Smart Electric Power Alliance

# Non-Wires Solutions & NSPM for DERs


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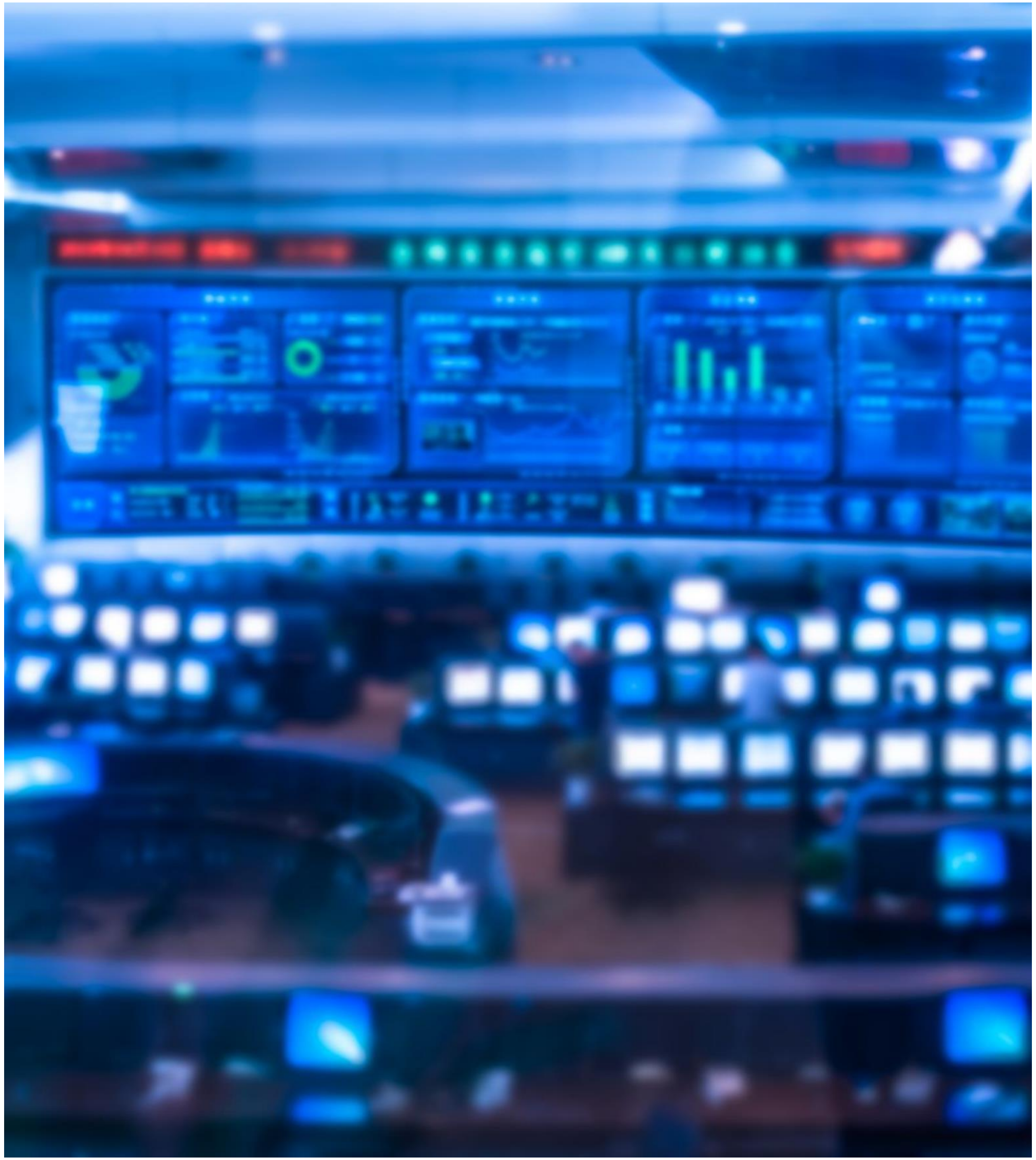
**Clean + Modern Grid**

Regulatory and Business Innovation | Grid Integration | Electrification



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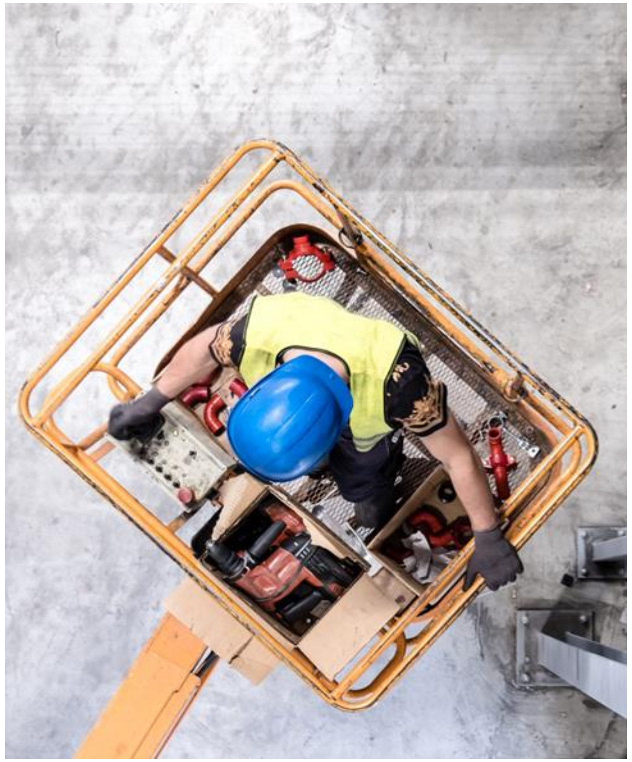
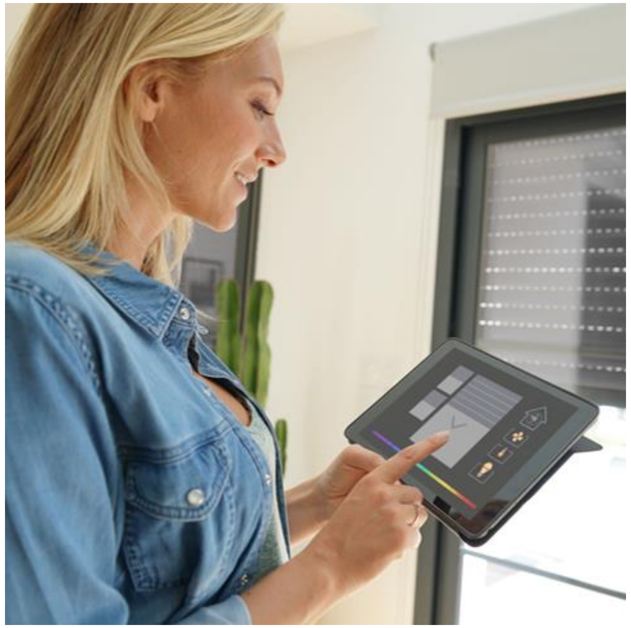
# Vision

