

# Electric Sector

# Context

- Electric sector is necessary to enable decarbonization of other sectors
  - Timing of load will change – more winter-time load
  - Flexible load management is critical
  - Ensuring affordability to help encourage decarbonization
  - Ensuring equitable access to programs – how can we make sure Vermonters have the infrastructure to take advantage of the ability to shift away from fossil fuel?
- Regional generation fleet changing
  - Significant amounts of offshore wind and solar will be built
    - This will change regional “system” fuel mix and help decarbonization, once it happens
    - And/but: Increased amounts of infrastructure will be necessary
  - Wholesale electricity market structures will need to change
    - Ancillary services will become increasingly important
    - Single hour capacity and transmission planning likely to shift to probabilistic analysis

# 100% renewable power supply requirement

- Existing Renewable Energy Standard reaches 75% by 2032
- Percentage requirements ensure increased load from electric vehicles, heat pumps, etc., are captured
- Mechanism will require legislative action (revisions to Renewable Energy Standard)
- Could focus on carbon free, rather than renewable, as in some other states, but focus here likely to continue to be renewable.

# Structure of a 100% RES

- Science & Data subcommittee and technical consultant examining GHG inventory and relevant issues associated with what constitutes renewable power sources
- Important policy issues need to be considered
  - In-state requirements; level from resources delivered into New England grid; diversity of supply considerations
  - Supporting continued operation of existing renewables here and regionally while ensuring significant, new resources are built to support decarbonization
  - Measurement period (annual, as now, or seasonal or even daily)
  - What to do about projects from SPEED program?
- Focus in climate council report likely on overall policy recommendation and guidance on how to develop common assumptions for policy decisions

# Potential Supporting Mechanisms:

- Renewable power when needed
- Flexible load management

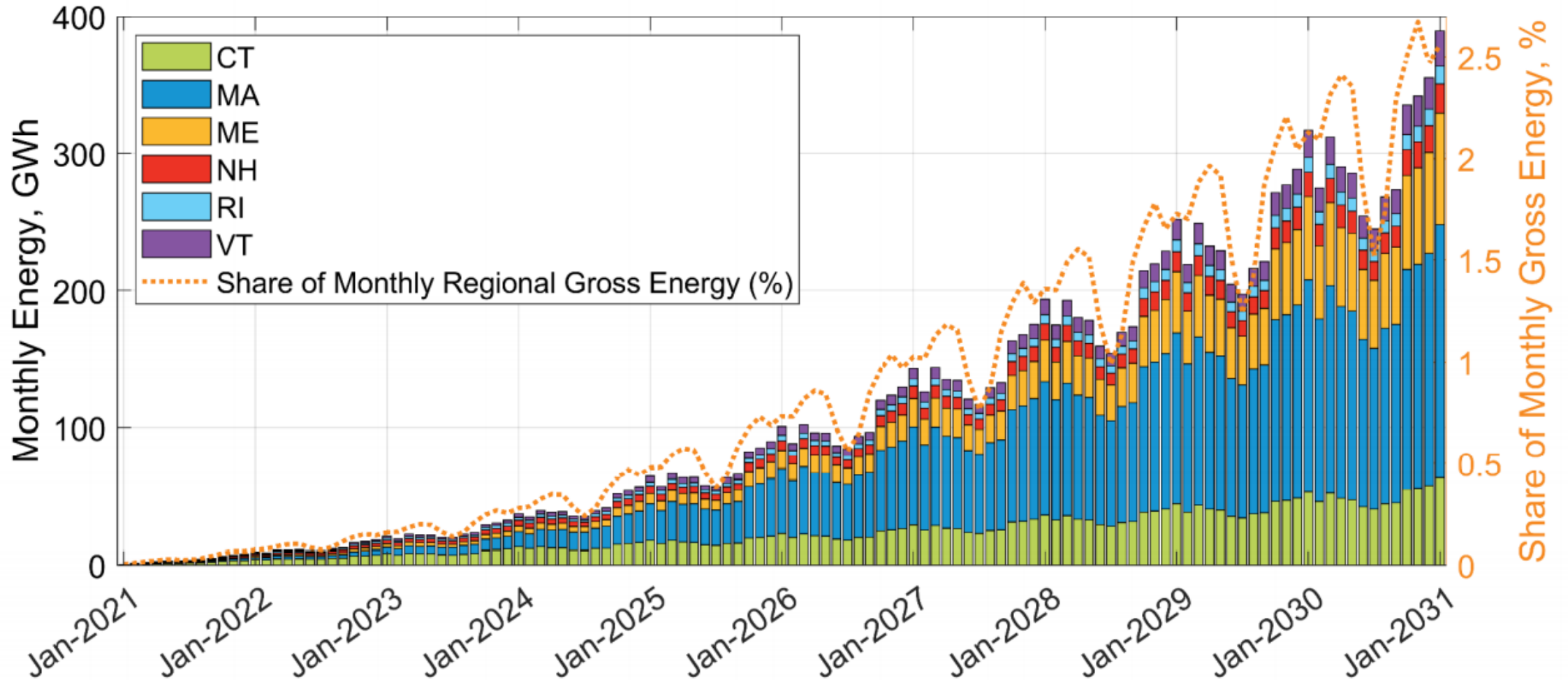
# Ensure policies help incentivize resources to deliver when they're needed

