Ontario Energy Board – Framework for Energy Innovation Working Group

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Agenda

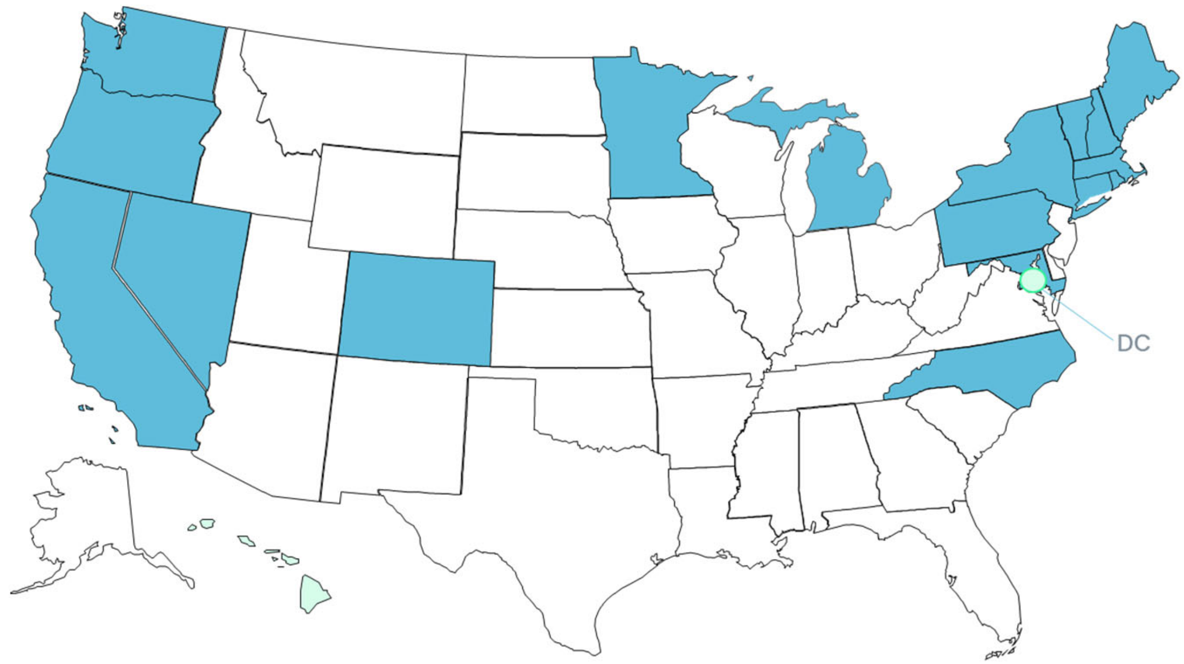
NWA motivations

NWA Benefits-Cost Analysis Practices

NWA Benefit-Benefit and cost examples

Potential Next Steps

Jurisdictions that require consideration of NWAs include California, Colorado, Connecticut, Delaware, District of Columbia, Hawaii, Maine, Michigan, Minnesota, Nevada, New Hampshire, New York, Rhode Island



Source: ICF

Many US jurisdictions are driving NWA policies

Developing a number of high-value, non-utility-owned DER use cases as alternatives to traditional solutions to meet distribution system needs, based on relevant players' knowledge of needs and alternative solutions.

Defining an approach to measure the benefits of these DER use cases relative to costs and assess the value of DERs relative to traditional distribution investments.

