May 11, 2023

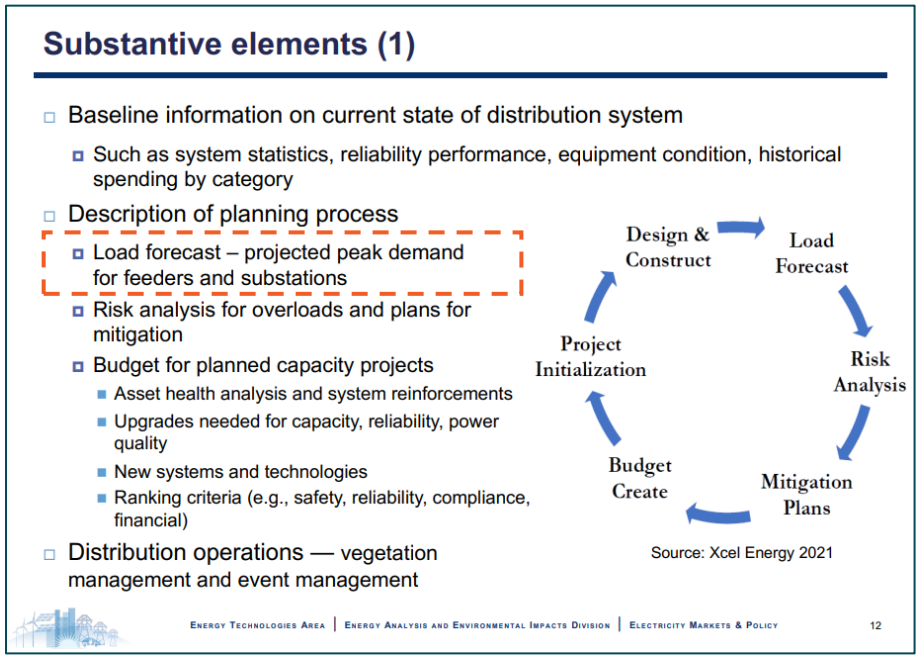
DER and Load Forecasting Considerations

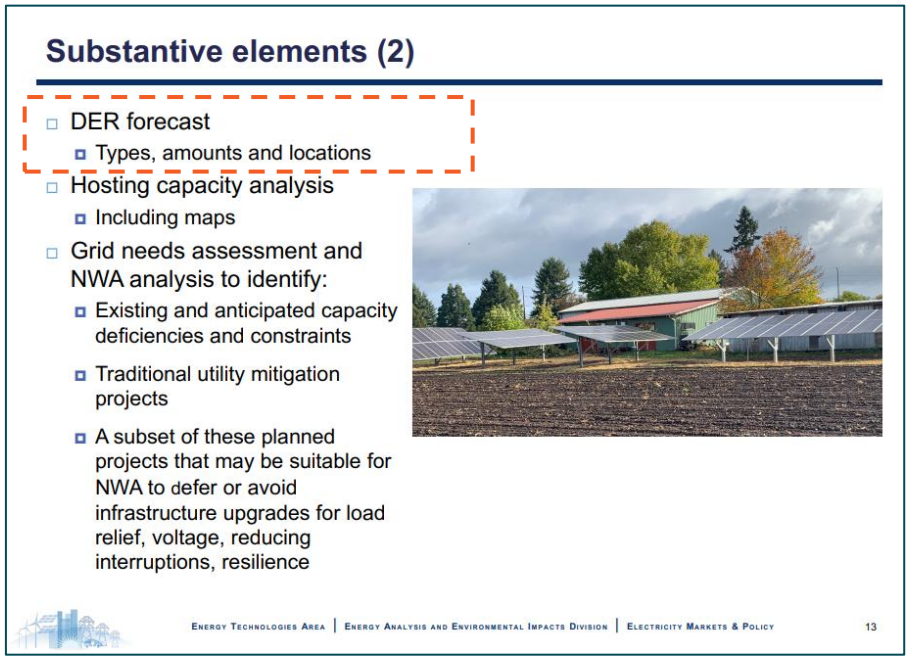
Prepared for Massachusetts DOER GMAC

cadeo

Forecasting is a component of distribution system planning

- April 13, 2023 GMAC meeting included a distribution system planning (DSP) presentation from LBNL.
- Load and DER forecasting play a role in DSP; location is important





Source: https://www.mass.gov/doc/gmacdistribution-system-planning-presentationlawrence-berkeley-national-laboratory/download

First, some definitions.

