DOCKETED	
Docket Number:	22-IEPR-03
Project Title:	Electricity Forecast
TN #:	242552
Document Title:	Presentation - Status Report Inter-Agency Working Group High Electrification Scenario
Description:	II.A. Mike Jaske, Interagency Scenario
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	4/5/2022 8:33:54 AM
Docketed Date:	4/5/2022

Status Report
Inter-Agency Working Group
High Electrification Scenario

Michael R. Jaske, Ph.D.,

April 7, 2022

Purpose

- The lead staff of the Energy Agencies (CEC, CPUC and CAISO) agreed to collectively develop an assessment of the transmission system impacts of a scenario with higher electrification than included in the 2021 IEPR adopted demand forecast.
- The CEC will develop demand projections and the CPUC will identify needed capacity increases and locate specific resources on the bulk transmission system.
- The CPUC will use this scenario in their resource planning (IRP) process and will consider it in the distribution system infrastructure assessments (DPP) process.
- The CAISO will use CEC and CPUC results to conduct an assessment as a sensitivity study within the CAISO's 2022-23 Transmission Planning Process.
- This study informs an initial view of these impacts using the normal transmission study time horizon.

Roles

Each agency is carrying out segments of this assessment within their usual areas of responsibility for electricity planning:

- Inter-Agency Working Group (IAWG): Develop the specifications of a demand scenario
- CEC: Develop the demand side projections of the scenario design
- CPUC: Quantify the electric generation resources needed to satisfy a higher electric load, determine the appropriate resource mix, and geolocate additional resource development at transmission busses
- CAISO: Conduct power flow and other studies to determine the impact of higher loads and new generating resource locations on the transmission system

Scenario Design Process

- An Inter-Agency Working Group was formed in November 2021. This group includes technical leads from the CEC, CPUC and CAISO.
- IAWG met multiple times in December 2021 and January to March 2022 to clarify the nature of the project, discuss which agency should carry out what tasks, and design a consensus scenario specification
- The IAWG presented its proposed design to a broader Inter-Agency group for approval
- CARB had a series of clarifying questions, which were resolved, and the overall design was “in place” by later February 2022.

Scenario Specification Framework

Sectors	Inputs		Electricity	Natural Gas
Residential/Commercial	Baseline Forecast		2021 IEPR Mid Residential/ Commercial Forecast	
	AAEE (Programmatic Contributions From EE/FS Data Integration Tool)		Mid -High (Scenario 4)	Mid -Mid (Scenario 3)
	AAFS	Programmatic Contributions from EE/FS Data Integration Tool	Mid- Mid Plus (Scenario 4)	
		Additional Speculative FS Contribution from the FSSAT Tool	Incorporate WH & SH NOx control measures from CARB 2022 SIP Strategy beginning in 2029 for BAAQMD and 2030 for the rest of the State	
Transportation	Baseline Forecast		2021 IEPR Mid Transportation Forecast	
	CARB State SIP Strategy (ACC II for LDV, ACF for MD-HD)		Incremental Requirements Beyond Baseline Forecast	
Other Sectors (Industrial, O&G, Agriculture, Petroleum Refining, TCU)	Baseline Forecast		2021 IEPR Mid Baseline Forecast	
	AAEE/AAFS		AAEE Scenario 4 & AAFS Scenario 4	AAEE Scenario 3 & AAFS Scenario 4

