micro grid sections that eliminate the loss. Hydrogen is currently being considered as a viable storage facility for enabling micro grid enablement in other countries and the 7 other states that NJ Governor just signed an initiative with for zero emission vehicles. We need to push harder on adjusting how NJ does business in energy. Status quo will only ensure that the transformation from fossil fuels to renewables will fail.

Communities around the world are actively integrating hydrogen now and reshaping their energy economy (California, UK, many countries in EU, China, South Korea and even Australia despite its PM's discouragement), and NJ agencies need to heighten their awareness and pursuit of this technology.

Another commenter to you (Kirk Frost) already submitted the following, but it bears copying and repetition. Did you know that:

- UK has started successfully pumping hydrogen into natural pipes.
- Nikola will start rolling out locally sourced hydrogen gas stations this year.
- There are 3 new methods of hydrogeneration becoming publically available.
  1. Photoelectrochemical PEC - Hypersolar and Israel University both competitively building separately.
  2. Nickel nano plated electrodes for electrolysis increasing efficiency up to 70% for hydrogen generation.
  3. UK company developed electromagnetic hydrogen generation.
- Swedish company is designing and building locally generated hydrogen gas stations and microgrids.
- South Korea will fully convert 3 cities to hydrogen in next several years.
- China and California will implement 1MM hydrogen fuel-cell vehicles by 2030.
- South Korea will manufacture 6.2MM hydrogen fuel-cell vehicles by 2040 (3MM for export).
- 500 Watt wind mills (5' total diameter) cost $250 and are excellent to deploy in microgrids. This enables homes to cost effectively generate electricity round the clock.

I very much appreciate your consideration of this comment and hope you act on the urgency of collecting real data and monitoring efforts to quickly and efficiently move toward 100% clean, renewable energy sourcing.

Sincerely,
Dr. Barbara Cuthbert
Princeton, NJ 08540

Jersey Central Power & Light
A FirstEnergy Company

300 Madison Avenue
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*Kurt E. Turosky*
*330-384-5847*

January 17, 2020

**VIA ELECTRONIC MAIL ONLY**

Aida Camacho-Welch, Secretary
New Jersey Board of Public Utilities
44 South Clinton Ave., 9th Floor
P.O. Box 350
Trenton, New Jersey 08625-0350
EnergyEfficiency@bpu.nj.gov

**Re: Jersey Central Power & Light Company's Comments in Response to the Energy Efficiency Transition Stakeholder Meeting Notice Dated November 27, 2019 and Updated January 9, 2020 on**

- **EM&V,**
- **Filing; and**
- **Reporting**

Dear Secretary Camacho-Welch:

On November 27, 2019, the Staff of the New Jersey Board of Public Utilities (the "Board") issued notice of a December 18, 2019 stakeholder meeting (the "Stakeholder Meeting") regarding implementation of the energy efficiency requirements of P.L. 2018, c. 17 (the "Clean Energy Act," or "CEA," codified in relevant part as N.J.S.A. 48:3-87.9). Subsequently, Board Staff issued an agenda for the Stakeholder Meeting, clarifying that the meeting was to address evaluation, measurement, and verification ("EM&V") as well as filing and reporting requirements for energy efficiency ("EE") and peak demand reduction ("PDR") programs.

Jersey Central Power & Light Company ("JCP&L" or "the Company") thanks the Board for the opportunity to provide feedback on these important issues. As set forth below, JCP&L believes that EM&V, tracking and reporting as well as filing requirements will be a crucial element of the State's success in meeting the Clean Energy Act's goals.

JCP&L believes that the wide-ranging experiences of its affiliated utilities in implementing comprehensive energy efficiency ("EE") and peak demand reduction ("PDR") program portfolios in other jurisdictions will prove helpful to the Board as it develops the policy necessary to support New Jersey's Energy Efficiency Transition. The program portfolios implemented by JCP&L affiliates in other jurisdictions have been successful, in part, because of the sound policy decisions and efficient practices established in those jurisdictions, including those practices related to EM&V and program reporting.

This extensive multi-state experience means that JCP&L has access to already established best practices and proven EM&V frameworks, tracking and reporting procedures and systems, plan filing policies, and a staff with experience in successfully managing all facets of EE and PDR programs across multiple states. JCP&L's comments offer insights on successful practices seen in other jurisdictions and examples of cautionary experiences in order to suggest policies New Jersey can adopt to avoid such pitfalls. The Company believes adoption of these suggestions will lead to the development of policies and practices that capture cost savings and best support New Jersey's energy efficiency transition. Further, JCP&L anticipates continuing its efforts to utilize cross-jurisdictional efficiencies and industry best practices, as its affiliates have done in Ohio, Pennsylvania, and Maryland, where appropriate. This includes leveraging relationships with third-party vendors and consultants that have nationwide EM&V and reporting experience.

## Evaluation, Measurement, and Verification

### Establish EM&V Framework

Establishing an EM&V framework in advance of the program filings, with clearly defined requirements, is essential for effective EM&V to occur. The EM&V framework is the guidebook upon which all EM&V is built. This is a necessary first step in determining EM&V requirements in New Jersey while reducing ambiguity. Ideally, items that should be part of a comprehensive framework include, but are not be limited to, roles and responsibilities, policy requirements, technical guidance, statewide evaluation methods, resources, workgroup meeting format, and measure-specific evaluation protocols. The framework established by Pennsylvania when implementing Act 129 is an excellent model for a comprehensive EM&V framework.[1]

The EM&V framework sets the course for EM&V activities during a plan phase. Roles and responsibilities must be clearly defined in the framework. Based upon experience, JCP&L would recommend the Board adopt an EM&V structure where the Board oversees a statewide evaluator and each utility engages with an independent third party to perform the needed utility-specific EM&V work. Each independent utility evaluator is responsible for developing a utility-specific evaluation plan, conducting reviews of the utility's tracking system, impact and process evaluations, net to gross analysis (if required), and determining program cost-effectiveness with audit and approval from the statewide evaluator. In addition, independent utility evaluators should participate in EM&V working group meetings to collect best practices and lessons learned across the state. The statewide evaluator is responsible for developing the evaluation framework, performing, reviewing and validating the accuracy of utility savings and cost-effectiveness data reported by the utilities and their independent evaluators, advising the Board on the status of compliance activities and program performance, performing statewide studies and developing statewide reports, and making periodic updates to the EM&V Protocols.

### New Jersey Protocol (Technical Resource Manual or "TRM") Review

Concurrent with the development of the EM&V framework, the New Jersey Protocols should undergo a comprehensive review and update to ensure savings estimates are current and

[1] http://www.puc.state.pa.us/Electric/pdf/Act129/SWE_PhaseIII-Evaluation_Framework050818.pdf

the Protocols include all applicable efficient measures and technologies. While it is prudent to undergo a thorough review to aid in program modeling and development well before the plan filing, it is essential that, once approved, the Protocols remain unchanged during a plan cycle. This aligns the savings assumptions included in the development, approval, and implementation of programs, and provides certainty to all stakeholders on how measures will be counted and evaluated. The methods of measuring savings should be determined prior to the design of each program and reviewed with those responsible for EM&V to ensure agreement on the methods to be used. Additional measures may, however, become available during a plan cycle as new technologies are developed and become viable. Accordingly, a process should be developed in the EM&V framework that allows for the addition of new measures.

The Protocols will determine which measures can rely on deemed savings, and which measures will require more rigorous EM&V. In general, deemed savings should be applied to common high efficiency equipment replacement measures, many of which are included in residential or small commercial programs. It is advantageous to have a robust set of Protocols with deemed savings for as many measures as practical, as evaluation costs are typically lower for these measure types.

Partially deemed measures utilize savings measurement protocols that include customer-specific information for each variable, resulting in a variety of savings values for the same measure. This method is commonly used when well-understood variables affect the savings and will be collected from the applicant. Ideally, a robust set of protocols will include default values to use when the open variable is not able to be measured.

In situations where deemed or partially deemed savings cannot be reasonably established, such as for programs that encourage more custom measures, including complex upgrades or replacement of highly variable energy consuming equipment and systems, best practices typically require more direct measurement, in some instances with pre-determined algorithms (which should be included in the Protocols) to determine energy savings. These types of measurements are typically required only for larger, commercial or industrial projects. The Protocols can help inform the measurement methods for these projects, while leaving the flexibility for unique projects and systems that may require project-specific detailed engineering analysis to accurately assess the energy savings.

**Gross vs. Net Savings**

Gross savings figures should be used to evaluate programs and measure program savings. Gross savings measure the actual energy and demand savings that were realized by the state. Further, gross savings reflect what program administrators can control, *i.e.* the participation in their programs driven by their efforts, whereas net savings (which attempt to adjust savings measurements for things like "free ridership") introduce ambiguity and the potential for survey bias into the determination of estimated savings achieved by the programs. Moreover, as net savings determinations require potentially extensive and lengthy research, net savings results are often not known until well after a program year is complete (years afterwards, in some jurisdictions), thus, potentially requiring the application of retroactive adjustments to historic results. Additionally, N.J.S.A. 48:3-87.9(c)states that the savings targets can be met not only from

efficiency programs, but from improvements in other codes and standards. As such, the CEA contemplates that the targets defined in the legislation are based on gross savings. To the extent the Board requires information about net savings to be determined, they should only be used for program planning purposes and to determine the cost-effectiveness of program portfolios.

## Cost-Effectiveness Guidelines

JCP&L supports the need to review the approach to be used for cost-benefit analysis screening. To best support New Jersey's energy efficiency transition in a cost-effective manner for all customers, the Board should consider the cost-benefit analysis tests to be performed, the estimates embedded in the programs' costs and benefits, as well as the customer bill impacts that will result.

The goal of a cost-benefit analysis is to monetize the perceived benefits of a program and compare them to the program's costs. To ensure that customers get the most value from implemented programs, it is important for the benefits-side of the calculation to be based on avoided costs or benefits that are fully vetted, determined to be reasonable, and readily quantifiable with a sufficient degree of certainty. While the Act contemplates the consideration of certain non-energy benefits when performing cost-effectiveness testing, JCP&L believes it is important for the Board to keep in mind that many non-energy benefits are speculative in nature and difficult to quantify or highly variable. As a result, the Board should exercise caution when designing cost-benefit analyses of utility EE programs.

JCP&L recommends that the Board utilize cost-benefit analysis tests that are based on standard industry practice and rely on fair and reasonable estimates of the programs' costs and benefits. More specifically, JCP&L recommends that the Board only require the Societal Cost Test ("SCT") and the Total Resource Cost ("TRC") Test as these most closely align with the Clean Energy Act and are common tests used in the industry to assess program cost-effectiveness. Further, the Company recommends that the avoided cost methodology, including the calculations and sources, to be developed on a statewide basis for use by all program administrators in their program filings, with utility-specific input factors where appropriate. This is an industry best practice and is performed in other states, such as Maryland[2] and Pennsylvania[3]. This practice ensures avoided costs are developed to align with state policies, are appropriately valued or monetized, are fully transparent, and utilize the same consistent methodology among all program administrators. In addition, developing the avoided cost and benefits using a consistent methodology on a statewide basis best supports the efficient review of the cost/benefit analysis

[2] The Maryland Energy Administration lead a process to develop the avoided costs methodology, including the calculations, sources and resulting values, that were used by the utilities submitting program plans under EmPOWER Maryland for their 2015-2017 program plans. The avoided costs were updated by the statewide utility evaluator for the 2018-2020 program cycle and are currently being updated by the statewide utility evaluator for the 2021-2023 program cycle.

[3] The Pennsylvania Public Utility Commission issues an Order prior to each phase of Act 129 that establishes the cost-effectiveness testing and the avoided costs and benefits methodology to be followed by the utilities in their program filings and annual reports. The most recent Order, issued December 18, 2019 under docket M-2019-3006868, is for a potential Phase IV of Act 129 which begins June 1, 2021 and includes an avoided cost calculator that was developed by the Statewide Evaluator. See http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/total_resource_cost_test.aspx.

provided by all program administrators in their program filings by Board Staff and all other stakeholders.

### Timing of Activities

EM&V processes and methods should be determined well before program filings and not after the programs are already implemented, so that planned results are achieved with more certainty and future results can be improved upon. Effective EM&V should set guidelines for measure assumptions and savings in order to determine program performance against those set guidelines. Further, EM&V must be an iterative process, providing frequent feedback on program operation and performance to allow for mid-course program improvements.

Timing of evaluation activities is dependent upon the evaluation type. Both cost-effectiveness calculations and impact evaluations to validate savings should be completed on annual cycles with results presented by program year. Process evaluations which investigate ways to improve the programs should be completed at least once during an approved plan cycle and potentially more frequently based on program specifics. Beyond these basics, additional EM&V research should be considered on a topic by topic basis. These parameters should all be included in the EM&V framework.

## Reporting

### Reporting Purpose and Guidance

JCP&L affiliates in four other states have run and provided extensive reporting for comprehensive EE and demand response portfolios for over a decade. During this time, the affiliated companies have seen jurisdictions take many approaches to reporting standards—some straightforward with meaningful key data indicators, and others that initially created voluminous requirements that produced thousands of pages of information on an annual, semi-annual, or even quarterly basis. Many states that initially established exhaustive reporting requirements subsequently reduced the frequency and breadth of reporting requirements after realizing much of the data was not useful to provide thorough oversight of program operations. Additionally, these states realized that the overly extensive reporting requirements often lead to confusion among stakeholders and unnecessarily increased ratepayer costs in order to support the additional administration, business and quality processes, and information technology infrastructure of vendors, program administrators, and evaluators. Said simply, just because something can be reported doesn't mean that it should. Thus, JCP&L recommends that New Jersey reporting requirements benefit from these lessons learned and initially focus on the most valuable reporting elements to ensure meaningful dialogue on program performance.

### Reporting Elements

An overarching principle in establishing reporting standards should be to provide straightforward and essential data and information so that stakeholders can gauge effectiveness of programs and progress towards CEA goals. In support of this objective, reporting standards should tie to key metrics and goals evidenced in the CEA framework or other BPU directives, and other

information essential to monitoring portfolio-level performance. Many of the program data outlined at the December 18, 2019 public comment meeting fit within that description, while others—specifically those involving in-progress applications or *projections* of participation, energy savings, costs, and cost-effectiveness analysis—should be rejected to minimize conjecture and inconsistent application of assumptions that may skew projected results. Other data elements discussed during that meeting, such as greenhouse gas emission reductions or jobs created/retained, fall outside of the utilities' quantitative objectives in the CEA. However, due to the importance of such information in furthering New Jersey goals, such information may be appropriately reported by the program administrators if the State provides guidance on how to derive the information from data already collected by the utilities. The United States Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator might assist in this effort.

In addition to defining what information needs to be collected, JCP&L strongly encourages a consistent reporting framework be established for all utilities to ensure reporting uniformity and comparability of results. JCP&L affiliates in other jurisdictions have found that straightforward reporting templates limited to key elements drive all parties to focus on meaningful data rather than being mired in granularity. As such, JCP&L has included, as Appendix A, a proposed portfolio and program reporting template adopted from Maryland's highly successful EmPOWER EE and PDR initiatives. The level of detail presented therein balances elements necessary to judge compliance with CEA goals as well as additional metrics that are indicative of overall program performance.

**Timeliness of reporting elements**

Based on the experiences of affiliated utilities in other jurisdictions, JCP&L encourages decisions on required reporting elements to be made on a timely basis and well in advance of the anticipated filing dates for utility EE and PDR program plans. JCP&L and its implementation vendors will spend considerable time during contracting, program launch, and IT system integrations to define customer, measure, financial, and programmatic information that will be tracked and reported. It is necessary for data requirements to be known upfront to ensure that such IT infrastructure and business processes can be developed in an efficient and cost-conscious manner. Should preliminary or incremental data requirements be introduced subsequent to initial vendor contracting and IT system scoping, the timely launch of programs may be significantly impacted, data integrity or quality processes may be compromised, and/or ratepayers may be exposed to avoidable incremental costs.

**Frequency of reporting**

JCP&L supports annual reporting as envisioned in the BPU's December 20, 2019 straw proposal. Based on experience from affiliated utilities in other jurisdictions, the Company believes annual reporting appropriately provides information necessary to gauge program performance, effectiveness, and progress towards CEA goals. JCP&L has found that more frequent reporting can lead to unintended confusion among stakeholders based on limited data sets, seasonality of participation, or other factors that do not provide meaningful insights into likely full-year program impacts.

### Tracking systems

A statewide database may be an extremely costly undertaking with significant administrative burden that may not be justified by its benefits. JCP&L strongly suggests that program administrators utilize existing databases. Establishing standard reporting templates will support uniform data inputs, and consistent reporting and evaluation across all program administrators making the effort to design, develop, implement and maintain a statewide database unnecessary.

However, JPC&L recognizes the potential need for a limited state-wide aggregated database to support the successful implementation of state-led initiatives where direct access to operational information is needed to manage program performance. As such, the additional administrative and IT infrastructure costs for such a limited purpose may be justified.

In the event the State requires a coordinated database for all programs, JCP&L recommends that it include only high-level aggregated, programmatic information necessary to monitor progress that is divorced from customer records due to the need to protect confidential customer information, cyber security related concerns, and unverified information that has not gone through utility-initiated quality processes or evaluation.

### Workgroup

Due to the importance of tracking and reporting as well as the cost of the system used to store data, support programs and providing the details necessary for internal, external and regulatory reports, JCP&L suggests that BPU Staff establish and lead a working group to discuss requisite details of tracking and reporting to meet the needs of all stakeholders.

## Filing Requirements

In the agenda attached to the public notice for the Filing and Reporting Stakeholder Meeting, the Board requested comments on Minimum Filing Requirements. Specifically, the Board asked, "What are best practices for filing requirements?"

JCP&L offers a couple best practice ideas for the consideration of the Board. First, a best practice in the industry involves the development of a standard filing template to be used by all program administrators. Not only does this ensure that the filings meet the minimum requirements established by the Board, this also ensures that the information is provided in an entirely consistent manner which supports the efficient review of the filings by all stakeholders. Secondly, it is a best practice for the minimum filing requirements to require only the information necessary to support the consideration of the filing by the Board and other stakeholders, while not being overly broad or requiring unnecessary or speculative information. The Clean Energy Act sets extremely ambitious savings targets that will require extensive program offerings, with program filings being completed and reviewed concurrently on a statewide basis by all parties. Given this, the minimum filing requirements should consider this overarching justification and timeline to ensure that the

requirements only require the necessary information for the Board to review the program filings as required by the Clean Energy Act and that the requirements are not overly broad or require unnecessary or speculative information. This will support the most efficient development of program filings as well as the most efficient review of the filings by the Board and other stakeholders.

Also, as discussed above, it is a best practice for the avoided costs used to test the cost-effectiveness of plans to be developed on a statewide basis for use by all program administrators in program filings. This ensures avoided costs are developed to fully align with state policies, are appropriately valued or monetized, are fully transparent and use the same consistent methodology (including calculations, sources and inputs values where appropriate).

JCP&L appreciates the Board and Board Staff's efforts throughout this ongoing EE stakeholder process and the opportunity to provide these comments. Establishing sound policies and efficient practices is critical to support New Jersey's energy efficiency transition in an administratively efficient and cost-conscious manner for all parties. The Board's guidance on these topics, following stakeholder input, is necessary for the utilities to develop and implement their EE and PDR programs in the most successful and cost-effective manner possible. As such, JCP&L encourages the Board to carefully consider these comments and provide sufficient time for utilities to develop and file plans after decisions on this and other important issues have been made.

If you have any questions about JCP&L's above comments, please do not hesitate to contact me.

Very truly yours,

Kurt E. Turosky

Kurt E. Turosky
Director, Energy Efficiency Compliance & Reporting

| **Appendix A**<br>**Report Date: x/xx/xx** | **Gross-Wholesale Level**<br>**Energy Efficiency & Conservation and Demand Response Program Savings** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Year 202X** | | | | | | | | | |
| **Program** | **Forecasted Participants** | **Reported Participants** | **Budgeted Total Program Expenditures ($)** | **Reported Total Program Expenditures ($)** | **Forecasted Annualized Energy Saving (MWh)** | **Reported Annualized Energy Savings (MWh)** | **Forecasted Coincident Peak Demand Reduction (MW)** | **Reported Coincident Peak Demand Reduction (MW)** | **Reported Lifecycle Energy Savings (MWh)** | **Reported Lifecycle Energy Savings ($)** |
| **Utility Administered Programs** | | | | | | | | | | |
| **Residential Programs** | | | | | | | | | | |
| Residential Program 1 | | | | | | | | | | |
| Residential Program 2 | | | | | | | | | | |
| **Residential Programs Subtotal** | | | | | | | | | | |
| **Commercial and Industrial Programs** | | | | | | | | | | |
| Small Commercial/Industrial Program 1 | | | | | | | | | | |
| Small Commercial/Industrial Program 2 | | | | | | | | | | |
| Large Commercial/Industrial Program 1 | | | | | | | | | | |
| Large Commercial/Industrial Program 2 | | | | | | | | | | |
| **Commercial and Industrial Programs Subtotal** | | | | | | | | | | |
| **Other Programs** | | | | | | | | | | |
| Other Program 1 | | | | | | | | | | |
| Other Program 2 | | | | | | | | | | |
| **Other Programs Subtotal** | | | | | | | | | | |
| **Total Utility Administered Programs** | | | | | | | | | | |
| **Co-Managed Programs** | | | | | | | | | | |
| **Residential Programs** | | | | | | | | | | |
| Residential Program 1 | | | | | | | | | | |
| Low Income Program | | | | | | | | | | |
| **Residential Programs Subtotal** | | | | | | | | | | |
| **Commercial and Industrial Programs** | | | | | | | | | | |
| Small Commercial/Industrial Program 1 | | | | | | | | | | |
| **Commercial and Industrial Programs Subtotal** | | | | | | | | | | |
| **Other Programs** | | | | | | | | | | |
| Other Program 1 | | | | | | | | | | |
| **Other Programs Subtotal** | | | | | | | | | | |
| **Total Co-Managed Programs** | | | | | | | | | | |
| **State-Led Programs** | | | | | | | | | | |
| Program 1 | | | | | | | | | | |
| Program 2 | | | | | | | | | | |
| Program 3 | | | | | | | | | | |
| Program 4 | | | | | | | | | | |
| Program 5 | | | | | | | | | | |
| **Total State-Led Programs** | | | | | | | | | | |
| **Total Residential Programs** | | | | | | | | | | |
| **Total Commercial & Industrial Programs** | | | | | | | | | | |
| **Total Other Programs** | | | | | | | | | | |
| **Total All Programs** | | | | | | | | | | |

From Kirk Frost via kirkafrost@yahoo.com

To be sent to publiccomments@njcleanenergy.com

1/9/2020 Comment #1: Dec 18, 2019 Energy Efficiency Transition – EM&V and Filing/Reporting (issued on 12/18/2019)

Dear NJ Clean Energy,

When I search on New Jersey Agency websites or utility websites, all references to energy measurements point towards EIA. EIA clearly states that their numbers are gross estimates based on assumptions and numerous factors, but no actual reading data at endpoints (whether supplier, distributor or consumer). From my understanding, it appears as though the entire energy infrastructure is built off of gross estimates and generalizations without live actual data updated for the public or New Jersey Agencies to process. The irony is, that data exists. At the end user consumer, meters are read every month, I am sure this process occurs both at the supplier and distributor levels. I saw a comment to Governor Murphy where the utility revealed (selective) internal data in attempt to discourage shutting down nuclear plants.