- **Distributed Energy Resource (DER).** Includes Solar, Storage, DR/Flex Loads, Building Electrification, Transportation Electrification. Consistent with NARUC definition.
- **DER Forecast.** Long-term (5+ year) forecast of DER adoption.
- **DER Load Impacts.** Hourly, net change in energy consumption from DER adoption.
- **Load Forecast.** Long-term (5+ year) forecast of hourly energy consumption. Can include hourly DER load impacts.

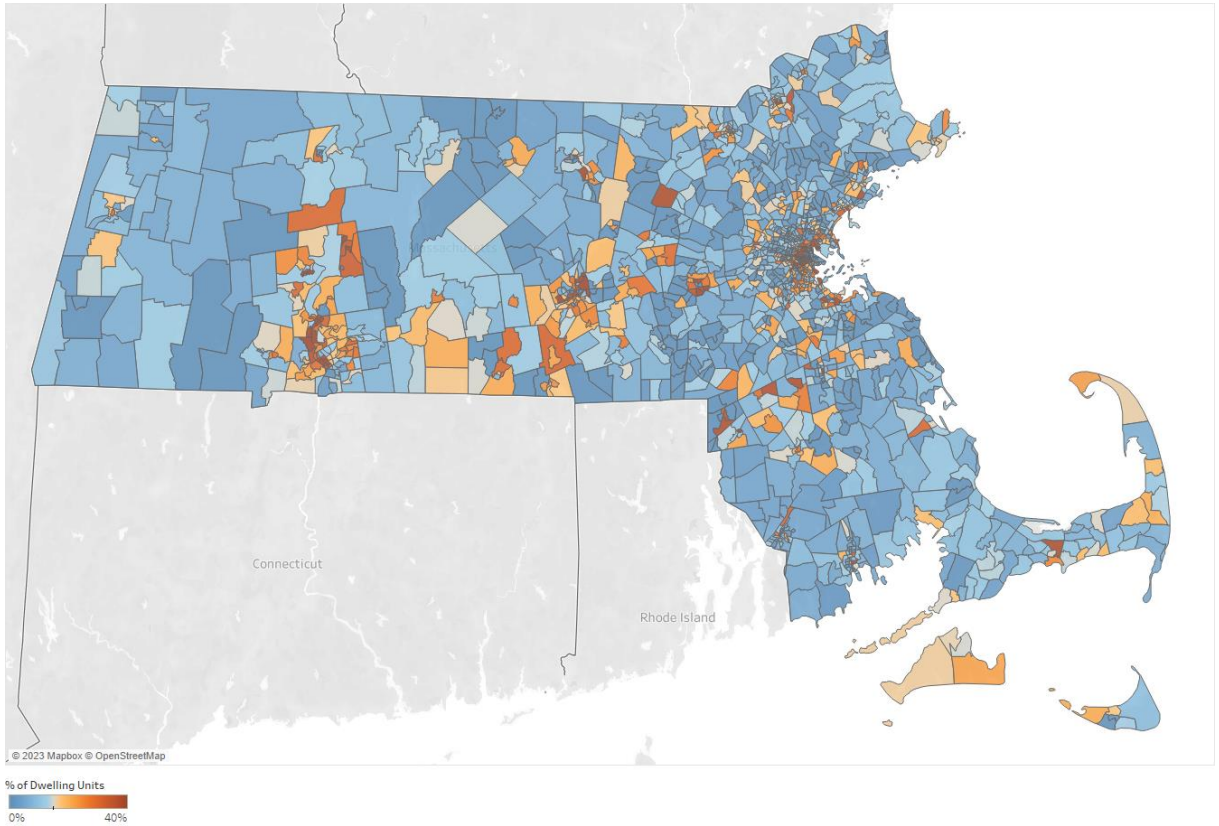
Four considerations for DER and Load Forecasting

- Account for local variability in equipment stock
- Use scenario analysis to set bounds
- Use 8760 hourly DER load Impacts
- Disaggregate by DER type

Account for local variability in equipment stock

- **Use granular stock data** to build DER adoption assumptions.
- DER adoption, especially electrification, will hit differently across the grid.