Links To CEC Demand Scenarios Project

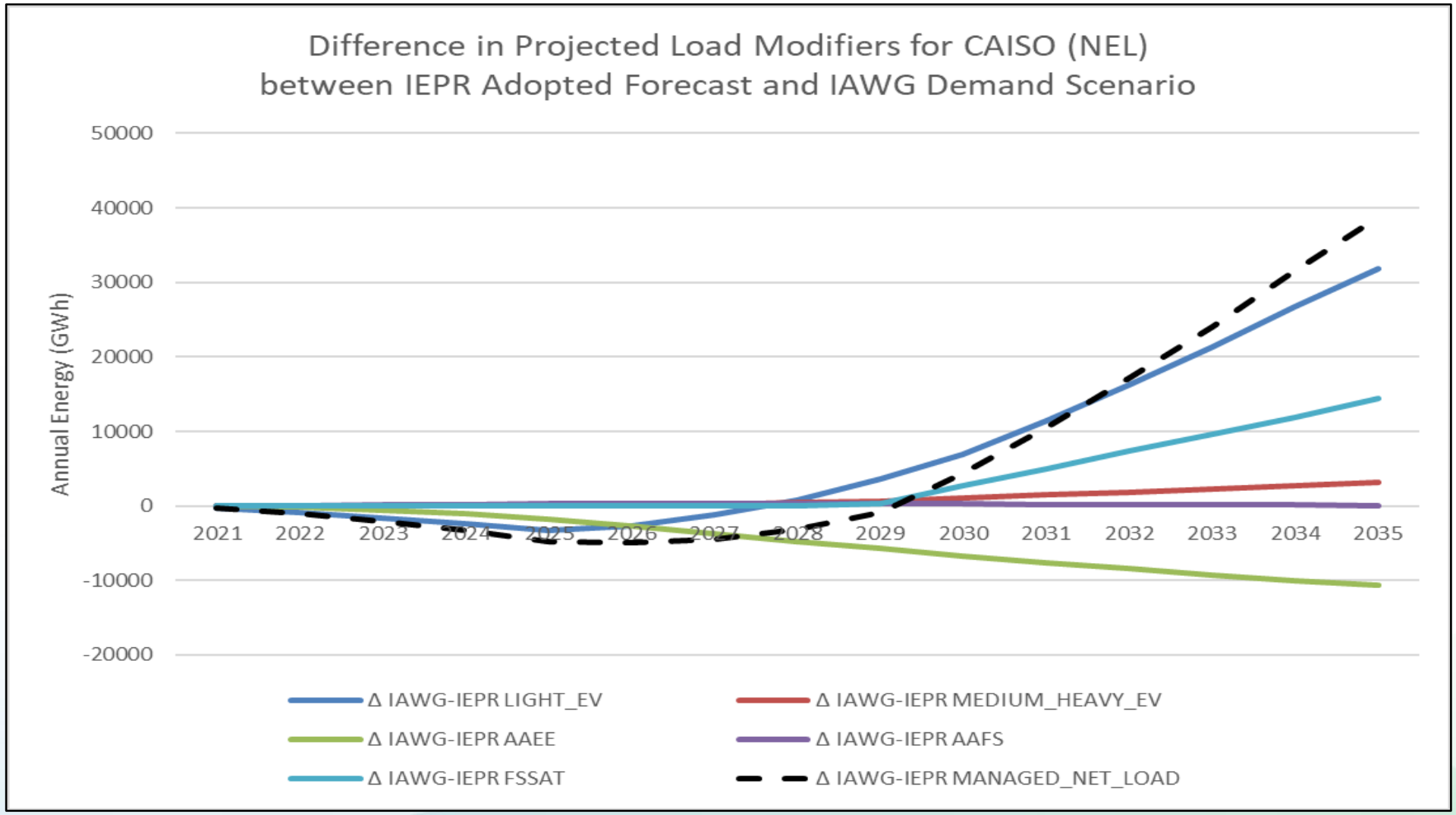
- The design of the scenario benefited from the CEC staff's prior investigation of factors influencing electricity demand through the original CEC demand scenarios project.

- Agency staff agreed to use CEC demand forecasting models and assessment tools that created the 2021 IEPR demand forecast for the following reasons:
  - Projecting electricity demand out to 2035 is within the scope of the CEC forecasting models
  - The use of the Adjusted-PATHWAYS model to cover multiple fuels and compute GHG consequences is not necessary
  - Electricity assessments require greater electricity demand detail than can be development using Adjusted-PATHWAYS