If this is an accurate picture of the current state, then EM&V needs to radically change methods, collection and public availability of all data measurements from energy sourcing, distributing, supplying and consuming. Utilities may provide sales and consumption on annual basis, but that gives little data to the actual data and doesn't provide any insight to the added renewable sources in New Jersey neighborhoods.

With the Governor's Executive Order 28, GWRA Bill signed, Draft EMP and IEP becoming finalized, new alliance formed with 7 other states to pursue zero emission vehicles and more bills in the pipeline to push New Jersey to convert from fossil fuels to renewable sources;

> ***it is critical that New Jersey equally pushes for open data transparency for energy measurement at the sourcing, gathering, supplying, sales and consumption – at all levels that are available in New Jersey. This data should be enforced to be provided and publicly available on a website (suggesting NJ Clean Energy) and updated at least monthly since current data is already collected on a monthly basis.***

Simply put:

- **Mandate all utilities under NJ oversight must start publishing all data in energy (sourcing, gathering, supplying, sales, consumption) on a monthly basis start by March 1, 2020.**

Utilities are deemed as a public service and granted markets where competition is not practical, in other words, there are no competitors. That privilege must also be associated with the responsibility for providing all data of utility energy related infrastructure to be publicly available. Please do not take this as something disparaging against current utilities, I highly regard and value the utility that servers me.

It is absurd to see NJ EMP, IEP, energy forecasts and sales all point to EIA.gov estimate data and always several years out of date as the basis of determining current policy. New Jersey is tasked with a massive challenge to shift 100% from fossil fuels to renewable clean energy by 2050. Without live energy measurement and reporting, we are shooting blind and allowing the few active voices to shape policy without actual data to assess. In this regard, EM&V would be a misnomer.

From Kirk Frost via kirkafrost@yahoo.com

To be sent to publiccomments@njcleanenergy.com

1/9/2020 Comment #2: Dec 18, 2019 Energy Efficiency Transition – EM&V and Filing/Reporting (issued on 12/18/2019)

Dear NJ Clean Energy,

Please accept the following added comment/responses for the recent EM&V Energy Efficiency Transition.

Question Set 1:

- What types of evaluations and studies (BCA (benefits cost analysis), baseline, process, impact) are necessary, in what cadence and frequency?
    - Evaluations should be made after utilities provide comprehensive monthly data updates to NJ Clean Energy regarding all energy activities (which should be mandated by March 1, 2020).
    - Frequency is such a relative term. If the data is 2 years out of date, the frequency becomes irrelevant. Ideally, frequency should be a daily practice of verifying utility data transmission, validation of independent NJ state collectors and identification/escalation of any data abnormalities or discrepancies.
    - Cadence should actively collect every articulation of energy traversal data available to utilities governed by New Jersey. Meaning, all data of sourcing, gathering, distributing, supplying, sales and consumption on an active oversight review to (1) Ensure data is being provided at scheduled times; (2) Data integrity review; and (3) verification all activities take place.
- What models do we see for who conducts, reviews, and approves each of those?
    - Current models do not work. This has to be completely overseen by NJ Clean Energy.
    - Highly doubt this function can be outsourced. There needs to be a governmental agency that drives towards actual data aggregation for both the state evaluation and public transparency.
    - In order for New Jersey to oversee a massive transition from fossil fuels, it is not realistic to outsource reviews and approval of data updates. Between 2020 and 2050, the state needs to be on top of the data updates, data public availability and data integrity assessment.
- How can stakeholders provide technical or on-the-ground expertise into the process?
    - Unrealistic question unless taken in through a Data Integrity Team. NJ Clean Energy must form a data integrity team in order to vet stakeholder input.
    - Current situation is severely limited with the input form on NJBPU for stakeholders with no Data Integrity Team validation. Analysis becomes ad-hoc and measurement is anecdotal.
    - Process anomalies can only be truly assessed when there is a process that fully measures, quantizes and analyzes technical/expertise postings.
- What model(s) for program evaluators should New Jersey consider?
    - 1. Require utilities to provide monthly measurements of all data utility has by March 1, 2020.
    - 2. Form a Data Integrity Team that focuses on enabling data being public, validating data has no integrity issues and pursue all data anomalies.
    - This should be owned by NJ Clean Energy if NJ Clean Energy is to be responsible for the data program, which I believe is integrally required in order to meet 2050 energy goals.

Question Set 2:

- How should the EM&V Evaluation, measurement, and verification process intersect with filing requirements? What types of information are needed when, and from whom?
    - Set March 15 as the cutoff date for all new application/filing events from utilities if monthly data is not provided by utility.

- Establish fines to incur to all utilities who have not met the March 1, 2020 data requirements by May 1, 2020 and increase fines every month until the data is provided.
- Enforce that all data is required by May 1 from utilities.

- What is needed in this transition period (through launch of new programs) and the long term (~5-year goal and beyond)?
  - NJ Clean Energy needs to transform their organization to enable massive transition of NJ from fossil fuels to clean renewable energy.
  - NJ Clean Energy needs to form a **Data Integrity Team** who are solely focused on data acquisition, integrity and publishing of data from utilities.
  - Within 5 years, New Jersey must have all data, granular to the street level, updated on a daily basis. Ideal if it is in real time.
  - If NJ agencies are not the recipients of actual data, then how could we ever trust the data is real? We are migrating from a passive, at least 2 years out of date, data estimate of bulk potential that has no real bearing of actual data from source to end. How could we ever evaluate losses, inefficiencies or issues with this type of false enumeration?
- Should New Jersey evolve towards a unified framework for all distributed energy resources?
  - NJ should evolve towards a comprehensive energy framework that tracks energy from source to end user. Anything less introduces masquerade or misrepresentation of energy measurement.

Question Set 3:

- Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended?
  - National Standard Practice Manual currently allows for non-measurement input. Without measurement, this becomes irrelevant when attempting to shift a state energy from fossil fuel to clean energy using renewable sources.
  - New Jersey needs to institutionalize actual data measurements provisioned by all utilities authorized in New Jersey to operate, where all data is provided to NJ Clean Energy.
  - New Jersey needs to abolish policies and procedures that advocate aggregation of estimates (false data) from other sources and take charge of being the authoritative reliable source for all data of energy traversal within NJ energy grids.
  - To move beyond fossil fuel requires a real mapping of actual data for energy traversal within New Jersey to accurately assess, advise and enforce a transition from fossil fuel to clean energy sourced from renewable sources.
- What are the costs and benefits that you would recommend for consideration in a single benefit-cost test?
  This question has no bearing when there currently exists no actual data for assessing benefit cost.
  I would recommend that NJ take a hard stance and require actual daily data updates from utilities where an actual Clean Energy Data Integrity Team could fully evaluate and assess energy traversal integrity with benefit cost methods.
  - Are there indirect or non-energy related costs or benefits that should be considered?
    - How to quantify long term Health Impact (at least out to 2050)?
    - Long term environmental impact (2040 complete flooding of some regions of New Jersey).
    - What are the real costs? What are the real measurements of actual energy traversal in the energy grid? What are the actual energy loss focus points currently in the state? What opportunities do new innovations in the hydrogen economy pose?
    - Sustainability of human health and environment in New Jersey are the fundamental components for assessing cost benefit cost analysis. Currently, many resources project substantial adverse human and environmental impact to NJ by 2040. NJ Clean Energy needs to incorporate long term with actual measures of today in defining a massive shift from toxic fossil

fuel usage towards clean energy (totally renewably sourced). Without this, NJ Clean Energy Fails its responsibility to New Jersey.

- If so, how can they be estimated?
  - First let's:
    1. Get real data from utilities and enforce data is provided monthly at first, then real time.
    2. Work with the other states that Governor Murphy agreed to collaborate with in fully assessing cost benefit analysis.
    3. Ensure that cost projections incorporate the constantly-changing threat from climate change such that it is considered and updated on an annual basis.
    4. Assess future health and environment costs as well as market, public and governmental resistance to change.
    5. Build a Risk Mitigant Strategy that incorporates costs, long term impacts, current impacts and costs for not pursuing continued migration to 100% clean energy migration.

    The focus needs to incorporate all changes and impacts from now until 2050 with continued updates based off of actual data added into the forecast analysis.

Question Set 4:

- What are the most important factors to address in measurement and verification of energy savings?
  - Should programs be evaluated based on gross or net savings?
    - Neither, it should be based off of actual data and savings. This is a fundamental requirement if NJ Clean Energy is to truly oversee actual migration to clean energy. Fake data doesn't cut it.
  - For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings?
    - This is complicated. Savings needs to incorporate reduced health costs and environmental damage. If people are suffering from increased sea levels in 2040 that completely ruin many neighborhoods of NJ, do those costs get incorporated? Do increased pathogen migration from southern states that afflict residents of NJ health costs get incorporated? Do increased toxic residual in air, water and ground from continued fossil fuel use factor into the equation?
    - NJ Clean Energy cannot solve all of these questions, but by instituting a Data Integrity Team, NJ Clean Energy can start to quantify and provide guidance to an overall cost to New Jersey.
- How should advanced M&V (measurement and verification) (automated data processing/increased data granulation) be integrated into EM&V?

  1. First, NJ should require all utilities to provide monthly data of all energy traversal within their grid including from sourcing, gathering, distributing, supplying, sales and consumption.
  2. NJ Clean Energy needs to create a Data Integrity Team that actively pursues, validates and assess data provisioned by NJ utilities.
  3. Only then can NJ start to advertise that it has advanced M & V.

  - When should it be incorporated? **AS SOON AS POSSIBLE**
  - What are best practices related to accuracy/confidence/reporting?
    - Identify source, mandate source to provide data
    - Review data and aggregate and analyze data against other outside data points
    - Establish ad-hoc inspections of data at all the points in the energy transversal grid to validate what is provided matches what is reported
    - Trend energy traversal attributes, history and reported issues to create a data integrity readout grade for each utility.

From Kirk Frost via kirkafrost@yahoo.com

To be sent to publiccomments@njcleanenergy.com

1/10/2020 Comment #3: Dec 18, 2019 Energy Efficiency Transition – EM&V and Filing/Reporting (issued on 12/18/2019)

Dear NJ Clean Energy,

In November of 2014, I noticed on several occasions that my solar inverters were in alarm mode. After several attempts to escalate at PSEG, contacting the manufacture of the inverter, I discovered that the grid voltage was out of the specification range and the inverters were shutting down. Initially the issue was sporadic, but from 11/29/2014 to 12/04/2014, the condition was constant and no energy from my solar panels was being fed back to the grid. I purchased a special communications tool to adjust the thresholds on my inverters and made the change on 12/05/2014. The issue continued for quite some time into mid-December and I had updated PSEG. A PSEG engineer visited and acknowledged they were having an issue with a nearby capacitor bank and working to get it fixed. I also purchased the monitoring upgrade modules for each inverter along with the cable and device that captured data from inverters. Since I was able to change the configuration, my solar panels generated energy to the grid even while the issue continued.

Notes:

1. PSEG wasn't able to detect the issue and for several weeks were initially adamant it was an issue due to my solar panels (which it wasn't and I had to spend money to prove that).
2. High voltage issue was sustained for quite a period of time (I think beyond 1 month).
3. This issue affected other homes in the neighborhood with solar panels.

Please note, this is not to disparage PSEG. I have high regards for the company and appreciate their continued drive towards quality, low rates and sustaining a grid that was never designed for the renewable revolution that started around 2010.

What do we need for Evaluation, Measurement and Verification?

1. All energy Data sourcing from NJ Utilities provided monthly to NJ Clean Energy
   Preferably under a real time Energy Performance website on NJ Clean Energy website.
   a. Phase 1 – due by March 1, 2020 – Utility monthly data provided to NJ Clean Energy at the township level summary (not average or estimate – real aggregated data)
   b. Phase 2 (parallel project track to Phase 1) due by June 2020 – NJ Clean Energy build energy performance website site on NJ Clean Energy that enables summaries of energy sourcing, generation, distribution, and consumption website available to the public. Data is does not reveal any information deeper than township level for units of electricity generated, units of electricity sold and units of electricity provisioned to town from large scale generation plants.
   c. Other sources of endpoints such as supplier energy output and energy measurements at distribution sites and any other data that is available between supplier and home endpoints.
   d. Phase 3 Utility to provide all endpoints monthly data by March 1, 2021
      Such as supplier energy output, energy measurements at distribution sites and any other measurement data that is available between supplier up to and including home endpoint measurements (which are available). This data to not be visible to the public at the endpoint detailed level, but rather aggregated into township/regional areas and identifying sourcing generated and actual distributed to end points. Ensure that all security and confidentiality criteria are met and in compliance with keeping NJ safe.

2. Actual Measurements of all electricity generation (renewable, fossil fuel, nuclear and imports)
    a. Due by March 1, 2022 – all new renewable installations that tie into the grid must include monitoring where data is published to NJ Clean Energy at least on a daily output. Since all monitoring options provide data output at least to the minute level, I would encourage this since it would help in diagnostics of any issues in the grid.
    b. All power generation plants to publish their actual energy generation to NJ Clean Energy by March 1, 2021.
3. NJ Clean Energy initiate a Data Integrity team by January 1, 2021 (or as soon as possible even if initially allocated current employees to the function on a part time basis. Mission of Data Integrity Team:
    a. Ensure that all energy supply, traversal measurement points and end use points are full provided by Utilities on a monthly basis.
    b. Implement NJ Clean Energy Performance website and data summary analytics are available on a monthly basis at first and then to a real time basis incorporating monitoring integrations.
    c. Responsible for reviewing and validating monitoring data with energy measurements provided by utilities.
    d. Data Analytics – develop algorithms to detect issues, anomalies and forecasts of usage.
    e. Monitor and provide monthly reports on NJ Energy supply and demand to Energy Master Plan commission.

What it appears to me, and I could be wrong, is that there is a lot of data not currently available that could help in planning New Jersey's transition from fossil fuels to clean energy. It also appears that the electric infrastructure needs to continue to reinvent itself in adjusting to accommodate distributed energy generation and usage model (such as microgrids) to more effectively integrate distributed renewable energy generation. This also, by default, will reduce inherent loss in the current grid that without data, agencies are not aware of.

The state agencies, working with the utilities, need to identify loss areas in the grid and use those as opportunities for creating micro grid sections that eliminate the loss. Hydrogen is currently being considered as a viable storage facility for enabling micro grid enablement in other countries and the 7 other states that NJ Governor just signed an initiative with for zero emission vehicles. We need to push harder on adjusting how NJ does business in energy. Status quo will only ensure that the transformation from fossil fuels to renewables will fail.

The Dutch report in this link: http://futuregrid.emrp.eu/wp-content/uploads/2016/09/12-Rietveld-Transformer-load-loss-measurement.pdf captures very similar issue that I experienced. The integrity of energy is dependent on what can be measured and verified. The utilities already measure energy traversal on their grids from all endpoints. This needs to be provided as soon as possible and NJ needs to implement monitoring to enable verification and analysis of energy traversal.

The utility companies are partners and have the experienced know how on energy. We also need to remove any barriers of 'proprietary data' that might exist so the state can work with utilities, other states and even other countries if useful. The world has moved much further ahead than New Jersey in terms of renewable and hydrogen, we need to catch up and become experts in this field.

Do you realize that micro wind mills generating 500 watts cost $250? This is another area of microgrids that needs to be considered and enabled at homes. In the microgrid scenario, loss is minimized and every watt generated is utilized.

I very much appreciate your consideration of this comment and hope you move up the urgency of data and monitoring.

From Kirk Frost via kirkafrost@yahoo.com

To be sent to publiccomments@njcleanenergy.com

1/10/2020 Comment #4: Dec 18, 2019 Energy Efficiency Transition – EM&V and Filing/Reporting (issued on 12/18/2019)

Dear NJ Clean Energy,

NJ Energy Master Plan and the Integrated Energy Plan require actual monthly energy metrics, monitoring and reporting on an ongoing basis. This enables NJ Agencies contributing to the transitioning from fossil fuels to clean energy.

In order to enable this transition, a substantial transformation must occur within New Jersey's energy infrastructure and monthly measurements and verification via monitoring are critical underpinnings to be reported actively on a monthly basis. Not numbers thrown into a budget proposal and labeled as KPIs. Real KPIs are monthly measures reported monthly, analyzed and acted upon in real time. At least that is what companies must do to maintain their productivity, services, products and integrity.

I recommend creating a **Data Integrity, Compliance and Reporting group (DICR)**
Responsible for:

- Central data warehouse and analytics for NJ Agencies for measuring, monitoring, compliance and reporting
- Overseeing the instrumentation of performance, quality and progress measures of all agencies contributing to the transition from fossil fuels to clean energy
- Incident Management of data anomalies and monitoring alerts
- Compliance and integrations with partners (initially utilities)
- Data Analysis, forecast, trends and energy efficiency learning algorithms
- Publishing monthly executive insights and reporting
- Independent from any specific agency focused on integrity and publishing of monthly meaningful data

The group initially starts with energy data and expands and grows to include all data measurements for transitioning from fossil fuels to clean energy. That is the reason why EM&V is even being discussed and should become the overall long term objective of DICR.

New Jersey cannot continue depending on federal agencies generating estimates for New Jersey. New Jersey should be collecting and evaluating KPIs, energy data points and providing real time visibility into New Jersey's energy status.

I very much appreciate your consideration of this comment and hope you move up the urgency of data and monitoring.

VIA ELECTRONIC MAIL (energyefficiency@bpu.nj.gov)

January 17, 2020

Honorable Aida Camacho-Welch, Secretary
New Jersey Board of Public Utilities
44 South Clinton Avenue, 9th Floor
P.O. Box 350
Trenton, NJ 08625-0350

**Re: IN THE MATTER OF THE IMPLEMENTATION OF P.L. 2018, c. 17 REGARDING THE ESTABLISHMENT OF ENERGY EFFICIENCY AND PEAK DEMAND REDUCTION PROGRAMS BPU DOCKET No. QO19010040**

**Comments regarding EM&V, Filing and Reporting**

Dear Secretary Camacho-Welch:

New Jersey Natural Gas Company ("NJNG" or "Company") looks forward to working with the Board of Public Utilities' ("BPU") on the implementation of P.L. 2018, c. 17 regarding the establishment of energy efficiency and peak demand reduction programs ("Clean Energy Act"). NJNG participated in the December 18, 2019 Stakeholder Meetings on Evaluation, Measurement and Verification ("EM&V") and the Filing and Reporting Requirements and shared our perspective on many of the questions posed on the published agenda. It is challenging to provide detailed recommendations for some of the discussions points due to the uncertainty regarding the administration of the programs. NJNG appreciates Board Staff's efforts to provide some preliminary directional information through their release of the December 21, 2019 Energy Efficiency and Peak Demand Program Administration Straw Proposal (Straw Proposal) but recognizes that information is likely to evolve as input from a broad range of stakeholders is considered. NJNG recognizes that our comments from the Stakeholder meeting are already part of the record so we are only sharing a few high-level thoughts on these topics for consideration in the Second Straw Proposal that is intended to be more comprehensive.

**General Comment**

After the concepts of the Straw Proposal get refined and programs are identified, the Board should secure stakeholder input to gain a better understanding of what information will be helpful to assess overall efforts to advance energy efficiency and meet policy objectives and the performance of the programs, both individually and as part of a program portfolio. This effort should apply to the utilities, as well as the Board for the programs they retain. Through this effort and to identify the questions that State and stakeholders want answered, both groups can consider which of these questions are answered by routine reporting and which can be better answered by evaluations, and an appropriate frequency for each. The Company recognizes the Board's interest in getting feedback for the questions posed in Question Set 1 and 2 from the December 18, 2019 meeting but NJNG believes the answers to many of those questions may be program specific. As part of this sorting of information the Board, with input from the Energy Efficiency Advisory Committee and the utilities, can consider:

- the potential cost for collecting such information vs. the value of knowing the answer at the desired frequency
- concerns regarding any potential transfer of Personally Identifiable Information ("PII")
- formats for sharing final reports and studies with other stakeholders and opportunities to discuss the results.

**EM&V Comments**

- Utilities must be directly involved in all evaluations and studies, regardless of which entity is administering a program. Through our routine interactions with customers, knowledge of customer usage patterns, and insights unique to our service territory, NJNG has specific knowledge and experience that can support and validate the evaluation. Many stakeholders expressed significant concerns about both the process and the findings of the Market Potential Study that the Board accepted in May 2019. There are still unanswered questions and concerns regarding stakeholder input on that effort. NJNG recognizes that this was an unusual situation where the Board was faced with meeting legislative deadlines but efforts should be made to ensure that utility input is considered for all evaluations that are managed by the Board.

- Regarding general models for evaluation, NJNG believes that the utilities should have the primary role for securing independent evaluators for all programs they administer. As entities running the programs and with the ultimate responsibility to successfully implement these programs to meet the energy saving targets and related regulatory priorities, we need to be as close to the process as possible to ensure the information the evaluator is assessing is accurately captured and to permit the Company to take actions

on process improvement suggestions as soon as possible or to research for more significant program design changes. The State could consider retaining a separate general evaluation consultant to help them monitor current and pending evaluations and reports and advise them as needed. NJNG appreciates the suggestions that other stakeholders made at the December 18, 2019 meeting regarding their experiences in other states that have similar models with this dual evaluator approach, especially their observation about the value that the diversity of perspectives and expertise that it brought to the discussions. NJNG suggests this model may be a good approach for New Jersey, especially if the state will be retaining the responsibility for some programs.

- Preliminary EM&V plans should be included within filings for both utilities and any programs retained by the state. The utilities would need a clear understanding of any efforts that the State may be pursuing for statewide insights and must have the opportunity to provide input into the scope. As noted above, it is problematic when utilities are not involved. The Straw Proposal currently references a pending baseline study but to-date the utilities have been excluded. Understanding statewide efforts can help avoid duplication for planned utility EM&V efforts. Utilities should collaborate on a common scope of work for evaluations on core programs. Programs that fall in the Utility Led Initiatives category should include a description of planned evaluation work as part of the utility filing. NJNG notes that the current Minimum Filing Requirements ("MFRs") require an Evaluation Plan to be included with the filing.

- Regarding to non-energy benefits, both the American Council for an Energy Efficient Economy and Lawrence Berkeley National Labs have done a lot of work on this topic. It includes a broad range of benefits, from health and safety on the residential side, to employee productivity and resiliency on the commercial side. New Jersey can learn from other jurisdictions that have addressed these benefits in their programs. NJNG would encourage the state to go beyond just capturing non-energy benefits and use the National Efficiency Screening Project's Resource Value Framework to test whether the approach to Cost Benefit testing that New Jersey intends to use is balanced and aligned with policy objectives. Traditionally, it is much easier to capture all the costs of energy efficiency programs and much more challenging to capture all the benefits of the programs. In states where there isn't a specific energy saving target, an unbalanced approach to screening the cost effectiveness of programs will lead to fewer energy-efficiency measures or programs being approved. Given the legislative mandate to achieve energy reduction targets, it is critical for Benefit-Cost Screening to capture all the benefits of the program to ensure that the structure does not create artificial barriers that inhibit the ability to achieve the goal. Ensuring all benefits are captured may be even more important for gas programs. From participation in national energy efficiency

organizations and conferences, NJNG knows that some natural gas programs face significant challenges because of the low cost of natural gas.

- NJNG believes that the Societal Cost Test is the most appropriate test to apply, especially in consideration of the Clean Energy Act's ("CEA") language stating that benefit cost test should consider economic and environmental factors. Further, the Company believes the language within the CEA also supports gross savings being used as the metric by which the programs are evaluated.

