NECPUC Working Group Presentation

Demand Response & Load Flexibility Pilots

Avangrid Networks

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Content

Our footprint: Avangrid utility companies

Berkshire Gas

- Location: Pittsfield, MA
- Service area: 738 mi² in western Massachusetts
- Population served: 191,084
- Natural gas customers: 40,699
- Employees: 132

CMP

- Location: Augusta, ME
- Service area: 11,000 mi² in central and southern Maine
- Population served: 1.3 million
- Electricity customers: 668,107
- Employees: 941

CNG

- Location: East Hartford, CT
- Service area: 724 mi² in Connecticut
- Population served: 790,813
- Natural gas customers: 186,834
- Employees: 329

MNG

- Location: Brunswick, ME
- Service area: 331 mi² in central and southern Maine
- Population Served: 18,840
- Natural gas customers: 6,000
- Employees: 21

NYSEG

- Location: Binghamton, NY
- Service area: More than 40% of upstate New York area (20,000 mi²)
- Population served: 2.2 million
- Electricity customers: 916,209
- Natural gas customers: 271,955
- Employees: 2,216

RG&E

- Location: Rochester, NY
- Service area: 2,700 mi² in western New York, around Rochester
- Population served: ~ 1 million
- Electricity customers: 390,947
- Natural gas customers: 323,496
- Employees: 724

SCG

- Location: Orange, CT
- Service area: 555 mi² in Connecticut
- Population served: 852,011
- Natural gas customers: 208,402
- Employees: 301

UI

- Location: Orange, CT
- Service area: 335 mi² southwestern Connecticut
- Population served: 777,644
- Electricity customers: 343,049
- Employees: 610

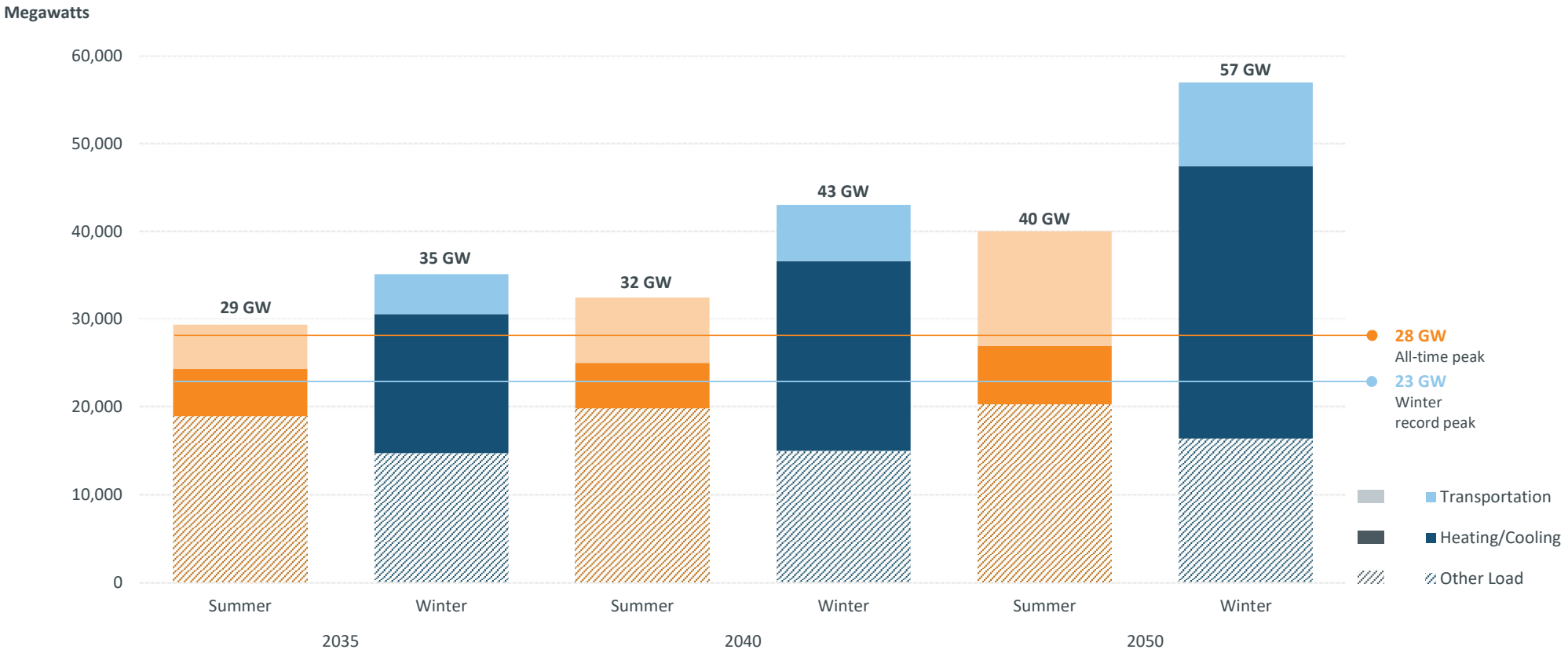
Winter Demand Response Programs & Strategies at United Illuminating

