# Development of the Puerto Rico Test Technical Workshop #1

June 30, 2021

Facilitated by: Courtney Lane and Asa Hopkins

# Agenda

| | |
|---|---|
| 9:30-9:40 | Introductions |
| 9:40-10:00 | Background and Process |
| 10:00-11:00 | Overview of *National Standard Practice Manual for Distributed Energy Resources* |
| 11:00-11:10 | Break |
| 11:10-12:15 | Step 1: Identification of applicable policies<br>• Summary of submitted comments<br>• Open discussion of policies and associated impacts |
| 12:15-12:30 | Wrap-up and next steps |

# Background and Process

# Background of EE and DR Proceedings

- Demand Response (DR) Regulation 9246
  - Establishes guidelines for DR programs
  - Mandate for PREPA to pursue all cost-effective DR resources
  - Requires the Energy Bureau to initiate a proceeding to define the Puerto Rico Benefit-Cost Test (PR Test) within 6 months to determine whether DR resources are cost-effective.
- Proposed Energy Efficiency (EE) Regulation
  - Issued April 22, 2021
  - Also requires the Energy Bureau to initiate a proceeding to define the PR Test within 6 months of its effective date
- PR Test Proceeding
  - Resolution and Order issued May 14, 2021
  - Purpose is to develop a Puerto Rico-specific cost-effectiveness framework to assess the benefits and costs of future DR and EE programs
  - Energy Bureau to use the *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources* (NSPM for DERs) as a guide to develop the PR Test

# The Importance of Cost-Effectiveness Testing

- Cost-effectiveness testing is an important part of EE and DR planning, reporting, and evaluation.
- Since the 1980, utilities have used cost-effectiveness tests to demonstrate that their investments in EE and DR programs are in the best interests of the utility, their customers, and society in general.
- Evaluating cost-effectiveness helps to ensure that funds invested in these programs create sufficient benefits to Puerto Rico.
- The development of a standardized cost-effectiveness framework will enable consistency across EE and DR programs and measures in order to create an optimal portfolio of offerings.

# Outcome of Workshops

- The end goal is to develop a cost-effectiveness framework, reflecting Puerto Rico public policy, that can be used to evaluate whether, and to what extent, proposed or actual DR and EE programs or initiatives provide greater benefits than their costs.
- Regulation 9246 indicates that the PR Test shall include:
  - *"All relevant generation, transmission, and distribution impacts, reliability and resilience, other fuel impacts, and environmental impacts, and may include other non-energy impacts, water impacts, economic development impacts, and social equity impacts. The accrual of specific non-energy impacts to certain programs or technologies, such as income eligible programs or combined heat and power, may be considered."*
- Over the course of the workshops, we will identify the relevant impacts to be included within these categories.
- We will not attempt to define exact methodologies or values.
  - Avoided cost study ongoing

# Timeline

| Date | Event | Description |
|---|---|---|
| June 30, 2021 | Technical Workshop 1 | NSPM for DERs overview and identification of Puerto Rico energy statutes, regulations, and policies |
| July 21, 2021 | Technical Workshop 2 | Identification of utility system impacts |
| August 25, 2021 | Technical Workshop 3 | Identification of non-utility system impacts and overarching considerations, including discount rate |
| September 22, 2021 | Technical Workshop 4 | Overview of proposed draft PR Test and discussion of remaining open questions from prior workshops |
| TBD | Order | Energy Bureau Resolution and Order on the PR Test for Demand Response and Energy Efficiency |

# Overview of the NSPM for DERs

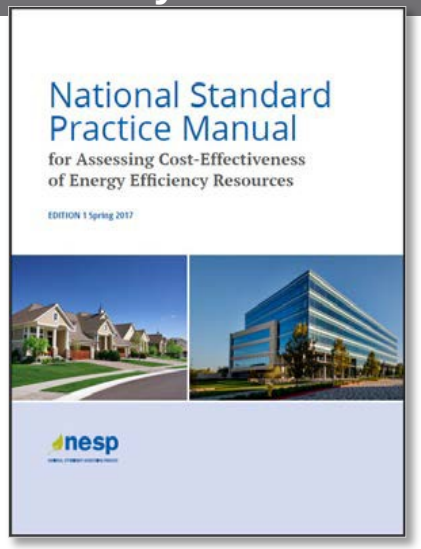
# What Is the NSPM and Why Use it?

- Provides an "objective, policy- and technology-neutral, and economically sound guidance" for developing a primary cost-effectiveness test
- Was vetted by a cross-cutting advisory group consisting of regulators, state agencies, utilities, expert consultants, and representatives from the DER industry
- Defines policy-neutral principles for developing cost-effectiveness tests
- Establishes a framework for selecting and developing a primary test
- Provides guidance on developing a cost-effectiveness tests that reflects pertinent jurisdictional/state policies