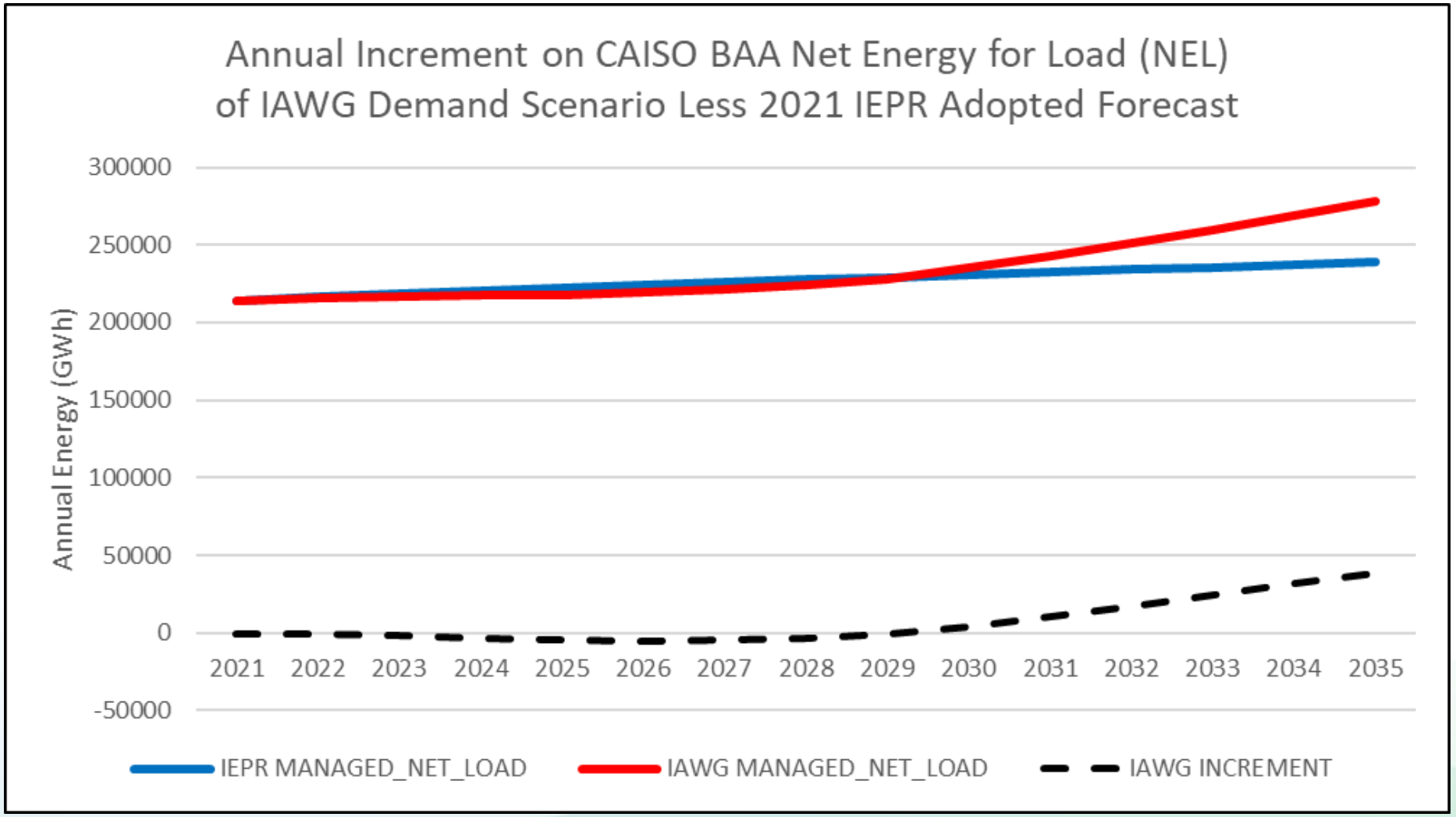
Sequential Phases of Analysis

- To facilitate inter-agency consensus, CEC staff is undertaking the demand analysis in three sequential phases according to the following schedule:
  - 3/15: Project annual electric energy out to 2035.
  - 3/31: Review and consider modification to selected load profiles necessary to develop hourly loads, and once finalized develop 8760 hourly projections out to 2035 for the three IOU TAC areas
  - 6/1: Review and consider modification to allocation of incremental loads to load busses, and once finalized allocate impacts.