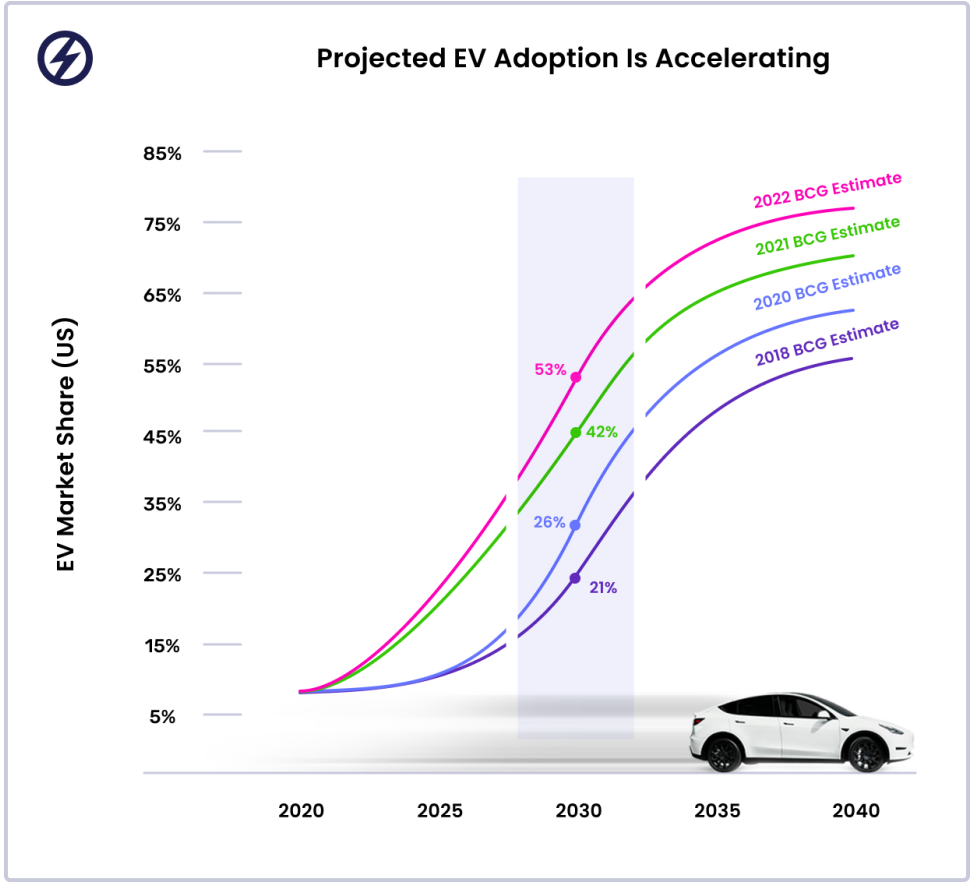
Percent of Dwelling Units with Electric Heat



Source: Analysis of American Community Survey. 2019 5-year estimates.