What are we doing today with our customers? Winter Demand Response

- **Growing Winter Peak Demand**: Winter electricity demand is rising due to electrification, especially with heat pumps and electric vehicles (EVs).
- **Mitigating Winter Peaks:** To manage winter peaks cost-effectively, scale up existing programs targeting winter demand (like energy efficiency and demand response).
- **Reducing Heating Load:** Measures that reduce heating load are key for managing winter peak demand.
- **Demand Response Options:** Explore options like energy efficiency, demand response, storage, and managed EV charging.
- **Decarbonization Alignment:** These efforts may align with economy-wide decarbonization goals.




Summer & Winter Forecast Peak Loads



New England is expected to transition to winter peaking due to the electrification of transportation and heating. Winter peak is expected to be double the all-time peak by 2050.

What are we doing today from a Planning perspective?

1. Assessment of Grid Adequacy:

- Evaluates grid performance under varying conditions (near-term and long-term).
- Considers bi-directional power flow, high DER penetration, and winter peak grid demands.

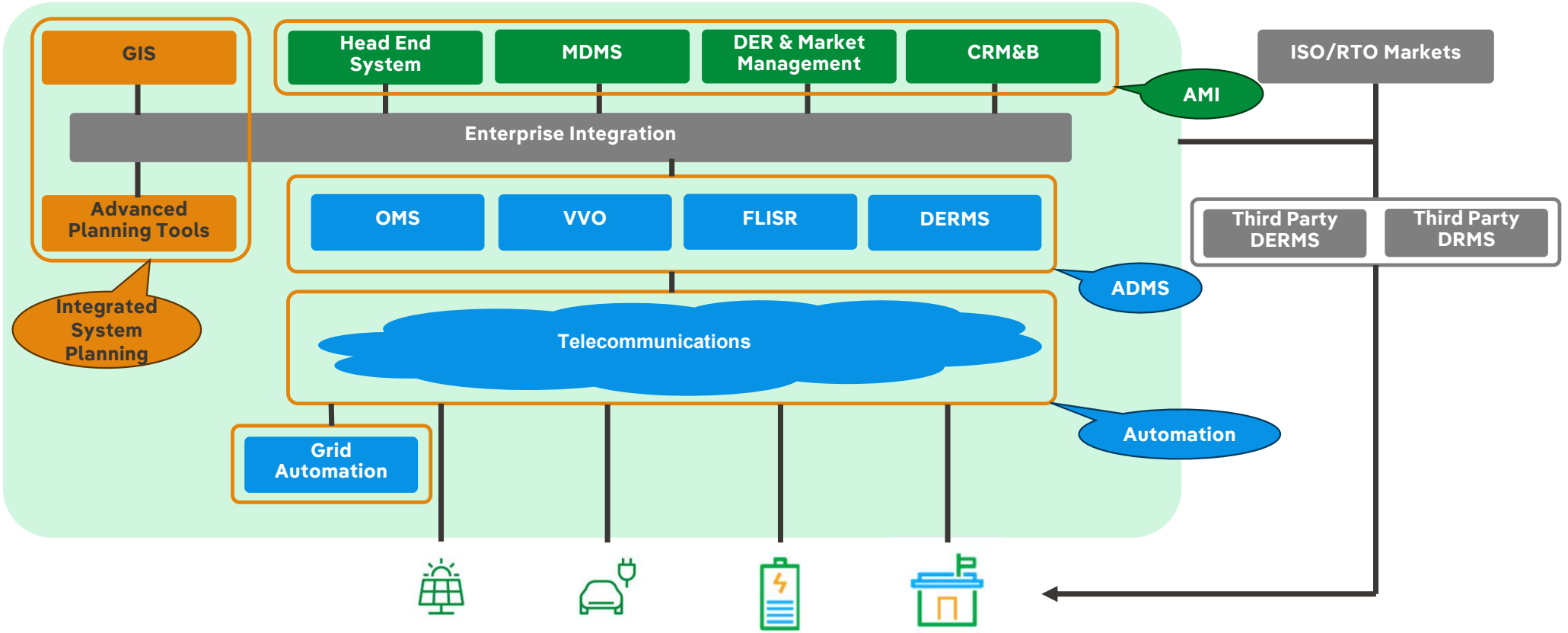
2.Demand Forecasting:

- Developing long-term summer and winter peak demand forecasts at substation and circuit level.
- Accounts for beneficial electrification and DER impacts.
- Supports future use of hourly load profile assessments.