Incremental Impacts of IAWG Load Modifiers



Annual Energy Compared to 2021 IEPR Adopted Managed Forecast



Load Profile Review

- The CEC staff contracted with E3 to review CEC load profiles. E3 concluded that it detected no substantive issues.

- The CPUC/CEC staff met with each of the IOUs about transportation electrification load profile response to TOU rates, TOU rate design evolution, and other related factors. No information justifying a change was obtained in this expedited review.

- Numerous items were identified for future project iterations that could not be included in the short timeline of this project.

Hourly Load Impact Assessment

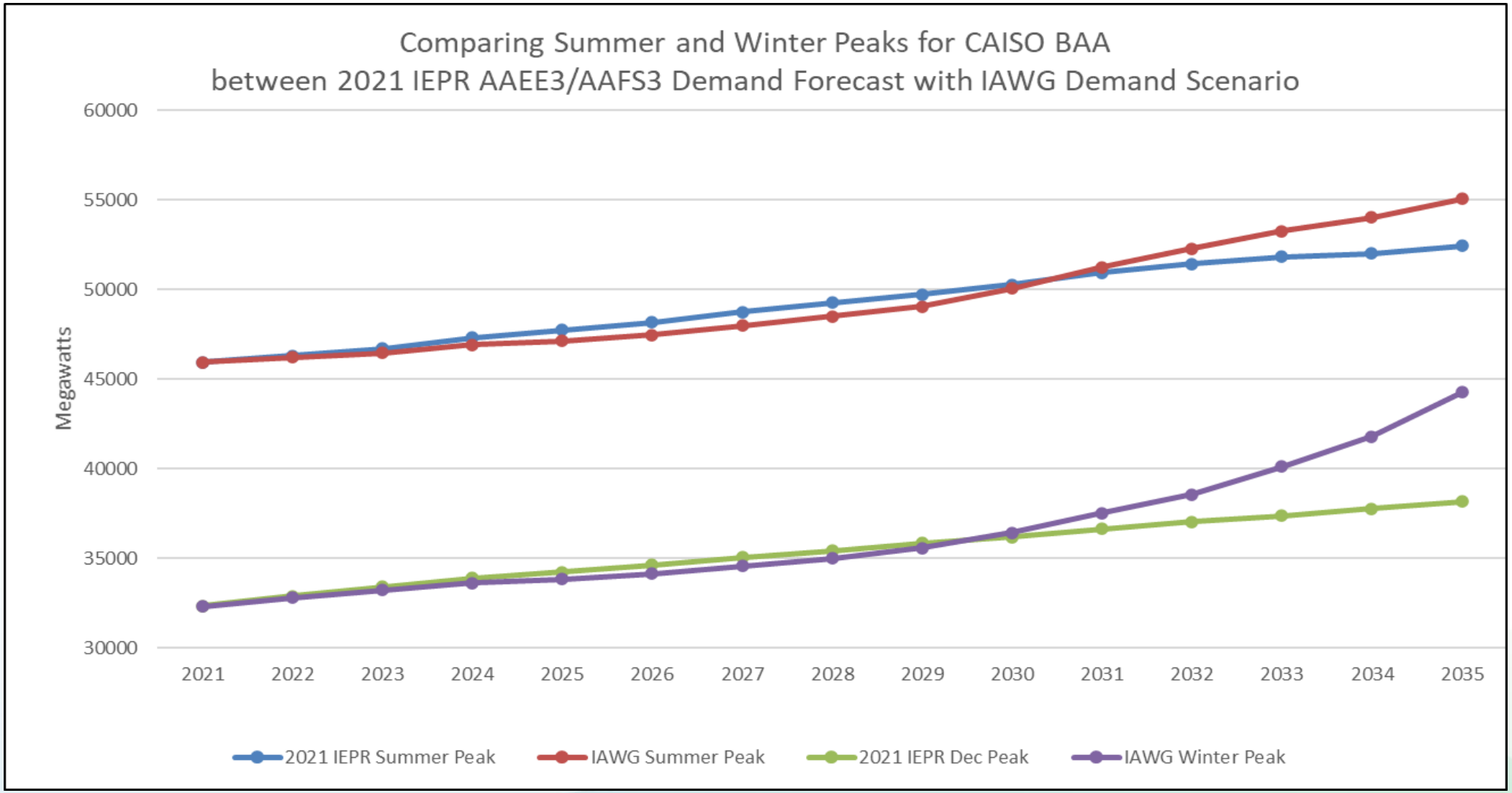
- The electric version of many appliances has already broadly penetrated consumer markets. The end-use load patterns of these appliances (ranges, clothes dryers, dishwashers) are largely known, and projecting impacts is mostly a question of scaling up aggregate loads using these profiles.