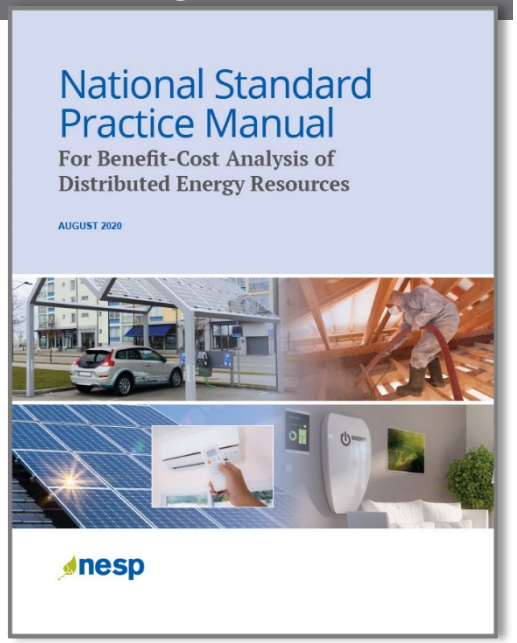
# History of the NSPM

- Managed and funded by E4TheFuture (with support from US Department of Energy via Lawrence Berkeley National Laboratory)
- Multiple co-authors
  - Extensive understanding of regulatory economics
  - Specialized expertise with different DERs
- Advisory Group
  - 45+ individuals
  - Diversity of perspectives
  - Input on manual outline and drafts
- NSPM for DERs builds on NSPM for EE (2017)

## NSPM for EE
**May 2017**




## NSPM for DERs
**August 2020**




*The NSPM for DERs incorporates and expands on the NSPM for EE.*

| NSPM for EE (2017) | → NSPM for DERs (2020) |
|---|---|
| 'Resource Value Framework' | 'NSPM BCA Framework' |
| 'Resource Value Test' | 'Jurisdiction-Specific Test' (JST) |
| 6 Principles | 8 Principles |
| 7-step process to develop primary test | 5-step process to develop primary test |
| Single DER analysis | Single- and multi-DER analyses |
| DERs covered: energy efficiency only | DERs covered: EE, DR, DG, DS, Electrification |

# Audience and Uses

**Audience:** All entities overseeing/guiding DER decision (PUCs, SEOs, utilities, DER reps, evaluators, consumer advocates, and others)

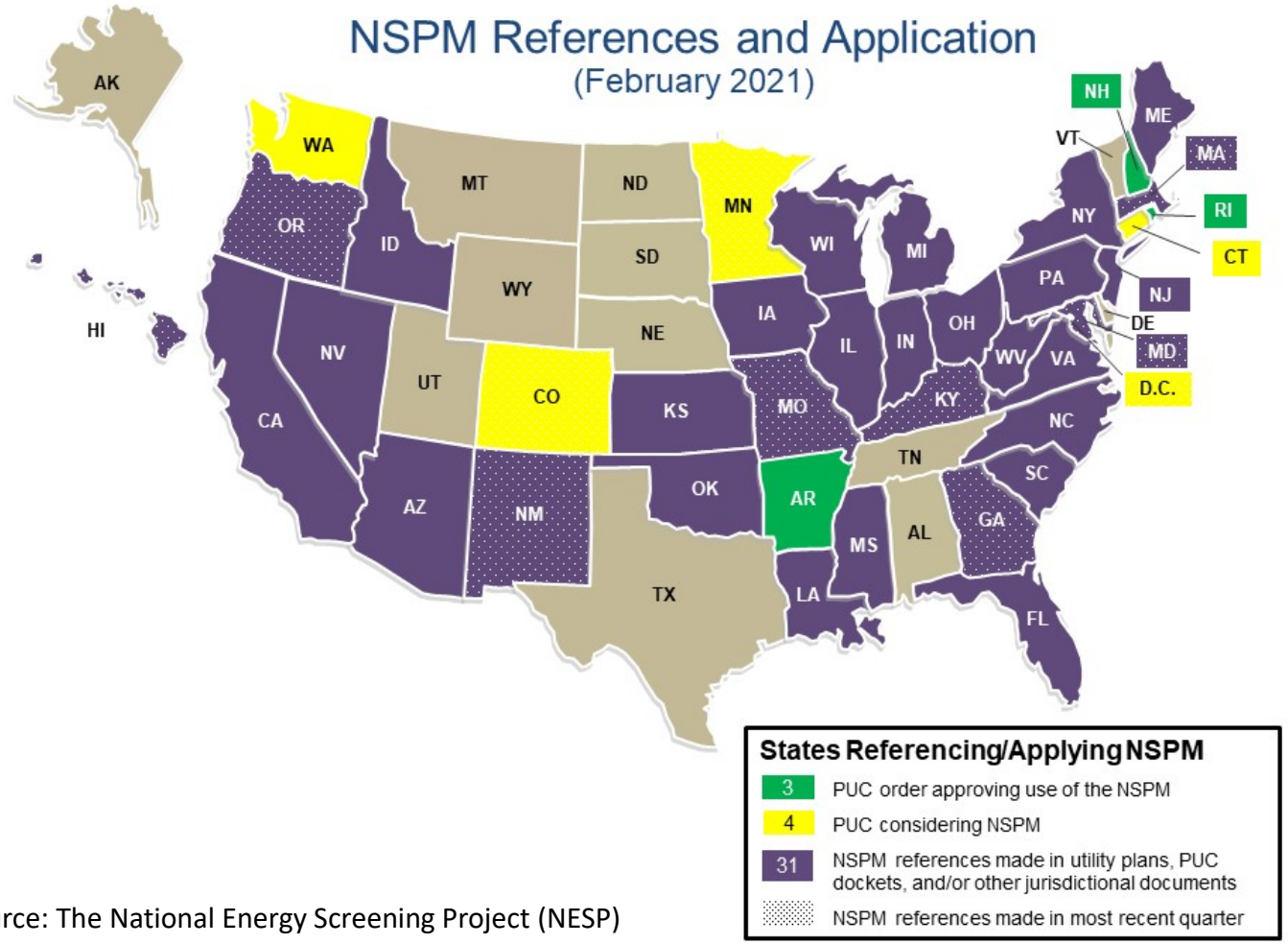
**Purpose:** Guidance for valuing DER opportunities to inform policies and strategies that support state goals/objectives, such as:

- expanding EE/DR plans, strategies, and programs to a broader set of DERs;
- evaluating and planning for non-wires/pipes solutions;
- incorporating DERs into distribution system planning;
- achieving electrification goals, including EV goals;
- achieving environmental and carbon emission objectives.

**Applies to:**

- **Programs**: initiatives and policies implemented by utilities or other entities to encourage adoption of DERs
- **Procurements:** initiatives to procure DERs, whether built by a utility or procured from third-party vendors, e.g., competitive procurement
- **Pricing Mechanisms**: such as those designed to compensate DERs for their value to grid or to achieve other policy objectives (e.g., time-of-use rates, peak time rebates, critical peak pricing)

# NSPM References and Application




Source: The National Energy Screening Project (NESP)

# NSPM for DERs - Contents



# Developing the Primary Cost-Effectiveness Test Using the NSPM for DERs Framework

# Common DR and EE Cost-Effectiveness Tests

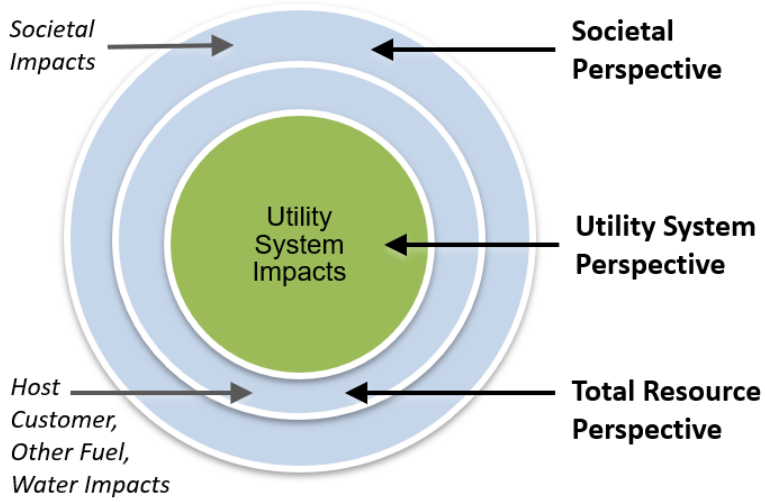
| Test | Perspective | Key Question Answered | Categories of Benefits and Costs Included |
|---|---|---|---|
| **Utility Cost Test** | The utility system | Will utility system costs be reduced? | Includes the utility system impacts |
| **Total Resource Cost Test** | The utility system plus host customers | Will utility system costs and host customers' costs collectively be reduced? | Includes the utility system impacts, and host customer impacts |
| **Societal Cost** | Society as a whole | Will total costs to society be reduced? | Includes the utility system impacts, host customer impacts, and societal impacts such as environmental and public health impacts |

# The Jurisdictional Specific Test (JST)

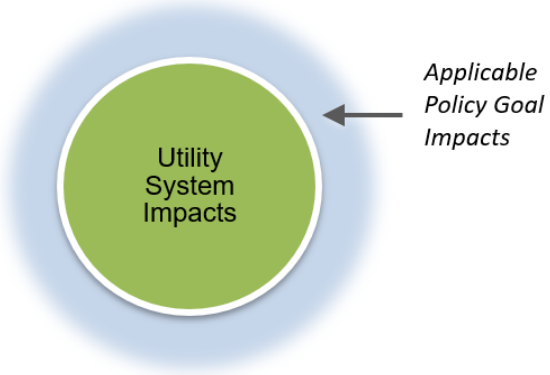
JST assesses cost-effectiveness from a regulator's perspective. It asks the question, will the cost of meeting utility system needs, while achieving applicable policy goals, be reduced?

## Traditional Perspectives




- Three perspectives define the scope of impacts to include in the most common traditional cost-effectiveness tests.