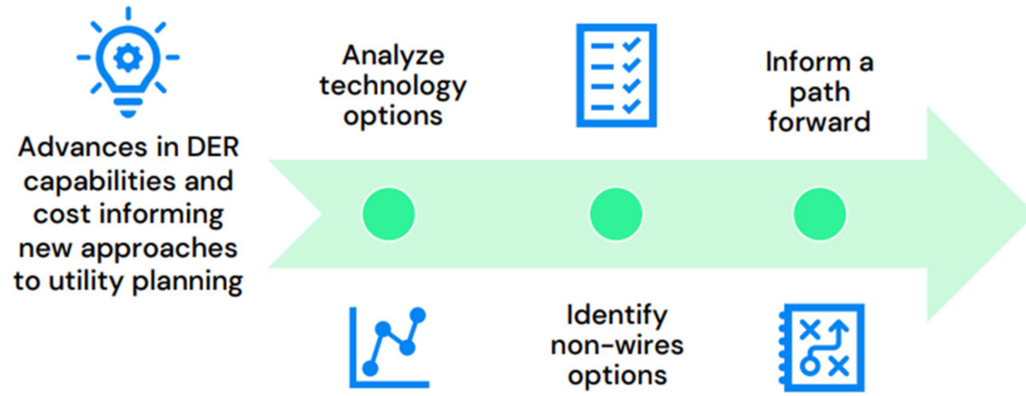


Fig. example process for NWA
Source: ICF

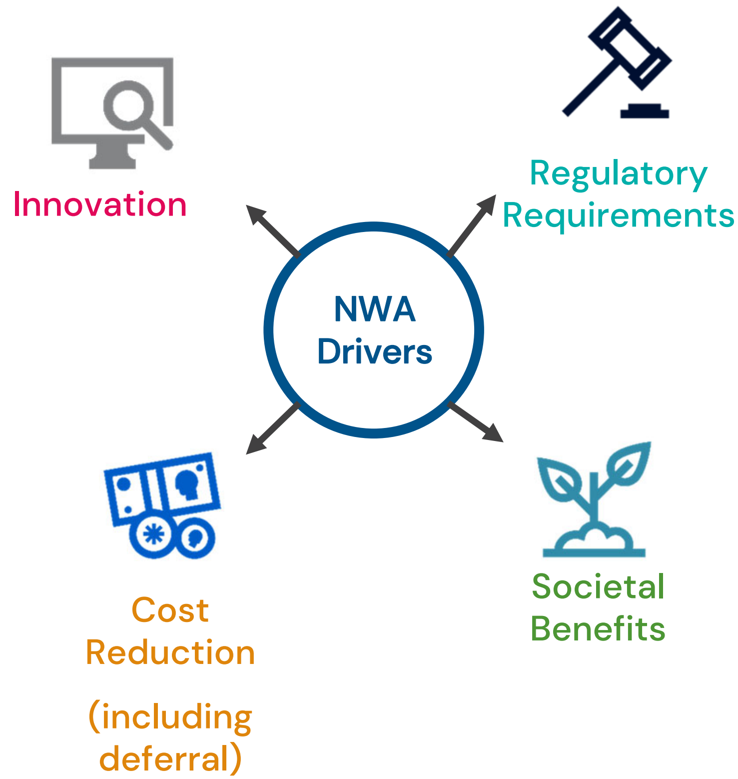
FEI WG – Terms of Reference

Growing numbers of state regulators and utilities see non-wires alternatives as a way to deliver grid and societal value, drive innovation, meet customer expectations and reduce costs for consumers.

Demand Side Management programs continue to play a critical role in realizing the value of non-wires alternatives.

Well-designed processes can leverage suitability criteria to enable planners to meet system criteria and manage risk effectively.

The ability to leverage customer and system data is critical to effectively connecting the dots between grid needs and DER characteristics.



Key Elements

Locational values of transmission and distribution impacts are among the driving factors behind non-wires solutions (NWS), and therefore should be accounted for in NWS benefit-cost analysis.

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

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

Costs and benefits may accrue to utility systems, host customers, and society.

Source (2020)

General Policy Guidance: National Standards Practice Manual (NSPM) for DER – NWA Cost Benefit

Common challenges in Determining NWS Benefits and Costs

Determining locational and temporal values of DERs in NWS

Accounting for Option Value and Determining Project Lifetimes

Interactive effects, including effects of DER types, avoided costs on kWh or kW impacts, enabling other DERs.

Evaluating and Measuring NWS Impacts – baseline forecasts and incremental impacts, geo-targeting forecasts

Accounting for System Reliability and Risk – modular deployment options; no-regrets strategies

Lost revenues and potential rate impacts should not be included in BCA, but be included in rate, bill, and participation analysis.