**Reporting and Filing Comments**

- It is appropriate to consider the MFRs in parallel with the evolving Straw Proposal.
    - To the extent that there is an expectation that some elements of the Core Programs are pre-negotiated through stakeholder discussions in advance of the required utility filings, it is worth considering whether some of the existing MFRs can be deleted/waived for those programs.
    - Once the Quality Performance Indicators ("QPIs) have been finalized, it is reasonable to request the utilities provide an overall assessment of how the programs within the filing relate to the established QPIs. This will require clarity regarding the expectation of the utility's expected performance with consideration of the expected contributions for any programs retained by the State.
- NJNG is supportive of using standardized templates for utility reporting with clear, consistent definitions for fields within the template. This should provide an easy way for the State to accumulate an aggregate view of activity throughout the State. Any templates that are developed should include separate fields to track funds distributed for on-bill repayment programs and other forms of financing to ensure parties can identify which forms of incentives will be repaid by customers over time, especially since on-bill repayment solutions may be an important part of the solution for ensuring equitable participation for moderate income customers. This clear distinction on types of funds can also mitigate the potential for some stakeholders to infer incorrect conclusions if they are making comparisons against programs that don't include a financing component.
- Referring to the point made in the general comments section, it is important to avoid requiring routine reporting for things that may be better assessed through an evaluation. The state should avoid requesting that excessive information be reported on a routine basis when it may be sufficient to just request the information be stored in a manner that will support future evaluation. The slides presented at the December 18, 2019 meeting

listed potential future data requirements for consideration. One bullet suggested the "Projects in progress and completed, including zip code, cost, program incentive, savings". It would not be advisable to try to routinely report this type of data at the project level. Excessive amounts of data being reported could tie up key resources and potentially divert attention from bigger program and portfolio level views of performance. Further, the State has prior experience trying to accept and reconcile account level data submission and ultimately decided that there was not sufficient value in trying to collect that data through their Information Management System (IMS).

- NJNG currently uses a vendor software solution to track individual program participants, as well as to communicate directly with participants and their respective contractors. Utilities should be encouraged to use systems like that to support data needs and improve the customer and contractor experience but should not be forced to transfer to a single statewide system. This should allow multi-state utilities to leverage synergies with platforms used in other jurisdictions and allow in-state utilities to continue to select systems that best integrate with their other information systems.

NJNG appreciates the opportunity to provide comments on these topics and looks forward to working with the Board and other stakeholders as the State considers how to restructure the approach to energy efficiency as to enable the utilities to reach the aggressive clean energy goals established by Governor Murphy's administration. Please feel free to contact me if you need any additional information regarding these issues.

Respectfully submitted,

Anne-Marie Peracchio
Director- Conservation and Clean Energy

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January 17, 2020

Via E-mail (EnergyEfficiency@bpu.nj.gov)
Aida Camacho-Welch, Secretary of the Board
Board of Public Utilities
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Re: Energy Efficiency Transition, Evaluation, Measurement & Verification and Filing and Reporting

Dear Secretary Camacho-Welch:

Please accept these comments on behalf of Public Service Electric and Gas Company ("PSE&G" or "Company") in connection with the above-referenced matter. PSE&G thanks the New Jersey Board of Public Utilities ("BPU" or "Board") for its initiation of the energy efficiency transition stakeholder process and the opportunity to provide these comments.

These comments will generally follow the structure of questions in the EM&V section of the agenda, and the agenda categories for the Filing and Reporting section.

Evaluation, Measurement & Verification

Question set 1:

- What types of evaluations and studies (BCA, baseline, process, impact) are necessary, in what cadence and frequency?
- What models do we see for who conducts, reviews, and approves each of those?
- How can stakeholders provide technical or on-the-ground expertise into the process?
- What model(s) for program evaluators should New Jersey consider?

PSE&G suggests that impact studies and benefit cost assessments (BCA) be conducted annually to measure actual performance against goals and to ensure that the portfolio remains cost effective. This is a best practice among the leading states and utilities. Process studies may be done less frequently, and may be more dependent on the details of the program. For example, a new program may require a process study soon after launch to gain initial feedback on the program design and customer response, but a mature, successful program may not require a process study on an annual basis. Utilities should work with staff and other stakeholders to determine the optimum sequencing of process studies.

All EM&V work should be performed by an independent third party with expertise in the field of EM&V. These EM&V vendors should be selected through a competitive bidding process conducted by the utilities. The utilities should directly contract with the vendors so that they can work closely together. EM&V vendors will require close interaction with EE program management and implementation teams and their contractors to effectively perform their work, and will need direct access to the data collected by the utilities on program participants, savings, etc.

While impact, process, and cost effectiveness studies are essential elements of a sound EM&V program, EM&V should not be limited to these three study categories. EM&V should also include other needed research related to energy efficiency. Research could include baseline studies to determine future savings targets, benchmarking studies to review comparative program element and results, local and statewide economic impacts from EE programs, or research into specific types of equipment that may be undergoing technological or market changes to ensure savings are being captured accurately (particularly for programs with deemed savings measures). EM&V research should be utilized to help inform updates to technical resource manuals, and can be used to inform new program design. A robust EM&V plan should include an assessment of all other areas of research needed to ensure long term success of the portfolio.

Finally, PSE&G recommends that BPU staff and Rate Counsel contract with their own EM&V vendors to oversee the EM&V plans and results of the utilities. These vendors should not seek to replicate the work of the utilities' EM&V vendor, but rather work as Staff and Rate Counsel's subject matter experts in ensuring that the EM&V work done is accurate and consistent with the plan. These vendors can also provide input into the overall EM&V plan, particularly in deciding what additional research should be conducted.

Question set 2:

- How should the EM&V process intersect with filing requirements? What types of information are needed when, and from whom?
- What is needed in this transition period (through launch of new programs) and the long term (~5-year goal and beyond)?
- Should New Jersey evolve towards a unified framework for all distributed energy resources?

The results of the EM&V process should help inform upcoming EE programs and filings by providing insight on how program designs, incentives, or performance may impact the future of the overall EE portfolio. Utilities should follow a strategic best practice approach to Energy Efficiency and utilize the recommendations and feedback from the process and impact studies as essential elements of the continuous improvement cycle, formalizing an action plan to implement the recommendations provided by the third party evaluator to improve the future results of the existing EE programs or develop new programs.

In its CEF-EE filing, PSE&G has proposed an initial EM&V structure that undertakes impact, process and cost effectiveness studies as a starting point, with available funds to perform additional EM&V tasks over time. This approach can be transitioned to the state-wide approach discussed over time, following the continuous improvement cycle described above.

Question set 3:

- Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach?
- What approach is recommended?
- What are the costs and benefits that you would recommend for consideration in a single benefit-cost test?
- Are there indirect or non-energy related costs or benefits that should be considered?
- If so, how can they be estimated?

For near term EE programs to move forward, such as PSE&G's CEF-EE filing, PSE&G recommends that the Board use the Societal Cost Test as the primary cost effectiveness test. This is the only test currently allowed by the Board that is consistent with the Clean Energy Act's mandate to evaluate both the economic and environmental impacts of EE programs.

In the longer-term, we suggest the Board follow the National Standard Practice Model (NSPM) model, which provides a framework to determine the cost effectiveness for not only EE resources, but other distributed energy resources (DERs) as well.

The NSPM presents the Resource Value Framework (RVF) as the approach to determine cost effectiveness. This approach allows each jurisdiction to determine the scope of benefits and costs to include in its cost effectiveness test; the Resource Value Test (RVT). It provides for the ability to include environmental impacts, public health impacts, non-energy impacts, impacts on low income customers, as well as others parameters. As a starting point, we recommend that all environmental and economic benefits be included, as these benefits are clearly mandated to be included by the Clean Energy Act, and that the EEAC consider other New Jersey policy goals and how they can be incorporated into the test, including, but not limited to, non-energy impacts and impacts on low income customers. Proposed benefits and costs to be considered in New Jersey's cost-benefit include:

| **BENEFIT** | **Method to Estimate** |
|---|---|
| **Lifetime Avoided Electric Supply Costs** | *PV of electric energy reduction at wholesale* |
| **Lifetime Avoided Electric Capacity Costs** | *PV of peak electric capacity cost* |
| **Lifetime Avoided Natural Gas Supply Costs** | *PV of natural gas reduction at wholesale* |
| **Lifetime Merit Order (DRIPE) Benefits** | *PV of merit order electric market benefits* |
| **Lifetime REC Avoided Purchases** | *PV of reduction of REC purchases* |
| **Lifetime Wholesale Volatility Value** | *PV of market hedge value* |
| **Lifetime Avoided Replacement** | *PV of avoided replacement Costs* |
| **Lifetime Avoided T&D Costs** | *PV of avoided T&D* |
| **Lifetime Emission Savings** | *PV of $CO_2$ + Nox + $SO_2$ emissions savings* |
| **Lifetime Economic Multiplier Benefits** | *PV of economic multiplier benefits* |
| **Low Income Customer Benefits** | *TBD* |

| | |
|---|---|
| **Small Business Customer Benefits** | *TBD* |
| | |
| **COST** | **Method to Estimate** |
| **Lifetime Participant Costs** | *PV of initial costs & repayments by participants* |
| **Lifetime Administration Costs** | *PV of administrative costs* |
| **Lifetime Program Investment Costs** | *PV of incentives* |

PSE&G suggests that difficult-to-quantify elements such as low income customer benefits be assessed by stakeholders with a goal to determine an optimum approach, and ensure appropriate recognition of the benefits and costs to New Jersey's most vulnerable residents. Other states have used EM&V research to assess such values in aggregate and recommend reasonable estimations of their value.

Question set 4:

- What are the most important factors to address in measurement and verification of energy savings?
- Should programs be evaluated based on gross or net savings? For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings?
- How should advanced M&V (automated data processing/increased data granulation) be integrated into EM&V?
- When should it be incorporated?

The most important elements to address in EM&V are the targets, methodologies and protocols that will be used to measure savings for each program. Gross savings should be the metric by which the programs are evaluated. The CEA states that the savings targets can be met from not only efficiency programs, but from improvements in other codes and standards. As such, the CEA targets defined in the legislation should be seen as gross savings. Additionally, the methodology used by Optimal in determining the maximum achievable potential also provided a view of the gross savings potential in the State. Measuring savings on a net basis would minimize the impact of codes and standards on achievement of goals, which may cause these valuable tools to be deprioritized, and become a missed opportunity for savings. Therefore, the savings targets should be based on gross energy savings, consistent with the language of the CEA and the study methodology.

In general, deemed savings should be applied to simple high efficiency equipment replacement programs, many of which are residential or small commercial programs. Because of the number of assumptions that go into these values, these deemed values should be validated from time to time with primary research, depending on the pace of change in technology or other market factors.

Programs that encourage more complex upgrades or replacement of energy consuming equipment and systems typically require more direct measurement, in some instances with pre-determined formulas, to determine energy savings. These are typically larger, commercial or industrial projects. Technical Resource Manuals can help inform the measurement methods for these projects, while leaving flexibility for unique projects and systems that may require project-specific

detailed engineering analysis. In cases such as this, it is appropriate to ensure that all savings calculations follow established professional protocols for measuring energy savings, and all calculations be validated by other engineering professionals. Program-specific methods should be used for unique programs, such as behavioral programs, in which savings accrue over time and control groups are used to net out non-program savings.

Advanced M&V can also be utilized to improve EM&V accuracy in impact and cost effectiveness studies, but requires Advanced Metering Infrastructure (AMI) and the more detailed usage data it provides. In this regard, PSE&G's CEF-Energy Cloud filing seeks to provide all of its 2.2 million electric customers with the advanced meters that would allow for these benefits.

With these general guidelines, the method(s) of measuring savings should be determined during program design of each program, and reviewed with those responsible with EM&V to ensure agreement of the methods to be used.

Following review of the methods by which EM&V will take place, it is critical to consider how the results of the EM&V process will feed into the utilities' Quantifiable Performance Indicators (QPIs), and used to assess incentives and penalties through the Performance Incentive Mechanism (PIM). As PSE&G has previously proposed in the January 3rd, 2020 comments titled *Re: Energy Efficiency Transition, Cost Recovery Scenarios*, PSE&G proposed the following mechanism.

PSE&G supports the use of performance incentives and penalties to promote State policy goals and reach the targets outlined in the Clean Energy Act. Performance should be determined based on the results of the Quantitative Performance Indicators ("QPI"). In relating performance to the award of an incentive or payment of a penalty, PSE&G recommends following best-practice elements, which are illustrated in Figure 1 below:

- **Simple and transparent**. The mechanism must be as simple as possible, to translate performance on QPIs into incentives and penalties.

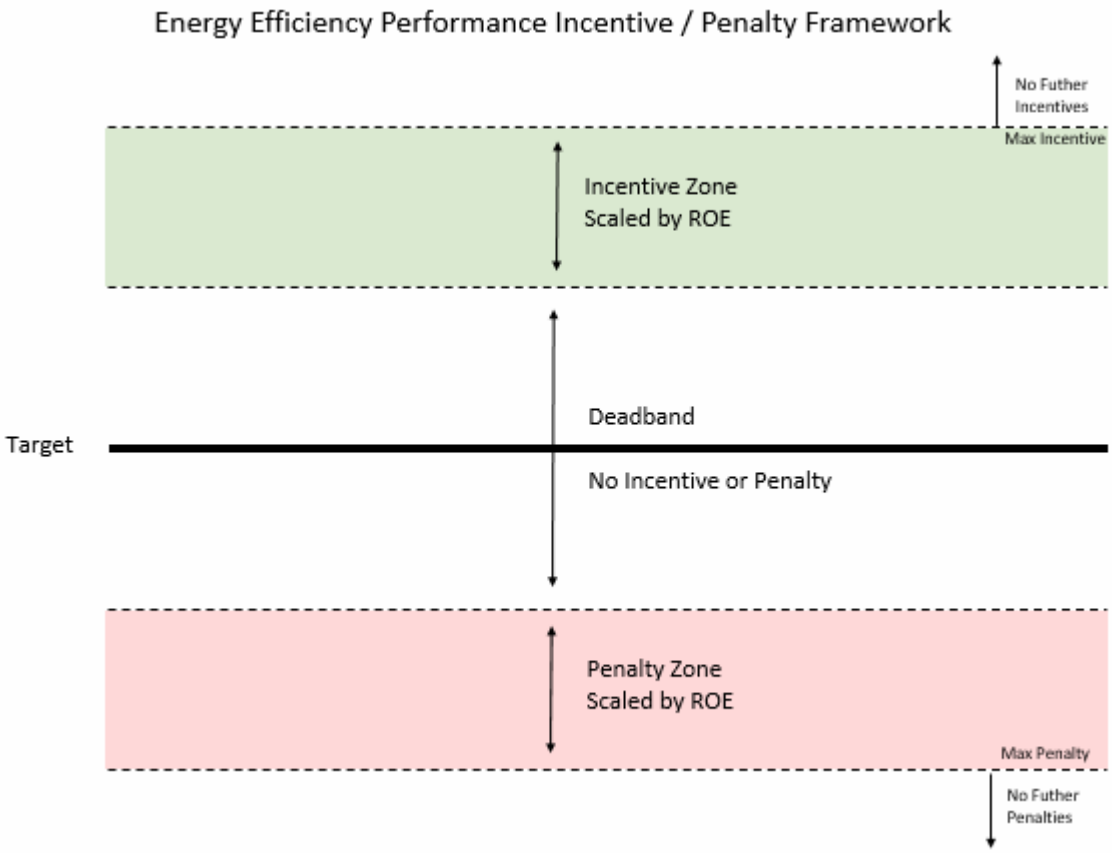
- **Dead band**. There should be a dead band around the targets in which no incentive or penalty is incurred.

- **Cap and floor**. The existence of a cap and floor serves to limit exposure by both customers and utilities in the event of significant under- or over-performance.

- **Linear scaling.** The incentives and penalties should scale linearly between the floor and the dead band, as well as between the dead band and the cap.

- **Recovered over time**. This approach aligns the incentive or penalty with the time over which customers receive the benefit from EE investment. It will also minimize the rate volatility that could flow from awarding the entire incentive or imposing the entire penalty in a single year.

Figure 1




To satisfy these guiding principles, PSE&G recommends that the incentive or penalty be awarded through an adjustment, up or down, to the return on equity ("ROE") earned on the energy efficiency investment at issue. This approach will naturally satisfy the principle to recover the incentive/penalty over time, and will keep the mechanism simple and transparent by tying it to the utility's existing ROE. This aligns with practices in both Illinois and New York, leading EE states that have both rate-of-return on EE investment and performance incentives.

Filing and Reporting

**Minimum Filing Requirements** - PSE&G suggests that some of the current minimum filing requirements (MFRs) be removed, namely the MFRs that look for program comparisons with other in-state or out of state programs, program barriers, and impacts on employment and economic development. These MFRs are highly subjective. As such, each utility has addressed these MFRs in their own way, producing varied responses that may not provide meaningful information to assist the Board in assessing whether EE programs should be approved or not. While the Company believes the issues addressed by these MFRs are important and necessary in the assessment of these EE programs, it believes that this information—instead of being provided

at the outset with the filing—should be addressed separately at a statewide level by the utilities collaboratively. These issues would be evaluated and assessed as part of the utilities' overall EM&V plan referenced earlier, in which vendors with the proper expertise perform the research on these topics and present the results in a comprehensive manner. Alternatively, statewide EM&V research will produce a more robust assessment of program comparisons through benchmarking program designs and results, can assess program participation barriers, and can analyze job creation & economic impacts of EE portfolios. This research, done as part of the utilities' EM&V plan, can be done on a regular schedule to keep Board staff informed on these issues. This effort would be similar in structure to the demographic study currently being undertaken by the utilities on a collaborative basis.

To the extent that the Board implements Quantitative Performance Indicators that are not already part of existing MFRs, they should be added.

**Reporting Requirements** – During the performance year, PSE&G recommends that the Board limit the data requirements to those elements that are essential to understanding the performance of the portfolio and programs over the year against the targets established and can be reported easily: expenditures, first year and lifetime savings, the number of participants all fall into this category. Other suggested data categories such as bill impacts, jobs created, benefit cost analysis are not items that can or should be reported at interim periods over a year, but are better assessed after the performance year is completed as part of the EM&V plan and reported separately.

PSE&G suggests a standard reporting format, common to all utilities, to provide the Board with consistent data, and further suggests that the reporting be no more than four times per year.

**Tracking System** - PSE&G suggests that the tracking and reporting needs of the BPU and the utilities are separate and should be viewed as two distinct needs. The BPU requires a reporting system for use by the Board and its staff, which would be capable of integrating the results from all of the utilities into a statewide data set. It would also be capable of compiling the data provided to create standard and ad hoc reports for the Board and its staff, and be able to synthetize data to provide dashboard information as well. Finally, it should be capable of presenting the statewide results into a viewable set of tables and graphs that would support a publically available statewide report on the results of all EE programs.

The utilities, as program administrators, require a "system of record" for each of the utilities, which would be the data repository of all EE-related information for that utility, and would include reporting capabilities. This system of record would also include all the capabilities to operate a 21st century EE portfolio, such as: the exchange of information with the utility's customer information system; the operation as a work management system for EE programs that have long sales cycles; interaction with customers, trade allies, and other contractors to exchange data; tracking of sales; and many other functions. It will need to interface with utility billing systems for on-bill repayments, and financial systems to accurately track and record all program expenditures, repayments, and incentive payments. PSE&G suggests further discussions with our Information Technology (IT) professionals to gain a better understanding of the IT systems needs for effectively operating a robust portfolio of EE programs.

This discussion highlights the need for investments in IT systems, for both the Board and the state's utilities, to successfully operate a portfolio of EE programs in the 21st century. Customers, vendors, and trade allies expect interactions with program administrators to be simple, flexible and seamless, taking full advantage of the digital technologies available in the marketplace today.

Conclusion

PSE&G trusts these comments and recommendations are useful to Board staff in its deliberation on these topics, and appreciates the opportunity to provide them.

Respectfully Submitted,

Joseph F. Accardo Jr.

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*Governor*

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STEFANIE A. BRAND
*Director*

January 17, 2020

**By Hand Delivery and Electronic Mail**
Honorable Aida Camacho-Welch, Secretary
NJ Board of Public Utilities
44 South Clinton Avenue, 9th Floor
P.O. Box 350
Trenton, NJ 08625-0350

**Re: New Jersey Energy Efficiency Transition**
**Stakeholder Comments – Evaluation, Measurement & Verification**

Dear Secretary Camacho-Welch:

Please accept for filing the enclosed original and ten (10) copies of comments being submitted on behalf of the New Jersey Division of Rate Counsel ("Rate Counsel") in connection with the above-referenced matter. Copies of Rate Counsel's comments are being provided to all parties on the service list by electronic mail and hard copies will be provided upon request to our office.

We are enclosing one additional copy of the comments. **Please stamp and date the extra copy as "filed" and return to our courier.**

Thank you for our consideration and attention to this matter.

Respectfully submitted,

STEFANIE A. BRAND
Director, Division of Rate Counsel

By: _____
Kurt S. Lewandowski, Esq.
Assistant Deputy Rate Counsel

Enclosure

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**Clean Energy Act**
**New Jersey Energy Efficiency Transition**
**Stakeholder Process**
**Energy Efficiency Stakeholder Meeting – Evaluation, Measurement and Verification**
**BPU Docket No.: Undocketed Matter**

**Comments of the Division of Rate Counsel**

**January 17, 2020**

## Introduction

As part of the process to implement the Clean Energy Act[1], the Staff ("Staff") of the Board of Public Utilities ("Board", "BPU") convened a Stakeholder Meeting on December 18, 2019 and invited stakeholders to comment on the subject of Evaluation, Measurement and Verification ("EM&V", or "M&V") for energy efficiency ("EE") programs in New Jersey.

The within comments are being submitted by the New Jersey Division of Rate Counsel ("Rate Counsel") pursuant to the Notice circulated on November 27, 2019 ("Notice"), and the subsequent Request for Comments dated January 9, 2020 ("RFC") which included four sets of questions intended to further engage discussion by stakeholders. Each set of questions is addressed below, following Rate Counsel's general comments.

## General Comments

While the within comments largely consist of addressing the questions posed by the OCE, at the outset several overarching principles to guide EM&V activities must be considered. The first principle is affordability. In evaluating EE and Demand Reduction ("DR") programs, customer bill impacts and affordability must be considered, both for residential and commercial customers. The concept of affordability is particularly important in the context of various

[1] P.L. 2018, c. 16 (C.48:3-87.3-87.7) ("Clean Energy Act" or "CEA").

ongoing utility infrastructure and renewable energy initiatives which also add to customers' utility bills.

The next principle is equity. Ideally, all utility customers should be able to participate in and benefit from EE and DR programs. Monetary bill reduction benefits should not flow to a few fortunate customers at the expense of other ratepayers who are unable to participate in EE and DR programs. The CEA recognizes the concept of equity. Specifically, the CEA requires utilities to assess the ability of all ratepayers to participate in programs through demographic analyses:

> Each electric public utility and gas public utility shall conduct a demographic analysis as part of the stakeholder process ***to determine if all of its customers are able to participate fully in implementing energy efficiency measures, to identify market barriers that prevent such participation, and to make recommendations for measures to overcome such barriers***. The public utility shall be entitled to full and timely recovery of the costs associated with this analysis. [N.J.S.A. 48:3-87.9(f)(2) *emphasis added*]

Demographic analyses should be an essential part of the evaluation process, in addition to conventional benefit-cost analyses ("BCA").