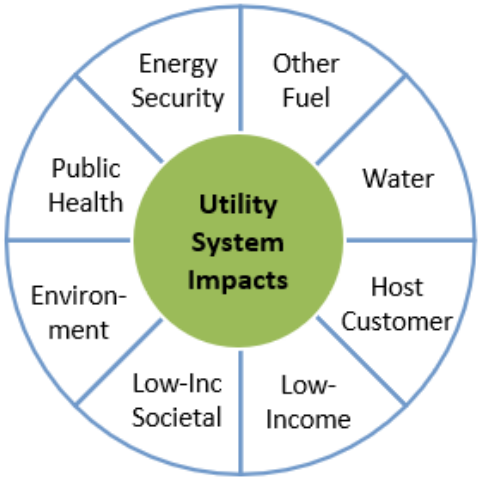
## Regulatory Perspective



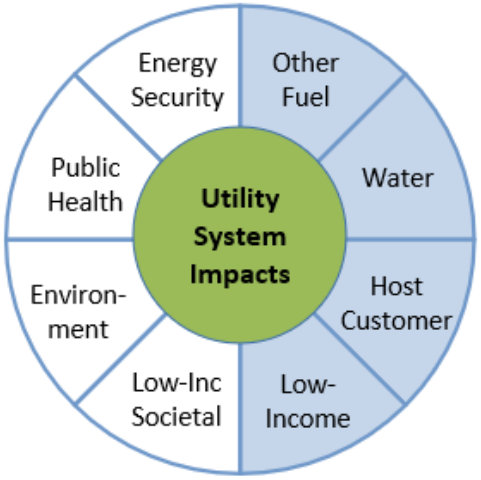

- Perspective of public utility commissions, legislators, muni/coop boards, public power authorities, and other relevant decision-makers.
- Accounts for utility system plus impacts relevant to a jurisdiction's applicable policy goals (which may or may not include host customer impacts).
- Can align with one of the traditional test perspectives, but not necessarily.

# Hypothetical JST Compared to Traditional Tests

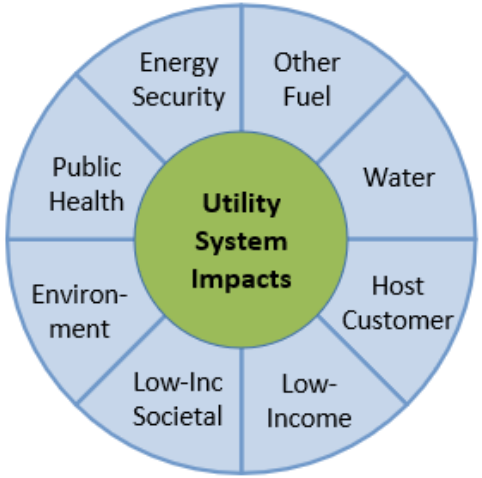
JST 1 = UCT/PACT



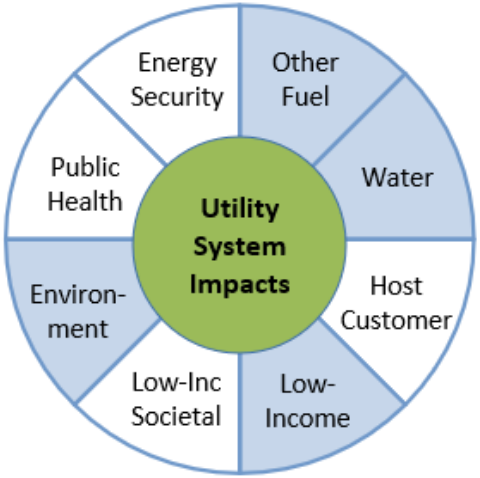

JST 2 = TRC Test




JST 3 = SCT




JST 4 ≠ traditional CE test *




UCT = Utility Cost Test (or PACT = Program Admin Cost Test)
TRC = Total Resource Cost Test
SCT = Societal Cost Test

All utility system impacts included

Non-utility system impacts included

Non-utility system impacts *not* included

*JST 4 includes a different set of non-utility system impacts based on *its applicable policies.*

JSTs may or may not align with traditional tests.

 | 

# NSPM Principles

| | | |
|---|---|---|
| **Principle 1** | **Treat DERs as a Utility System Resource** | DERs are one of many energy resources that can be deployed to meet utility/power system needs. DERs should therefore be compared with other energy resources, including other DERs, using consistent methods and assumptions to avoid bias across resource investment decisions. |
| **Principle 2** | **Align with Policy Goals** | Jurisdictions invest in or support energy resources to meet a variety of goals and objectives. The primary cost-effectiveness test should therefore reflect this intent by accounting for the jurisdiction's applicable policy goals and objectives. |
| **Principle 3** | **Ensure Symmetry** | Asymmetrical treatment of benefits and costs associated with a resource can lead to a biased assessment of the resource. To avoid such bias, benefits and costs should be treated symmetrically for any given type of impact. |
| **Principle 4** | **Account for Relevant, Material Impacts** | Cost-effectiveness tests should include all relevant (according to applicable policy goals) material impacts including those that are difficult to quantify or monetize. |
| **Principle 5** | **Conduct Forward-Looking, Long-term, Incremental Analyses** | Cost-effectiveness analyses should be forward-looking, long-term, and incremental to what would have occurred absent the DER. This helps ensure that the resource in question is properly compared with alternatives. |
| **Principle 6** | **Avoid Double-Counting Impacts** | Cost-effectiveness analyses present a risk of double-counting benefits and/or costs. All impacts should therefore be clearly defined and valued to avoid double-counting. |
| **Principle 7** | **Ensure Transparency** | Transparency helps to ensure engagement and trust in the BCA process and decisions. BCA practices should therefore be transparent, where all relevant assumptions, methodologies, and results are clearly documented and available for stakeholder review and input. |
| **Principle 8** | **Conduct BCAs Separately from Rate Impact Analyses** | Cost-effectiveness analyses answer fundamentally different questions than rate impact analyses, and therefore should be conducted separately from rate impact analyses. |

# Developing the Puerto Rico Test Involves 5 Steps

**STEP 1** **Articulate Applicable Policy Goals**

Articulate Puerto Rico's applicable policy goals related to DERs.