National Standards Practice Manual (NSPM) for DER (2)

Common NWA Benefits Categories

Distribution Benefits

- Distribution system performance
- Retail supplier & risk premium
- Value of improved reliability
- Avoided distribution losses
- Avoided operations & maintenance
- Net avoided outage costs
- Demand reduction

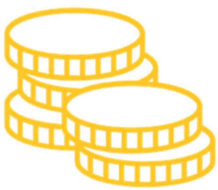
Other grid/energy/market benefits

- Avoided transmission losses
- Avoided ancillary services
- Avoided generation capacity costs
- Wholesale market price impacts
- Energy supply & transmission operations benefits
- Value of renewable energy credits
- Demand reduction

Non-energy benefits

- GHG reductions
- Nox & SO2 reductions
- Economic development benefits
- Avoided public safety/health costs
- Resilience benefits

Potential NWA Cost Categories



Utility Costs

- utility/third party developer renewable energy, efficiency, or distributed energy resource costs

Participant Costs

- program participant / prosumer benefits / costs (customer level)

Program Administrative Costs

- Program management costs

Incremental costs

- Participant DER costs
- Lost utility revenue
- Net non-energy costs
- Added ancillary service costs
- Incremental transmission and distribution costs

Regulatory commissions work with utilities and stakeholders to develop framework through working groups, technical workshops, etc.

Utility proposes BCA framework.

Regulatory commission requires utility BCA.

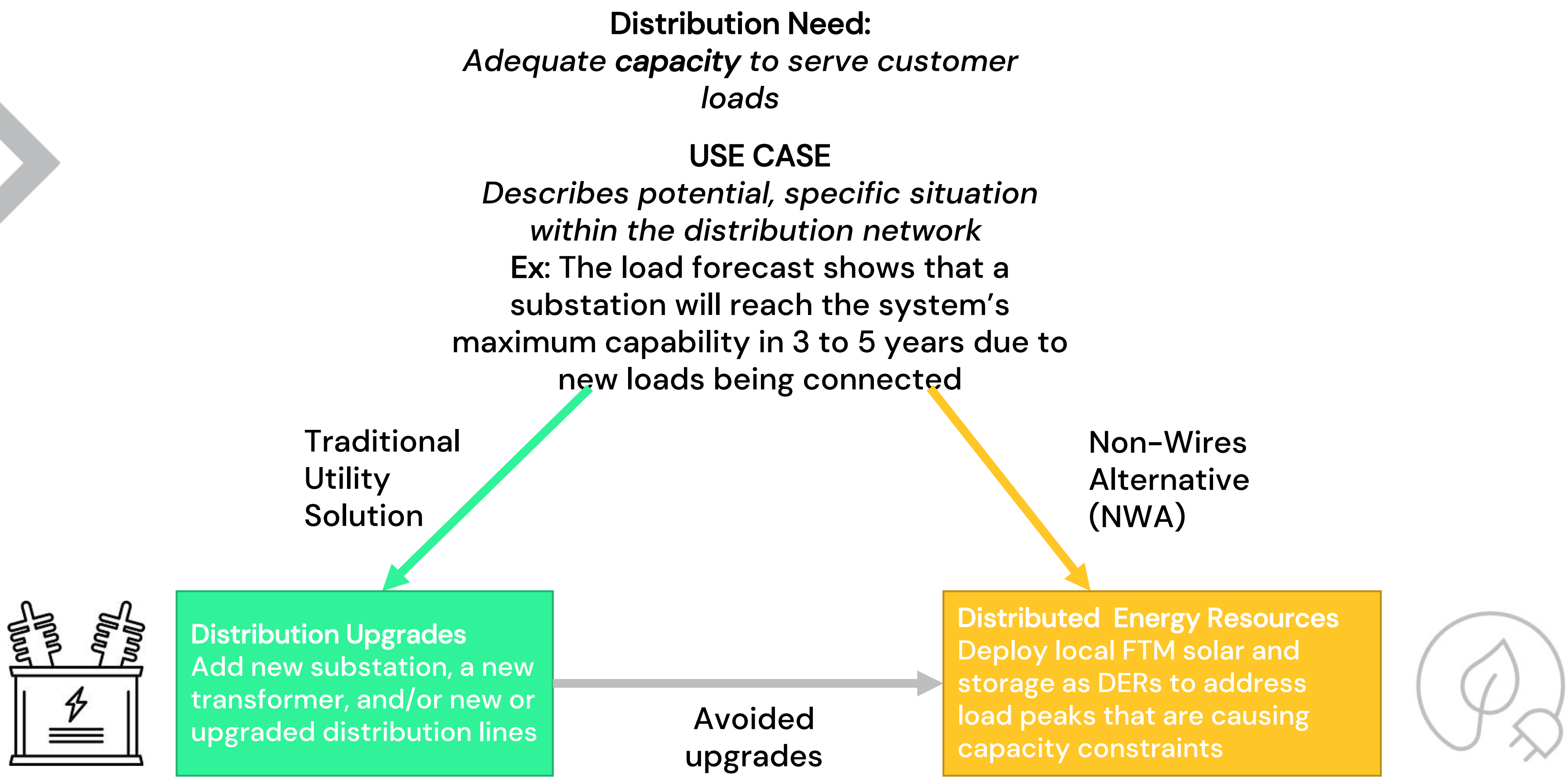
Regulatory commission encourages NWA pilot programs (limited scope).