A carbon-free energy system by 2050

# Mission

To facilitate the electric power industry's **smart transition** to a clean and modern energy future.





# Who Are We?

Smart Electric Power Alliance

| | |
|---|---|
| A membership organization | Founded in 1992 |
| Staff of ~50 | Research, Education, Collaboration & Standards |
| Based in Washington, D.C. | Unbiased |
| No Advocacy – 501c3 | Technology Agnostic |

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# >1,150

Total Members

# Membership

SEPA is an **alliance** of over 1,150 members made up of utilities, technology solution providers, regulators, and other stakeholders.

**74%**

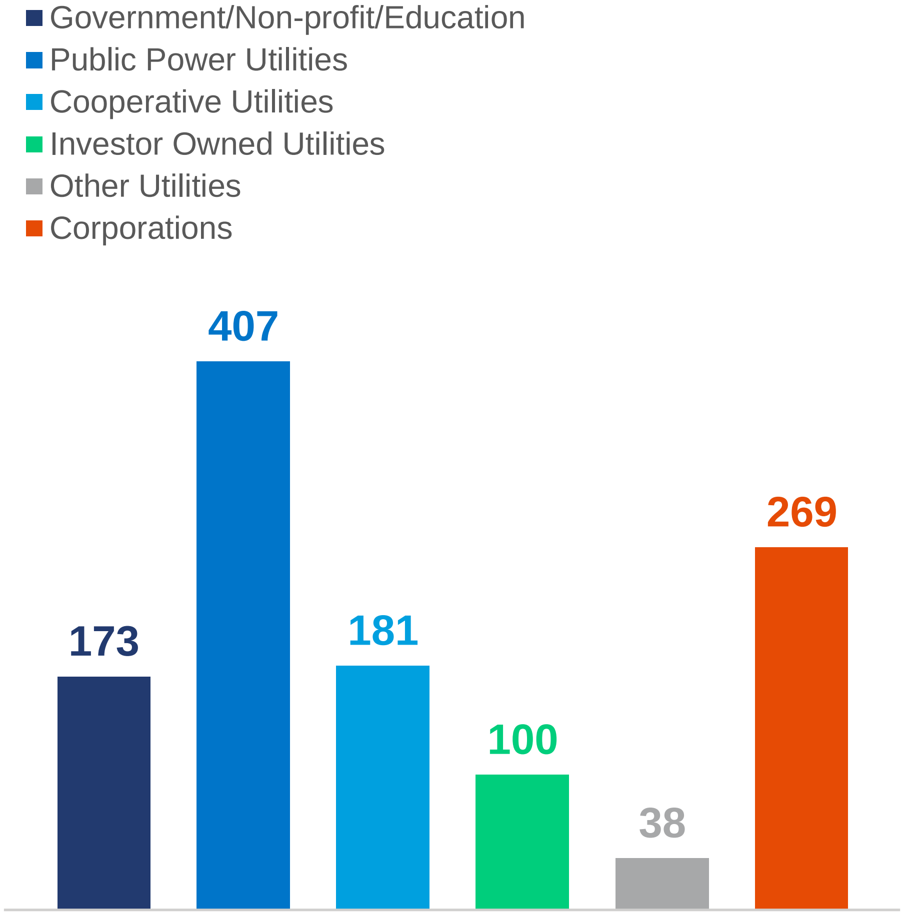
of MWh sold

**80%**

of utilities with carbon-free or net-zero emissions goals

**72%**

of utility commissions



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# Non-wires Solutions: Case Studies

SEPA, PLMA & E4TheFuture (2018)