**STEP 2** **Include All Utility System Impacts**

Identify and include the full range of utility system impacts.

**STEP 3** **Decide Which Non-Utility System Impacts to Include**

Identify those non-utility system impacts to include in the test based on applicable policy goals identified in Step 1:

- Determine whether to include host customer impacts, low-income impacts, other fuel and water impacts, and/or societal impacts.

**STEP 4** **Ensure that Benefits and Costs Are Properly Addressed**

Ensure that the impacts identified in Steps 2 and 3 are properly addressed, where:

- Benefits and costs are treated symmetrically;
- Relevant and material impacts are included, even if hard to quantify;
- Benefits and costs are not double-counted; and
- Benefits and costs are treated consistently across DER types

**STEP 5** **Establish Comprehensive, Transparent Documentation**

Establish comprehensive, transparent documentation and reporting, whereby:

- The process used to determine the primary test is fully documented; and
- Reporting requirements and/or use of templates for presenting assumptions and results are developed.

# STEP 1: Articulate Applicable Policy Goals

| Laws, Regulations, Orders: | Illustrative Policy Goals Reflected in Laws, Regulations, Orders, etc. | | | | | |
|---|---|---|---|---|---|---|
| | Low-Cost | Fuel Diversity | Risk | Reliability | Environmental | Economic Development |
| Statutory authority | X | | | X | | |
| Low-income protection | | | | | | X |
| EE or DER law or rules | X | X | X | X | X | X |
| State energy plan | X | X | X | X | X | X |
| Integrated resource planning | | X | X | | X | X |
| Renewable portfolio standard | | X | X | | X | X |
| Environmental requirements | | | | | X | |

- This chart is illustrative only.
- Each jurisdiction has a constellation of energy policy goals embedded in statutes, regulations, orders, guidelines, etc.
- The table illustrates how laws, regulations, orders, etc. might establish applicable policy goals.

# STEP 2: Include All Utility System Impacts

| Illustrative Utility System Costs | Illustrative Utility System Benefits |
|---|---|
| • Program Measure Costs (e.g., rebates) | • Avoided Energy Costs |
| • Program Technical Support | • Avoided Generating Capacity Costs |
| • Program Marketing/Outreach | • Avoided T&D Upgrade Costs |
| • Program Administration | • Avoided T&D Line Losses |
| • Program Evaluation, Measurement & Verification (EM&V) | • Avoided Costs of Environmental Compliance |
| • Performance Incentive Mechanisms | • Avoided Credit and Collection Costs |
| | • Reduced Risk |
| | • Increased Reliability |

# STEP 3: Decide Which Non-Utility Impacts to Include

This step is guided by the identification of policy goals in Step 1.

| Non-Utility Impact | Description |
|---|---|
| **Other fuel impacts** | Impacts on fuels that are not provided by the relevant utility, for example, electricity (for a gas utility), gas (for an electric utility), oil, propane, gasoline, and wood |
| **Host customer impacts** | Host customer portion of DER costs and host customer non-energy impacts (NEI), such as impacts on productivity, comfort, health and safety, mobility, and more |
| **Impacts on low-income customers** | Impacts that are different from or incremental to non-low-income customer impacts such as energy affordability and poverty alleviation |
| **Environmental impacts** | Impacts associated with GHG emissions, criteria pollutant emissions, land use, solid waste, etc.; includes only those impacts not embedded in the utility cost of compliance with environmental regulations, which should always be treated as a utility system cost |
| **Public health impacts** | Impacts on public health; includes health impacts that are not included in host customer impacts or environmental impacts and includes benefits in terms of reduced healthcare costs |
| **Economic development and jobs** | Impacts on direct and indirect economic development and jobs |
| **Energy security** | Reduced reliance on fuel or energy imports from outside the state, region, or country |

*This table is presented for illustrative purposes and is not meant to be an exhaustive list or prescriptive to what should be included in the Puerto Rico Test.*

# STEP 4: Ensure that Impacts Are Properly Addressed

Ensure that the impacts identified in Steps 2 and 3 are properly addressed, where:

- Benefits and costs are treated symmetrically;
- Relevant and material impacts are included, even if hard to quantify;
- Benefits and costs are not double-counted; and
- Benefits and costs are treated consistently across DER types