Another important principle is the use of reasoned judgment in evaluation. The Board should not rely on any single or primary benefit cost analysis in its evaluation of EE and DR programs. The Board should recognize the strengths and weaknesses of each benefit cost evaluation methodology. More importantly, the Board must use its reasoned judgment in its evaluation of the worth of EE and DR programs, relying on public policy considerations such as affordability and equity, in addition to numerical analyses. Additionally, the evaluation process should be ongoing, to inform both the Board's review of proposed EE and DR programs as well as to provide the feedback needed to modify and improve existing programs. Further, the evaluation process should extend not to just to the EE and DR program measures themselves, but

the process of implementing the programs, including customer enrollment and other program implementation activities.

Finally, the Board should require a robust M&V process, to ensure that the projected and claimed energy savings are, in fact, achieved. Adequate funding for M&V activities is essential. And a degree of independence for M&V activities should be established to credibly verify the claimed energy savings goals are met, particularly when energy savings are a decisive factor in assessing utility incentives and penalties under the CEA.

**Question Set 1**

***a. What types of evaluations and studies (BCA, baseline, process, impact) are necessary, in what cadence and frequency?***

The CEA provides some basic guidance regarding the frequency and scope of the evaluations and studies. For example, the CEA requires that utilities file EM&V strategies with their EE and DR program filings.[2] Further, the CEA requires the Board to review the energy savings targets for each utility every three years.[3] This energy savings target review should also include a review of Quantitative Performance Indicators ('QPI") and the QPI components, such as potential and baseline studies, customer class mix, etc. Participation rates and demographic analyses should also be conducted at that time. As discussed below, evaluation studies (BCA, baseline, projected impact) should be conducted prior to program approval, as well as part of the three-year review (BCA, baseline, process, impact). The Board should also assert its authority to require any such studies, as needed at any time, for good cause.

[2] N.J.S.A. 48:3-87.9(d)(3).
[3] N.J.S.A. 48:3-87.9(b).

Evaluation, measurement, and verification assesses the performance of energy efficiency programs to ensure that (a) program impacts are accurate and credible for meeting required targets for state and/or utility energy efficiency programs; (b) programs use ratepayer funding judiciously by ensuring programs are cost-effective; and (c) programs identify and address areas for improvement in program design in order to overcome program barriers, increase customer participation, and improve program achievements (e.g., energy and peak savings, emissions savings).[4] To meet these objectives, program administrators should arrange for a third-party evaluator to conduct the following evaluations and studies: avoided cost analysis, cost-effectiveness analysis, impact evaluation (including net-to-gross studies and measure-life studies), process evaluation, baseline and market characterization assessment, incremental cost assessment, and potential assessment.

Among these studies, impact evaluation studies should start prior to or during the implementation of a program cycle. Evaluation planning should ideally begin prior to program implementation when programs are being designed so that the program budget, schedule, and resources can incorporate evaluation requirements. In fact, the CEA requires that utilities file EM&V strategies with their program approval petitions.[5] This will also help evaluation activities support the success of the programs. Further, early planning of evaluation activities helps ensure that the data collection process will start once implementation begins.[6] As shown in FIGURE 1,

[4] Takahashi et al. (2016). Starting Energy Efficiency Off on the Right Foot: Regulatory Policies to Support Successful Program Planning and Design, Prepared for Island Regulatory & Appeals Commission, Prince Edward Island, p. 4.

[5] N.J.S.A. 48:3-87.9(d)(3).

[6] Schiller, Steve (2012). "Energy Efficiency Program Impact Evaluation Guide." State & Local Energy Efficiency Action Network, p. 8-1, Available at https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf.

impact evaluation activities prior to program launch include evaluation goal setting, budgets, schedule, reporting expectations, and preparing preliminary evaluation plans.

**FIGURE 1. Program implementation cycle with high-level evaluation activities**[7]

**TIMELINE – Stages of Development for EE Programs and E M&V Processes:**

**Stage 1** A. EE Program Activity – program goal setting.
B. E M&V Evaluation Activity – set evaluation goals, schedule, budgets, and reporting expectations.

**Stage 2.** A. EE Program Activity – program design.
B. E M&V Evaluation Activity – prepare preliminary evaluation plan.

**Stage 3.** A. EE Program Activity – program launch.
B. E M&V Evaluation Activity – prepare detailed evaluation plan and collect baseline data as needed.

**Stage 4.** A. EE Program Activity – implement evaluation.
B. E M&V Evaluation Activity – implement evaluation.

**FEEDBACK MECHANISM :** the results of the E M&V evaluations in Stage 4 may be used to develop future EE programs and modify current EE programs.

Program administrators should engage in program activities 1 to 3 as shown in FIGURE 1 for every program. However, if the evaluation budget is limited, program administrators may not be able to conduct evaluation studies for every program for every program cycle.

Similarly, planning for process evaluation should begin prior to program implementation. A best practice is to start process evaluations when a program concept is being developed, as part of the research support for the program, along with market research.[8]

In terms of timing, process evaluation differs from impact evaluation in that it can be operated continuously as part of a continuous improvement effort and should be implemented

[7] Adapted from Source: Schiller, Steve (2012). State and Local Energy Efficiency Action Network.

[8] See Peters, J. S. (2007). Lessons learned after 30 years of process evaluation. Retrieved from http://www.bpa.gov/EE/Utility/research-archive/Documents/30_Yrs_of_Evaluation-102507-2.pdf

when existing programs have significant program design changes (e.g., incentive design or levels). The latter is to assess the effectiveness of new program changes.

Other studies do not need to follow the schedules for the impact and process evaluation studies as described above. These studies are most helpful when they are conducted prior to preparing energy efficiency plans. Among the other evaluation studies, avoided cost studies should be conducted or updated prior to conducting benefit-cost and energy efficiency potential studies because these studies require key outputs from the avoided cost studies. Finally, baseline and market characterization assessment studies should be conducted or updated (when they are outdated) prior to conducting impact evaluation and potential studies because baseline and market characterization studies set baselines against which program impacts are assessed. As discussed above, baseline and potential studies are part of the initial QPI and QPI review processes under the CEA.[9]

In addition, New Jersey's Protocols to Measure Resource Savings should be updated annually to reflect the latest information available from impact evaluation and other relevant studies, such as baseline assessment.

***b. What models do we see for who conducts, reviews, and approves each of those?***

All EM&V studies should be conducted by independent vendors in order to ensure that such studies are unbiased and robust. In addition, it is critical that vendor selection is competitive and transparent. The selection should ideally be carried out with assistance from the Board or an independent entity or individual to further ensure the integrity of evaluation studies. Finally, evaluation studies and evaluation plans should be include in utility program filings, together with all supporting information, for review by the Board and other parties. Entities who

[9] See N.J.S.A. 48:3-87.9(a),(b) and (c).

oversee studies should make sure that evaluation studies are supported with data reviewable by the Board and stakeholders, and that plans reflect stakeholder feedback.

***c. How can stakeholders provide technical or on-the-ground expertise into the process?***

The Clean Energy Act established the independent advisory group ("IAG") to study and provide recommendations for improvement of the evaluation, measurement, and verification process for energy efficiency and peak demand reduction programs.[10] The IAG can also provide general feed-back on the EM&V process. In essence, the IAG operates at a limited higher-level advisory role rather than at "ground-level." Once EM&V proposals are filed by utilities, parties can review the specific plans in detail. Further, in the future the Board can establish stakeholder processes such as the instant proceeding, as needed, to address EM&V issues and policy questions as they arise.

***d. What model(s) for program evaluators should New Jersey consider?***

Please see the responses above.

**Question Set 2**

***a. How should the EM&V process intersect with filing requirements? What types of information are needed when, and from whom?***

Whenever the utilities and OCE file program plans for new program cycles, they should also file EM&V plans for the program cycle, as required by the CEA.[11] For example, in its 2012 report titled "Energy Efficiency Program Impact Evaluation Guide," the State and Local Energy

[10] N.J.S.A. 48:3-87.9(f)(1).
[11] N.J.S.A. 48:3-87.9(d)(3).

Efficiency Action Network ("SEE Action") describes what needs to be included in an EM&V planning document as follows:

> The evaluation planning documents should clearly present the evaluation efforts and details of the actions to be undertaken during the evaluation activity, as well as consideration of regulatory (reporting) requirements. A plan is a stand-alone decision document, meaning it must contain the information the evaluator and others need to understand what is to be undertaken, why, when, and how.[12]

This approach seems reasonable. While the SEE Action report focuses on impact evaluation studies, this approach may be applicable to other types of EM&V activity.

***b. What is needed in this transition period (through launch of new programs) and the long term (~5-year goal and beyond)?***

During the transition period (through the launch of new programs), the OCE and the New Jersey utilities will lay the groundwork for the program administration framework currently under consideration by the Board. This framework will likely require the CEP and utility program administrators to work in a more integrated fashion, including working collaboratively to conduct evaluation studies and to update the statewide savings protocols. The evaluation process should be flexible to accommodate various arrangements by the different program administrators.

A key foundation of the evaluation framework for the Board is to establish an independent advisory group to oversee the EM&V process, as required by the CEA.[13] The CEA directs the Board to establish a stakeholder process to evaluate energy usage and peak reduction potential, quantitative performance indicators, and the process for EM&V activities. The CEA also directs the Board to establish an IAG as part of this stakeholder process.

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[12] SEE Action. 2012. Energy Efficiency Program Impact Evaluation Guide, p. 8-13.
[13] N.J.S.A. 48:3-87.9(f)(1).

Furthermore, Rate Counsel recommends that the Board create a statewide EM&V coordinator to coordinate key EM&V activities involving the IAG, the third-party evaluators, the utilities, and the OCE. This coordinator role would serve to ensure statewide consistency of high-level EM&V decisions (e.g., methodology, confidence levels, assumptions, and inputs).

Ideally, once the IAG and the EM&V coordinator are established and in a position to do so, they can take a fresh look at the most recent CEP evaluation plan (issued in 2017) and consider which studies need to be conducted and in what timeframes. This activity will create the first statewide evaluation plan for the new program administrator framework. There are some evaluation studies that could be conducted by the OCE that can be applicable to any type of program. For example, the 2017 evaluation plan proposed conducting an energy efficiency baseline study in 2018.[14] Progress on the baseline study should be monitored. A baseline study has implications for many types of programs. Thus, the OCE should this study should be completed as soon as possible. Further, following the CEP's regular schedule, the Savings Protocols document should be updated annually. Finally, avoided costs may need to be updated to be used for assessing the benefits of new programs that will be proposed by the CEP and the utilities. The IAG and the EM&V coordinator have a critical role in ensuring that all program administrators use the same key assumptions and avoided costs where applicable.

When the utilities file program implementation plans, the CEA requires each utility to file an EM&V plan.[15] Rate Counsel strongly recommends that the CEP also follow this directive. It is imperative for the CEP to follow the same standards required of the utilities, because this will promote consistency among different entities and across the State. When the utilities or the CEP

[14] NJ CEP. 2017. Evaluation and Research Plan – Fiscal Year 2017 (July 1, 2016 to June 30, 2017): New Jersey's Clean Energy Program Energy Efficiency and Renewable Energy Programs.

[15] N.J.S.A. 48:3-87.9(d)(3).

file their implementation and EM&V plans, evaluation activities should start immediately. Planning and preparation for impact evaluation and process evaluation studies should begin prior to program implementation as we described in our comments under Question 1 above. This process occurs at the end of the transition period (through the launch of new programs). Further, new program filings should include a projected benefit-cost assessment that meets the cost-effectiveness guides promulgated in the CEA.[16]

In the long-term (after the launch of new programs), the CEA requires each utility to "file an annual petition with the board to demonstrate compliance with the energy efficiency and peak demand reduction programs, compliance with the targets established pursuant to the quantitative performance indicators, and for cost recovery of the programs, including any performance incentives or penalties, pursuant to section 13 of P.L.2007, c.340 (C.48:3-98.1)."[17] Rate Counsel recommends that the utilities provide updated benefit-cost assessments along with this annual compliance filing. Rate Counsel further recommends that CEP also file benefit-cost assessments annually.

Lastly, through the transition period and in the long-term period, the IAG and the EM&V coordinator should meet periodically to oversee and manage evaluation studies for NJCEP and the utilities. They also need to develop annual statewide evaluation plans each year.

***c. Should New Jersey evolve towards a unified framework for all distributed energy resources?***

New Jersey policymakers should examine the possibility of expanding energy efficiency and demand reduction programs to include distributed energy resources ("DERs") such as batteries, behind-the-meter solar systems, and electric vehicles. The CEA requires the Board to

[16] N.J.S.A. 48:3-87.9(d)(2).
[17] N.J.S.A. 48:3-87.9(e)(1).

conduct a study on energy storage and distributed energy resources and establishes specific goals for deployment of battery storage.[18] The CEA also establishes "the goal of 600 megawatts of energy storage by 2021 and 2,000 megawatts of energy storage by 2030."[19] In order to support the CEA's energy savings and demand reduction goals, New Jersey should work to develop a unified approach which may include a role for distributed energy resources.

**Question Set 3**

***a. Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended?***

Rate Counsel supports the use of multiple tests to assess program impacts from several perspectives and does not find it useful to determine and rely on a single primary cost test. Moreover, ratepayer bill impacts must be a part of all evaluation studies.

With respect to benefit cost analyses, Rate Counsel continues to support the use of all five standard tests set forth in the California Standard Practice Manual ("CSPM") , namely the Utility Cost Test ("UCT"), Total Resource Cost ("TRC") test, Societal Cost Test ("SCT"), Participant Cost Test ("PCT"), and Ratepayer Impact Measurement ("RIM") Test. Each test provides valuable information from different perspectives. For example, the UCT provides information about how programs affect a utility's revenue requirements, and therefore indicates the extent to which energy efficiency will reduce total costs and average customer bills. The TRC provides additional information regarding impacts on efficiency program participants. The SCT provides additional information regarding environmental and economic development benefits, which the CEA requires be included in a benefit-cost test. Rate Counsel supports the

[18] N.J.S.A. 48:3-87.8 (a),(c).
[19] N.J.S.A. 48:3-87.8 (d).

use of the RIM test, however, all evaluation studies should also include bill impact analyses to assess the impact of the programs on the utility bills for customers, particularly residential customers at various levels of usage. Bill impact analyses are necessary to assess the affordability of utility bills.

Therefore, Rate Counsel strongly recommends that all program administrators in the state be required to conduct long-term rate, bill, and participation impact studies[20] Specifically, rate impacts should be measured in terms of cents per kWh for electricity and dollars per therm for natural gas as well as percentage changes in rates due to energy efficiency programs. Bill impacts should be measured in terms of dollar impacts per month and percentage changes in monthly bills due to energy efficiency programs. Presenting the long-term rate impacts in this way allows program administrators and other stakeholders to fully understand any potential rate impacts.

Further, Rate Counsel considers it critical to analyze cumulative efficiency program participation rates to address equity and rate impact concerns regarding energy efficiency programs. This analysis will tell us how widespread energy efficiency programs are likely to be, and to what extent ratepayers are mitigating potential rate increases with reduced energy bills due to energy efficiency measures. It would help ensure that there is equity whereby all ratepayers have the opportunity to participate and save on their energy bills.

With respect to the Resource Value Framework ("RVF") found in the National Standards Practice Manual ("NSPM"), which seeks to define benefits and costs in the context of policy objectives, that approach is not effective as a "primary test" since it fails to address a core function of utility regulators, i.e. ratemaking. Thus, the NSPM should not be used as a primary

[20] This is consistent with the recommendations found in Appendix C of the National Standard Practice Manual ("NSPM").

test, although it could be evaluated along with the other tests discussed above. The Board must have all the tools available to review EE and DR programs, which include a full range of BCA tests and affordability analyses, in order to assess and implement its policy goals. Further, if the Board decides to also include the NSPM test as one of its enumerated BCA tests, the RVF factors should include, at a minimum, benefits and costs associated with low income customers, including estimates of energy burdens and program participation for various customer classes and demographic groups. Rate Counsel recommends that any such new test should only be considered in combination with the traditional cost-effectiveness tests and other analyses.

***b. What are the costs and benefits that you would recommend for consideration in a single benefit-cost test?***

***i. Are there indirect or non-energy related costs or benefits that should be considered?***

***ii. If so, how can they be estimated?***

As discussed above, Rate Counsel does not support the use of a single benefit-cost test. The inherent simplification of a single benefit cost test is its weakness. The five recognized "standard" BCAs found in the California Standard Practice Manual have some weaknesses as set forth in the CSPM, but generally provide several perspectives for evaluating EE and DR programs, as discussed in the response to the prior question. Consideration of several analyses provides a multi-perspective approach, where a reasoned balancing of perspectives is required. Furthermore, affordability must always be considered. Finally, no single test or group of BCA tests can replace the need for reasoned judgement of the Board and stakeholders in assessing the merits of EE and DR programs.

Utility avoided costs, environmental health savings and so forth are among the societal costs factored into the CSPM BCA tests. However, other cost and benefits need to be examined.

For example, program participation rates (by customer class and demographics), bill impacts, energy bill burdens, and other factors need to be considered in weighting and evaluating the costs and benefits of EE and DR programs. In fact, the CEA requires an analysis of customer participation in EE and DR programs.[21]

**Question Set 4**

***a. What are the most important factors to address in measurement and verification of energy savings?***

Measurement and verification activities are critically important in the context of the CEA. The measurement and verification of energy savings primarily constitutes an impact evaluation, assessing the actual amount of energy savings achieved in relation to the CEA's energy savings requirements. Further, energy savings are a key determinant of utility incentives and penalties under the CEA. The goal of an impact evaluation is to reliably establish the energy savings, peak demand savings and non-energy benefits that result from a program.

There are a number of factors that must be addressed in impact evaluations. Some of these factors that must be broadly addressed in any evaluation (not limited to impact evaluation only) include the following:

1. The evaluation should be non-biased and independent.
2. The assumptions, inputs, calculations, and methodologies should be transparent.
3. The activities should apply an appropriate level of rigor based on the best practices and evaluation priorities.
4. Evaluation activities should be planned in a way that prioritizes the high value activities.

When conducting an impact evaluation for a program, the specific goals, objectives, and research questions should be clearly defined so that the impact evaluation can be conducted in a

[21] N.J.S.A. 48:3-87.9(f)(2).

way that supports the program goals and objectives. This allows the impact evaluation activities to be results-focused with the intention of improving program planning and program delivery. In addition, especially when programs are under development or in the early stage of implementation, reporting standards and the frequency of reporting of different metrics must be clearly defined for each program. The key performance metrics that are to be measured and produced as outputs to the evaluation activities should be clearly listed.

Uniformity and consistency in how the evaluation is conducted and how the reporting is done are crucial to the success of any energy efficiency plan. Metrics, when defined upfront, allow for such uniformity and consistency across programs and across different phases/cycles of the energy efficiency plans. In the context of impact evaluations, the results must be defined at measure level, program level, sector levels (business, commercial, residential etc.) and at a portfolio level. Therefore the impact evaluation needs to be done in a way that allows for reporting the results for these different levels.

Depending on the nature of the program, there are also a number of technical aspects such as inputs, assumptions, and methodologies that are important factors to address at the outset of an impact evaluation. These details could include specifics on the energy savings protocols to be used, any necessary savings protocols development activities, approaches for evaluating the gross and net energy savings and any associated key assumptions in these calculations (e.g., free ridership and spillover). Also important to address are approaches for evaluating non-energy benefits associated with the program. Finally, the results of an impact evaluation must always clearly state the overall certainty of the savings estimates and any bias associated with the savings.

### *i. Should programs be evaluated based on gross or net savings?*

Energy efficiency programs should be evaluated based on net savings. Net savings refer to energy savings that are attributable to an energy efficiency program. Net savings typically take into account (and exclude) free riders who would have implemented the program measure or practice in the absence of the program. Net savings should also incorporate any spillover effects. Spillover effects are savings impacts caused by the presence of an energy efficiency program beyond the program-related savings of the participants and without financial or technical assistance from the program. Net savings are useful outputs of energy efficiency programs because they indicate the effectiveness of the programs. For example, when net savings are substantially low compared to gross savings and the net-to-gross savings ratio is low, program administrators need to examine the cause of the poor program performance through process evaluation. This can help identify ways to improve program designs in order to reduce free riders and improve the effectiveness of the programs.

### *ii. For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings?*

Deemed savings or deemed savings calculations are suitable for projects that are not expected to have significant variation in the savings. Assessment of actual energy usage and savings are required for measuring impacts for programs that involve relatively complex retrofits which are subject to more variation in savings. This approach - called a project-specific M&V approach - is generally applied to only a sample of projects in a program. It is often used when other approaches are not applicable (e.g., when no deemed savings exist) or when per project savings are needed.[22] The project-specific M&V approach uses one or more methods that can

[22] Schiller, Steve. 2012. pp. 4-12.

involve measurement, engineering calculations, and billing regression analyses to verify actual savings. These different methods are described in the International Performance Measurement and Verification Protocols ("IPMVP"). The M&V approach also typically accompanies field activities dedicated to collecting site information. Such information can include equipment counts, observations of field conditions, building occupant or operator interviews, measurements of parameters, and metering and monitoring.[23] Information and data collected through field activities are essential for measuring and verifying savings. Generally, more complex EE and DR measures require more careful and comprehensive M&V processes, as compared to simple measures such as lighting which are amenable to deemed savings garnered from protocols and other appropriate guide manuals.

***b. How should advanced M&V (automated data processing/increased data granulation) be integrated into EM&V?***

Where available, Advanced M&V (also known as M&V 2.0) might provide additional data to inform studies of energy savings.[24] Advanced M&V has some similarity to traditional billing analysis. Billing analysis uses an adjusted baseline, developed using actual metered consumption data in the pre-program period, to estimate what future building energy use would be absent the energy efficiency measure. Advanced M&V also does this analysis, but in a more dynamic and automated manner. Advanced M&V can collect and process data in real-time and can produce "dynamic savings estimates that are customized based on automated data analytics

[23] Schiller, Steve. 2012. pp. 4-12.

[24] Advanced M&V uses emerging information and communications technologies ("ICT") to automate the process of collecting and processing actual energy data in real-time to produce building energy profiles, estimate savings potential, or estimate building energy savings in near real-time.[24] ICT relevant to Advanced M&V includes smart meters, smart thermostats and devices, non-intrusive load metering ("NILM") devices, building automation systems ("BAS"), and building energy management systems ("BEMS").

for each potential customer."[25] Thus, it can more easily develop baseline consumption and estimate savings in numerous buildings in near real-time. However, deploying advanced M&V is understandably very costly relative to the value of the energy savings data except, perhaps, for very large customers. Moreover, Advanced M&V should not be used as a driver for uneconomical automated metering infrastructure ("AMI").

*i. When should it be incorporated?*

As discussed above, Advanced M&V has various applications. A critically important factor in the deployment of Advanced M&V is cost. The timing of the applications is different by application. In each instance, the cost of deploying Advanced M&V must be measured against the value of the acquired data.

*ii. What are best practices related to accuracy/confidence/reporting?*

Applications of Advanced M&V are very limited at this point. Therefore, Rate Counsel is not aware of any comprehensive best practices on Advanced M&V based on actual experience with wide-ranging deployment of such systems.

[25] See VEIC. 2018. A Guidebook to Adoption of M&V 2.0., p. 8.

BPU Notice November 26, 2020
Evaluation, Measurement & Verification, and Filing and Reporting
Rockland Electric Comments January 17, 2020

As requested by the New Jersey Board of Public Utilities ("BPU"), Rockland Electric Company ("RECO" or the "Company") offers the following comments regarding the evaluation, measurement and verification ("EM&V") and filing and reporting issues relating to the utilities' energy efficiency ("EE") and distributed energy resource ("DER") programs. RECO has responded to the specific EM&V Discussion Questions attached to the Notice of the December 18, 2019 Stakeholder Meeting ("Notice"), as well as the questions implicit in the Filing and Reporting Agenda contained in the Notice.