Use scenario analysis to set bounds

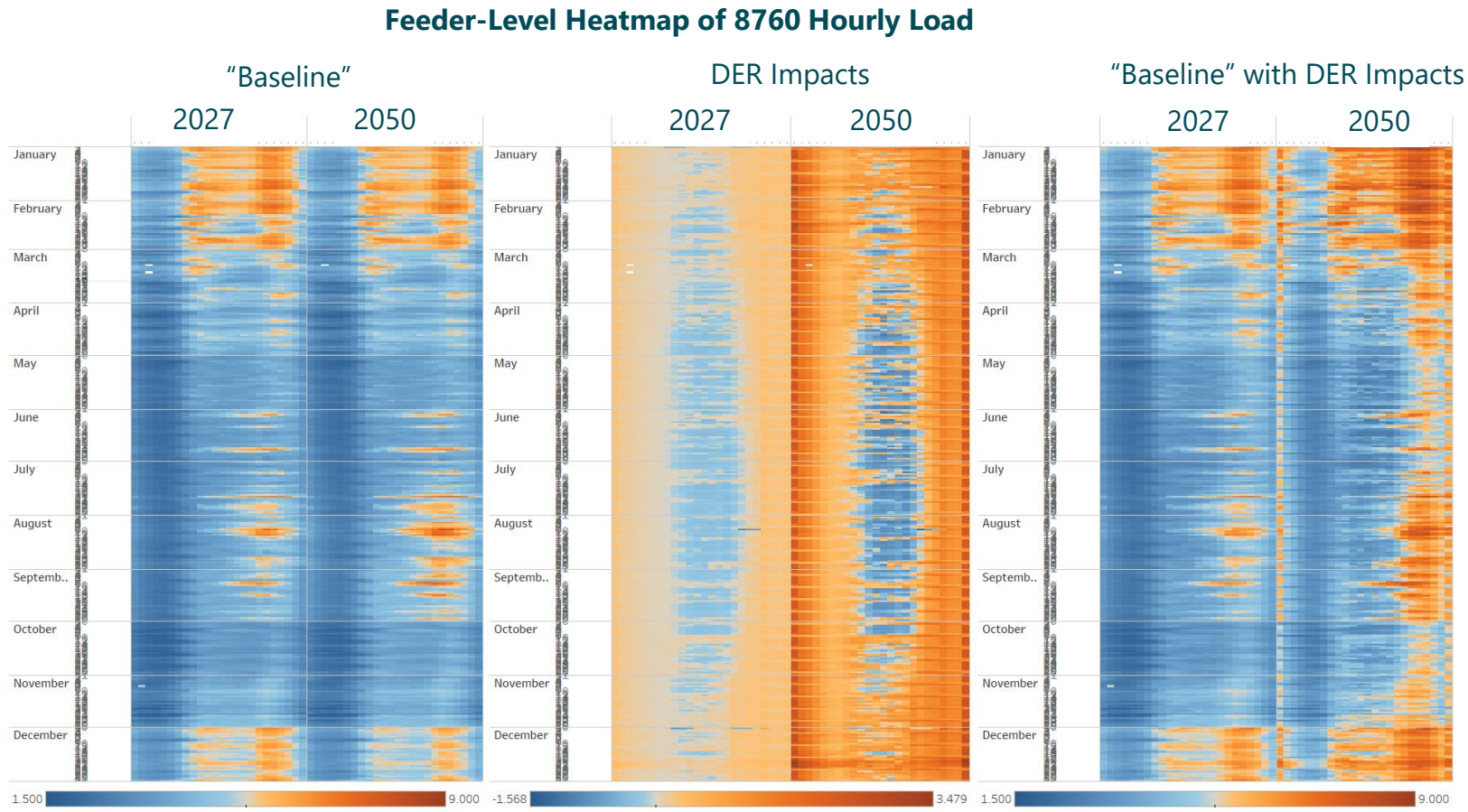
- At minimum, **use low, reference, and high scenarios** in DER and load forecasting
- The future is uncertain – lots of things can change
- Massachusetts has a climate action plan and decarbonization goals
  - What happens if the Commonwealth achieves its goal?
  - What if it falls short?



Source: https://www.recurrentauto.com/research/ev-adoption-us

Use 8760 hourly DER Impacts

- **Use hourly DER impacts** in load forecasting.
- DER adoption can shift peaks.