# Ensure Symmetry of Benefits and Costs

**Illustrative Example: Treatment of Host Customer Costs and Benefits**

| Costs and Benefits | Asymmetry | Symmetry | |
|---|---|---|---|
| | A. Host Customer Costs **Included,** Benefits **Excluded** | B. Host Customer Costs and Benefits **Both Included** | C. Host Customer Costs and Benefits **Both Excluded** |
| **DER Costs** | | | |
| Utility System Costs: | | | |
| - Rebate/Incentive | $1,875 | $1,875 | $1,875 |
| - Administrative Costs | $1,500 | $1,500 | $1,500 |
| Host Customer Costs: | $5,625 | $5,625 | not included |
| ***Total Costs Accounted for:*** | $9,000 | $9,000 | $3,375 |
| **DER Benefits** | | | |
| Utility System Avoided Costs | $6,000 | $6,000 | $6,000 |
| Host Customer Non-Energy Benefits | not included | $4,000 | not included |
| ***Total Benefits Accounted for:*** | $6,000 | $10,000 | $6,000 |
| **Net Benefit/Cost** | ($3,000) | $1,000 | $2,625 |
| **Benefit-Cost Ratio (BCR):** | 0.67 | 1.11 | 1.78 |
| Treatment of Host Customer Impacts | X Asymmetrical | ✓ Symmetrical | ✓ |

# Develop Methodologies and Inputs to Account for All Relevant Impacts

(Including Hard-to-Quantify Impacts)

| Approach | Application |
|---|---|
| Jurisdiction-specific studies | Best approach for estimating and monetizing relevant impacts |
| Studies from other jurisdictions | Often reasonable to extrapolate from other jurisdiction studies when local studies not available |
| Proxies | If no relevant studies of monetized impacts, proxies can be used |
| Alternative thresholds | Benefit-cost thresholds different from 1.0 can be used to account for relevant impacts that are not monetized |
| Other considerations | Relevant quantitative and qualitative information can be used to consider impacts that cannot or should not be monetized |

# STEP 5: Establish Comprehensive, Transparent Documentation

- Development of Puerto Rico Test process should be transparent to all interested stakeholders
- Address objectives based on current jurisdiction policies
  - *Flexibility needed to incorporate evolution of policies over time*
- Review of policy goals may require consultation with other government agencies
  - *Environmental protection*
  - *Transportation*
  - *Health and human services*
  - *Economic development*
- Ensure Transparency in Reporting (See example template in Appendix B)

# Additional Considerations

| | |
|---|---|
| Discount Rate | • Choice of discount rate is a decision that should be informed by the jurisdiction's applicable policy goals.<br>• The regulatory perspective should be used to determine the appropriate discount rate.<br>• Draft EE regulations indicate it should reflect low-risk nature of EE investments. |
| Assessment Level | • Analysis at all levels can provide insight/value – but focus should only be on the program, sector, or portfolio level for making "yes or no" investment decisions.<br>• Draft EE regulations state the portfolio, sector, and/or program level. |
| Analysis Period | • Should be long enough to cover Lifecyle costs and benefits of the EE or DR measure. |
| Free Ridership and Spillover | • Draft EE regulations state test should reflect net resource impacts and include Free Ridership and Spillover effects. |

*Appendix H. of the NSPM for DERs contains additional guidance on assessing the cost and benefits for EE programs. Topics include Analysis of Early Replacement Measures, and Application of Free-Ridership and Spillover.*

# Today's Task

## Step 1: Articulate Applicable Policy Goals and Identify Impacts

# Importance of Identifying Applicable Policy Goals

- The identification of applicable policy goals will inform several aspects of the cost-effectiveness test.
- Policy goals will help answer key questions:
  - Which non-energy impacts should be counted?
  - What should be considered as a utility system impact?
    - For example, resiliency is a key aspect of IRP – likely a utility system impact.
  - Should the cost of carbon be included?
    - If yes, is this a global value or a Puerto Rico value?
  - What discount rate should be used?
  - Should participant impacts be included?
  - How are tax credits and federal incentives or other funds treated?

# What Are Applicable Policy Goals?

*Example Goals: as articulated in statute, regulations, decisions, etc.*

**Common Overarching Goals:** Provide safe, reliable, reasonably priced electricity and gas services; support fair and equitable economic returns for utilities; promote customer equity; protect/reduce energy burden for low-income and vulnerable customers.

**Resource Goals:** Reduce electricity and gas system costs; develop least-cost energy resources; improve system reliability and resiliency; reduce system risk; promote resource diversity; increase energy independence; reduce price volatility; provide demand flexibility.

**Other Applicable Goals:** Ensure stable energy markets; reduce environmental impact of energy consumption; promote jobs and local economic development; improve health associated with reduced air emissions and better indoor air quality.

# Stakeholder Comments: Relevant Puerto Rico Statutes and Policy Goals

| | Electric Utility System Impacts | Resilience | Reliability | GHG Emissions | Other Environmental | Public Health | Economic Development/Jobs | Energy Security | Participant Impact (Host customer) | Low-Income customer | Price stability/low cost | Other Fuels (ex. oil) | Innovation | Equity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Act 17-2019 | X | | X | | | | X | X | X | X | X | | X | X |
| Act 57-2014 | X | | | X | X | X | | X | | | | | | |
| Act 60-2019 | | | | | | | X | | | | | | | |
| Act 17-2019 | X | | | | | | | | | | | | | |
| Act 114-2007 | | | | | | | | | | | | | | |
| Act 120-2018 | X | | | | | | | | | | X | | | |
| Act 82-2010 | X | | | X | X | X | X | | X | X | X | X | | |
| Act 2018-2008 | | | | | X | X | | | | | | | | |
| Act 33-2019 | X | X | | X | X | X | X | | | | X | X | X | X |

