Vermont System Planning Committee
Load Forecasting Subcommittee Meeting
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Draft Meeting Minutes

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Meeting Summary

The Load Forecasting Subcommittee convened to discuss the upcoming cycle of Vermont's electric load forecasting process, with a focus on methodology, data enhancements, and zone-specific modeling. The meeting began with an overview of the work plan and project timeline, then transitioned to a deep dive into forecasting methodology, technology trends (notably electric vehicles and heat pumps), scenario planning, and long-term goals such as integration of distribution-level forecasts.

Workplan and schedule

The forecast work was broken into four key stages, each with specific deliverables. The first phase, running through September 2025, focuses on updating all required datasets: hourly zone-level load, system-level load, solar generation (both utility-scale and behind-the-meter), and AMI data. The group also discussed the need to refresh economic inputs (from Woods & Pool and Moody's) and end-use equipment saturation data, such as the prevalence and efficiency of electric appliances like heat pumps and water heaters. Itron highlighted a priority to "reconstitute" load by adding solar generation back into observed data, as VELCO's readings reflect net—not gross—demand.

The second phase (September through November 2025) will be dedicated to forecasting new technologies, including heat pumps, EVs, solar, load control devices, and battery storage. The team is particularly focused on improving the geographic allocation of these technologies—

especially EVs and heat pumps—across Vermont's planning zones. Battery storage and load control programs will also be addressed in this phase.

The third phase (September 2025 through January 2026) centers on baseline forecast development. This forecast excludes new disruptive technologies and represents a "frozen in time" view of existing demand, including embedded DOE efficiency standards. Once the baseline is complete, an adjusted load forecast will be built that layers in projected adoption of disruptive technologies (e.g., EVs, heat pumps, batteries, solar).

The final phase (January 2026 through April 2026) will involve scenario modeling. Scenarios under consideration include extreme weather events, high/low adoption of DERs, alternative EV charging behaviors, and different economic outlooks. The finalized forecast report will be issued at the conclusion of this stage.

Forecast Method Overview

Itron uses a statistically adjusted end-use (SAE) framework, which involves modeling residential and commercial energy consumption as a combination of heating, cooling, and other usage components. Forecasts begin with sales data at the customer class level, reconstituted to reflect actual demand by adding back solar production. These sales forecasts are informed by economic indicators, weather trends, end-use saturation data, and building efficiency projections.

To enhance the accuracy of long-term predictions, the model incorporates new DOE appliance standards, particularly those affecting water heaters and HVAC systems in the late 2020s. Vermont's average residential usage dropped between 2010–2017 due to federal efficiency improvements, but has since trended upward due to the adoption of heat pumps, especially during the COVID era. Vermont observed a November system peak in 2022, likely due to heat pump operation at the 32°F crossover point—an important behavioral insight. Traditionally, Vermont's electric system peaks in summer (due to air conditioning) or mid-winter (due to electric heating and lighting).

Peak Load Forecasting and DER Impacts

A separate peak demand model is being developed that aligns with the baseline energy forecast. This model uses heating/cooling demand projections and non-weather-sensitive loads to estimate monthly system peaks. Peak loads are influenced by demand-side management programs (e.g., GMP's flexible load and battery programs), which can shift or suppress peaks. GMP reported the ability to shift up to 60 MW of load during optimal conditions.

Participants noted the importance of accurately quantifying historical and ongoing demand-side interventions, such as peak-shaving battery operations and hydro scheduling, in order to properly "add back" that demand when modeling underlying usage trends. Utilities were

encouraged to share historical interruptible load or DR program data to inform these adjustments.

Zonal and Distribution-Level Forecasting

One of the central goals of this planning cycle is improving forecasting at the zonal level. Itron will aim to build more detailed economic profiles by zone, develop differentiated weather response models using Artificial Neural Networks (ANN), and refine EV and heat pump adoption forecasts at the sub-regional level.

Historically, zone-level forecasts were developed by allocating state-level forecasts based on population and employment data. Going forward, Itron will incorporate not just relative size but growth trends in each zone, improving the granularity of predictions. Artificial Neural Networks will also be used to optimize heating and cooling response curves for each zone based on historical temperature and usage patterns. This allows zone-specific sensitivities (e.g., differences between Burlington's gas-heated urban profile and Morrisville's electric-heated rural profile) to be more accurately captured.

Forecasting at the substation and bus level was identified as a potential change in approach. Itron's distribution group is engaged in several such projects with other utilities and is expected to present their methodology at the next Load Forecasting meeting in fall 2025. These forecasts aim to integrate long-term system forecasting with granular, bottom-up distribution planning in a consistent and scalable way. Data availability—particularly hourly feeder and substation data—will be needed to enable this work.

Technology Forecasting: Focus on EVs and Heat Pumps

A major improvement over past forecast cycles will be the adoption of dynamic EV and heat pump adoption models. Instead of static allocations based on the most recent registration snapshot, Itron will build time-series adoption trends using DMV data, Drive Electric Vermont data, and the Atlas EV database. This will allow the model to account for differential growth rates across zip codes and counties.

Special consideration is being given to Vermont's unique demographics, particularly second-home ownership and out-of-state vehicle registration, which may obscure where EV charging is actually occurring. Approximately 20–25% of Vermont's housing stock is comprised of second homes, and credit card data suggests up to 25% of gasoline purchases are made by out-of-state visitors.

EV charging data, including event-day charging profiles and participation in demand management programs, is available for a subset of vehicles and will be used to calibrate future charging behavior models.

Vermont is seeing a plateau of the sales of heatpumps.

Scenario Planning and Future Integration

In the final stage of the process, Itron will model various forecast scenarios to understand how the system might respond under different external and internal pressures. Proposed scenarios include:

- Extreme weather events (heat waves, cold snaps)
- High/low technology adoption (EVs, solar, heat pumps)
- Alternative EV charging profiles (managed vs unmanaged)
- Energy storage behavior patterns
- High/low economic growth

While past analysis suggests economic variation has limited effect on load, disruptive technologies remain the most important drivers of forecast change. Itron will model all technology adjustments and scenarios at the zonal level, and then aggregated to the system level to ensure consistency across the state.

Next steps

- VSPC Staff will resend LFS kickoff questionnaire for distribution utilities to provide information to Itron.
- The next meeting will be held in September/October 2025.