## COMMENTS

### I. Evaluation, Measurement & Verification

Question Set 1:

- **What types of evaluations and studies (BCA, baseline, process, impact) are necessary, in what cadence and frequency?**

Each utility should perform an annual benefit cost analysis ("BCA") to validate that its portfolio of electric and gas EE and DER programs are cost-effective. Process and impact evaluations should be conducted once the programs have launched and are fully operational so that there is a significant population of participants to survey and sufficient historical usage data to verify the impact of the measures installed. These studies should be repeated if the program design changes significantly with new measures and technologies incorporated, and at least before the end of a program cycle to inform the program design for the next program cycle. As a general rule, a utility should perform a baseline study prior to designing programs to determine the potential savings that may be achieved by the portfolio. Thereafter, another baseline study should be performed at the end of the current five year program cycle as defined in the legislation to inform the next period to incorporate changes in technology and equipment baselines, lessons learned, and best practices.

- **What models do we see for who conducts, reviews, and approves each of those?**

The Company recommends that the evaluation studies noted in its response to the previous question be performed by independent third parties. This approach has been accepted nationally and will serve to enhance the objectivity of and confidence in such evaluation studies. The Company advises that EM&V work should comply with the International Performance Measurement and Verification Protocol ("IPMVP") standards. The protocol selected within IPMVP will depend on the measures included within

the project and the historical performance of the measures. These standards have been adopted in New York and have proven to be beneficial for providing consistent evaluation results.

- **How can stakeholders provide technical or on-the-ground expertise into the process?**

To bolster confidence in the EM&V process, the Company agrees that stakeholders should be afforded an opportunity to provide their technical or on-the-ground expertise. In order to streamline the EM&V process, the BPU should convene a proceeding to engage with interested stakeholders to provide their experience to enhance EM&V procedures for EE and DER programs.[1] As part of this statewide proceeding, interested stakeholders will be able to comment on proposed EM&V policies and procedures. For example, New York employs a joint committee comprised of utilities, New York State Energy and Research Authority ("NYSERDA"), relevant parties, and Department of Public Service ("DPS") Staff.

- **What model(s) for program evaluators should New Jersey consider?**

As noted above, the Company recommends that third parties performing EM&V studies should follow the IPMVP standards.

Question Set 2:

- **How should the EM&V process intersect with filing requirements? What types of information are needed when, and from whom?**

The Clean Energy Act ("CEA")[2] at section e (3) requires that utilities file an annual petition as follows:

> Each electric public utility and gas public utility shall file with the board implementation and reporting plans as well as evaluation, measurement, and verification strategies to determine the energy usage reductions and peak demand reductions achieved by the energy efficiency programs and peak demand reduction programs approved pursuant to this section. The filings shall include details of expenditures made by the public utility and the resultant reduction in energy usage and peak demand. The board shall determine the appropriate level of reasonable and prudent costs for each energy efficiency program and peak demand reduction program.

[1] Given the diversity among the utilities and their service territories, these general protocols and procedures should allow for local variation.
[2] P.L. 2018, Chapter 17. The EE portion of the CEA is codified at *N.J.S.A.* 48:3-87.9.

Accordingly, the CEA envisions that utilities will file petitions prior to implementing their EE and DER programs. Such petitions will project reductions in energy usage and peak demand, as well as perform benefit-cost tests on forecasted program achievement. These projections will be based primarily on best practices and industry knowledge with energy and demand savings forecast based on technical resource manuals and industry guided principals, participation assumptions and forecast expenditures. Subsequent annual filings will compare actual results to projections and reflect any recommendations provided by process and impact evaluations if they were performed during that year. The first impact evaluations should be performed after enough heating and/or cooling cycle energy usage data is captured to determine the impact of the measures installed that are affected by weather. Once EM&V studies are completed, their evaluation findings should inform the next program design cycle.

- **What is needed in this transition period (through launch of new programs) and the long term (~5-year goal and beyond)?**

Please see the Company's comments above. After the initial five-year term, the frequency of studies will depend on the nature of the program(s) implemented.

- **Should New Jersey evolve towards a unified framework for all distributed energy resources?**

Rockland supports a unified framework approach for DER and recommends that development of such frameworks be addressed in a separate proceeding. Unified frameworks provide a method for comparing the benefits of various technologies, thereby creating certainty for utilities and other third parties seeking to implement these technologies and approaches. New York State's Reforming the Energy Vision ("REV") Proceeding supports a unified framework for analyzing the costs and benefits of distributed energy resources on a societal, customer and utility basis. REV is a platform for EE, EV, demand response, demand reduction, and storage technologies that may help alleviate grid constraints, expand customer program offerings, and increase customer satisfaction. This framework allows these resources to be compared in a consistent manner using common factors to determine which resource best solves the grid issue at the least cost. For example, Non-Wire Solution ("NWS") projects incorporate energy efficiency as a least-cost solution when the potential exists to resolve a system constraint, often providing long-term demand reduction. Demand response and EE programs are co-marketed as these technologies often provide both energy and demand savings. On O&R's Marketplace, smart thermostat rebates are now bundled for both EE and demand response to streamline the customer experience to provide a point of sale

rebate that reduces the upfront cost and facilitates energy savings, targets demand reduction, and increases customer satisfaction. These thermostats are pre-provisioned so that customers are automatically enrolled in the Company's demand response program once the thermostat is installed. By integrating EE and demand response, program spending is minimized to achieve maximum benefits.

Question Set 3:

- **Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended?**

The Company agrees that New Jersey and the BPU should develop a primary cost test. The Company supports the Societal Cost Test which incorporates the value of benefits associated with environmental externalities. This test may also incorporate other external benefits realized through program evaluation studies. The societal test has been adopted in New York and has proven successful in measuring cost-effectiveness.

- **What are the costs and benefits that you would recommend for consideration in a single benefit-cost test?**

The utilities previously submitted their joint position on benefits and costs associated with BCA and the Company supports these variables. A copy of the joint position is set forth as Attachment A to these comments.

- **Are there indirect or non-energy related costs or benefits that should be considered?**

Yes, there indirect or non-energy related costs or benefits that should be considered. For example, low income EE programs generally have a BCA ratio less than one. While additional benefits are realized by participants, such as enhanced health and safety, the value of a lower energy bill, and reduced subsidies needed to support credit programs, these are not easily quantified. The efforts necessary to quantify these non-energy benefits are considerable, and argue against the quantification of such benefits. As a result, low income programs are implemented despite a BCA less than one while realizing that these benefits if quantified would produce a BCA ratio above one.

- **If so, how can they be estimated?**

The Center for Energy, Environment and Economic Policy ("CEEEP") has quantified the value for avoided energy and capacity costs and environmental externalities for New Jersey EE programs. CEEEP may assist in the estimation of additional external benefits identified through program evaluations, program experience, and the introduction of new technologies that may be incorporated into BCA.

Question Set 4:

- **What are the most important factors to address in measurement and verification of energy savings?**

The most important factors to address in measurement and verification are the impact of the programs on the utilities' system. These include the impact of energy and demand reductions and the associated environmental benefits realized through the installation of EE and DER measures. These measures and processes should not only reduce energy consumption but also result in participant bill reduction and should have a positive impact on future supply costs. In addition, in areas of significant growth or constraint, demand reductions resulting from EE and DER programs, will defer or eliminate the need for future capital investment.

- **Should programs be evaluated based on gross or net savings?**

The Company supports program evaluation based on gross savings. Calculating net savings is time consuming and introduces an unnecessary level of complication and expense (*e.g.*, the methodology for calculating free ridership and spillover effects) and corresponding potential for disagreement. In addition, gross benefits represent the true impact of programs in the State.

- **For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings?**

It is critical that EM&V activities strike a balance between the level of rigor and accuracy, and the cost, timeliness and usefulness of the information measured in a rapidly evolving market environment. As a general matter, deemed savings should be used for those measures for which there is extensive historical operational experience and are prescriptive in nature. For example, lighting used in a specific facility can be estimated using traditional engineering formulae. However, equipment used in various processing or industrial applications may require the use of custom formulae. Custom projects may require pre- and post-metering or billing analysis to determine savings to address specific customer circumstances.

- **How should advanced M&V (automated data processing/increased data granulation) be integrated into EM&V?**

Advanced M&V should be integrated into EM&V to the extent that it is cost effective to do so. For example, the implementation of advanced metering infrastructure ("AMI") should allow for the measurement and verification of increasingly granular data. This effort will be enhanced by the development of new software/technology for data processing, the incorporation of building and energy management systems, and new advancements in EM&V protocols.

- **When should it be incorporated?**

Advanced M&V should be incorporated when enough AMI data is accumulated to inform savings from the installation of measures, and estimates from new software/technology are available at a reasonable cost. As new methods are validated and proven to be accurate, they should be incorporated in advanced M&V.

- **What are best practices related to accuracy/confidence/reporting?**

In New York, utilities incorporate a 90/10 confidence interval for impact evaluation studies whenever possible. However, in certain circumstances it may be cost prohibitive to incorporate this level of accuracy, and a lower confidence interval is used. If the costs to determine a 90/10 confidence interval exceed evaluation budgets, then a lower confidence interval should be considered.

## II. Filing Requirements

As stated above, the Notice did not contain specific questions regarding filing requirements. In the comments below, the Company addresses several filing related issues.

**Minimum Filing Requirements**

a. **Current minimum filing requirements for proposed new or modified programs**

**Examples: market segment/efficiency targeted, delivery method, estimated participants, total project energy savings, marketing, market barriers, impact on employment and competition in the marketplace**

**b. Discussion**

**i) How are the current filing requirements working, including regarding required information and process?**

The current Regional Greenhouse Gas Initiative ("RGGI") filing requirements exceed what is necessary to determine the effectiveness of EE programs. For example, determining a program's impact on job creation is far too speculative to be meaningful in the determination of program effectiveness. Moreover, a comparison to programs in other states is often irrelevant based on varying service territories and demographic profiles. These are not core components needed to determine the effectiveness of an EE program; moreover, they can be subjective and costly to determine. It is difficult to determine employment levels as many programs are implemented by third parties. The accuracy of data reported may be subjective or inaccurate and the resources and systems needed to update and maintain this data are costly while providing no benefit toward the effectiveness of the EE program. The Company would note that in New York, the annual filing requirements include the following components: program design, program delivery method, target market and customer eligibility, anticipated participation levels, quality assurance plans, budget and plan summaries, EM&V plans, and BCA summaries.

**ii) What are best practices for filing requirements?**

While program reporting requirements vary by state, filing requirements in New York, as noted above, provide the information necessary for DPS Staff to determine the effectiveness and impacts of a utility's EE programs. Overall budgets and targets are approved for the electric and gas portfolio and provide the utility the flexibility to achieve these goals while maintaining the portfolio's budget. This flexibility allows the utility to shift funds from under-performing programs to other programs with greater customer interest resulting from market drivers.

**Reporting Requirements**

**a. Current reporting requirements**

Currently, pursuant to the Stipulation of Settlement in its Low Income Direct Install III Program[3], the Company submits an annual report to BPU Staff and Rate Counsel that includes the number of participants, kWh and kW savings, program expenditures by task, survey results, and outreach activities. The Company believes that these reporting requirements are sufficient.

[3] RECO's Low Income Direct Install Program was authorized by the Regional Greenhouse Gas Initiative ("RGGI") legislation. *See* L.2007, c. 340, § 13 codified at N.J.S.A. 48:3-98.1.

**b. Data quality control / verification**

The Company will establish financial tracking by program and task to monitor expenditures and progress in achieving program targets. In addition, in New York, the Company currently uses a demand-side management software tool for the purpose of tracking energy and demand reduction resulting from the installation of EE measures. Measure savings are calculated using engineering formulas built directly into the software as described in a Technical Resource Manual that is vetted by the utilities and DPS Staff. The Company also inspects at least 10% of all rebate applications to verify that measures are installed and meet the eligibility requirements of each program.

**c. Potential new data requirements**

**Examples: committed and actual dollars spent per program by sector and category, projected and actual participants by program, projects in progress and completed, projected and actual energy saved per program by fuel source and sector, projected and actual cost of measures, projected and actual benefit-cost analysis of programs, actual energy sales by sector, rate and bill impacts, greenhouse gas emission reductions, jobs created and retained, payment times for contractors**

Many of the data requirements that are listed above are needed to track the effectiveness of programs. However, with respect to actual measure costs, job creation and retention, and payment times for contractors, these data requirements may be overly burdensome to track and may add unnecessary costs to the program, while providing little incremental value.

**d. Frequency, formats, and types of reporting**

Reporting should be done annually in order to track the expenses and performance of each program.

**e. Discussion**

- **Feedback about current reporting requirements regarding data and process**
  Utilities should maintain a tracking tool that can provide the data for reporting in an aggregated fashion. To determine what data should be provided, the BPU should establish a working group to evaluate and determine program reporting requirements - the frequency, format and level of detail.
- **What is needed from a reporting system to meet Clean Energy Act goals?** Please see the Company's response to subsection d above.
- **What is a successful reporting program?** Providing the BPU with data described above.

- **Access: What data from the utilities and State should be tracked?** Please see the Company's response to subsection c above.
- **Use: How should data be used**? Data should be used to track and monitor performance and report within 90 days of close of quarter. Data should be presented in an aggregated fashion, so as to protect customer confidentiality interests.
- **What are barriers to a successful reporting program**? Customer compliance, *e.g.*, customers providing complete applications.
- **What are best practices and lessons learned?** Utilities should submit reports within 90 days after a program closes, only claim energy and demand savings when rebates are paid, – not from contractor report – do not use committed savings – only actual

**Tracking System**

**a. Current practices by utilities and the State - features and utilization**

Rockland only has one EE programs, which is the Low Income Direct Install Program noted above. The Stipulation in that program requires that Rockland provide an annual report to BPU Staff and NJ Rate Counsel that includes the number of participants, kWh and kW savings, program expenditures, survey results, and outreach activities. The Rockland vendor, Honeywell, uploads tracking data about energy savings to the Office of Clean Energy.

**b. Discussion**

- **Advantages and disadvantages of current tracking systems**
    - **What are utilities using in New Jersey (legacy systems) and other states to track information about energy efficiency programs**

      RECO's parent O&R implements EE programs in NY and based on the amount of data required to determine the programs performance, a database tracking tool is utilized. This minimized the potential for human error and provides a repository for all historical program performance and project and measure level data.
- **Desired outcomes of the next tracking system**
    - **What is needed from a tracking system to meet Clean Energy Act goals?**

      A tracking system at the state level must have the capability to upload individual utilities aggregated program performance data including, annual and lifetime energy and demand reductions, environmental impacts, rebates paid, number of projects completed, program

expenditures all by program. As long as the data above is provided by program in aggregate as opposed to by customer, PII should not be of concern.

- **What is a successful tracking system?**

  A successful tracking system provides for ease of use, quick access to real time information, and easily integrates with other software systems.

- **What are best practices and lessons learned?**

  Tracking system should be flexible to evolve over time and incorporate the latest TRM formulas to calculate energy and demand savings. Reporting of tracking data should be easily customizable to demonstrate the overall effectiveness of the program.

- **Ideal features / capabilities / utilization?**

  - **How and when should advanced M&V (automated data processing increased data granulation) be integrated?**

    Once the tracking system is tested and proven effective, advanced features including more granular data can be incorporated.

  - **Is a dynamic I automated platform needed for it to be useful? For example, could there be a monthly data dashboard?**

    Depending on the reporting cadence, a dashboard feature is helpful and can demonstrate the state's progress toward anticipated goals.

  - **Should it be a statewide system?**

    Yes, a statewide system is needed to aggregate each utilities tracking data in order for the state to track overall program performance towards the state energy goals.

  - **What level of detail should it hold? For example, should it be able to hold demographic and tax data?**

    No, demographic and tax data is not necessary, however, energy and demand as discussed above are critical components.

  - **Should it be able to hold downloaded utility records and data provided by contractors?**

    Contractors should provide data by customer to the utility, while the utility provided aggregate data to be uploaded into the statewide tracking system.

  - **Should it be able to work / connect / cross-reference with other (e.g., utility, State) systems?**

Utilities should be able to connect to the statewide system but the statewide system does not need to connect to the utilities tracking software. This will ensure that PII is maintained and not improperly compromised.

- **Ownership and transparency of data**
    - **Who should own the system and data?**

      The statewide system which will contain aggregated utility data by program should be owned by the state. The utility tracking systems which will contain measure level data and PII should be owned by each utility.
    - **How accessible to the public vs. the utilities and State should it be?**

      The statewide system should be accessible to the public and a dashboard may work well, however, various functions like read and write access should only be available to selected users. Utilities tracking systems should not be accessible by the public as they will contain individual customer specific information and PII must be secured.
- **What are barriers to a successful tracking system?**

  Barriers to a successful statewide tracking system include complex and inflexible rules. Setting the goals of the system prior to development will increase the likelihood of developing a useful tool. All parties that will provide data, including the utilities and OCE, should be part of the development of the tracking system. The system should be easy to use and provide dashboards to monitor performance by program and utility.

Attachment A – Utilities' Submission to BPU Staff on Cost-benefit

# Utilities Response to EEAG Homework on EM&V and Cost-Benefit

**What are the costs and benefits that you would recommend for consideration in a single benefit-cost test? Are there indirect or non-energy related costs or benefits that should be considered and if so, how can they be estimated?**

We suggest the Board follow the National Standard Practice Model (NSPM) model, which provides a framework to determine the cost effectiveness for not only EE resources, but other distributed energy resources (DERs) as well.

The NSPM presents the Resource Value Framework (RVF) as the approach to determine cost effectiveness. This approach allows each jurisdiction to determine the scope of benefits and costs to include in its cost effectiveness test; the Resource Value Test (RVT). It provides for the ability to include environmental impacts, public health impacts, non-energy impacts, impacts on low income customers, as well as other parameters. As a starting point, we would recommend that environmental and economic benefits be included, as these benefits are recognized by the Clean Energy Act, and that the EEAC consider other New Jersey policy goals and how they can be incorporated into the test, including, but not limited to, non-energy impacts and impacts on low income customers. Proposed benefits and costs to be considered in New Jersey's cost-benefit should be reasonably quantifiable and include:

| **BENEFIT** | **Method to Estimate** |
|---|---|
| Lifetime Avoided Electric Supply Costs | *PV of electric energy reduction at wholesale* |
| Lifetime Avoided Electric Capacity Costs | *PV of peak electric capacity cost* |
| Lifetime Avoided Natural Gas Supply Costs | *PV of natural gas reduction at wholesale* |
| Lifetime Merit Order (DRIPE) Benefits | *PV of merit order electric market benefits* |
| Lifetime REC Avoided Purchases | *PV of reduction of REC purchases* |
| Lifetime Wholesale Volatility Value | *PV of market hedge value* |
| Lifetime Avoided Replacement | *PV of avoided replacement Costs* |
| Lifetime Avoided T&D Costs | *PV of avoided T&D* |
| Lifetime Emission Savings | *PV of $CO_2$ + Nox + $SO_2$ emissions savings* |
| Lifetime Economic Multiplier Benefits | *PV of economic multiplier benefits* |
| Low Income Customer Benefits | *TBD* |
| Small Business Customer Benefits | *TBD* |
| Lifetime Water Savings | *PV of avoided water usage* |
| **COST** | **Method to Estimate** |
| Lifetime Participant Costs | *PV of initial costs & repayments by participants* |

| | |
|---|---|
| Lifetime Administration Costs | *PV of administrative costs* |
| Lifetime Program Investment Costs | *PV of incentives* |

**What are the most important factors to address in measurement and verification of energy savings? Should programs be evaluated on gross or net savings? (net savings are the gross energy savings less the amount that would have occurred without an incentive, e.g., manufacturing codes requiring energy efficiency in appliances, or with a smaller incentive)**

The most important elements to address in EM&V are the targets, methodologies and protocols that will be used to measure savings for each program. There should be agreement on these elements before the programs are designed so that all parties have clarity on how savings will be measured.

Additionally, best practice in EM&V is for each utility (either separately or jointly) to engage with an independent third party to perform the needed EM&V work, and to have that work done on a regular basis. This includes annual work such as an impact evaluation to validate savings, and cost effectiveness calculations based on validated savings and actual costs. A process evaluation to investigate ways to improve the programs should be completed at least once during an approved plan cycle. Beyond these basics, additional EM&V research should be considered on a topic by topic basis, such as updating savings protocols for use in future program cycles.

Process and impact studies are essential elements of the continuous improvement cycle. A best practice approach includes formalizing an action plan to implement the recommendations provided by the third party evaluator to improve the future results of the existing EE programs or develop new programs. All entities delivering programs must report savings, costs, and evaluation data following the same requirements to facilitate transparency and oversight, in line with best practices.

Gross savings should be the metric by which the programs are evaluated. Gross savings measure the impact of the program based on the full savings that were realized. Further, gross savings reflect what utilities can control, whereas net savings introduce ambiguity and the potential of survey bias into estimated savings achieved by the utilities' programs. Additionally, the CEA states that the savings targets can be met from not only efficiency programs, but from improvements in other codes and standards. As such, the CEA targets defined in the legislation should be gross savings. Additionally, the methodology used by Optimal in determining the maximum achievable potential also provided a view of the gross savings potential in the State. Measuring savings on a net basis would minimize the impact of codes and standards on achievement of goals, which may cause these valuable tools to be deprioritized, and become a missed opportunity for savings. Therefore, the savings targets should be based on gross energy savings, consistent with the language of the CEA and the study methodology.

**For which measures are deemed (assumed) savings appropriate and what measures should be tested to verify actual savings?**

Generally speaking, deemed savings should be applied to simple high efficiency equipment replacement programs, many of which are residential or small commercial programs. Because of the number of assumptions that go into these values, these deemed values should be validated prior to each program

cycle with primary research and updated protocols, depending on the pace of change in technology or other market factors. It is advantageous to have a robust Technical Reference Manual (TRM) with deemed savings for as many measures as practical, as evaluation costs are typically lower for these measure types.

Programs that encourage more complex upgrades or replacement of energy consuming equipment and systems typically require more direct measurement, in some instances with pre-determined algorithms , to determine energy savings. These are typically larger, commercial or industrial projects. TRMs can help inform the measurement methods for these projects, while leaving flexibility for unique projects and systems that may require project-specific detailed engineering analysis. In cases such as this, it is appropriate to ensure that all savings calculations follow established professional protocols for measuring energy savings, and all calculations be validated by an independent third party.

Additionally, TRMs should be updated prior to the beginning of each program cycle and remain unchanged for the duration of the phase to provide consistency between program development, plan approval and implementation of those programs. With these general guidelines, the method(s) of measuring savings should be determined prior to program design of each program and reviewed with those responsible with EM&V to ensure agreement of the methods to be used.

RECURVE

Comments on
New Jersey Energy Efficiency
Evaluation, Measurement, and Verification Framework
Submitted: January 17, 2020

Aida Camacho-Welch, Secretary of the Board
Board of Public Utilities
44 South Clinton Avenue, 9th Floor
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Trenton, NJ 08625-0350

**Re: December 18, 2019 Energy Efficiency Transition Filing & Reporting Requirements**

Recurve appreciates the opportunity to comment on the topic of evaluation, measurement, and verification (EM&V) and reporting within the New Jersey energy efficiency processes. We applaud New Jersey BPU for taking the time to create a public process for soliciting input on best practices and capabilities in the market to meet the State's needs.