# Stakeholder Comments: Relevant Puerto Rico Statutes and Policy Goals

| | Electric Utility System Impacts | Resilience | Reliability | GHG Emissions | Other Environmental | Public Health | Economic Development/Jobs | Energy Security | Participant Impact (Host customer) | Low-Income customer | Price stability/low cost | Other Fuels (ex. oil) | Innovation | Equity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PREB Reg. 9028 | X | X | X | | X | X | X | | X | | X | | X | |
| PREB Reg. 9021 | X | X | | X | X | | | | | | | | | |
| PREB Reg. 8818 | | | | | | | | | | | | | | |
| PREPA Reg. 8915 and 8916 | | | | | | | | | | | | | | |
| Energy Star-EPA* | | | | | X | | X | | | X | | | | |
| State Energy Program – PPPE* | | | | | X | | X | | | X | | | | |
| LEED-USGBC* | | | | | X | | | | | | | | | |

* Federal

# Questions for Group Discussion

1. Should the policies be ranked? Is there a hierarchy?
   a. *Is there one that dictates all others?*
   b. *What are the key impacts we know need to be considered?*
   c. *What is considered secondary?*

2. Are any policies missing from table?

3. Do any policies not apply?

4. Do you agree with the categories and mapping of impacts?

# Next Steps

# Comments and Next Meeting

- Comments can be submitted until Friday, July 16th on topics covered in this workshop.
  - *We will review before next workshop and begin the meeting with a discussion of any outstanding issues, comments, or questions related to Workshop #1.*
- Second workshop will focus on identifying the relevant utility system impacts to include in the PR Test.
  - *A potential list of utility system impacts can be found in Appendix A.*

# Appendix A

## List of Common Impacts for DERs

# Potential Electric Utility System Impacts

| Type | Utility System Impact | Description |
|---|---|---|
| **Generation** | Energy Generation | The production or procurement of energy (kWh) from generation resources on behalf of customers |
| | Capacity | The generation capacity (kW) required to meet the forecasted system peak load |
| | Environmental Compliance | Actions to comply with environmental regulations |
| | RPS/CES Compliance | Actions to comply with renewable portfolio standards or clean energy standards |
| | Market Price Effects | The decrease (or increase) in wholesale market prices as a result of reduced (or increased) customer consumption |
| | Ancillary Services | Services required to maintain electric grid stability and power quality |
| **Transmission** | Transmission Capacity | Maintaining the availability of the transmission system to transport electricity safely and reliably |
| | Transmission System Losses | Electricity or gas lost through the transmission system |
| **Distribution** | Distribution Capacity | Maintaining the availability of the distribution system to transport electricity or gas safely and reliably |
| | Distribution System Losses | Electricity lost through the distribution system |
| | Distribution O&M | Operating and maintaining the distribution system |
| | Distribution Voltage | Maintaining voltage levels within an acceptable range to ensure that both real and reactive power production are matched with demand |
| **General** | Financial Incentives | Utility financial support provided to DER host customers or other market actors to encourage DER implementation |
| | Program Administration | Utility outreach to trade allies, technical training, marketing, and administration and management of DERs |
| | Utility Performance Incentives | Incentives offered to utilities to encourage successful, effective implementation of DER programs |
| | Credit and Collection | Bad debt, disconnections, reconnections |
| | Risk | Uncertainty including operational, technology, cybersecurity, financial, legal, reputational, and regulatory risks |
| | Reliability | Maintaining generation, transmission, and distribution system to withstand instability, uncontrolled events, cascading failures, or unanticipated loss of system components |
| | Resilience | The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions |

# Potential Gas Utility or Other Fuel Impacts

| Type | Gas Utility or Other Fuel Impact | Description |
|---|---|---|
| **Energy** | Fuel and Variable O&M | The fuel and O&M impacts associated with gas or other fuels |
| | Capacity | The gas capacity required to meet forecasted peak load |
| | Environmental Compliance | Actions required to comply with environmental regulations |
| | Market Price Effects | The decrease (or increase) in wholesale prices as a result of reduced (or increased) customer consumption |
| **General** | Financial Incentives | Utility financial support provided to DER host customers or other market actors to encourage DER implementation |
| | Program Administration Costs | Utility outreach to trade allies, technical training, marketing, and administration and management of DERs |
| | Utility Performance Incentives | Incentives offered to utilities to encourage successful, effective implementation of DER programs |
| | Credit and Collection Costs | Bad debt, disconnections, reconnections |
| | Risk | Uncertainty including operational, technology, cybersecurity, financial, legal, reputational, and regulatory risks |
| | Reliability | Maintaining the gas or other fuel system to withstand instability, uncontrolled events, cascading failures, or unanticipated loss of system components |
| | Resilience | The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions |

# Potential Host Customer Impacts

| Type | Host Customer Impact | Description |
|---|---|---|
| **Host Customer** | Host portion of DER costs | Costs incurred to install and operate DERs |
| | Host transaction costs | Other costs incurred to install and operate DERs |
| | Interconnection fees | Costs paid by host customer to interconnect DERs to the electricity grid |
| | Risk | Uncertainty including price volatility, power quality, outages, and operational risk related to failure of installed DER equipment and user error; this type of risk may depend on the type of DER |
| | Reliability | The ability to prevent or reduce the duration of host customer outages |
| | Resilience | The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions |
| | Tax incentives | Federal, state, and local tax incentives provided to host customers to defray the costs of some DERs |
| | Non-energy Impacts | Benefits and costs of DERs that are separate from energy-related impacts |
| | Low-income non-energy impacts | Non-energy benefits and costs that affect low-income DER host customers |

*(inclusion depends on policy goals)*

| Host Customer Non-Energy Impacts | Summary Description |
|---|---|
| **Transaction costs** | Costs incurred to adopt DERs, beyond those related to the technology or service itself (e.g., application fees, time spent researching, paperwork) |
| **Asset value** | Changes in the value of a home or business as a result of the DER (e.g., increased building value, improved equipment value, extended equipment life) |
| **Productivity** | Changes in a customer's productivity (e.g., changes in labor costs, operational flexibility, O&M costs, reduced waste streams, reduced spoilage) |
| **Economic well-being** | Economic impacts beyond bill savings (e.g., reduced complaints about bills, reduced terminations and reconnections, reduced foreclosures—especially for low-income customers) |
| **Comfort** | Changes in comfort level (e.g., thermal, noise, and lighting impacts) |
| **Health & safety** | Changes in customer health or safety (e.g., fewer sick days from work or school, reduced medical costs, improved indoor air quality, reduced deaths) |
| **Empowerment & control** | The satisfaction of being able to control one's energy consumption and energy bill |
| **Satisfaction & pride** | The satisfaction of helping to reduce environmental impacts (e.g., one of the reasons why residential customers install rooftop PV) |

# Potential Societal Impacts

| Type | Societal Impact | Description |
|---|---|---|
| **Societal** | Resilience | Resilience impacts beyond those experienced by utilities or host customers |
| | GHG Emissions | GHG emissions created by fossil-fueled energy resources |
| | Other Environmental | Other air emissions, solid waste, land, water, and other environmental impacts |
| | Economic and Jobs | Incremental economic development and job impacts |
| | Public Health | Health impacts, medical costs, and productivity affected by health |
| | Low Income: Society | Poverty alleviation, environmental justice, and reduced home foreclosures |
| | Energy Security | Energy imports and energy independence |

# Appendix B

## Sample Reporting Template

# Template Table: Summary Benefit-Cost Analysis Results

| Single DER Program/Project Name: | | | Date: | | |
|---|---|---|---|---|---|
| **A. Monetized Electric Utility System Impacts** | **Benefits** | **Costs** | **(A. cont.)** | **Benefits** | **Costs** |
| Generation: Energy Generation | | | Distribution: O&M | | |
| Generation: Capacity | | | Distribution: Voltage | | |
| Generation: Environmental Compliance | | | General: Financial Incentives | | |
| Generation: RPS/CES Compliance | | | General: Program Administration Costs | | |
| Generation: Market Price Effects | | | General: Utility Performance Incentives | | |
| Generation: Ancillary Services | | | General: DG tariffs | | |
| Transmission: Capacity | | | General: Credit and Collection Costs | | |
| Transmission: System Losses | | | General: Risk | | |
| Distribution: Capacity | | | General: Reliability | | |
| Distribution: System Losses | | | General: Resilience | | |
| | | | ***A. Sub-Total Electric Utility System Impacts*** | $ - | $ - |
| **B. Monetized Host Customer Impacts** | **Benefits** | **Costs** | **C. Monetized Societal Impacts** | **Benefits** | **Costs** |
| DER costs (host) | | | Resilience | | |
| Transaction costs (host) | | | GHG Emissions | | |
| Interconnection Fees | | | Other Environmental | | |
| Risk | | | Economic and Jobs | | |
| Reliability | | | Public Health | | |
| Resilience | | | Low Income | | |
| Power Quality | | | Energy Security | | |
| Non-Energy Impacts (Host) | | | Energy Security Benefits | | |
| Non-Energy Impacts (Low-income) | | | | | |
| ***B. Sub-Total Host Customer Impacts*** | $ - | $ - | ***C. Sub-Total Societal Impacts*** | $ - | $ - |
| **D. Total Monteized Benefits and Costs** | **Total Present Value ($)** | | **Benefit-Cost Ratio** | | |
| **Total Benefits** | $ - | | | | |
| **Total Costs** | $ - | | | | |
| **Net Benefits or Costs** | $ - | | **0.0** | | |
| **E. Non-Monetized and Qualitative Assessments** | | | | | |
| Economic Development and Job Impacts | *Provide quantitative information and discussion of assessment/how considered* | | | | |
| Market Transformation Impacts | *Describe qualitative considerations and describe how considered* | | | | |
| Other Non-Monetized Impacts | *Provide quantitative information, qualitative considerations, and describe how considered* | | | | |
| **COST-EFFECTIVENESS DETERMINATION:** | ***Do DER Benefits Exceed Costs?*** | | ***[Yes/No]*** | | |

Include Host Customer Impacts to extent they are part of JST

Include Societal Impacts to extent they are part of JST

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