# Selected NWA Case Studies

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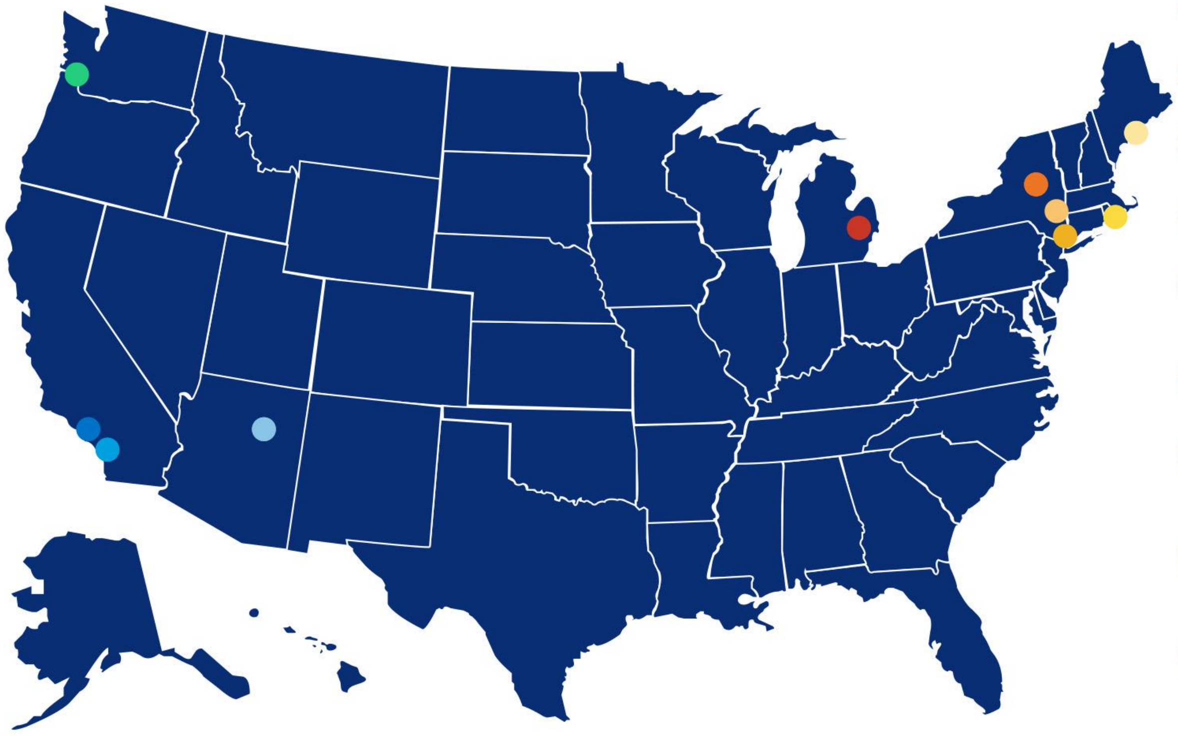
**FIGURE 1: MAP OF TOP SELECTED NWA CASE STUDIES**



- **BPA—SOUTH OF ALLSTON**
  ALLSTON, WA
- **SCE—VIRTUAL POWER PLANT**
  LOS ANGELES, CA
- **SCE—DESI 1**
  ORANGE, CA
- **APS—PUNKIN CENTER**
  PUNKIN CENTER, AZ
- **CONSUMERS ENERGY—SWARTZ CREEK ENERGY SAVERS**
  SWARTZ CREEK, MI
- **NATIONAL GRID—OLD FORGE**
  OLD FORGE, NY
- **CENTRAL HUDSON GAS & ELECTRIC—PEAK PERKS PROGRAM**
  MID-HUDSON RIVER, NY
- **CON ED—BROOKLYN QUEENS DEMAND MANAGEMENT**
  BROOKLYN, NY
- **NATIONAL GRID—TIVERTON NWA PILOT**
  TIVERTON/LITTLE COMPTON, RI
- **GRIDSOLAR—BOOTHBAY PILOT**
  BOOTHBAY PENINSULA, ME

Source: SEPA, PLMA, and E4TheFuture, 2018.

**Report available**
**https://sepapower.org/resource/non-wires-alternatives-case-studies-from-leading-u-s-projects/**

# NWS Case Study: Consumers Energy - Swartz Creek Energy Savers Club

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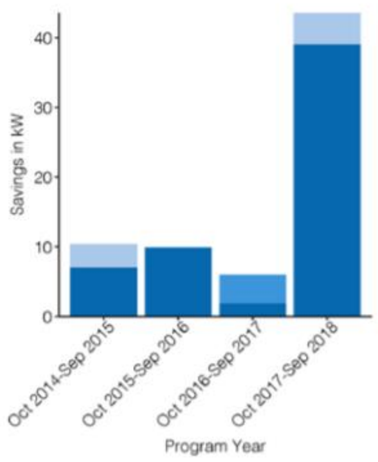
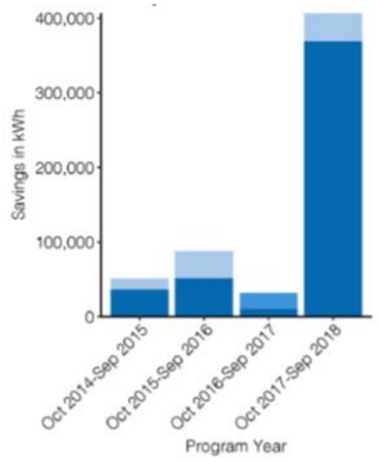
## Overview:

- **Size and Location:** Up to 1.6 MW in Swartz Creek, Michigan, a small rural, suburban town southwest of Flint
- **Challenge/Opportunity:** Distribution grid constraint
- **Primary Drivers:** Internal management decision relative to regulatory mandate
- **Technology Focus:** Energy efficiency; demand response
- **Sourcing:** Customer program
- **Utility and other key allies:** Consumers Energy with ICF and Natural Resources Defense Council
- **Status:** Completed (December 2018)

## Pilot Results:

- Total demand reductions due to EE programs was ~795 kW in City of Swartz Creek, ~363 kW on Swartz Creek substation
- Residential demand reductions due to EE and DR programs at key times of the year
- C&I customers saw reductions in both demand and total usage, but C&I DR was not used




Source: Consumers Energy presentation, MI PSC meeting 2019

# NWS Case Study: Consumers Energy - Swartz Creek Energy Savers Club

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## SEPA Key Takeaways:

- **Load Forecasts are Dynamic.** Anticipated load growth at the substation did not materialize.
- **Program Start-up Components are Replicable**. Design projects so that the expense and effort that goes into structuring new programs can be replicated when launching in other locations.
- **Community Size and Economy are Limiting Factors.** Challenges with generating commercial and industrial investments in programs; potential to create a diverse set of DERs should be a key consideration in site selection.