Recurve is an industry leader in meter-based demand flexibility. Based on the open-source OpenEEmeter, our advanced M&V platform tracks changes in consumption due to program interventions for both individual buildings and in aggregate in order to support resource planning and facilitate performance-based transactions. We encourage and support market-based solutions for decarbonization.[1]

EM&V offers the most value when it creates and sustains a meaningful feedback loop for continuous improvement. Reporting requirements also support this loop by building trust and maintaining accountability as all parties track performance toward state goals. Both the Climate Action Plan and energy efficiency programs call on multiple parties to engage and take action. A consistent, transparent, and accessible infrastructure for performance feedback is essential for the success of these initiatives. Many states have an EM&V framework for this purpose.

However, many of these same states are limited by historic precedent and therefore miss out on the new opportunities to shore up that feedback loop. The conventional methods used for EM&V have seen incremental improvements over time, but the real opportunity for EM&V to support scaling efficiency and demand flexibility lies in the application of meter-based quantification in course of program deployment to optimize cost-effectiveness and prioritize the next investment.

Standardized methods and open-source software solutions provide the consistency, transparency, and repeatability that has been elusive with only evaluation protocols to lean on. Measured approaches have historically been considered the "high rigor" option, but to use them evaluators have had to rely on data requests and sample plans to review a

[1] *Decarbonization of Electricity Requires Market-based Demand Flexibility*, September 2019, https://www.recurve.com/blog/the-secret-plan-for-decarbonization-how-demand-flexibility-can-save-our-grid

statistically significant portion of the portfolio. Now, however, they can process and analyze consumption data for the entire population. This robust data set can be the foundation for targeting analytics, comparison groups and understanding the net impacts of interventions to the grid. When most states' EM&V frameworks were devised this was only a dream.

New Jersey has a unique opportunity to leap-frog toward new best practices in EM&V that will support the integration of energy efficiency and demand flexibility and spur market-based decarbonization through enhanced accountability.

Today New Jersey can adopt the following three principles in its EM&V and Reporting process to set itself up for success now and in the future:

1. **Meter everything for resource planning**. Naturally occurring changes in monthly consumption as well as changes resulting from a broad swath of interventions can be tracked for each utility geographically and be used to enhance planning, targeting, and tracking. Sample-based evaluation results do not have to be the default -- census analysis can be the default without increasing costs.

2. **Track outcomes consistently and transparently for enhanced management**. Standardized quantification at the meter (for monthly data) is available and accessible to all stakeholders in New Jersey today. The CalTRACK methods and the OpenEEmeter code base have been operationalized at scale for millions of meters across the US. These methods and code are built on industry standard practice for whole building analysis and can be used across distributed energy resources.

3. **Build a secure and accessible data exchange infrastructure**. Everyone has a stake in the outcomes of the Clean Energy Act. Tracking the progress toward those goals means that stakeholders, including the public, will need role-based secure access to data and information. This should be designed into the system from the start.

We look forward to continued conversations with all stakeholders in New Jersey to act on these principles and support market-based decarbonization efforts in the state.

Respectfully,

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RECURVE

Comments on
New Jersey Energy Efficiency
Evaluation, Measurement, and Verification Framework
Submitted: January 17, 2020

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*RECURVE Responses to Questions From the December 18, 2019 Workshop:*

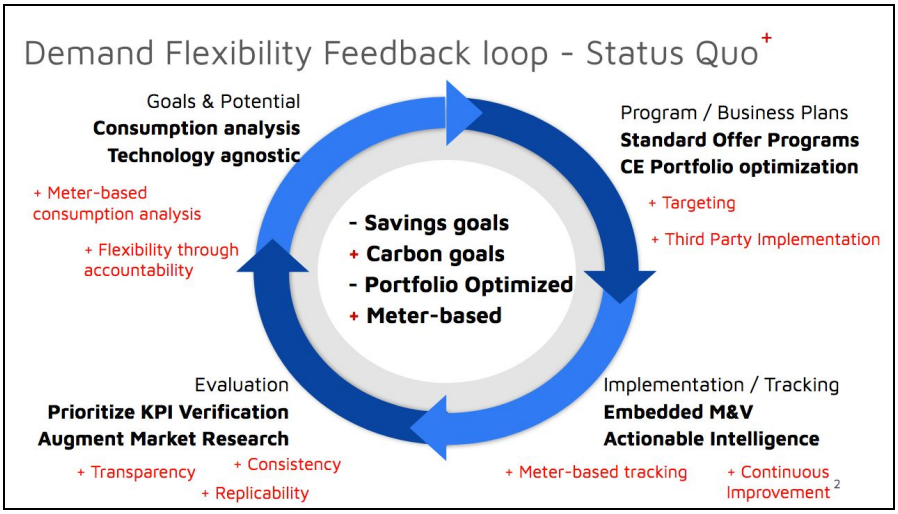
Question Set 1:

- What types of evaluations and studies (BCA, baseline, process, impact) are necessary, in what cadence and frequency?

***Evaluation Measurement & Verification must deliver answers, not just studies.***
*The BPU and other parties should start by identifying the suite of questions that need to be answered and how they will be used. Priority questions should be relevant to all stakeholders and support a meaningful feedback loop for continuous improvement and supporting oversight processes. A range of studies or discrete analyses may emerge from this review to create an evaluation framework.*

***Impact analysis will be essential to track progress on outcomes*** *from the energy efficiency investments. This can most efficiently accomplished with an EM&V framework that considers meter-based analysis as part of the full system of program implementation and resource planning. Meter-based (monthly) consumption analysis provides a foundation for New Jersey to monitor trends in consumption and clearly identify which changes are coming from the interventions of specific actors as well as the collective actions supporting the whole state.*

*The illustration represents a* ***feedback loop*** *that is similar to the status quo process used in most energy efficiency program portfolios. For each phase, we have called out some of the new opportunities (shown in red text) that adoption of a meter-based evaluation framework can provide.*




***Improvements are not confined to the typical "evaluation step" in the process, but rather provide benefits throughout the system****.*

*The* ***cadence and frequency of this feedback is continuous****, with stop points determined by whichever program administrative process is ultimately adopted by the NJBPU, which may be on an annual, three, or five year cycle.*

*Let's walk through each step of the process and see how meter-based M&V supports each stage:*

***Program and Business Plans***

*As each program administrator (utility or state program) develops plans for programs, they should also be looking at the consumption trends that the program is intended to influence. Aligning the expected outcomes can allow the utilities to design programs that will maximize cost effectiveness by targeting customer segments that will benefit most from the programs while also helping to achieve grid goals. Plans submitted to the BPU for review will be backed by analytics and as such can allow program administrators maximum flexibility in achieving the desired outcomes, while eliminating the need for the BPU to micromanage specific technology deployments.*

***Implementation and Tracking***

*For the proposed programs, administrators and implementers should establish M&V infrastructure that provides quick feedback in order to leverage and optimize ongoing targeting and support third party implementation in close to real time. Embedded M&V provides actionable intelligence, letting administrators know which customer segments are responding, which interventions are succeeding and which contractors are delivering the greatest value (and which ones may need support). All of this supports the state's decarbonization goals while delivering cost effective savings to the utility and customers.*

*In contrast, relying on deemed savings as the primary means of tracking installations of technologies creates a trap by incentivizing minimal performance rather than promoting and encouraging the best results. With a deemed approach, outcomes that exceed the fixed estimate and achievements that fall short are all treated the same. Improving these estimates with sample based field checks in the evaluation phase is useful, but does little to motivate improved implementation or mitigate surprises at the end of an evaluation that may happen several years later.*

***Evaluation***

*The "Evaluation" step in a meter-based system would have a* ***particular focus on reviewing performance****. This would likely involve a review of Key Performance Indicators, cost-effectiveness for the full portfolio, or other "deeper dive" questions that inform broader market-transforming impacts. This review can use the same base of consumption analysis as program tracking and resource planning.*

***Analysis used to inform performance, in particular, should be accessible to all parties*** *on a regular, predictable cadence and based on pre-established criteria (methods and open-source calculations). Without clarity of methods and calculations, the process can*

*quickly devolve into debates over moving goal posts and lose sight of the common goal of decarbonization and grid optimization.*[2]

***Other research can also be conducted to augment the core impact analysis*** *as part of this phase of the process. Reliable M&V can confidently answer the "what" and these studies can tackle the "why". These studies may need a longer timeframe, but would still benefit from a consistent stream of basic information on program impacts. Process or market studies can provide useful feedback prospectively, to modify and adapt programs or policies over time or assess broader market transformations resulting from the programs.*

***Potential and Goals***

*Today, many goals and potential studies are* ***limited to a fixed list of technologies*** *(with their prescribed savings listed in a technical reference manual). While this construct has historically been useful, it limits the range of approaches available to programs. Adding the option to assess the meter-based potential for decarbonization objectives allows for greater flexibility in program design and offers the ability to achieve or exceed goals through improved implementation.*

*In a meter-based regime,* ***potential should be defined by the opportunity to reduce consumption or decarbonize*** *- not just improve incremental efficiency. This frame creates a pathway for the integration of DER solutions to drive decarbonization. As programs are deployed, the actuarial analysis of past performance is critical to calibrate the potential and serve as the foundation of goals and targets for program administrators.*[3]

- What models do we see for who conducts, reviews, and approves each of those?

***Actionability and objectivity*** *are the main considerations when deciding who conducts reviews and approves EM&V work when creating the continuous feedback loop described above.*

*Using a* ***third-party whose financial interests are not tied to outcomes helps maintain objectivity in the analysis****. Utilities, state agencies, or other stakeholders can contract with third parties to get technical support in answering the questions relevant to their role in the system. Peer review and collaborative input can also support objectivity. Transparency, consistency and replicability should be required of whomever is conducting the analysis. These parties must be accountable for using appropriate methods and ensuring stakeholders can validate their answers. This will enable administrators to conduct evaluation measurement and verification that is actionable and maintain objectivity in the process.*

[2] The Promise of Performance, June 2018, http://zondits.com/article/15763/the-promise-of-performance
[3] For more detail on a proposed approach, Recurve's detailed comments on goals and potential updates for the California Public Utilities Commission. https://www.cpuc.ca.gov/General.aspx?id=6442461220

**Case Study: California's Evolving Evaluation Framework**
A rather one-sided evaluation framework, that has needed to evolve, comes from the California Public Utilities Commission. Commission staff manage all of the impact evaluations to inform the performance incentive mechanism and cost effectiveness review. Evaluation plans, budgets and results are subject to stakeholder review.

In this construct, program administrators struggle to optimize programs and can do little to track their actual performance. With new legislation, calling for meter-based quantification, they have since been allowed to embed measurement and verification into these programs to help them optimize. If administrators use open source methods for M&V they can bypass certain regulatory review steps.

With this evolution, the Commission benefits by having increased confidence that the savings are real (but still subject to verification) and that administrators can innovate to meet cost effectiveness targets. Staff and consultants have a robust stream of data and information from which to verify impacts as well as conduct in-depth evaluation.

- How can stakeholders provide technical or on-the-ground expertise into the process?

*Stakeholders' most important contribution is **defining the questions that need to be answered and setting priorities** for analysis as part of the system's EM&V framework.*

*Third-party evaluators that conduct analysis should **present results with consistency and transparency and meet a standard of peer review**. Methods and results should be accessible to stakeholders and presented in a public forum to support comments and questions prior to finalizing. While stakeholders may have a range of capabilities to engage in this process, creating the opportunity to comment will build trust and awareness as well as accountability for the quality of the evaluations.*

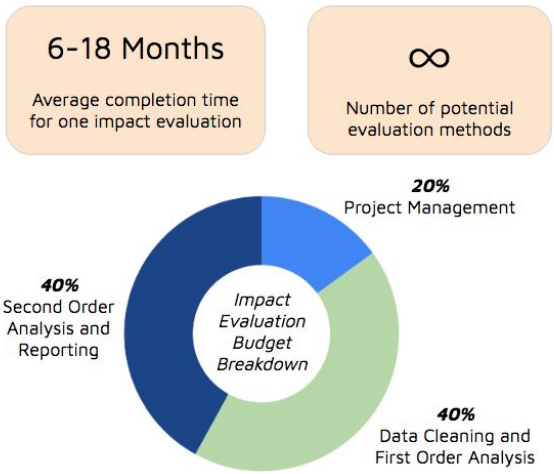
*Using **consistent methods for quantification developed through collaborative processes** -- such as CalTRACK and the OpenEEmeter -- helps stakeholders to quickly process results and understand the impacts because the methods are laid out in advance with pathways to contribute and continually improve the approaches.*

- What model(s) for program evaluators should New Jersey consider?

*We recommend a model where in evaluators can add value across the system as described in earlier responses. We recommend New Jersey **adopt a construct that supports and encourages program administrators to use embedded evaluation measurement and verification** to optimize their programs and report impacts.*

***Program evaluators should use standardized methods for impact analysis where feasible.** Standardized pre-post billing and hourly analysis methods, like those found in CalTRACK (operationalized with open source code - OpenEEmeter), will significantly support transparency of impact analyses across program types and for the full portfolio to ensure it*

*is meeting the Clean Energy carbon reduction goals. It will also ensure that impact analyses will generate comparable and consistent results across the portfolio from evaluators, and cut costs for ex post evaluation. Most impact analysis can be automated and tracked for the entire portfolio and comparison groups can be established to provide additional insight. Evaluation reports can be automated and standardized to deliver consistent information in a digestible digital format.*[4]




*Program evaluators can also **dive deeper on questions of issues driving customer behavior, market adoption, and processes** that may affect future program design. Historically these analyses have gotten short shrift as evaluators' budgets and time have been used up by data cleaning and redoing straightforward impact analyses (see illustration of typical impact evaluation budget challenges).*

Question Set 2:

- How should the EM&V process intersect with filing requirements? What types of information are needed when, and from whom?

***The EM&V processes should directly inform the filing requirements**. In a meter-based evaluation regime, the savings or carbon impacts that are achieved and the costs to achieve them are the core element of the reporting requirement filings. Other criteria, like how detailed strategies or targets are defined, should be established by the BPU in collaboration with program administrators and stakeholders to match with the obligations of the Clean Energy Plan and the energy efficiency portfolios.*

*A **portfolio or business plan should be filed on a three to five year basis and have the flexibility to adjust annually**. The plans should be informed by population analysis of opportunities to reduce consumption, improve efficiency and reduce carbon, and the success of existing programs in doing so. Program administrators should describe how the plans are a cost effective investment and how they synchronize with their overall system planning needs.*

[4] OpenEE Technical Report: Comparison Group Identification for Impact Evaluation, for Energy Trust of Oregon, 2018
https://www.energytrust.org/wp-content/uploads/2018/11/OpenEE-Technical-Report-Comparison-group-identification-methods-FINAL-wSR.pdf

- What is needed in this transition period (through launch of new programs) and the long term (~5-year goal and beyond)?

*Stakeholders closer to the process have more intimate knowledge of the status of current programs and how they synchronize with longer term plans. We offer suggestions based on generalized best practice for feedback and continuous improvement.*

***Business or Program Plans** from the program administrators should include:*

- *Market Sector Opportunities and Strategies*
  - *identified potential,*
  - *general strategy, and*
  - *proposed targets*
- *Key Performance Indicators (pending definition and criteria for tracking)*
  - *Sector level carbon reductions*
  - *Sector level consumption reductions (kWh and Therms) and peak impacts (kW)*
  - *Cost Effectiveness*

*In later years, grid integration strategies can be included to synchronize with market sector opportunities and augment KPIs.*

*For illustrative purposes, consider the following five year stepwise path for evolution of the EM&V process and the evolution of programs to integration with DERS.*

<table>
<tr><th>Phase</th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 4</th><th>Year 5</th></tr>
<tr><td>Program Planning</td><td>Deploy status quo programs</td><td>Target programs based on metered results</td><td>Target programs based on metered results</td><td>File Plan with Revised Programs (integrate DERs)</td><td>Targeted program to geographic/discrete grid needs</td></tr>
<tr><td>Implementation / Tracking</td><td colspan="5">• Track programs at the meter<br>• Target customers based on meter analysis to improve CE<br>• Report results on a metered basis</td></tr>
<tr><td>Evaluation</td><td colspan="2">Prioritize Research questions</td><td colspan="3">Validate results, conduct long term studies</td></tr>
<tr><td>Potential / Goals</td><td></td><td></td><td colspan="3">Include actuarial consumption analysis to define decarbonization potential.</td></tr>
</table>

- Should New Jersey evolve towards a unified framework for all distributed energy resources?

*New Jersey should **absolutely evolve towards a unified framework for all distributed energy resources**. A consistent valuation framework across DER resources is essential to this evolution. Meter-based quantification supports a unified approach to track reductions in carbon intensity and enable grid optimization.*

*A unified framework will be **enhanced with the deployment of advanced metering infrastructure**, but using monthly consumption analysis augmented with carbon intensity metrics is a no-regrets first step for a flexible evaluation framework that can adapt to this future.*

Question Set 3:

- Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended?

*We recommend that, as part of system planning, the **marginal cost of any given resource should be the basis of comparison for the next investment**. In this structure, resources can be consistently valued and chosen based on their ability to meet system needs (carbon intensity included as a factor). This is most readily employed in competitive procurement processes for all source procurements.*[5]

*In lieu of direct cost comparisons, **we support the use of the Resource Value Framework** in the National Standard Practice Manual. In particular, we support the process described in the NSPM to develop a cost test that is consistent with New Jersey's policy goals. In the interim, we find that the Program Administrator Costs test is a manageable metric to use as programs are launching to track the value of demand-side investments for the grid.*

***We strongly advise against adopting the Total Resource Cost test as applied in California**, which penalizes programs that leverage non-ratepayer funding, including that from willing participants. More detail is provided in this white paper.*[6]

Question Set 4:

- What are the most important factors to address in measurement and verification of energy savings?

[5] The Economics of Clean Energy Portfolios, Rocky Mountain Institute 2018. https://rmi.org/insight/the-economics-of-clean-energy-portfolios/

[6] *Evolving Cost-Effectiveness Policy and Tools to Enable Modern Energy Efficiency and Demand-Side Management*, November 2019 https://www.recurve.com/blog/rethinking-cost-effectiveness-to-meet-the-needs-of-the-modern-grid

*The most important factor to address in measurement and verification is the **actual impact of the interventions at the meter** compared to an existing conditions/usage baseline. This is the representation of the avoided energy usage by the customer and what the grid "sees."*

*Having a **consistent, transparent and reproducible calculation** of the resulting change in consumption creates the "weights and measures" necessary to build market confidence and transactional accountability for continued investment in demand-side resources for the grid optimization and carbon reduction.*

o Should programs be evaluated based on gross or net savings?

*The **net impact of programs to the grid** should be the end goal of measurement and verification (not the net of program influence derived from customer surveys) to inform system planning.[7] Meter-based consumption analytics enable this type of net analysis. The natural trends of changes in consumption in the population can be used to understand the relative contributions of specific programs with control or comparison group analysis.[8] This type of analysis is akin to economic and demographic factors used in consumption modeling and forecasting.*

*The **gross impacts of an intervention for any given project or portfolio should still be monitored as part of evaluation activities**. Gross impacts reflect the avoided energy use achieved by individuals, through their interventions. They are real bill savings, and real impacts to the bottom line.*

o For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings?

*New Jersey should **track actual savings in every situation for which it is feasible**. Interventions may include a wide range of measures and behavioral components that can together drive carbon reductions. Tracking meter-based impacts enables technology agnostic program flexibility across DERs and enhanced program flexibility.*

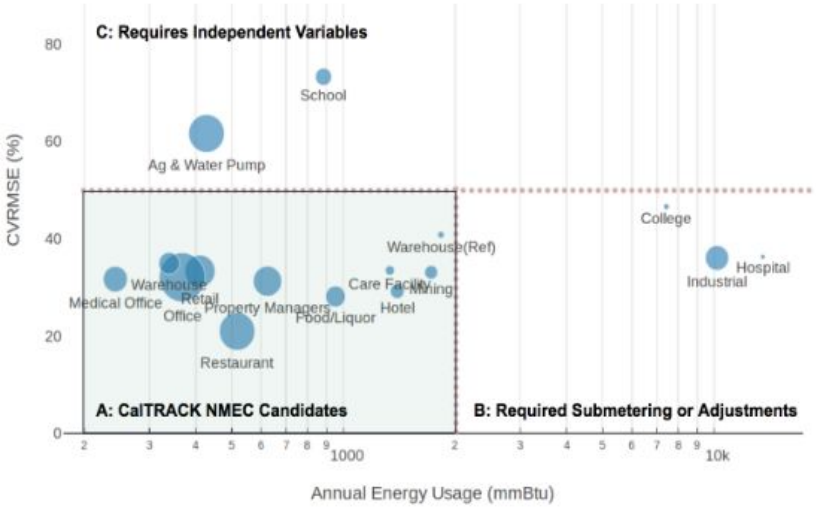
***Meter-based analysis is feasible for the majority of building type /sector situations and program interventions**. Instead of tracking impacts by measure, whole building*

[7] Chapter 21: Estimating Net Savings – Common Practices The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. National Renewable Energy Laboratory (NREL) Department of Energy. 2017, https://www.nrel.gov/docs/fy17osti/68578.pdf

[8] OpenEE Technical Report: Comparison Group Identification for Impact Evaluation, for Energy Trust of Oregon, 2018 https://www.energytrust.org/wp-content/uploads/2018/11/OpenEE-Technical-Report-Comparison-group-identification-methods-FINAL-wSR.pdf

*meter-based tracking can be applied to sector and building type combinations. There are limits, but as illustrated in the following graphic, CalTRACK whole building methods[9] can provide statistical reliability for most sector-building combinations. Large industrial projects (C) need other site specific measurement and verification techniques; and upstream interventions (where the meter being impacted and time of intervention is not known) may be exceptions.*

*As illustrated in the graphic:* ***the CalTRACK methods will be most effective for buildings in region A****, which have relatively low energy consumption and low CV(RMSE). Buildings in region B are high energy consumers. These buildings often have a single meter tracking consumption for various sub-buildings with mixed uses, which make it difficult to quantify the effect of an energy-efficiency intervention on overall consumption. These buildings will likely require custom M&V and would not qualify for CalTRACK. The buildings in region C have a high CV(RMSE). The high CV(RMSE) is likely due to correlation in energy usage that is not specified in the model, such as seasonality or weather. These models should not qualify for CalTRACK.[10]*




*Based on out of sample test on 50 Million IOU meters in California through the CEC using 2014 and 2015 data.

- How should advanced M&V (automated data processing/increased data granulation) be integrated into EM&V?

***Automated M&V should be foundational to the feedback system.*** *Cloud computing and open-source standardized methods make it possible to track the consumption trends of the entire population. The incremental costs for tracking everything up front are recouped through improved targeting and cost-effective program delivery, reduced costs of conducting third party evaluations (data requests, custom method development, and*

[9] [insert definition of wholebuilding methods from Adam in APS proposal]
[10] Building Qualifications Test Reveals Wide Applicability of CalTRACK Method for Portfolio Analysis, CalTRACK project updates March 2018, https://www.caltrack.org/project-updates/week-eight-caltrack-update

*customized reporting), and the cost of stakeholder review of highly customized evaluation end products.*

*Some evaluations will need to be adapted to program specifics, but a large portion of the evaluation task (impact evaluation in particular) can be much more efficiently conducted with advanced M&V solutions, which democratize the value across the system.*

- When should it be incorporated?

