Addbacks and Energy Efficiency in the Load Forecast

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Resource Adequacy Planning

Market Implementation Committee
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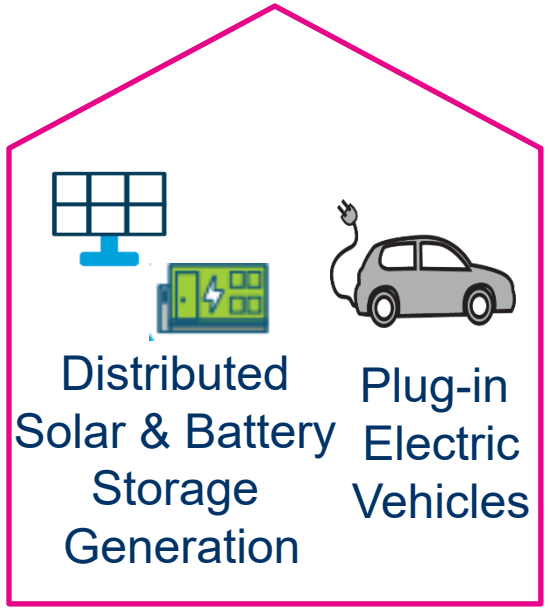
Load Forecast Model Overview – Addbacks

Load Data

Hourly metered load data and estimated load drops



Manual 19 - Addbacks

- Addbacks for capacity resources:
  - Load Management
  - Price Responsive Demand

Attachment A: Load Drop Estimate Guidelines

General

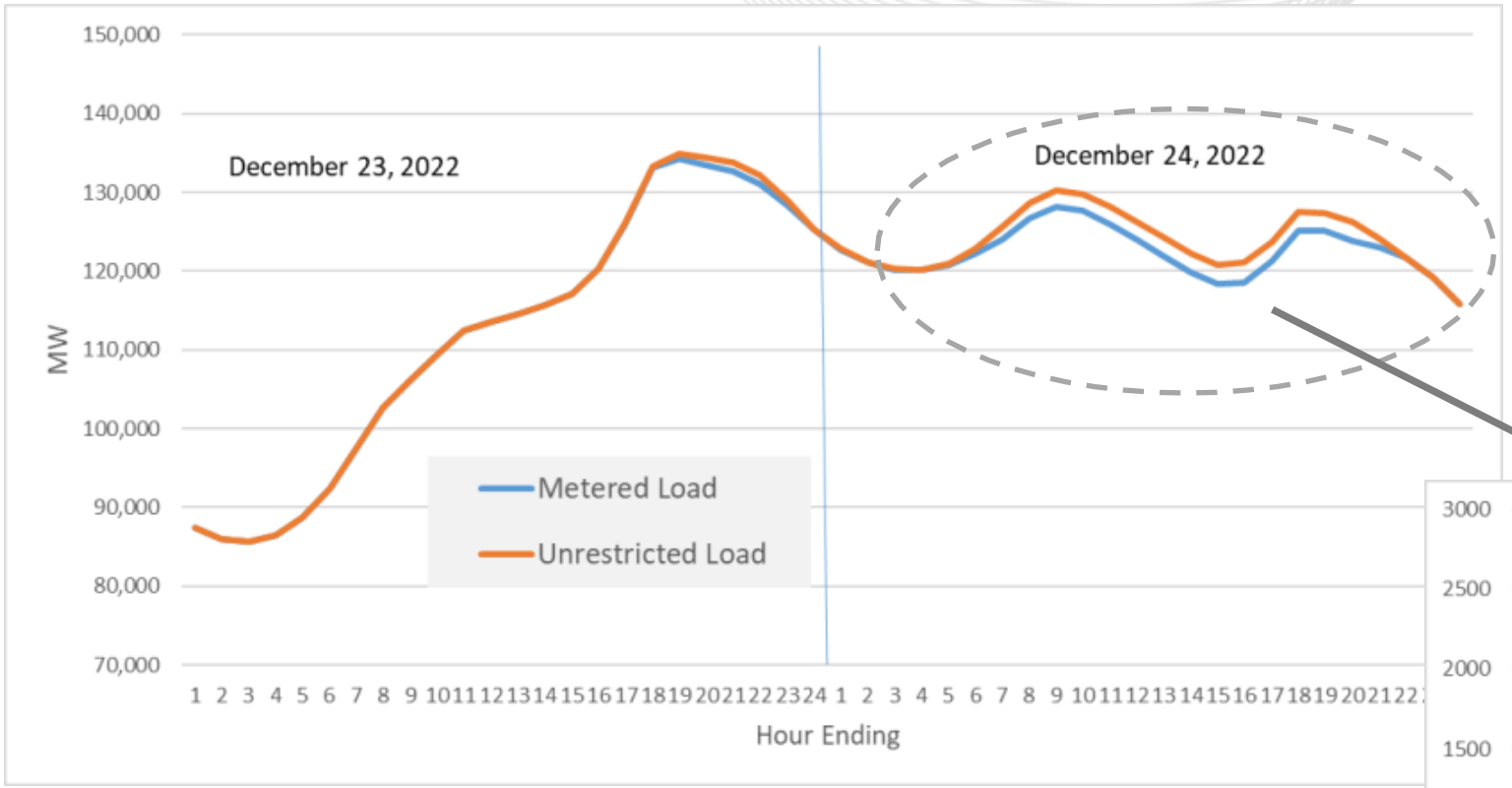
Load Drop Estimates (also referred to as addbacks) are produced for three types of occurrences:

1. Curtailment of load for customers registered in the PJM emergency or pre-emergency program either as a Load Management resource (Demand Resource) or an Emergency – Energy Only resource, or customers registered to meet a Price Responsive Demand (PRD) commitment for either the Reliability Pricing Model (RPM) or the FRR Alternative.
2. Voltage Reductions implemented by PJM or an EDC
3. Significant losses of load.

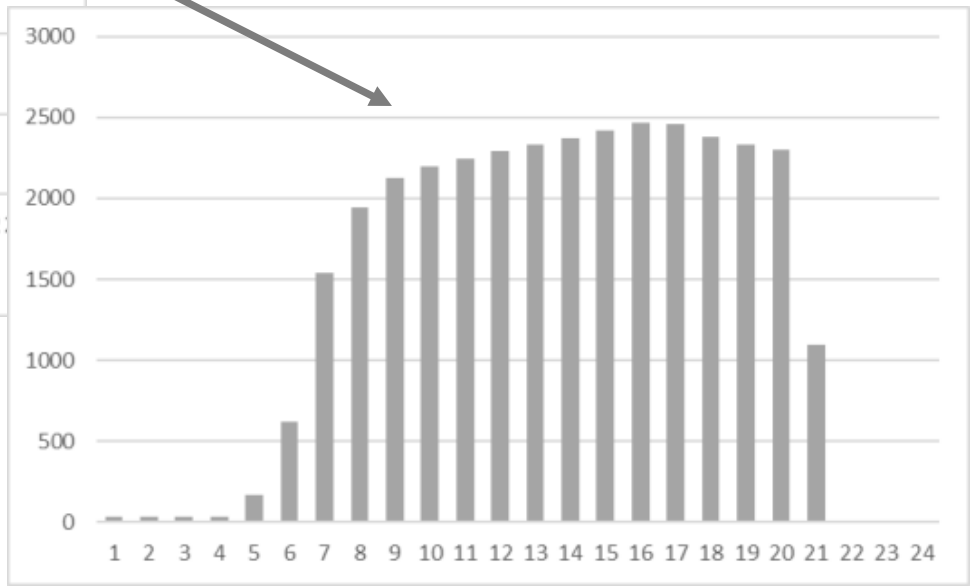
PJM is responsible for producing Load Management/Emergency/Pre-Emergency load drop estimates, from CSP and EDC input into the appropriate PJM system. EDCs are responsible for reporting the estimated impact of voltage reductions (optional) or significant losses of load on their systems.

PJM is responsible for producing PRD load drop estimates, from PRD Provider input into the appropriate PJM system. PRD Providers that registered price responsive demand to satisfy a PRD commitment for either RPM or FRR Alternative must provide PJM with meter data when PRD was required to be dispatched (LMP is greater than the offer price). Meter data is entered at the site level; load drop estimates will be calculated at the registration level.