- Solar has helped move Vermont to be winter peaking
- EV and heat pump loads will further drive that trend
- Increased amounts of variable resources and load increases need to send price signals reflecting time value
- Existing policy has not incentivized new renewable generation that also consistently performs well during winter months
- Incentives should reflect value of resources for grid needs
- Can be delivered in multiple ways (e.g., storage)

# Final 2021 Transportation Electrification Forecast

## Monthly Energy

Source: ISO-NE 2021 Final Transportation Electrification Forecast, at slide 12.  
[evf2021\\_forecast.pdf \(iso-ne.com\)](https://www.iso-ne.com/forecast/evf2021_forecast.pdf)







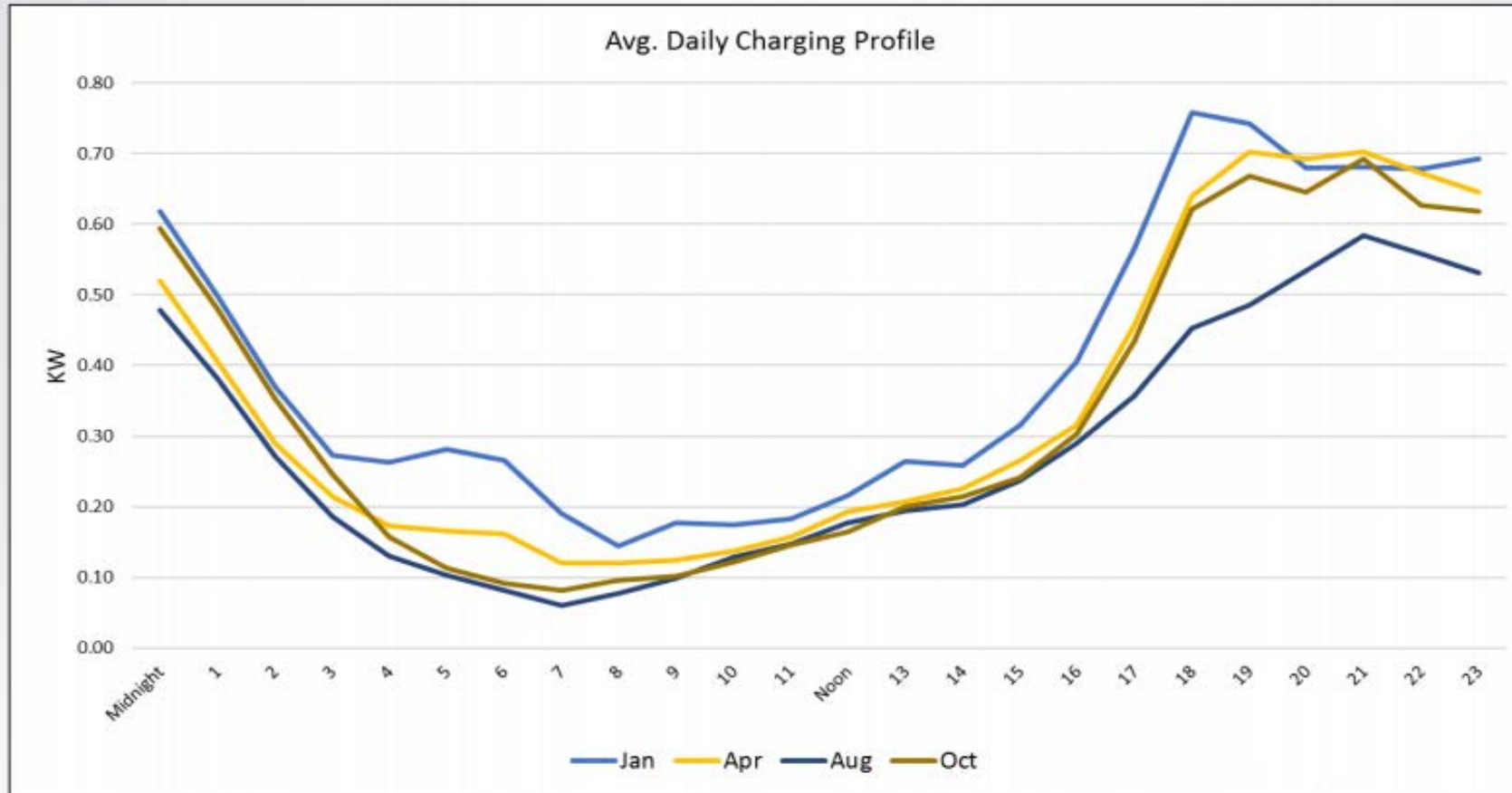
# Hypothetical Approach for Acquiring Resources for Timing Needs:

- Identify time period where resources are most valuable
  - E.g., November 15- March 1; 4pm-10pm
- Could be tier within RES, or
- Payment model
  - Resource delivered during that time would receive adder (higher value REC/RES credit or X cent per kwh, e.g.)
- Eligible resources could be storage, renewables with delivery shape (wind, hydro), demand reduction, etc.
- Potential value for weatherization for homes with heat pumps

# Flexible load management

- Peak loads impact:
  - subtransmission and distribution infrastructure costs (state level);
  - Transmission infrastructure costs (regional level);
  - Resource adequacy (regional level)
- Flexible load can be used to increase hosting capacity of distributed generation