***Metering everything for resource planning should be incorporated prior to program launch.*** *Including this step will enable targeting to optimize cost effectiveness, inform competitive solicitations for third party implementation, and set the baseline for monitoring progress on the Clean Energy Plan goals.*

***Ongoing tracking will provide actionable intelligence, inform oversight and enable calibration of potential throughout the portfolio deployment****. Ongoing tracking derived from a common pool of data and commonly understood pre-post intervention consumption analysis builds a bridge for communication among stakeholders and sows the seed of trust necessary to enable scale in the future.*

- What are best practices related to accuracy/confidence/reporting?

*There are several ways to address the question of accuracy and confidence in reporting. One way to describe best practices is by outlining the difference between deemed savings claims and meter-based savings claims. Each has trade offs and benefits described below:*

***Deemed savings claims fix the output for consistency - and serve as the bar for accuracy in evaluation.*** *Technical reference manuals typically outline a method for a specific technology or intervention and the values are adopted or updated on a regular basis. When these deemed values are used as the basis for reporting and tracking process two main problems emerge due to their static/fixed nature:*

*1.) They do not motivate or incent action beyond the minimum*

*2.) They almost never come with a measure of confidence beyond sample statistics from a field analysis.*

*Deemed values are assumed to be true at least for their period of application. Realization rates (the ratio of the evaluated result to the deemed result) are treated as the equivalent of a "confidence" metric -- illustrating how close the evaluated result is to the assumed value. In a reporting context, deemed values do provide consistency and can carry with them lots of other assumptions about persistence. Evaluations provide limited support to deemed*

*values by providing updates to the specific parameters based on sample based field assessment.*

***Meter based claims fix the method for consistency - and statistics around model fit serve as the metric for accuracy in evaluation.*** *Meter-based consumption analytics are fixed in the method, but offer a "read" of the actual outcomes at the meter because they are not just a count of the technology installed but rather an assessment of the change in consumption at the meter. As such they:*

*1.) Do motivate and incent implementers and others to drive the greatest value to customers beyond the minimum;*

*2.) Can provide uncertainty statistics (CVRMSE) that are reflective of the accuracy of the model to assess changes in consumption, which is a proxy for the effect on the grid.*

*The trade off is in confidence in the upfront savings claims estimates; adaptations are necessary to accommodate early estimates while actual metered results materialize.*

*The added value of meter-based tracking to inform the system, motivate maximal performance and provide a more realistic view of the grid impacts, supports its importance in scaling demand-side investments.*

*Recurve Responses to Questions on Reporting Requirements and Tracking System in December 18, 2019 Workshop.*

*Recurve supports the high-level description of reporting priorities in the New Jersey Energy Efficiency Program Administration Straw Proposal:*

> Reporting
>
> All entities responsible for program delivery, including the DCE, will be required to report savings, costs, and evaluation data following a consistent set of requirements to ensure that all savings and expenditures are accurately tracked, accounted for, and attributed to the proper entity. While the time constraints, format, and specific metrics for reporting are still being developed and will be shaped by additional stakeholder engagement, accurate and timely reporting is crucial in ensuring that the savings targets are met and to evaluate program performance. As mentioned above, a coordinated database to track and store program data must be developed to make the reporting process easier and the evaluation process more timely and accurate. This will not only facilitate cost recovery but also ensure sufficient information for the State to regularly evaluate the effectiveness of the overall portfolio of programs and make appropriate modifications. p 31

*The following comments are intended to augment this vision as stakeholders fill in specifics for operationalizing a tracking system.*

## Reporting Requirements

*The **reporting requirements should be kept as straightforward and simple as possible**. However, keeping it simple does not mean asking for Excel spreadsheets with summary numbers. Reporting should be consistent (allowing infrastructure to be built around delivering them efficiently and using them in day to day operations) and designed to inform or answer specific questions relevant to oversight.*

***Frequency, formats and types of reporting should be driven by the questions that needed to be answered and applicable oversight processes**. Consideration should also be given to the burden of customized reporting requirements and standardization across program administrators and programs should be the goal.*

***Carbon reductions achieved is the core element that needs to be included to track impacts for the Clean Energy Act.** In addition to the ultimate impact, what was done to achieve the impact, how much it cost and where it happened are all essential components for public accountability and prioritizing the next best investment.*

***New Jersey should track**: State-wide energy consumption data, the changes in consumption resulting from program interventions, budgets, spending where the*

*intervention happened (related to the grid impacts) and when the intervention and resulting impacts happened (related to the carbon impacts). This information can be augmented with other datasets that add dimension to demographic characteristics or other factors that may be relevant for informing future investments.*

***Best practice for reporting requirements is to ensure the data can answer the questions required for oversight.*** *This is not the same as asking for questions to be answered via reporting requirements. A standardized reporting requirement can be granular and straightforward. Data filed should support BPU in conducting analysis to answer their own questions enhancing transparency, and potentially cutting down on follow up data requests. Automate the filing processes to ease the burden of reporting to allow everyone to stay primarily focused on implementation and have confidence that the reported numbers are reliable.*

Tracking System

***A successful tracking system enhances transparency and communication across stakeholders and supports market growth through accountability.*** *New Jersey has an incredible opportunity to step beyond the status quo on siloed tracking systems and adopt a tracking system that can provide secure nodal access to a range of stakeholders. It is possible today, with current technology, to monitor consumption and the impacts of interventions for the entire state of New Jersey. Program administrators, stakeholders and the BPU should settle for nothing less.*

***Tracking changes in consumption opens up a wide range of opportunities for resource planning, targeting, and monitoring impacts****, as described in our comments on evaluation measurement and verification. This video illustrates the power of straightforward segmentation analysis with monthly consumption data from 5 million meters in California.*[11]

*The project shown in the video was completed for the California Energy Commission with investor owned utility data that was shared via the California Public Utilities Commission. Two years of consumption data were run through the OpenEEmeter to compare changes in consumption between the two years for non-program participants. The results represent the naturally-occurring savings and offer a proxy for potential at the macro analysis level (i.e. whole building consumption by sector, zip code, or other geographic factors).*

[11] Meter Everything, OpenEE 2018 Project with California Energy Commission, Video: https://www.dropbox.com/s/kuvft95uvxut04u/openee_meter_everything.mp4?dl=0

*The California Energy Commission provides a great example of how meter-based analysis can be leveraged as strategic policy. In its statewide Energy Efficiency Action Plan, energy data is a core strategy for supporting market growth of demand side strategies.*

*Meter-based program tracking is also happening in Oregon, New York, Massachusetts, and Connecticut. It is being used to track a wide variety of programs including residential retrofits, HVAC, behavioral, on-bill-financing, strategic energy management, and C-PACE.*

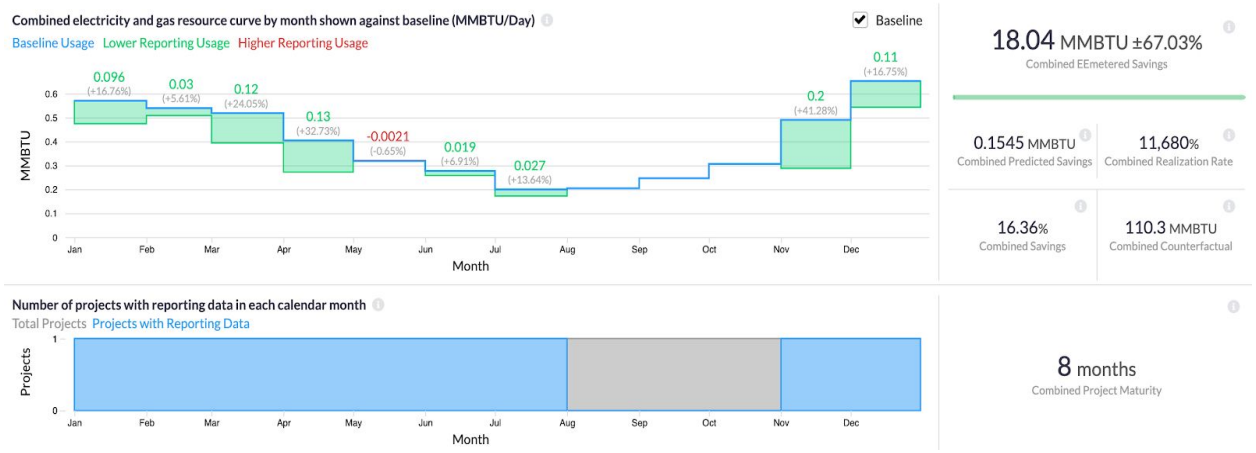
**2019 Energy Efficiency Plan - Doubling Efficiency**

- "Develop hourly and locational aggregated energy consumption **datasets**"
- "Develop hourly energy efficiency savings estimates from interval meter data to **verify and forecast SB350** targets."
- "State agencies should **collaborate**...data analytics, warehouses, modeling methods, etc."
- "develop ability to incorporate **aggregations** of energy efficiency and demand response programs into **long term planning**"
- "incorporate **meter-based analysis** into potential studies to identify cost effective savings potential."

CALIFORNIA ENERGY COMMISSION

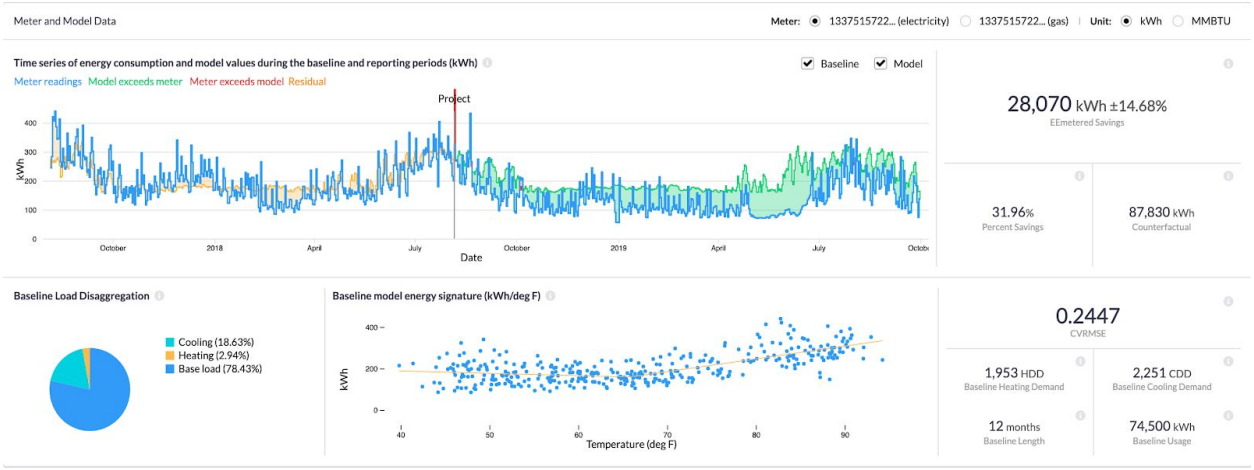
https://ww2.energy.ca.gov/2019_energypolicy/documents/#08272019

***Automated M&V can deliver on New Jersey's tracking needs today***. *Once program deployment begins, utilities, program administrators, and implementers can all benefit from ongoing meter-based tracking to monitor progress month to month as illustrated below. Site-level tracking is at the base of the analysis; aggregation or comparison within or across programs is based on other characteristics of partipants or programs. Administrators and implementers can manage risk across the portfolio as they see savings unfold. Real-time tracking provides actionable intelligence for their decision on the next cost-effective investment and enables seamless reporting of impacts with audit capabilities down to the project level.*

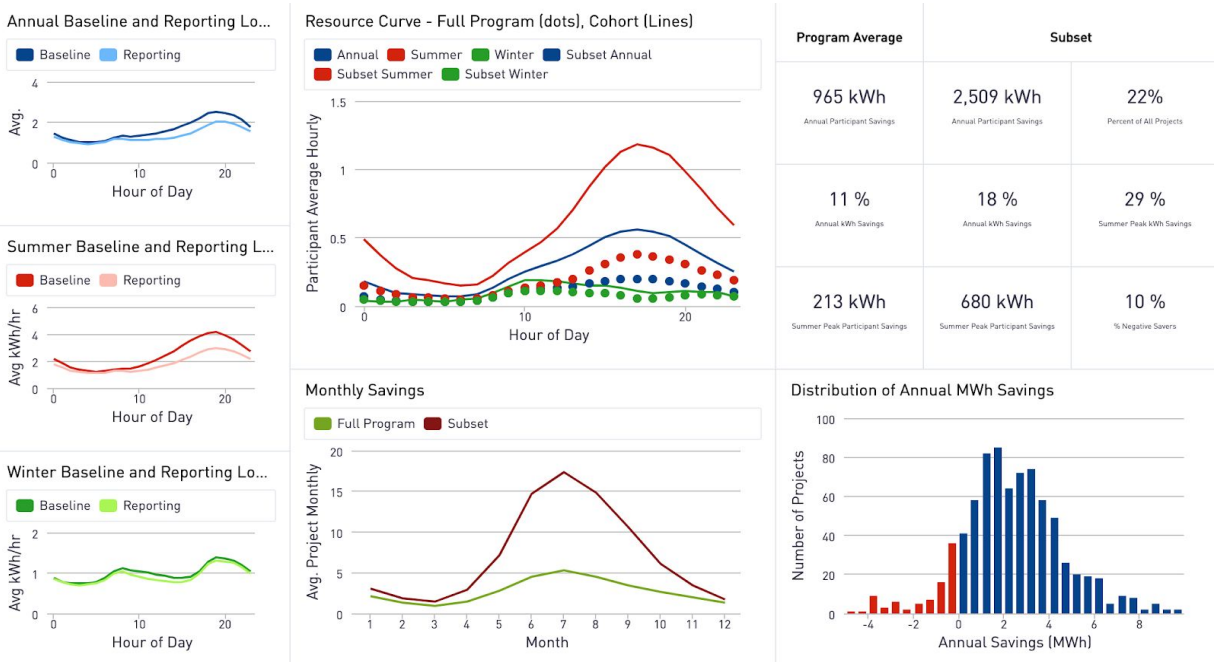



Example - Recurve Monthly Tracking Platform

*As advanced metering infrastructure is adopted, the **hourly impacts can be visualized**, **enabling a new dimension for program design** that can target peak or carbon intensive times of the day and contribute more directly to decarbonization and grid optimization.*




Example - Recurve Hourtly Tracking Platform




Example - Recurve Portfolio Analytics Platform

*These **tools are designed to be interoperable with existing systems to animate the underlying consumption data to understand impacts and drive decisions**. Other data sets can be merged to the consumption data so the system does not have to house every conceivable*

*data set that may need to be included at the start but rather have the flexibility to augment based on the various end users, or based on evolving needs for a particular organization.*

*Access to the system is an important consideration and can be managed based on roles to ensure security.*

- *The utilities have primary access to customer consumption data. They are also responsible for and should be empowered to use customer data alongside third party implementers to optimize the grid and the programs that support the grid and decarbonization. The utilities should have a fully accessible system to track their own contributions to the clean energy goals and maintain accountability.*

- *State agencies like the BPU that are responsible for oversight should also have access to consumption data, but may not need to have personally identifiable information within the data. The state should demonstrate its contributions to the goals, as well as be responsible for tracking progress toward the overall goals across the state.*

- *A public-facing system (that does not reveal personal information) to track progress on on clean energy goals is an important means of accountability for public investment. This can be accommodated by presenting anonymized and aggregated data on specific metrics of relevance.*

***Data Security is a serious consideration.*** *Access rules must be devised, if not already in place, to balance the interests of protecting privacy and supporting ambitious goals for climate change. Privacy budgets and other strategies enabled through differential privacy can support these procedures and regulations.*

*Establishing a meter-based tracking system means overcoming some key barriers -- but have succssfully been overcome in other jurisdictions. The first task is establishing data flow at the utilities into a common platform. Infrastructure for managing large data systems would be necessary to do this either internally or via vendor. These tasks have been completed in weeks to months depending on the status of the data infrastructure at the utility. Devising a centralized meter-based tracking system includes developing data flow from the utilities, introduces another layer of data exchange, but is being successfully executed in other jurisdictions.*

Attention Aida Camacho-Welch EnergyEffciency@bpu.nj.gov

To the Secretary of the Board of Public Utilities

44 South Clinton Avenue, 9th Floor

Post Office Box 350

Trenton, New Jersey 08625-0350

Dear BPU Directors,

The following are comments in response to the New Jersey Board of Public Utilities, addressing their inquiry in the evaluation, measurement and verification (EM&V) of energy efficiency and peak demand reduction programs, as well as the filing and reporting requirements.

As a group, we cannot discuss these issues of EM&V without discussing New Jerseys negligence in promoting Geothermal as a choice and actually the solution for many of our infrastructure, carbon reduction and economic issues and shortfalls.

If we as a society are truly looking for solutions in reductions in energy demand, we as a collective group need to look into providing systems that significantly reduce energy demand consistently and continuously. Geothermal heat pumps reduce electrical demand significantly, providing up to six times the energy reduction. Geothermal heat pumps reduce carbon emissions by burning no combustible fuel at the source and reducing the amount consumed at the electrical source generation. Geothermal reduces the need for enlarging infrastructure through reduction in actual amount of electric demand not just during peak hours.

If we as a society are seeking to switch to electrification, aggressively, while seeking "Environmentally Beneficial Electrification" we need to blend it with "Environmental Beneficial" usage and reductions. To be clear this is very germane to this discussion as we switch homes, business and government entities to electric heat sources. It is imperative that one state program benefit other state energy goals, or at least does not diminish the effects. Reduction in peak demand usage can quickly be offset by increases in customer demand through changes to conventional electric heat pumps. Geothermal heat pumps prevent the negative offset or increase in electrical demand, whether peak or non-peak usage.

New Jersey needs to move to the front of the line of energy reduction. New York has eclipsed us in championing Geothermal conversion. WaterFurnace has already created a system for energy monitoring adding this type of monitoring to new conversions would answer the first question, measurement and verification, as well as part of the second question, reporting. Once the data sets are collected, then filing and evaluation of the reductions can take place. True electrical reduction and true green technology are possible, available and the path is easily followed.

I would welcome the opportunity to be involved in further discussions on this topic.

All the best

Roger R Locandro MPA, IGSPA cert.  NJMHVAC1018, RMC, QPA, CPWM

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**Deborah M. Franco, Esq.**
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January 17, 2020

***VIA UNITED PARCEL SERVICE AND ELECTRONIC MAIL***

**EnergyEfficiency@bpu.nj.gov**
Honorable Aida Camacho-Welch, Secretary of the Board
Board of Public Utilities
44 S. Clinton Ave., 9th Floor
P.O. Box 350
Trenton, NJ 08625-0350

**Re: New Jersey Energy Efficiency Transition – December 18, 2019 Stakeholder Meeting Regarding Evaluation, Measurement & Verification and Filing and Reporting**

Dear Secretary Camacho-Welch:

On December 18, 2019, New Jersey Board of Public Utilities ("Board") Staff ("Staff") held a stakeholder meeting regarding the New Jersey energy efficiency transition and, in the Notice of that meeting, provided for the submission of written comments concerning Evaluation, Measurement & Verification ("EM&V") and Filing and Reporting. These comments are being submitted on behalf of South Jersey Gas Company ("SJG") and Elizabethtown Gas Company ("ETG") (collectively, the "Companies") in accordance with the Notice.

As the Companies have represented in prior submissions on this topic, SJG and ETG appreciate the dedication of the Board and Board Staff to fulfill the requirements of the Clean Energy Act of 2018 (the "Act") and to advance the State's clean energy goals. SJG and ETG commend Board Staff's facilitation of the stakeholder meetings that are being held to further the State's objectives and note the particularly productive format followed by Board Staff at the December 18 Meeting. SJG and ETG remain committed to supporting the State's objectives and the Companies fully understand their responsibilities as reflected in the Act to ensure that the mandated energy reductions are met. *See* N.J.S.A. 48:3-87.9.

Under the Act, New Jersey gas and electric utilities are required to reduce the use of electricity and natural gas. N.J.S.A. 48:3-87.9(a). Each natural gas public utility must achieve

annual reductions of 0.75% average annual natural gas usage in the prior three years within five years of implementation of programs. Each electric public utility must achieve annual reductions of 2% of average annual usage in the prior three years within five years of implementation of programs.

In furtherance of the Act's consumption reduction requirements, Board Staff is required to establish a stakeholder process to evaluate, *inter alia*, the process for evaluating, measuring, and verifying energy usage reductions and peak demand reductions. N.J.S.A. 48:3-87.9(f). The Act also requires the establishment of an independent advisory group to study the evaluation, measurement, and verification process for the reduction programs and provide recommendations to the Board for improvements to the programs. N.J.S.A. 48:387.9(g). Relatedly, the Act requires each electric and gas public utility to file with the Board implementation and reporting plans, as well as evaluation, measurement, and verification strategies.

In connection with these requirements, discussions held at the December 18 meeting included, *inter alia*, how energy savings will be measured, what methods will be utilized to verify reported energy savings and the filing and reporting requirements that will apply to energy efficiency programs. SJG and ETG appreciate the perspectives offered by the panelists at the December 18 Meeting on these topics, including those of Rutgers Center for Green Building, ACEEE, Energy Futures Group, FirstEnergy and the New Jersey Division of Rate Counsel. Like all stakeholders, SJG and ETG agree that EM&V is critical to be able to demonstrate that the benefits of energy efficiency programs are realized. The Companies emphasize consideration of the following in the establishment of an EM&V framework to ensure criteria that advance the goals of the Act:

- All entities delivering programs must report savings, costs, and evaluation data following the same requirements to facilitate transparency and oversight. Of important note, to support setting future targets, it is necessary for the Office of Clean Energy ("OCE") to report utility-specific savings and other critical information for historical and current programs in a timely fashion;

- OCE is positioned to promote the adoption of energy efficiency and market transformation as New Jersey transitions into new energy efficiency programs. Providing regulatory oversight and review of programs, establishing evaluation, measurement and verification criteria and processes, assisting with the quantification of savings occurring outside of utility-administered programs, promoting energy efficiency, and facilitating stakeholder meetings are all important roles the OCE can play as NJ transitions to new EE programs;

- The ultimate framework developed should ensure that the information provided in the EM&V process not duplicate that provided through the reporting process. This will facilitate an efficient process that ensures full transparency of information without resulting in unduly burdensome requirements; and

- Currently, there is insufficient information available regarding the quantitative performance indicators (QPIs) related to electric and natural gas usage reduction targets. The number of QPIs should be limited and focused on energy impact. Creating a more limited set of targets creates clear objectives and minimizes distractions otherwise associated with defining and measuring success on a long list of metrics. Consistent with the Act, QPIs can be reassessed in year 3 after programs are established. It is critical when defining QPIs for utilities that the development, implementation, and administration of energy efficiency programs be within their control.

Thank you again for the opportunity to provide these comments. We look forward to continued collaboration with all stakeholders.

Respectfully yours,

Deborah M. Franco

/DMF

January 17, 2020

Secretary of the Board of Public Utilities
Attn: Aida Camacho-Welch
44 South Clinton Avenue, 9th Floor
Post Office Box 350
Trenton, New Jersey 08625-0350

**Re: Response Comments to NJ BPU Staff Questions from the Energy Efficiency EM&V and Filing & Reporting Stakeholders Meetings December 18, 2019**

Uplight is a nationwide software-as-a-service ("SaaS") company that helps utilities engage their residential and business customers in a decarbonized energy future that is efficient, equitable, and resilient. Our 400 employees serve our 93 energy provider clients, including PSE&G, Exelon, First Energy, Orange & Rockland, New Jersey Natural Gas, and South Jersey Gas / Elizabethtown Gas, to provide connected customer journeys to over 100 million energy customers in North America and Europe. As a certified B-Corp, we share the NJ BPU's commitment to providing energy consumer savings while reducing energy and associated greenhouse gas emissions to build a more sustainable future.