Example of Addbacks – Winter Storm Elliott



Difference between orange line and blue line is addbacks



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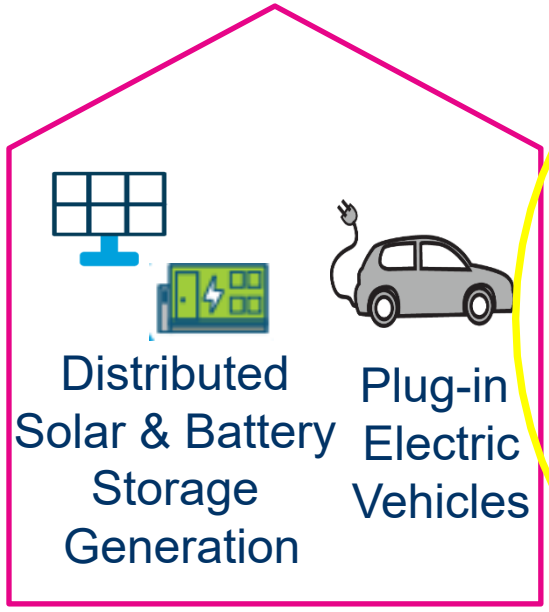
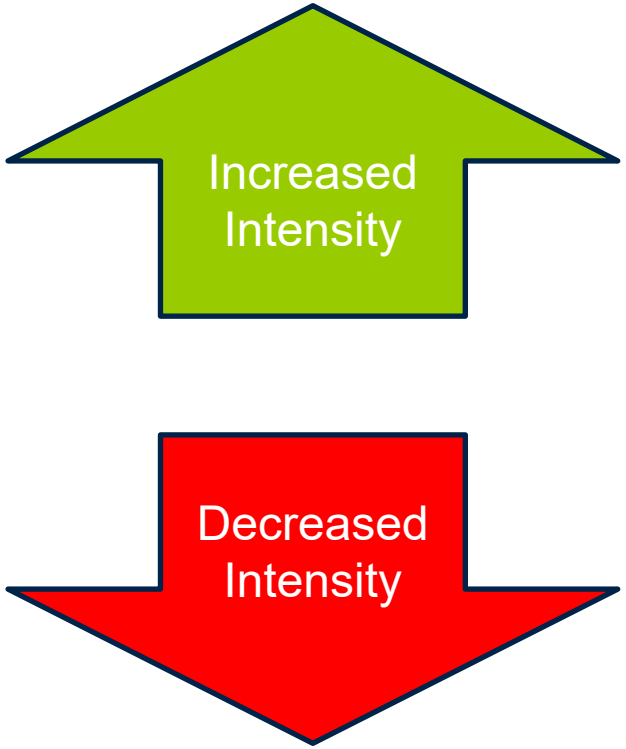


Overview of End-Use Characteristics

- Weather sensitive and non-weather sensitive variables that capture end-use intensities to build an average use relationship for Residential and Commercial
  - Saturation of end-uses
    - % of homes or floor space using an end-use
  - Efficiency of end-uses
    - Relative efficiency over time

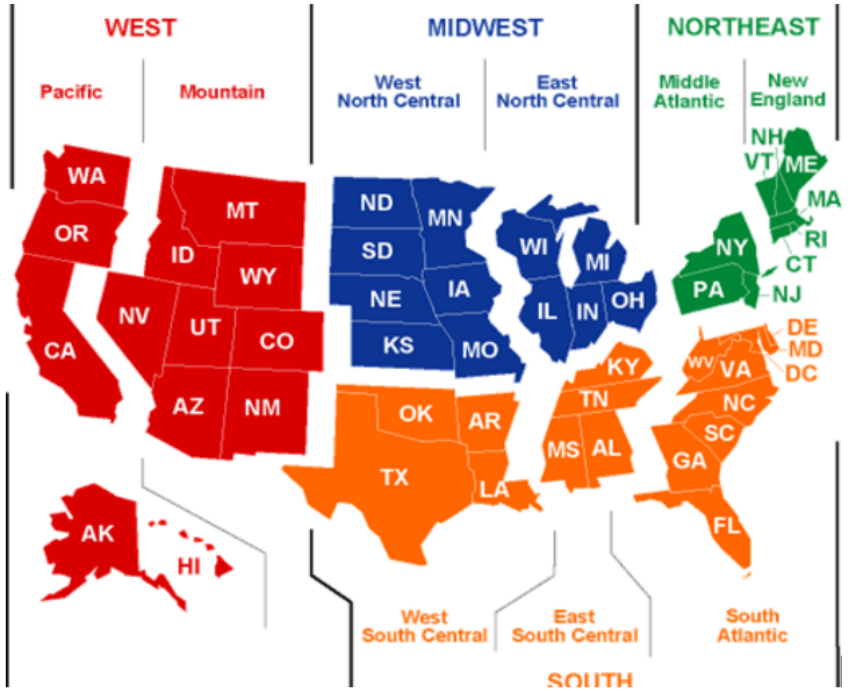


Source(s)

- The end-use intensity information (saturation and efficiency) are derived from The Energy Information Administration (EIA) Annual Energy Outlook (AEO).
  - The AEO generates detail end-use information including number of households, number of end-use units, total consumption, and for many end-uses stock efficiency. Forecasts are produced by census division.