## Consumers Energy Lessons Learned:

- **Time of Peak**. Residential customers – and substations serving predominantly residential customers – do not always peak on weekdays when DR events are most easily called; Swartz Creek substation had annual peak on a Sunday (greater presence of C&I in load profile could address this).
- **Participation:** Offering bonus incentives increases participation.
- **Marketing & Communications**
  - Marketing must be targeted; direct customer contact is more effective than general broadcast advertising
  - Direct outreach by company is helpful, particularly with C&I customers; Company representatives can guide through options and process

Source: Consumers Energy presentation, MI PSC meeting 2019

# NWS Case Study: Consumers Energy - Four Mile substation pilot

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## Overview:

- **Size and Location:** Up to 0.5 MW peak load reduction, Four Mile substation, Grand Rapids, MI
- **Primary Drivers:**
  - Defer $2.5M-$3M in future capital spending
  - Continue leveraging targeted EE and DR to address distribution capacity needs
  - Build on lessons learned from Swartz Creek
- **Selection Criteria**

| Criterion | Target Range | Four Mile |
|---|---|---|
| Load relief needed | 5%-20% | 10% |
| Deferrable project cost | $1M-$3M | $2.5M-$3M |
| Expected upgrade need | 3-5 years out | 2023-2024 |
| DSCADA available | Yes | Yes |
| Residential load share | ≤40% | 18% |

Source: Consumers Energy presentation, MI PSC meeting 2019

# NWS Case Study: Consumers Energy - Four Mile substation pilot

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## Quick Launch Program

*Incorporating lessons learned from Swartz Creek:*

- Increased (doubled or tripled) financial incentives up front for the Quick Launch
  - C&I customers to receive up to $1,000 each for air conditioning, refrigeration, and lighting programs
  - Residential customers to received increased amounts for various programs
- Adding C&I DR as an option during full roll-out
- More targeted advertising plan
  - Emails, postcards, and mailings to residential customers on key programs (special emphases on bonus incentives)
  - Mailings to C&I customers
- More direct engagement with customers instead of community events
  - Increased engagement with C&I customers and key trade allies

**Load Profile**

| | Swartz Creek | Four Mile |
|---|---|---|
| Residential Customers | 3,800 | 3,500 |
| C&I Customers | 300 | 750 |
| Residential Load Share | 63% | 18% |
| C&I Load Share | 37% | 82% |

**Residential Bonus Incentives**

| Measure | Typical Incentive | NWS Total Incentive |
|---|---|---|
| HVAC-14.5-14.99 SEER | $50 | $100 |
| HVAC- 15.0-15.99 SEER | $150 | $300 |
| HVAC- 16.0-16.99 SEER | $200 | $400 |
| HVAC-17.0- 18.99 SEER | $400 | $800 |
| HVAC-19.0-20.99 SEER | $450 | $900 |
| HVAC-21.0 SEER or Higher | $500 | $1,000 |
| HVAC- AC Tune-up | $50 | $150 |
| AC Peak Cycling | $25 | $50 |
| Appliance Recycling | $50 | $75 |

Source: Consumers Energy presentation, MI PSC meeting 2019

# NWS Case Study: National Grid - Tiverton

## Overview:

- **Size and Location:** 1 MW in Tiverton and Little Compton, Rhode Island
- **Challenge/Opportunity:** Distribution grid constraint
- **Primary Drivers:** Substation and feeder upgrade deferral; Internal management decision
- **Technology Focus:** Energy efficiency and demand response
- **Sourcing:** Customer program
- **Utility and other key allies:** National Grid, Whisker Labs, Opinion Dynamics Corporation
- **Status:** Began in 2012 and completed in 2017

## Pilot Results:

- Deferred $2.9 million feeder project over the five years (in conjunction with other projects)
  - Did not fully realize 1 MW of 2017 summer load reduction goal.
  - Cost-effective with a benefit-cost ratio of 1.40
  - Despite the unrealized load reduction, the substation upgrade was further deferred

**TABLE 4: SUMMARY OF COST EFFECTIVENESS FOR THE TIVERTON NWA PILOT PROJECT**

| SYSTEM RELIABILITY PROCUREMENT (SRP) — TIVERTON/LITTLE COMPTON SUMMARY OF COST EFFECTIVENESS ($000) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | OVERALL |
| BENEFITS | $179.0 | $1,325.4 | $1,033.3 | $1,281.1 | $687.7 | $568.0 | $0.0 | $5,074.6 |
| FOCUSED ENERGY EFFICIENCY BENEFITS* | $90.2 | $1,015.1 | $716.7 | $1,024.8 | $435.0 | $66.94 | $0.0 | $3,348.7 |
| SRP ENERGY EFFICIENCY BENEFITS** | $88.8 | $310.4 | $136.8 | $78.0 | $88.1 | $341.6 | $0.0 | $1,043.7 |
| DEMAND REDUCTION BENEFITS*** | $0.0 | $0.0 | $5.6 | $6.8 | $5.3 | $11.3 | $0.0 | $28.9 |
| DEFERRAL BENEFITS† | $0.0 | $0.0 | $174.2 | $171.5 | $159.4 | $148.2 | $0.0 | $635.3 |
| COSTS | $133.4 | $672.4 | $569.3 | $1,029.4 | $611.1 | $510.9 | $90.8 | $3,617.4 |
| FOCUSED ENERGY EFFICIENCY COSTS†† | $46.6 | $331.1 | $195.8 | $529.3 | $280.1 | $281.3 | $0.0 | $1,664.1 |
| SYSTEM RELIABILITY PROCUREMENT COSTS†††, Δ | $86.8 | $341.3 | $373.5 | $500.2 | $331.0 | $229.6 | $90.8 | $1,953.3 |
| BENEFIT/COST RATIO | 1.34 | 1.97 | 1.81 | 1.24 | 1.13 | 1.11 | - | 1.40 |

