Flexible Distributed Energy Resources and Grid Storage

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Vermont Utility Context

- 17 electric distribution utilities (DUs) serving 320,000 customers
  - 1 IOU, 2 Coops, 14 Munis
- DUs vertically integrated, fully regulated by Public Utility Commission
  - Part of ISO-New England market (~4%)
  - Electric rates remain relatively stable and slightly lower than other Northeast States
- Statewide Energy Efficiency Utility
  - Runs electric efficiency programs on behalf of DUs
- Statewide Transmission Company (VELCO)
  - Owned collectively by the DUs
  - Develops *Long Range Transmission Plan*, requires analysis of non-transmission alternatives (NTAs)
- Public Service Dept. serves as ratepayer advocate and State Energy Office
  - Reviews Utility *Integrated Resource Plans* and Rate Cases
  - Conducts *Comprehensive Energy Planning* every 6 years

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Vermont Approach to DERs



1. Aggressive Renewable Energy Standard - high penetration of solar distributed generation, especially Net Metering

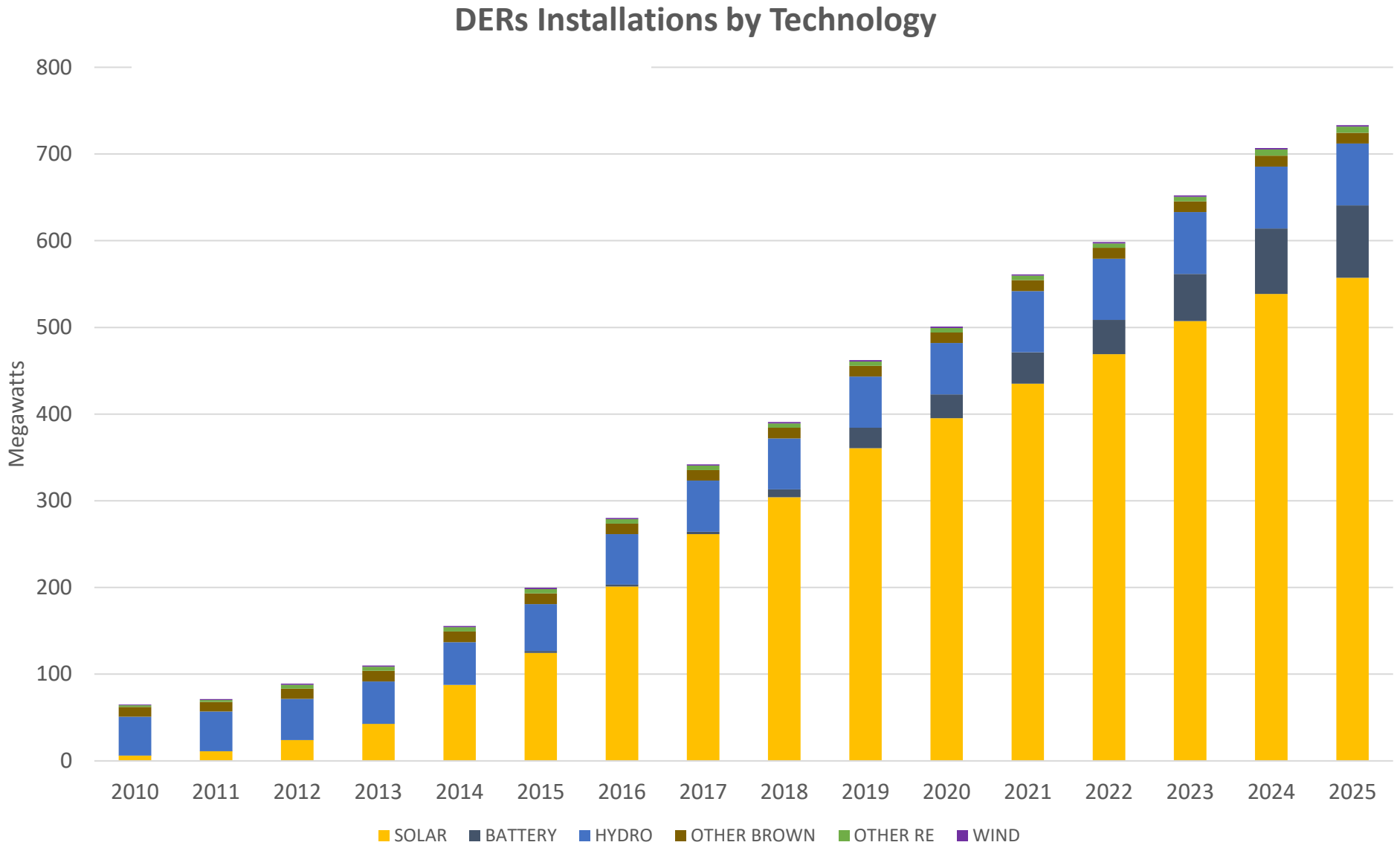
2. Vermont does not have a statutory storage goal or mandate.
   Storage deployment remains top in the region as percentage of peak load (14%)

3. High per capita penetration of Electric Vehicles and EVSE

4. Facilitate utilization of flexible distributed energy and load resources to avoid infrastructure constraints and reduce utility charges

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Vermont penetration of Distributed Energy Resources (DERs)



VT now has over 733 MW of operational DERs including 115 MW of battery storage; Peak load is under 1000 MW

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Electric Vehicle Rates

- EV rates were mandated by Vermont Legislature in 2021
- All but 2 VT utilities have 1 or more EV rate/program/pilot
  - Active management
  - EV specific rate
  - TOU rate
  - Day ahead pricing
  - Free Level 2 charger
- ~ 28% of EVs enrolled in an EV rate/controlled charging program
  - *Long Range Transmission Plan* assumes no EV load controllability
- Ongoing challenges:
  - Technology/software costs
  - Service Upgrades

Utility Storage Programs

VT's largest utilities have implemented residential energy storage programs

IOU

- Energy Storage System Service (discounted lease)
- Bring your own Device (customer-owned, equipment incentive)

Coop

- Bring your own Battery (per kW bill credit)

Utilities are also pursuing owned storage and/or PPAs

Energy Storage Access Program (ESAP)

$7 Million in state funds deployed for:

Municipal Storage

Support installation of battery electric storage systems at municipal buildings

Residential Battery Storage

Battery electric storage systems for low- and moderate-income households

Load Management Platforms

Flexible load management software acquisition by munis and coops

Key Takeaways

1. Aggressively advancing flexible load management provides multiple benefits to ratepayers.

2. Constraints in 2024 Vermont's *Long-Range Transmission Plan* can be avoided or deferred with Flexible Resources.

3. Valuation can be challenging. Remain mindful of considerations around ratepayer cost and cost-shifting.

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