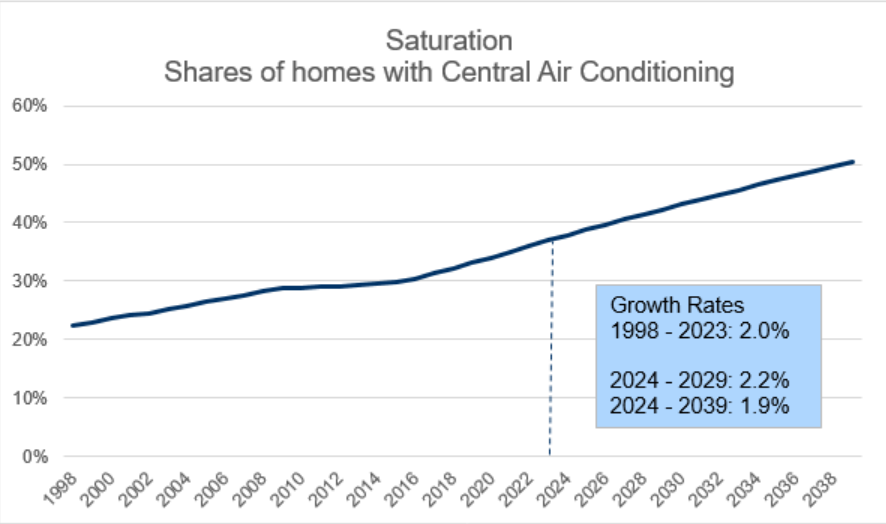
https://www.eia.gov/outlooks/aeo/assumptions/

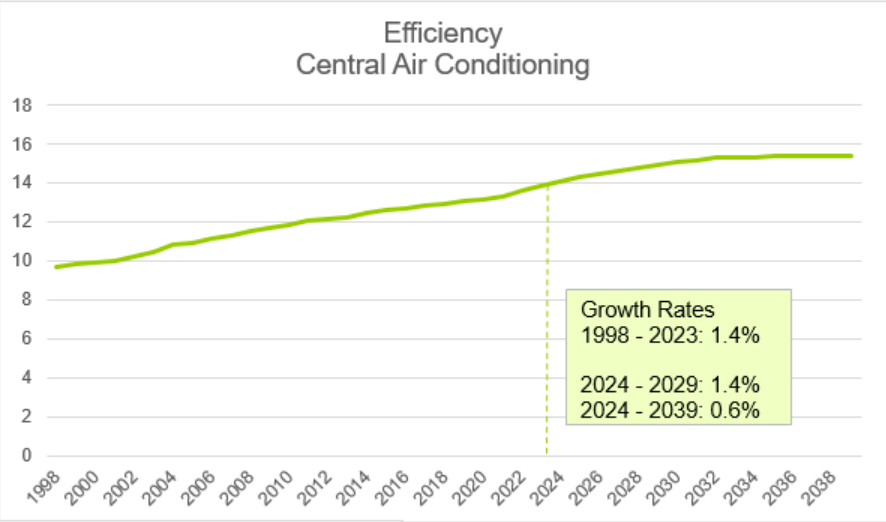
- Itron processes the AEO forecast database and develops and maintains historical and projected end-use consumption, saturation, and efficiencies.