# NWS Key Insights & Challenges

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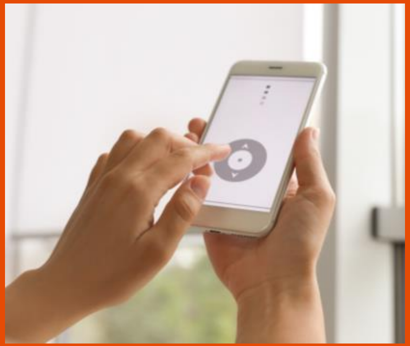
| SUMMARY OF KEY INSIGHTS AND CHALLENGES | | |
|---|---|---|
| PLANNING AND SOURCING | IMPLEMENTATION | |
| | PROJECT IMPLEMENTATION | TECHNOLOGY-SPECIFIC IMPLEMENTATION |
| Open and technology-agnostic approaches can help with project success | Plan for internal development | Launching energy efficiency first allows longer lead times for other DER solutions |
| Procurement processes and bidding responses require more time than originally anticipated | Community outreach helps overall reception and likelihood of project success | Demand response encompasses a wide range of technologies and was met with varying levels of success across six case studies |
| Uncertainty of load growth is a challenge for utilities but a strength for NWAs | Recruitment and customer engagement requires a multipronged approach | Energy storage implementation has its share of obstacles, including: siting, reliability requirements, interconnection, and system impact challenges. These challenges are largely due to the nascency of storage technologies |
| Know as much about your service territory as possible to inform program recruitment | | |
| Utilities often use a benefit-to-cost assessment to evaluate NWA opportunities | | |

Source: SEPA, PLMA, and E4TheFuture, 2018.



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# NSPM for DERs

# What is the NSPM for DERs?



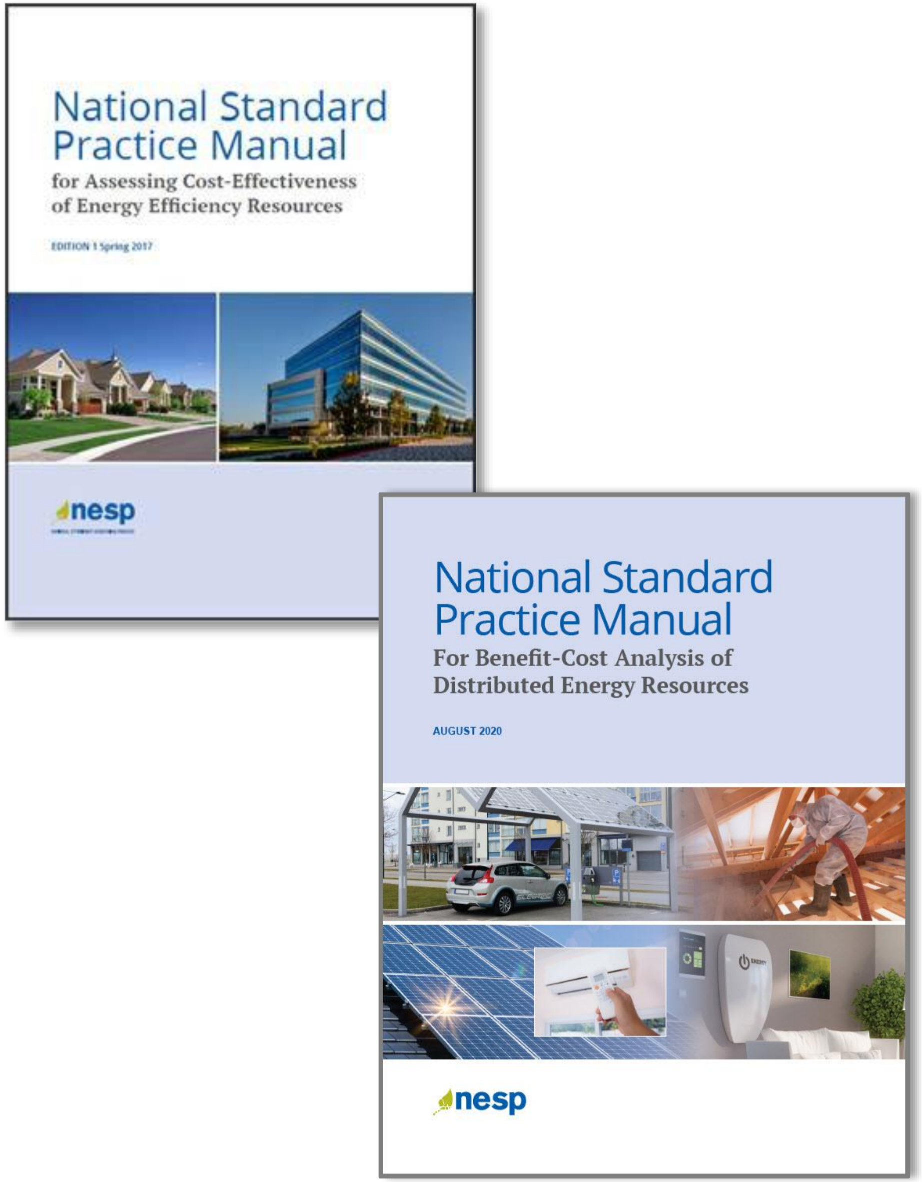
**What**: "NSPM for DERs" = *National Standard Practice Manual for Benefit-Cost Analysis for Distributed Energy Resources (DERs)* (2020).