We appreciate the opportunity to share our perspective and expertise with the New Jersey Board of Public Utilities ("BPU") on demand side management ("DSM") program evaluation, measurement, and verification ("EM&V") for implementation of the Clean Energy Act ("CEA") through both in-person participation and follow up through these written comments. Herein we share our perspective and insights on several topics, including guiding principles for DSM EM&V as a supplement to those of our trade association, the Energy Efficiency Alliance of New Jersey ("EEA-NJ") specific recommendations for EM&V of the two programs Uplight currently

provides in New Jersey, behavioral energy efficiency ("BEE") through home energy reports ("HERs") and retail products through utility (or state agency) branded online marketplaces, as well as some comments on the EM&V on potential demand response ("DR") investments.

**EM&V Guiding Principles**

Uplight has contributed to and supports the comments of our trade association, EEA-NJ. As a supplement to those comments, we wish to reiterate the importance designing EM&V using innovative approaches designed to reflect the State's (and BPU's) stated policy goals of carbon reduction, equity, and reducing energy cost burden, while also leveraging advances in technology, data analytics, and economy-wide marketing, to create a superior consumer experience.

*Recommendations for EM&V Application*

The purpose of EM&V is multifold - to determine program and investment performance for oversight and performance evaluation by regulators and policymakers, but also to provide real-time feedback to program administrators, implementers, and technology providers so they can work to improve performance in real-time. Therefore performance metrics must reflect the full set of objectives, be measured on a regular cadence, and be transparent to all parties.

*Recommendations for EM&V Metrics and Calculations*

Traditionally EM&V has neglected to incorporate consumer experience ("CX") as a primary evaluation metric, which dismisses the inherent value of positive consumer experience, fails to recognize the synergies that CX can provide in terms of reduced participant acquisition costs, and effectively settles for a defeatist perspectives on "achievable" potential. Additionally, a fear of double-counting benefits from investments has created the concept, and negative perception, of uplift, a deduction of the savings benefits from one program that results in customers' participating in other programs or investments. Of course, rather than a bug, this cross-participation should be considered a feature.

To remedy this misalignment a measure of consumer engagement, such as Net Promoter Score ("NPS,") should be included in EM&V measurements. Uplift should be continued to be calculated, but not automatically deducted from the benefits calculation; instead it should be considered in comparison to other participant acquisition costs.

*Recommendations on Evaluation Cost Tests*

Traditional approaches often favored by incumbent program evaluators and administrators have failed to provide an optimized experience or realization of the full energy efficiency potential by devaluing ancillary benefits of comfort, health, safety, and resilience, and have consistently failed to leverage technology synergies between energy efficiency, demand response, and broader distributed energy resources (DER).

In order to address these shortcomings and align the evaluation costs tests for programs in New Jersey, we support the recommendations expressed by many stakeholders that the BPU implement the Resource Value Test (RVT) outlined in the National Standard Practice Manual (NSPM) In the interim, the BPU may consider modifying existing costs tests, such as the Utility Cost Test (UCT) to incorporate societal benefits (such as pollution, jobs, and undervalued consumer energy savings) for programs launched before at RVT framework can be established for New Jersey.

**EM&V for BEE**

Our experience as a leading provider of BEE has provided significant insights specific to the EM&V of those programs, and we recommend the following approaches:

1. Follow the guidance listed in Chapter 17 of the U.S. Department of Energy Uniform Methods Project (www.nrel.gov/docs/fy17osti/68573.pdf)
2. EM&V for BEE must be based on measured savings, not on deemed savings.
    a. Given the dynamic nature of BEE programs and consumer behaviors, and variations on the performance of solutions providers, measured savings are vastly superior to deemed savings, well worth the incremental costs.

b. Measuring energy savings by comparing treatment groups to control groups in a randomized control trial (RCT) leads to higher-quality outcomes. Deemed savings approaches can favor cheaper approaches that are, in fact, less effective at engaging customers.[1] Additionally, with measured savings hypothetical net-to-gross ratios need not be applied.

c. It is critical to gather real-time feedback from the evaluators to program administrators and implementers so real time adjustments can be made in the treatment protocols and content.

3. Measure life for BEE should be set at one year. While savings persistence is in fact a real benefit, accounting for this is often not worth the cost.
    a. Solutions to managing complexity e.g. "crop rotation" require loss of treatment, less benefits, including a detriment to the consumer experience, including frustration, confusion, and significant opportunity costs.
    b. Assuming a persistence value of 1 year also addresses the issues of annual vs. cumulative savings for BEE, providing significant simplicity while erring on the side of more investment in DSM.
4. Uplift should be measured but not deducted from the benefits attributed to BEE.
    a. The deduction for uplift is typically much less than the value of the associated participant acquisition for other programs, i.e. market transformation benefits of consumer education and engagement.
    b. Until a more precise acquisition valuation methodology is developed for measuring this benefit, inclusion of the uplift savings works as a proxy value.
5. Performance measuring and reporting must be frequent and timely. Third party evaluators should report annually, with no more than one quarter delay in reporting from the end of the evaluation period. Implementers should also deliver ex-ante performance results to minimize surprises and maximize opportunities for improvement.

[1] Several examples from BEE programs across the country have demonstrated underperformance of programs utilizing deemed savings approaches. In Ameren Missouri's 2018 M&V report (www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936232335) Page 50 shows the 2017 and 2018 evaluated kWh numbers per customer of 39.1 and 82.4kWh, far short of the deemed value of 150 kWhs.

6. EM&V for BEE should account for, accept, and optimize around differences, such as consumer segments potential and propensity to save, paper vs. digital only delivery, content variations, etc. to allow implementers to optimize costs and benefits to equitably serve all consumer segments, manage trade-off between individual policy and regulatory objectives, realize synergies with other programs (such as retail products) and optimize for overall savings.[2]
7. As mentioned above, CX must be measured, both as an "ends" (i.e. happy energy consumers are an inherent good) and as a "means" (happy customers are more likely to constructively engage and participate in programs.)

**EM&V for Retail Products and Online Marketplaces**

Utility-branded online marketplaces should be evaluated not as direct DSM resources but instead as core market transformation infrastructure, with significant participant acquisition benefits. Experience has shown dedicated online marketplaces offer both lower "free ridership" and higher velocity, and in turn net savings, than traditional channels.[3] At the same time, it is important to support other channels as well, as a true "multi-channel" approach, and "be where the customers are" is critical to optimizing deployment of DSM technologies.

Utility branded and run online marketplaces offer additional value in their modularity as a consumer engagement channel, with the potential to expand from retail product delivery to infrastructure for other services, such as enrollment in rate plans, demand response programs, installation services, consumer information and education, utility financing, and services not yet developed.

[2] The scope and scale of BEE programs is often limited due to a focus on aggregate savings, but given the engagement synergies HERs provide and low cost of digital-only programs, it is important to measure them on a kWh per $ - not just aggregate kWh basis - to drive maximum investment in this cost-effective approach.

[3] A 2017 Xcel EM&V study showed a 5x higher net kWh savings for smart thermostats through online marketplaces compared to than traditional retail channels, with a 26% lower free ridership calculation. In New Jersey, the PSE&G online marketplace pilot program far exceeded expectations for moving thermostats in program years 2018 and 2019, suggesting that higher deployment rates are possible with even lower rebate amounts.

The performance of this channel as a central transactional hub can be evaluated a number of ways, but perhaps most straightforward is through the use of consumer experience metrics, of which the use of Net Promoter Score (NPS) is becoming the industry standard. Other tracking metrics, such as transaction velocity, percentage of utility consumer site visits, click-through rates, and the like may also prove useful in evaluating marketplace performance.

**EM&V for Demand Response**

Demand response (DR), while not currently widespread in New Jersey, will likely serve as a critical resource for the future low-carbon energy system in the state. As such, the BPU should ensure DR EM&V metrics and methodology are optimized to meet the state's objectives. The traditional approach of apply a Ratepayer Impact Test (RIM) on a program by program basis fails to adequately evaluate and promote DR; Uplight recommends the following considerations when developing a superior EM&V approach:

1. Ensure carbon reduction objectives are accounted for in cost tests. Recent work in California has shown that simply increasing demand flexibility may not reduce carbon intensity of the grid. Development of a RVT can address this, but in the interim the addition of a carbon price adder to the RIM or UCT calculation can address this.
2. DR can be complex, with a number of factors[4] impacting the depth, frequency, and cost effectiveness of a program in any given DR season. Optimizing DR portfolios must recognize this, and as such, success should be measured not only in realized peak shaving in a particular season, but in ways that optimize the availability of the resource, analogously to energy and capacity markets for wholesale power generation. One approach is to set targets and measure performance against both enrolled and dispatched DR.
3. DR programs and technologies serve optimally when integrated and synergized with other programs - e.g. when smart thermostats are deployed for both efficiency and DR

[4] These may include weather, wholesale market design and operations, power plant availability, or fuel price fluctuations.

benefits, or when DR technologies empower consumers to respond under time-of-use (TOU) or demand rates. As such, EM&V practices must incorporate the sharing of costs and benefits across these multiple values.

4. As mentioned above, CX must be measured, both as an "ends" (i.e. happy energy consumers are an inherent good) and as a "means" (happy customers are more likely to constructively engage and participate in programs.) This is especially useful to understand how to optimize the frequency, depth, communication channels and content, and technology deployment for meeting the state's DR resource objectives.

Thank you once again for the opportunity to share our insights and perspectives. We look forward to continuing these conversations as part of the BPU's continued efforts to develop a sustainable and cost-effective energy system for the people and businesses of New Jersey.

Sincerely,

Tanuj Deora
Vice President, Market Development and Regulatory Affairs
tanuj.deora@uplight.com
720-839-2264

TO: publiccomments@njcleanenergy.com DATE: January 17, 2020
RE: Comment: Dec 18, 2019 Energy Efficiency Transition – EM&V and Filing/Reporting

Dear NJ Clean Energy,

Real and measurable data for monitoring New Jersey's conversion to clean energy is needed in the NJ Energy Master Plan and the Integrated Energy Plan so that the agencies involved in this necessary transitioning from fossil fuels to clean energy have the structure, information and oversight/monitoring supports they need to effectively reach state goals and comply with their mandates.

New Jersey cannot continue depending on estimates from federal agencies as New Jersey's method for determining NJ energy usage. New Jersey should be collecting and evaluating key performance indicators (KPIs), energy data points and providing real time visibility into New Jersey's energy status, especially over the next 30-year transition to clean energy.

Based on the 3.1.1 NJ Clean Energy Goal from the draft Energy Master Plan, recommended actions for evaluation, measurement & verification (EM&V) are:

1. **Require all utilities serving NJ to provide all monthly actual measures available in their natural gas and electric systems to NJ Clean Energy electronically.**
    a. By a specified date in 2020 – All monthly data should be compiled for each city/township to show sources, distribution and usage.
    b. By a specified date in 2021 – All data daily to all end points in system (with endpoint details anonymized for confidentially and security) should be compiled.

    All utilities servicing NJ currently collect this data, which is necessary for sales, delivery, maintenance monitoring, managing demand/capacity and charging customers.
2. **Implement policy that requires all new renewable installation projects after September 1, 2020 to include monitoring, with monitoring data published to NJ Clean Energy.**
    The cost of monitoring has decreased substantially. For Equity Justice considerations, NJ Clean Energy should offer rebates for covering monitor costs to any home wishing to install renewable energy if the total annual income is less than $100,000.
3. **Formalize a Data Integrity, Compliance and Reporting (DICR) function at NJ Clean Energy.**
    a. By a specified date in 2020 – Identify allocated resources to perform the DICR function.
    b. By a specified date in 2021 – Budget for formalized department with monthly reporting metrics to EMP committee and public.
4. **Create a Monthly Metrics Dashboard on the NJ Clean Energy website by June 1, 2020.**
    a. First iteration is to publish totals of energy per utility purchased, distributed and consumed.
    Data should be presented on dashboard instead of the NJ Transit version of pictorial meters, so that the public, legislators and NJ agencies all can reference specific concrete numbers.
    b. Plan monthly improvements to Dashboard including adding additional data points, adding additional Key Performance Indicators and the capability for trending changes in NJ Energy supply and usage per month.

Below are the suggestions / responses to the questions posed regarding EM&V that were prepared by Kirk Frost. I concur with his suggestions and am including them in this comment as reinforcement.

I appreciate your consideration of this comment and hope you seriously act with urgency to collect and monitor data to be used by agencies as NJ transitions to clean, renewable energy sources and makes optimal use of emerging technologies to support this goal. Without data, monitoring/oversight, transparency, and clear communication of meaningful information, there can be no certainty or accountability in the transitioning to clean renewable energy sources.

NJ Clean Energy needs comprehensive methods to actually measure, monitor and adjust Energy Efficiency progress and utility energy grid change required for shifting toward 100% clean energy.

Sincerely,
Dr. Barbara Cuthbert - Princeton, NJ

**Question Set 1:**

- **What types of evaluations and studies (BCA [benefits cost analysis], baseline, process, impact) are necessary, in what cadence and frequency?**
    - Evaluations should be made after utilities provide comprehensive monthly data updates to NJ Clean Energy regarding all energy activities (which should be mandated by March 1, 2020).
    - Frequency is such a relative term. If the data is 2 years out of date, the frequency becomes irrelevant. Ideally, frequency should be a daily practice of verifying utility data transmission, validation of independent NJ state monitoring collectors, and identification/escalation of any data abnormalities or discrepancies.
    - Cadence should actively collect every articulation of energy traversal data available to utilities governed by New Jersey. In other words - All data sourcing, gathering, distributing, supplying, sales and consumption should be actively collected and reviewed to (1) ensure data is being provided at scheduled times; (2) check for data integrity; (3) verify data using monitoring; and (4) employ data analysis to spot any issues or anomalies in NJ energy flow.

- **What models do we see for who conducts, reviews, and approves each of those?**
    - This has to be completely overseen by a dedicated staff in NJ Clean Energy.
    - It is highly doubtful that this function can be outsourced. There needs to be a governmental agency that drives towards actual data aggregation and reporting for both the state evaluation and public transparency.
    - In order for New Jersey to oversee a massive transition from fossil fuels, it is not realistic to outsource aggregating and monitoring energy data flow. This ability will enable NJBPU to more proactively manage regulating energy using actual NJ energy data and steer the Energy Master Plan to mitigate risk and manage unplanned energy events associated with transitioning from fossil fuels to clean energy.

- **How can stakeholders provide technical or on-the-ground expertise into the process?**
    - There needs to be an open conduit available from NJ residents to provide input, technical expertise and notifications. This cannot be the NJBPU feedback form, but an input form in NJ Clean Energy specific to NJ Energy Plan.
    - Another method is to utilize high schools and colleges as the focus funding point from interested companies and organizations that want to help. Not only does this spread awareness from students to residents, but it also separates funding influence from entities wishing to sponsor changes. This enables entities to provide technical and funding, but becomes objective since school projects vet out the viability.
    - Process anomalies can only be truly assessed when there is a process that fully measures, quantizes and analyzes technical/expertise postings**.**

- **What model(s) for program evaluators should New Jersey consider?**
    - 1. Require utilities to provide monthly measurements of all data that the utility has by March 1, 2020. Without this data provided on a monthly basis, evaluation becomes ad-hoc without continuity in planning.
    - 2. Form a Data Integrity Team that focuses on collecting data, enabling data to be publicly available, verifying data, and pursuing all data anomalies or energy grid issues.
    - 3. Target implementing an Engineering Steering Committee by 2022. The committee should include engineers from NJ agencies, utilities, DICR and nominate professors for NJ schools who are provided a stipend to attend. The committee should be focused on collaborating with the 7 other states that Governor Murphy signed on with regarding the Zero Emissions Initiative as well as other countries and companies that are making substantial progress into clean energy.
      Nikola Motor is working with California to install hydrogen gas stations that are *locally sourced* from renewable energy. UK is currently injecting hydrogen into natural gas pipelines to lower their carbon footprint. Many other new developments in rebuilding a grid from the inside out are using microgrid advancements instead of massively adding electrification distribution capability (California can warn NJ Clean Energy of the hidden costs and project overruns associated with electrification).

**Question Set 2:**

- **How should the EM&V Evaluation, measurement, and verification process intersect with filing requirements? What types of information are needed when, and from whom?**
    - Set March 15 as the cutoff date for all new application/filing events from utilities if monthly data is not provided by utility.
    - Establish fines to incur to all utilities who have not met the March 1, 2020 data requirements by May 1, 2020 and increase fines every month until the data is provided.
    - Enforce that all data is required by May 1 from utilities.
    - New filings from energy companies and utilities must include methods for providing NJ Clean Energy with monthly energy data by March 1, 2020 and near real time data by March 1, 2021.

- **What is needed in this transition period (through launch of new programs) and the long term (~5-year goal and beyond)?**
    - NJ Clean Energy needs to evaluate the current organization, functions and services to determine what changes are required in order for NJ Clean Energy to drive the transition from fossil fuels to clean renewable energy.

- NJ Clean Energy needs to form a DICR Team who are solely focused on data acquisition, integrity and publishing of energy data. The Data Integrity, Compliance and Reporting (DICR) unit should begin publishing Monthly Metrics on the NJ Clean Energy website and develop deeper insight into energy usage issues, anomalies, provisioning to other agencies that are reported to the Governor and public monthly.
    - Within 5 years, New Jersey must have all data, granular to the street level, updated on a daily basis. It would be ideal if it is in real time.
    - If NJ agencies are not the recipients of actual data, then how could we ever trust the data accurately reflects NJ energy?
    - Migrating from a passive estimated out-of-date (at least by 2 years) energy model to an actual measuring of energy traversal in NJ from supply to end customers. This is a large task and requires accountability, measurements of progress in this shift. I believe NJ Clean Energy has the ability to achieve this, but it requires changes in behavior and functions.

- **Should New Jersey evolve towards a unified framework for all distributed energy resources?**
    - Not yet. It is too premature to determine what type of unified framework.
    - Ultimately, a framework needs to be built from the microgrid concept as a core building block for energy, but that isn't effectively designed using clean energy and hydrogen as a buffer between microgrids yet.
    - Until that time, NJ Clean Energy needs to sponsor competitions in NJ high schools and NJ colleges like other states that enable companies to engage via sponsoring schools on an annual basis. In order to prepare for a unified framework, much research, proof of concepts and pilots need to be completed – the schools are the perfect place to ensure objectivity while also spreading awareness.

**Question Set 3:**

- **Should New Jersey develop a primary cost test associated with key policy initiatives, e.g., following the Resource Value Framework (National Standard Practice Manual), designate one of the five standard tests as the primary test, or employ another approach? What approach is recommended?**
    - National Standard Practice Manual currently allows for non-measurement input. Without measurement, this becomes irrelevant when attempting to shift a state energy from fossil fuel to clean energy using renewable sources.
    - To move beyond fossil fuel requires a real mapping of actual data for energy traversal within New Jersey to accurately assess, advise and enforce a transition from fossil fuel to clean energy sourced from renewable sources.
    - Without a framework or end state defined, cost test has to be more basic in terms of ensuring funding is available and that initiatives are in line with a clean energy framework that includes hydrogen. Other states can help here, especially California. We can learn from their mistakes and unexpected outcomes.

- **What are the costs and benefits that you would recommend for consideration in a single benefit-cost test?**
  - **Does the proposal:**
    1. Promote further locally-sourced renewable energy (including households)?
    2. Enable hydrogen solutions using knowledge from other states and companies that are currently using hydrogen?
    3. Promote microgrid development using hydrogen and all forms of renewable energy (a 500 watt micro windmill costs $250 and generates electricity at 3mph)?
    4. Enable further development of transition models using actual energy usage?
    5. Create reduced carbon emissions and reduced fossil fuel toxic emissions' long-term impact on the environment?
  - **Are there indirect or non-energy related costs or benefits that should be considered?**
    - How to quantify long-term Health Impact (at least out to 2050)?
    - Long-term environmental impact (such as: 2040 complete flooding of some regions of New Jersey).
    - What are the real costs? What are the real measurements of actual energy traversal in the energy grid? What are the actual energy loss focus points currently in the state? What opportunities do new innovations in the hydrogen economy pose?
    - Sustainability of human health and environment in New Jersey are the fundamental components for assessing a cost benefit analysis. Currently, many resources forecast substantial adverse human and environmental impact to NJ by 2040. NJ Clean Energy needs to incorporate long-term impacts with actual measures of today in shifting from toxic fossil fuel usage towards clean energy (totally renewably sourced).
  - **If so, how can they be estimated?**
    - First steps to be carried out over the next 3 years:
      1. Get real data from utilities and require data to be provided monthly at first, then in real time.
      2. Work with the other states that Governor Murphy agreed to collaborate with in fully assessing cost benefit analysis.
      3. Ensure that cost projections incorporate the constantly changing threat from climate change such that it is considered and updated on an annual basis.
      4. Assess future health and environment costs as well as market, public and governmental resistance to change.
      5. Build a Risk Mitigant Strategy that incorporates costs, long term impacts, current impacts and costs for not pursuing continued migration to 100% clean energy migration.

**Question Set 4:**

- **What are the most important factors to address in measurement and verification of energy savings?**
  - **Should programs be evaluated based on gross or net savings?**
    - Gross and net savings inevitably invite large scale renewable energy plants to replace large scale fossil fuel plants. This is the wrong direction.
    - Until there is sufficient data and trending at NJ Clean Energy, programs should be based on effectiveness of program to add more renewable energy at each local homesite and business entity.
    - Programs should also be evaluated towards enabling microgrid transition of energy infrastructure.
    - We have to get away from the concept of large energy production plants and massive energy transmissions except for highly dense populations.
    - Another factor is improving energy efficiency at buildings and homes. There is substantial opportunity in reducing energy consumption which will also offset energy demand.
  - **For which measures are the use of deemed (assumed) savings appropriate, and which measures should be tested to verify actual savings?**
    - This is complicated. Savings need to incorporate reduced health costs and environmental damage. If people are suffering from increased sea levels in 2040 that completely ruin many neighborhoods of NJ, do those costs get incorporated? Does increased pathogen migration from southern states that afflict

residents of NJ health costs get incorporated? Do increased toxic residual in air, water and ground from continued fossil fuel use factor into the equation?

- NJ Clean Energy cannot solve all of these questions at this point, but by instituting the DICR team, NJ Clean Energy can start to quantify and provide guidance to an overall cost to New Jersey.

- **How should advanced M&V (measurement and verification) (automated data processing/increased data granulation) be integrated into EM&V?**

  1. First, NJ should require all utilities to provide monthly data of all energy traversal within their grid including from sourcing, gathering, distributing, supplying, sales, and consumption.
  2. Second, NJ Clean Energy needs to create a DICR Team that actively pursues, validates and assesses data provisioned by NJ utilities and renewable sources.
  3. Only then can NJ start to advertise that it has advanced M & V.

  - **When should it be incorporated? AS SOON AS POSSIBLE**
  - **What are best practices related to accuracy/confidence/reporting?**
    - Identify source; mandate source to provide data.
    - Review data and aggregate and analyze data against other outside data points.
    - Establish ad-hoc inspections of data at all the points in the energy infrastructure grid to validate that what is provided matches with what is reported.
    - Trend energy traversal attributes, history, and reported issues to create a data integrity readout grade for each utility.