  - E.g., shift EV charging to daytime; work with commercial/bussing fleets to maximize load control value; work with commercial customers to maximize efficient/load controlled operations; ensure heat pumps and other devices (water heaters, e.g.) in homes are able to enroll in load control

# AVERAGE DAILY CHARGING PROFILE



- » On average a January charging day consumes 40% more electricity than August.
- » January peak charging hour is 6pm, whereas August is 9pm.

# Opportunities for Load Management – HPs and other appliances

- Storage paired at homes with DG – resilience at individual home level for outages but also possibility of load control for grid by homeowner, energy services companies
- Continue/expand direct load control programs
  - Managed charging by utility with agreement of customers
- Time-of-use rates – shifted rate design to have peaks at “right” hours
- Overall reductions
  - Energy efficiency, weatherization (for homes with heat pumps)

# Other electricity sector policies that crosscut:

- Resiliency zones – community level planning for recovery/resilience from weather and other events that affect infrastructure (local generation; local storage; local communications in central place suited to core community services).
- Electrification for all – support all Vermonters’ ability to make in home infrastructure upgrades, with equity in mind. Grants/incentives and low cost financing, with multifamily homes and older housing stock targeted for work hand in hand with weatherization efforts so that panels, service, equipment are not a barrier to switching from fossil fuels for transportation and heating