Use of third-party NWA administrator.

Pathways differ for NWA policy

OEB
Distribution Use Case and DER Exploration

Working document – November 2021



Relationships between Distribution Need, Use Case, NWA, DER

Capacity: Including addressing network needs, constraints, load peak management, and load forecasting.

Reliability: Delivery of power during normal operating conditions and throughout planned network service events and activities

Power Quality: Providing steady supply voltage at the customer entrance as per the CSA standard limits.

Resilience: Availability of power during unplanned outages and catastrophic events.

Distribution Needs

Geo-targeted EE/DR	- Commercial & industrial EE/DR - Aggregated/portfolio approach
Energy Storage	- Managed charging/discharging - Combined with solar PV
Solar PV	- Behind the meter (on-site) - Local resource (front of the meter)
Electric Vehicles	- Managed charging - Vehicle to grid (V2G)

DERs for Distribution Needs

Use Case Example – Industrial Demand Response

DER: Industrial DR

Distribution Need: Capacity

Use Case:

A feeder line has new customer requests for added commercial/industrial capacity that will not be available without significant reconfiguration and time.

NWA Description:

Demand response systems that reduce load from existing customers can enable increased capacity for new customers, as long as they provide for consistent power quality and reliable supply for the anticipated duration and timing to alleviate constraints.

DER Solution:

Industrial demand response (DR) controls that are installed at key customer sites and configured to be both remotely monitored and dispatchable could be used to avoid costly feeder upgrades.

DR solutions for large users are mature, scalable, and cost-effective.

Examples:

https://www.bpa.gov/EE/Technology/demand-response/Documents/2008-09_OpenADR_Pilot_Final_Report.pdf

https://www.nrg.com/business/all-products-and-services/demand-response.html

Use Case Example – Electric Vehicles

DER: Electric Vehicles

Distribution Need: Reliability

Use Case:

Scenario where distribution lines without backup supply either at the distribution level or transmission supply level. Potential for long duration or frequent outages during maintenance. Reliability unsatisfactory for two or more customers.

NWA Description:

In urban areas, there are parts of the system that are served radially and aren't economic or feasible to reinforce and provide more reliable supply. In these instances, the utility generally won't build new facilities to improve reliability. DERs are available to provide energy to customers islanded power during an outage.

DER Solution:

When needed, EVs are close to the load and could be dispatchable for customer reliability needs. EV capabilities for reliability needs depend on number of EVs, location, available storage, and technical considerations for using on-board batteries as a critical load power supply.

EVs are a stable technology with high scalability, are potentially dispatchable with the appropriate technical solution, and can be deployed at relatively low cost via incentive programs.

Examples:

https://sepapower.org/resource/a-comprehensive-guide-to-electric-vehicle-managed-charging/

https://www.tdworld.com/smart-utility/article/21135451/us-utilities-expanding-managed-charging-programs-for-evs-finds-study

https://www.utilitydive.com/news/as-utility-collaboration-with-charging-companies-rises-emerging-difference/581877/

DER – Current Status	Capacity	Reliability	Power Quality	Resilience
Geo-targeted EE/DR				
– C&I EE/DR				
– Aggregated/Portfolio Approach				
Electric Vehicles				
– Managed Charging				
– Vehicle to Grid (V2G)				
Energy Storage				
– Managed Charge/Discharge				
– Combined with Solar PV				
Solar PV				
– Behind the Meter				
– Local Resources				

Technical Readiness of DERs by Distribution Need

- Additional information gathering for 3-5 sample use cases
  - How often is use case expected to occur?
  - What is the impact by stakeholder?
  - How is this handled/experienced today?
  - What are the traditional upgrade costs?
  - What are the estimated costs for a DER alternative?
  - What are the resultant benefits?
  - How are benefits “stacked” – both for NWA and other value streams?
  - Are there any legal/regulatory constraints?