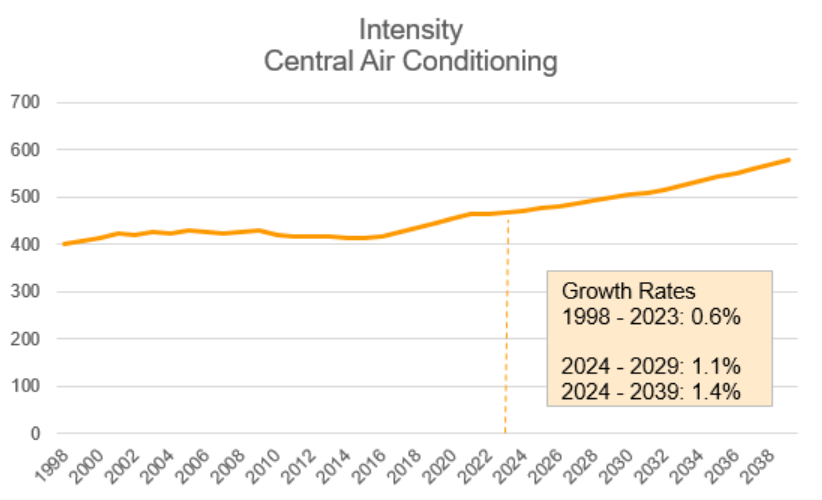


Residential Intensity Example: Central Air

Middle Atlantic





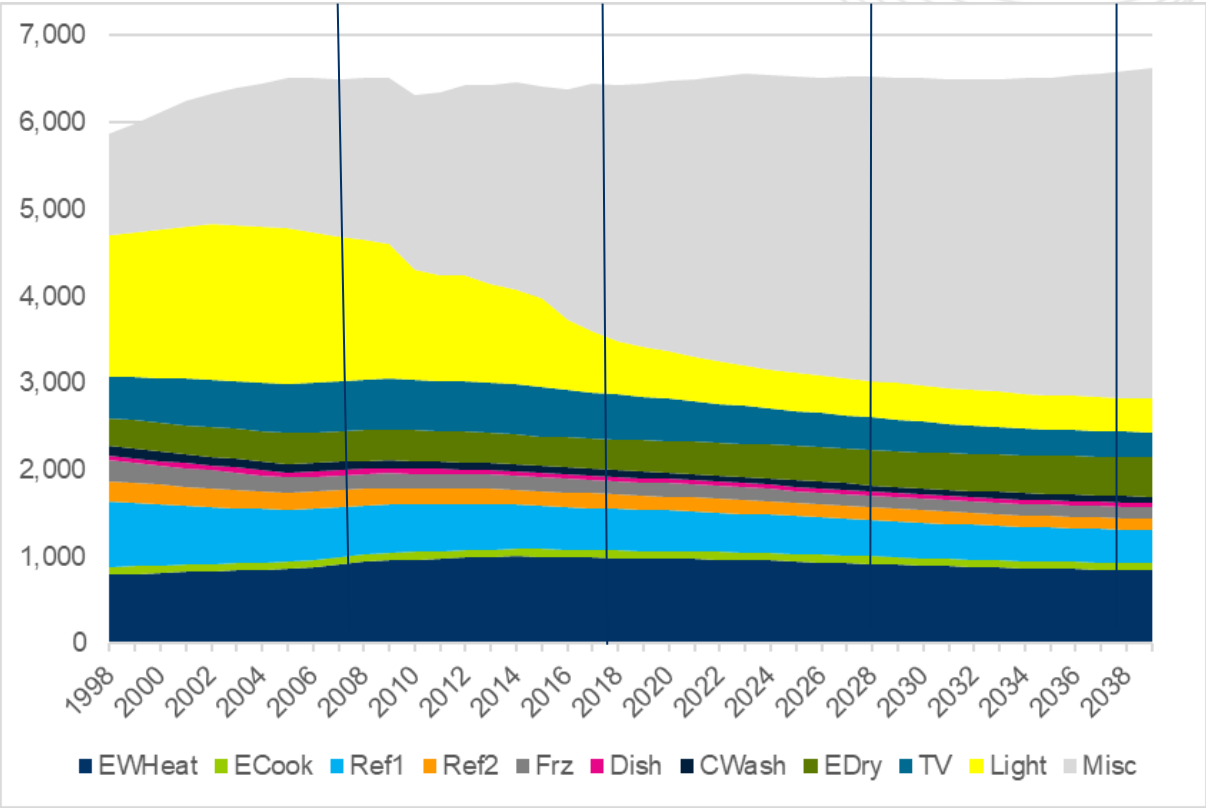


Central Air Conditioning in MidAtlantic

- Increase in intensity in forecast is driven by a greater saturation of homes with central air and leveling of efficiency

Residential Intensity Example: Lighting

Middle Atlantic



Ten year growth rates of Residential Lighting intensity:

- 1998 – 2008: -0.2%
- 2008 – 2018: -9.0%
- 2018 – 2028: -3.8%
- 2028 – 2038: -0.7%

Shell Efficiency

- From the EIA AEO:

> *"The shell efficiency of the building envelope (including thermal losses from walls, roofs, doors, and windows) is an important determining factor of the heating and cooling load for each type of household. In the NEMS RDM, shell efficiency is an index that changes over time to reflect improvements in the building envelope. The shell efficiency index is formulated based on the age and type of housing unit, fuel used, end-use service (space heating and air-conditioning), and census division."*

https://www.eia.gov/outlooks/aeo/assumptions/pdf/RDM_Assumptions.pdf

Links to Load Forecast Materials

- Load Forecast Development Process
  - https://www.pjm.com/planning/resource-adequacy-planning/load-forecast-dev-process
- Supplement provides an overview of 2024 Load Forecast inputs and assumptions:
  - https://www.pjm.com/-/media/planning/res-adeq/load-forecast/load-forecast-supplement.ashx
- End Use graphs – Residential and Commercial
  - https://www.pjm.com/-/media/planning/res-adeq/load-forecast/end-use-input-variables.ashx

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