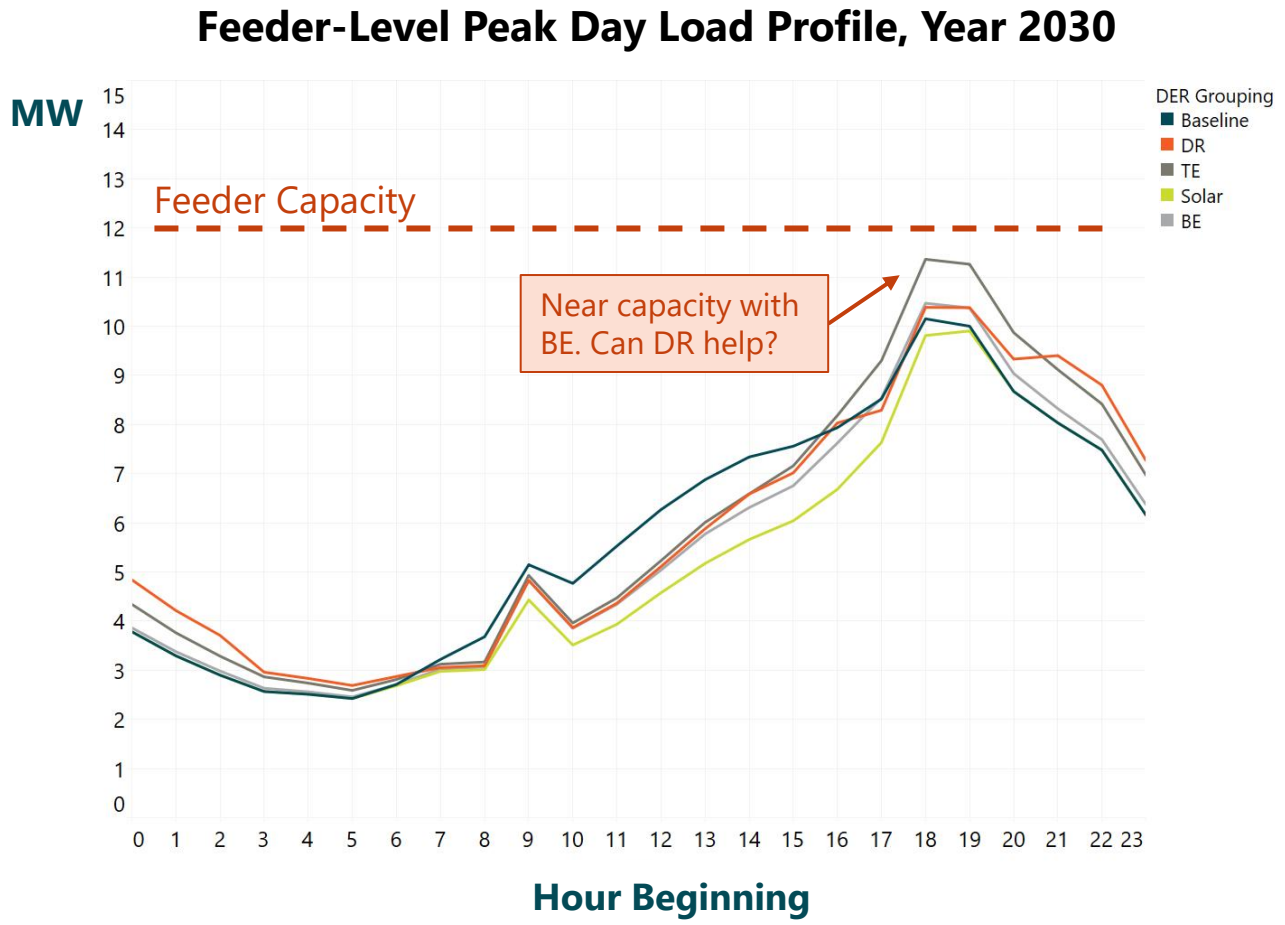


Source: analysis of EDC hourly load data

Disaggregate by DER type

- **Look at electrification independent of solar, DR/Flex loads**.

- Identify trouble areas before thinking about mitigation opportunities.



Developing “local” forecasts is a challenge

- Lots of data required
- QA processes requires careful planning
- QC is time-consuming
- Forecasts might not age well

Thanks!

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