- NSPM for DERs builds on NSPM for EE (2017)

**Description**: The 2020 NSPM for DERs provides a comprehensive framework for cost-effectiveness assessment of DERs. The manual provides a set of policy-neutral, non-biased, and economically-sound principles, concepts, and methodologies to support single- and multi-DER benefit-cost analysis (BCA) for: energy efficiency (EE), demand response (DR), distributed generation (DG), distributed storage (DS), and (building and vehicle) electrification. The manual is intended for use by jurisdictions to help inform which resources to acquire to meet the jurisdiction's specific policy goals and objectives.

**Who**: Managed and funded by E4TheFuture (with support from US DOE via LBNL), developed by Multiple co-authors & Advisory group

*NSPM is a 'living document' and will be updated and improved over time, adding case studies, addressing gaps, etc. contingent upon funding.*



# Why an NSPM for DERs?

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- Traditional cost-effectiveness tests often do not address pertinent jurisdictional/state policies.
- Traditional tests are often modified by states in an ad-hoc manner, without clear principles or guidelines.
- DERs are treated inconsistently in many BCAs or valuations (i.e., in context of programs, procurement, pricing mechanisms, distribution planning, IRP, etc.)
- DERs are often not accurately valued.
- There is a lack of transparency on why tests are chosen and how they are applied.

# NSPM for DERs: Audiences & Purpose

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**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 for DERs – BCA Framework


| 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 |

# NSPM for DERs – Principles

1. Recognize that DERs can provide energy/power system needs and should be compared with other energy resources and treated consistently for BCA.
2. Align primary test with jurisdiction’s applicable policy goals.
3. Ensure symmetry across costs and benefits.
4. Account for all relevant, material impacts (based on applicable policies), even if hard to quantify.
5. Conduct a forward-looking, long-term analysis that captures incremental impacts of DER investments.
6. Avoid double-counting through clearly defined impacts.
7. Ensure transparency in presenting the benefit-cost analysis and results.
8. Conduct BCA separate from Rate Impact Analyses because they answer different questions.

**Principles are not mutually exclusive.**

# NSPM for DERs – Cost-Effectiveness Perspectives

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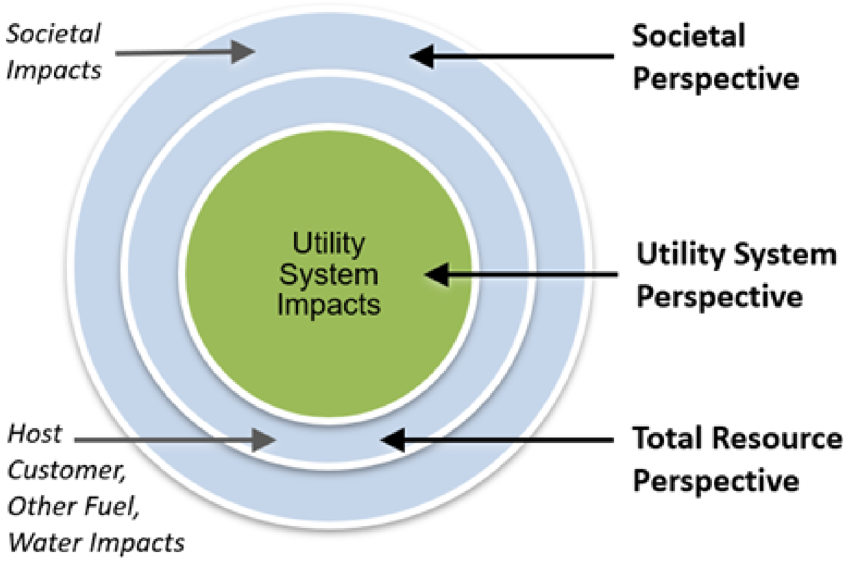
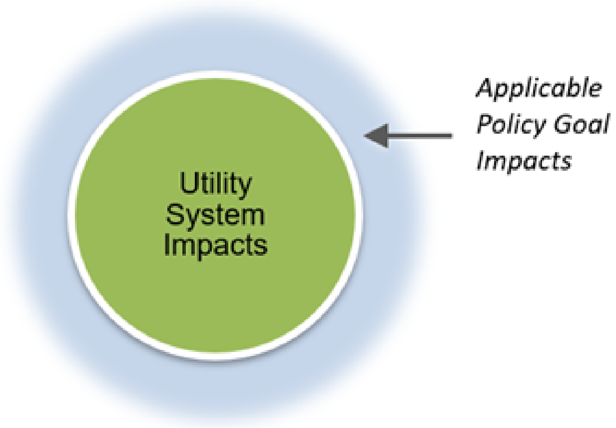
## NSPM for DERs

### 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.

# NSPM for DERs – Defining Your Primary Cost-Effectiveness Test

| | |
|---|---|
| STEP 1 | **Articulate Applicable Policy Goals**<br>Articulate the jurisdiction's applicable policy goals related to DERs. |
| STEP 2 | **Include All Utility System Impacts**<br>Identify and include the full range of utility system impacts in the primary test, and all BCA tests. |
| STEP 3 | **Decide Which Non-Utility System Impacts to Include**<br>Identify those non-utility system impacts to include in the primary test based on applicable policy goals identified in Step 1:<br>• 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**<br>Ensure that the impacts identified in Steps 2 and 3 are properly addressed, where:<br>• Benefits and costs are treated symmetrically;<br>• Relevant and material impacts are included, even if hard to quantify;<br>• Benefits and costs are not double-counted; and<br>• Benefits and costs are treated consistently across DER types |
| STEP 5 | **Establish Comprehensive, Transparent Documentation**<br>Establish comprehensive, transparent documentation and reporting, whereby:<br>• The process used to determine the primary test is fully documented; and<br>• Reporting requirements and/or use of templates for presenting assumptions and results are developed. |