- Residential space heating using heat pumps is not well understood nor are the reliability implications of large load additions to winter season load patterns.

- The CEC AB3232 assessment effort (documented in the report to the legislature) identified high winter loads in Northern California, under scenarios with high heat pump stock shares, approaching that of summer peak loads.

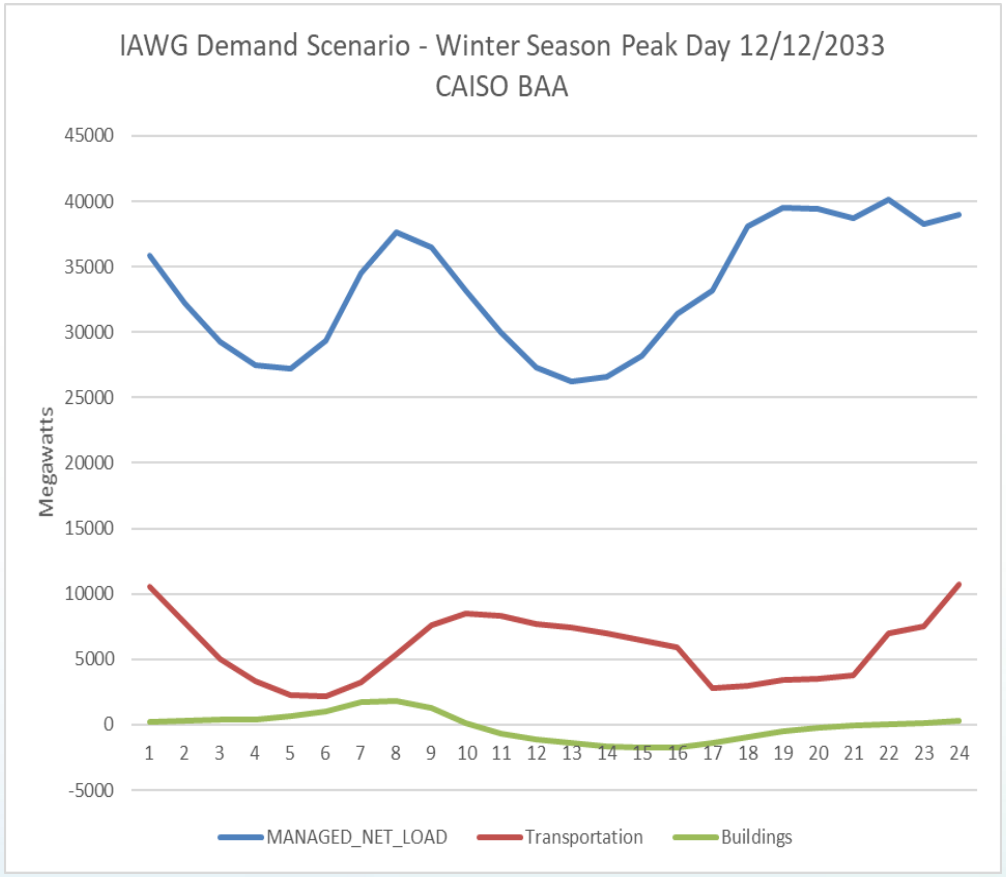
- The 8760 hourly assessment for IOU TAC areas is designed to further understand both summer peak and winter load assessments.