3.Grid Solutions Evaluation:

- Analyzes traditional wires solutions, non-wires alternatives, and emerging technologies.
- Aims to cost-effectively address grid needs.

Utilities will need Tools & Capabilities beyond DR to transform the Grid



Integrated System Planning assessing near- and long-term grid adequacy.
Flexibility enabled by integrating technologies.

Foundational Distributed System Platform Technologies & Systems will be vital investments to deliver flexibility

Informing future capabilities with Innovative pilots and demonstrations

- Existing and in-flight pilots demonstrating DER flexibility technology and market platforms
- Lessons learned are essential to effectively understand how flexible solutions can be a tool in utility tool kits to address winter reliability matters
- Foundational System and Tools (e.g. AMI, OMS, DERMS, ADMS) will enable integrated system planning and visibility to the grid edge enabling real time operations to leverage DERs

Connecticut (United Illuminating)

- Partnering with Innovators to demonstrate edge level flexibility.
- Understand market and dispatch platforms to test DERMS functionality, vehicle to grid integration and load/resource flexibility.

New York (NYSEG and RG&E)

- Demonstration project implementing Active Network Management demonstrating resource flexibility.
- Enables higher level of flexibly-connected renewable generation interconnected without expensive required system upgrades.

Grid Level Automation & Management enables Volt Var Optimization (VVO)

Technology platforms have improved the visibility (AMI) and control (ADMS) enabling energy and peak savings opportunities via “Advanced” functionality

Peak Reduction	By optimizing voltage levels and VAR supply during peak times, the amount of generating resources needed to serve system needs can be reduced. The reduction in peak can potentially defer the need for system capacity upgrades.
System Energy Savings	Voltage and VAR optimization can reduce system losses and system requirements. This energy savings reduces the total amount of energy needed from generation or system imports.
Customer Energy Savings	Voltage optimization can reduce the amount of energy used by customers, reducing customers’ energy bills.

VVO will manage voltage levels and VAR requirements, reducing peak demand, system energy losses and resource requirements.

Summary

1.Existence of EE/DR Programs:

- Existing EE/DR programs can be adapted to the winter season

2.Real-World Testing:

- Funded pilots with established recovery enable testing of various technologies & key learnings

3.Challenges of Demand Response:

- Demand response is just one tool in the toolbox and are only part of the solution

4.Investments and Capabilities:

- Critical to: (1) operationalize successful pilots, (2) invest in new technologies, tools & capabilities

5.Enhancing Grid Flexibility:

- Advanced distribution system technology platforms will play a crucial role

For further questions, please contact:

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Appendix

United Illuminating - Winter DR Programs & Strategies

C&I Auto DR - Electric	CT ESS Battery (PURA)	Residential Gas DR – BYOT Pilot	C&I Gas DR Pilot
Technology Agnostic Auto DR	BTM Battery Systems	Wi-Fi Enabled Thermostats	Technology Agnostic Manual DR
12 mo. season that targets summer & winter peaks. Max of 15 Summer & 6 Winter events	Summer Daily Passive Dispatches (3-8 pm) 30-60 Summer & 1-5 Winter Active Dispatches	Up to 5 Winter events (opt-out)	Up to 6 Winter events
Performance Incentive $50/kW (annually)	Upfront Incentive up to $200/kWh Performance Incentive $200/kW Summer $25/kW Winter	$75 Enrollment $25 End of Season + $100 for 24 hr. event	Performance Incentive $10/CCF (per event)
2 Hr. Events ISO Seasonal Pk. Hrs.	1-3 Hr. Event Passive & Active Events	4 Hr. Event	24 Hr. Events
Custom Auto DR Strategies	Passive & Active Dispatches to Grid	Thermostat setback with pre-heat	Manual DR Strategies

Selected Acronyms

ADMS: Advanced Distribution Management System
AMI: Advanced Metering Infrastructure
BYOT: Bring Your Own Thermostat
C&I: Commercial and Industrial
CRM&B: Customer Relationship Management and Billing
DER: Distributed Energy Resource
DERMS: Distributed Energy Resource Management System
DRMS: Demand Response Management System
EE: Energy Efficiency
ESS: Energy Storage System
EV: Electric Vehicle
FLSIR: Fault Locating, Isolation, and Service Restoration
GIS: Geographic Information System
IES: Innovative Energy Solutions
ISO: Independent System Operator
ISO–NE: ISO New England, Inc.
MDMS: Meter Data Management System
NYSEG: New York State Electric & Gas Corporation
OMS: Outage Management System
REV: Reforming the Energy Vision
RG&E: Rochester Gas and Electric Corporation
RTO: Regional Transmission Organization
UI: The United Illuminating Company
VAR: Volt-ampere reactive
VVO: Volt-VAR Optimization