# NSPM for DERs – DER Benefits & Costs

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**Table 4-1. Potential DER Benefits and Costs: Electric Utility System**

| 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 |

**Table 4-2. Potential Benefits and Costs of DERs: 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 |

# NSPM for DERs – DER Benefits & Costs

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**Table 4-3. Potential Benefits and Costs of DERs: Host Customer**

| 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 |
| | Host Customer NEIs | Benefits and costs of DERs that are separate from energy-related impacts |
| | Low-income NEIs | Non-energy benefits and costs that affect low-income DER host customers |

**Table 4-5. Potential Host Customer Non-Energy Impacts**

| Host Customer NEI | 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) |

**Table 4-6. Potential Benefits and Costs of DERs: Societal**

| 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 |

# Non-Wires Solutions

## BCA Considerations and Challenges

### Considerations

- Geo-targeting of DERs in high-value location
- Characteristics of traditional infrastructure project (type, timing, etc.)
- NWS technology characteristics
- Impacts beyond the targeted T&D deferral

### Challenges

- Deriving granular locational and temporal values
- Accounting for option value
- Interactive effects between DERs
- Evaluating and measuring NWS impacts
- Accounting for system reliability and risk

The assessment of NWS cost-effectiveness depends on **where** the program or DERs are located, **when** they provide services, and the resulting benefits and costs.

# NSPM for DERs – NWS Key Benefit-Cost Factors

## Key Factors

### Characteristics of Infrastructure Constraint

- E.g., T&D infrastructure constraint, the size of constraint, and the season and time of constraint.

### Selected Technology Characteristics and Capabilities

NWSs can include a broad range of DER types, sizes/capacities, and locations (FOM or BTM). Diverse technologies included in an NWS will have different benefits and costs that they can simultaneously provide while addressing localized T&D constraints.

### Existing Programs or Procurement

- E.g., if a NWS portfolio includes DER types that are based on an existing program or a new program.

### Accounting for Other Electric Utility System and Non-Electric Impacts

- In addition to T&D deferral benefits, NWS cost-effectiveness should account for other electric utility system and non-electric impacts, to the extent they are relevant to a jurisdiction given its applicable energy policy goals (see Chapters 2 and 3).

# NSPM for DERs – NWS Common Benefit-Cost Challenges

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## Common Challenges

### Determining Locational and Temporal Value of DERs in an NWS

- Benefits and costs of NWSs should be estimated using sufficient locational and temporal detail to adequately represent the DER operating patterns and consequent benefits and costs.

### Accounting for Option Value and Determining Project Lifetimes

- Whether an NWS initiative is new or is based on existing resources or programs with incremental benefits and costs should be accounted for in the NWS BCA.

### Interactive Effects

- Cost-effectiveness analyses of NWS initiatives should account for interactive effects of DER types, especially the interactive effects on the total kW and kWh impacts of the DERs.

### Accounting for System Reliability and Risk

- Cost-effectiveness analyses of NWS initiatives should accurately forecast customer adoption and participation because risks from not meeting requirements pose challenges to the system.

# NSPM for DERs – NWS Illustrative case study

## Overview

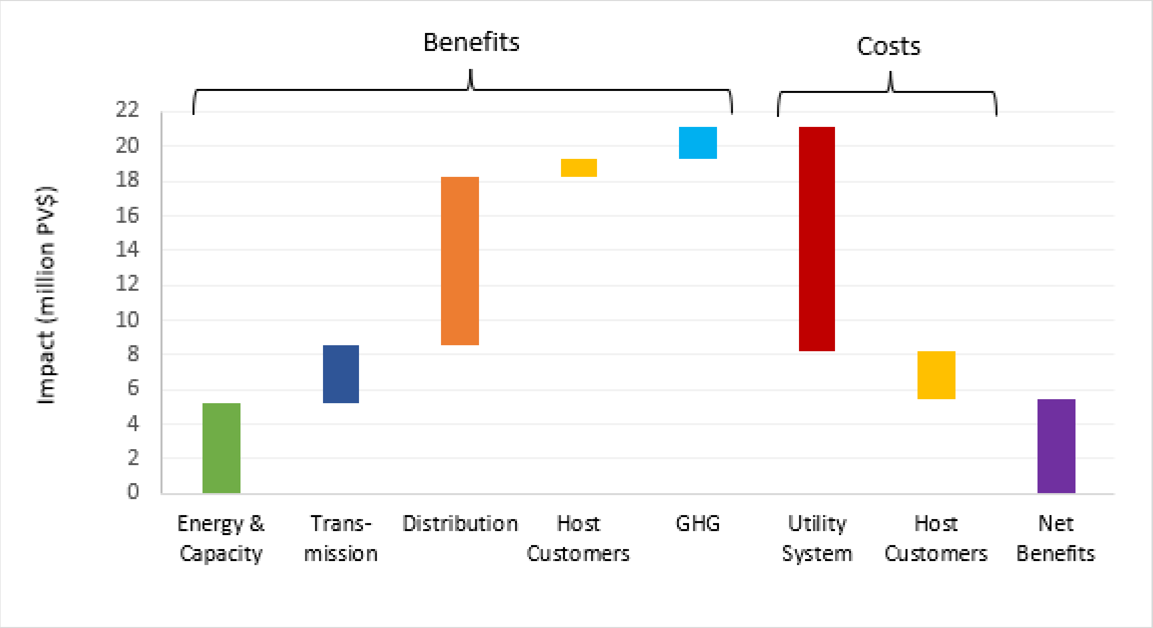
***DER Types***: BTM DERs in residential and commercial buildings: EE lighting and controls; DR Wi-Fi-enabled thermostats; DPV; and DS (thermal and battery storage)