Seasonal Load Impacts

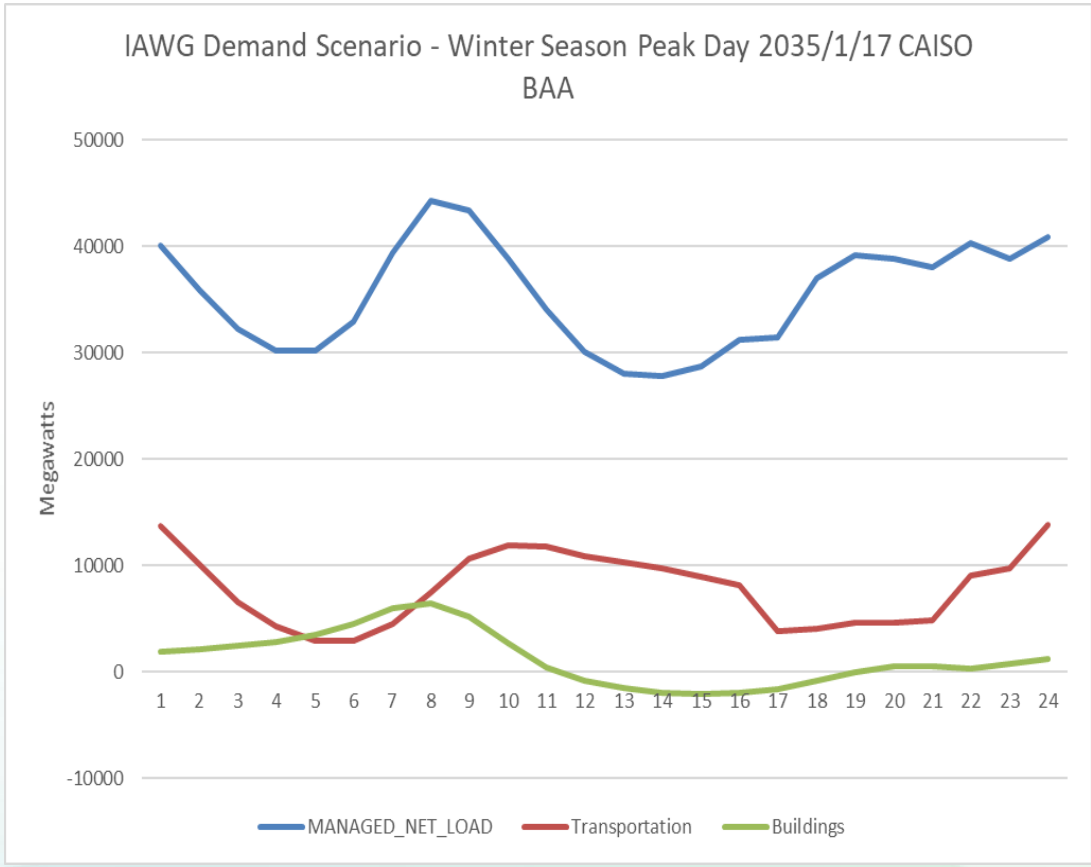


Shift in Winter Peak Day/Hour

IAWG Scenario 2033



IAWG Scenario 2035



Local Capacity Area Implications

- The way that the transmission system evolved through time results in multiple areas where special consideration in demand/supply balance is needed under peak load conditions.
- The CAISO and utilities study these areas using complex engineering models that model the flow of power on the grid from sources to demands, e.g. power flow models.
- Each IEPR Cycle, the CEC allocates the adopted IEPR demand forecast to a set of load busses used in a power flow study. The CEC staff is adapting its tools to address the location of incremental electrification loads.
  - The load bus allocation phase of this inter-agency scenario will provide results to the CAISO for use in its part of this overall infrastructure assessment effort.
  - This phase, including discussions with IOUs, is just getting underway and is targeted for June 1.

Project Timeline

- 8/21: Initial discussion of need for high electrification scenario to support infrastructure assessment
- 11/21: CAISO agrees to conduct a sensitivity study in 2022-23 TPP
- 12/21: Formation of HEIAWG to design demand scenario specification
- 2/22: Scenario specification presentation to JASC
- 3/22: Annual electric results finalized
- 3/22: Annual electric energy and 8760 hourly demand delivered to CPUC
- 6/1/22: CPUC delivers resource portfolio to CAISO
- 6/1/22: CEC delivers load bus allocation to CAISO
- 1/23: Preliminary results presented in CAISO stakeholder meeting

Questions?