Refinements to Use Cases to Test BCA Approach

What triggers NWA varies by jurisdiction

- Planning processes (IRP/GRC)
- DER deployment trends and volume
- Cost thresholds for distribution network upgrades
- Utility-driven offerings
- Size and scale of deployment

Pathways for development and implementation change BCA values

- Third party ownership structure
- Customer or solution provider-initiated actions

NOTES

Appendix

The Public Utilities Regulatory Agency (PURA) proposed the use of an independent Non-Wires Alternative (NWA) Administrator to review utility investments above $500,000.

In a technical meeting on October 5, 2021,

- BCA recommended that Connecticut "define suitability criteria and Benefit-Cost Analysis (BCA) methodologies for evaluation of candidate NWAs."
- Recommended that Electric Distribution Companies should be responsible for conducting BCA evaluations and that the PURA should develop a BCA handbook.
- Eversource claimed the straw proposal had "no defined BCA framework"
  - "Lacks prescriptive, stakeholder vetted, benefit classifications and their associated values and terms
  - "Ignores NWA technology types and characteristics – specific benefits they provide and more importantly, benefits they do not provide"
- Eversource also requested that EDCs be responsible for conducting BCA analysis.

Third-party NWA Administrator - Connecticut

Utility NWA Pilots - Minnesota’s lessons learned

Center for Energy and Environment – Non-Wires Alternatives as a Path to Local Clean Energy: Results of a Minnesota Pilot (2021)

- Small-scale, demand-side non-wires alternatives are feasible to implement within reasonable budgets and timescales using existing program portfolios.
- Modest statewide technical potential estimated at between $1 million and $4 million per year
- Distribution planners need more tools to accurately model non-wires resources in their forecasts.
- Demand-side management is a valuable resource for real-time distribution operations
- Minnesota has numerous existing policy frameworks that can support the use of cost-effective non-wires technologies

Michigan Public Service Commission Staff – purpose of BCA is to "rank possible solutions based on the present value of each solution's costs and benefits."

Utilities encouraged to continue to explore best BCA practices and include information in their forthcoming 2021 electric distribution plans (more broadly).

Working group – align distribution plans with integrated resource plans, including "Methodologies or frameworks to evaluate non-wires alternatives (NWAs) such as targeted energy waste reduction and demand response in distribution plans and integrated resource plans…"

Stakeholder Working Group - Michigan PSC work on BCA

Benefits

- Avoided generation capacity costs
- Avoided energy costs
- Avoided ancillary services costs
- Avoided PJM Transmission Investment and O&M costs
- Deferred Distribution and Subtransmission Investments and O&M costs
- GHG Emissions Reductions
- Incremental Reliability and Resiliency

Costs

- Implementation Risk Premium
- Local Constraint Solution Costs
- Administrative Costs
- Incremental Distribution System Costs
- Source (2020)

Example: Pepco (DC) – Benefit-to-Cost Analysis Handbook

Total resource cost (TRC) Test as applied to energy efficiency, demand response, and managed charging to offset electric vehicle load growth.

Comparison was cost effectiveness compared to cost of traditional wires investment via EPCOR estimates.

Cost-benefit ratio of the NWA = net present value of both the NWA and the traditional investment, nominal discount rate of 5% (from EEA potential study)

Identified risks associated with the scenarios for assessing value (e.g. EV forecast accuracy, specificity of choices of technologies).

NWA Example - Alberta

RULES REGULATING ELECTRIC UTILITIES, 4 CODE OF COLORADO REGULATIONS 723-3, RELATING TO DISTRIBUTION SYSTEM PLANNING

Rule 3535(a):

- Utilities use NSPM methodology for CBA to assess the proposed NWA.

NWA Policy Example - Colorado