***The Jurisdiction-Specific Test:*** Includes utility system impacts, host customer impacts, and GHG impacts.

***Key Assumptions***:

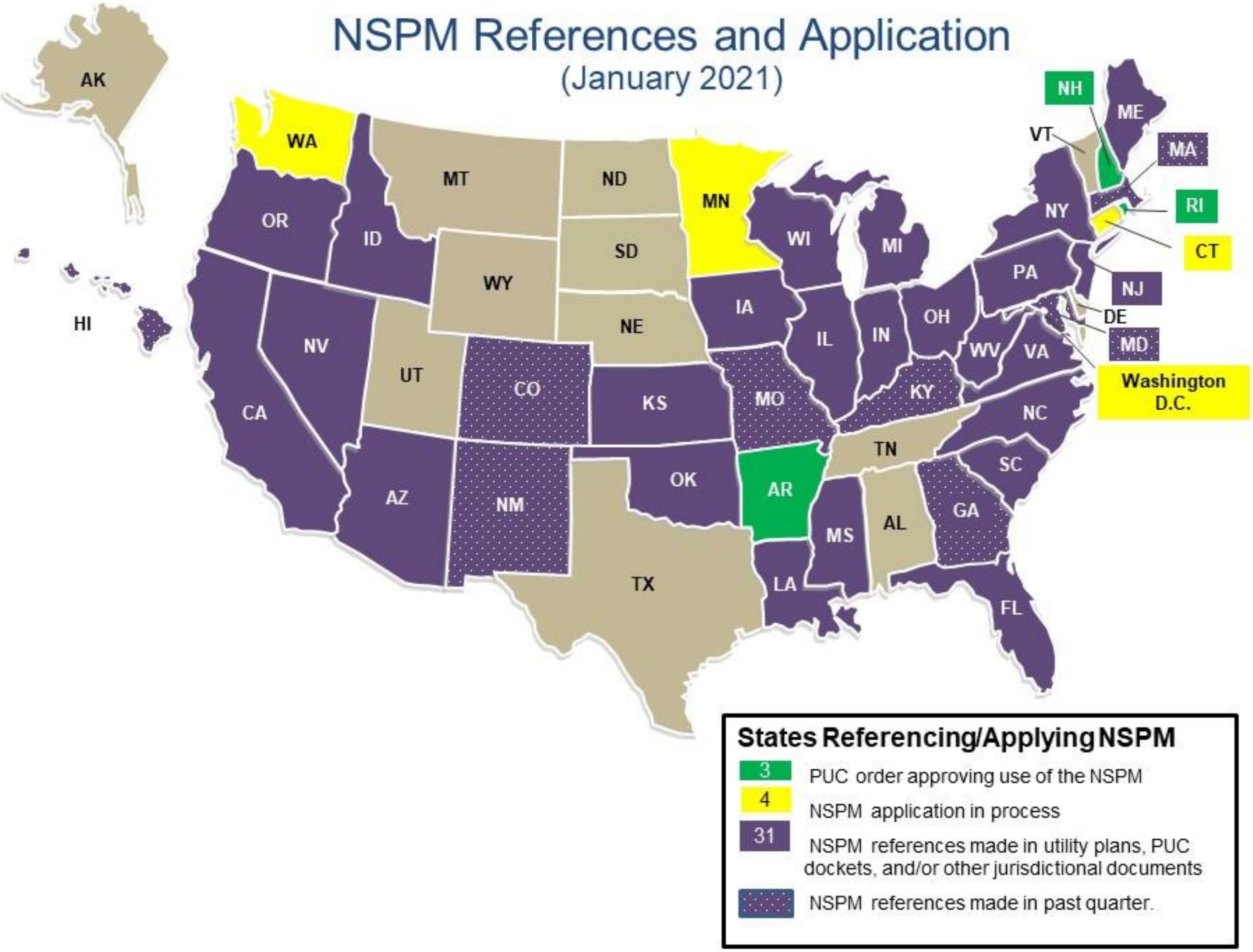
- Assumes non-coincident with overall system peak (e.g., constrained distribution feeder peaks at 1-5pm, while system peaks at 5-9pm)
- Assumes system-peak hours entail higher marginal emissions rates than NWS = delivers GHG benefits.
- Assumes DER operating profiles where:
  - All DERs are operated to reduce the distribution peak, and some can reduce the system peak as well.
  - Storage discharges during the distribution peak hours and charges during the system off-peak hours.
  - DR reduces demand during distribution peak periods and/or shifts load from distribution peak periods to system off-peak periods.
  - Distributed PV resources generate during distribution peak periods and during a portion of system peak periods.
  - EE helps to reduce demand during distribution peak periods, as well as system peak periods.

**Figure 12-1. Example of NWS Cost-Effectiveness**



# NSPM References & Application

Smart Electric Power Alliance



# NSPM for DERs – Resources

Smart Electric Power Alliance

The 2020 ***National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*** *(NSPM for DERs)*

- Download the **NSPM for DERs Summary** (20 pages)*
- Download the full guidance document: **NSPM for DERs** (300 pages)*
- Download the **NSPM for DERs Overview Presentation.**
- **View media release** announcing publication
- **Webinars and Events**

2017 *National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*

*Case Studies:*

- **New Hampshire -** NSPM Case Study authored by NESP (January 2019: NSPM for EE)
- **Arkansas -** NSPM Case Study authored by NESP (May 2019: NSPM for EE)
- **Minnesota -** NSPM Case Study authored by NESP (December 2018: NSPM for EE)
- **Rhode Island -** NSPM Case Study authored by NESP (December 2018: NSPM for EE)

# Be in touch

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