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2025 Senate Bill 100 Interagency Report Workshop Utilities' Progress Toward Statutory Goals

Interagency Staff

November 22, 2024

California Public Utilities Commission

Logistics

- Workshop slides and materials related to the 2025 SB 100 report are available on the CEC's SB 100 docket webpage: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-SB-100
- **Questions:**
  - After the presentations and the panels and questions from the Dais, there will be time for stakeholder questions.
  - Stakeholders can either submit questions through the Q&A feature of Webex or can raise them verbally.
  - All attendees have been muted. To ask questions:
    - In Webex:
      - Please "raise your hand"
      - Webex host will unmute your microphone and you can proceed to ask your question
      - Please "lower your hand" afterwards
    - For those with phone access only:
      - Dial *3 to "raise your hand". Once you have raised your hand, you'll hear the prompt, "You have raised your hand to ask a question. Please wait to speak until the host calls on you"
      - WebEx host will unmute your microphone and you can proceed to ask your question
      - Dial *3 to "lower your hand"
- Comments on this workshop are due on December 6th, 2024 to the CEC docket.

Workshop Agenda

Time	Topic
9:00 AM	Housekeeping & Opening Remarks
9:10 AM	Comments from the Dais
9:25 AM*	Presentation: State Agency Resource Planning and Procurement to meet SB 100 Goals
10:25 AM*	Panel: Utility Perspective on Progress Towards Meeting SB 100 Goals
11:25 AM*	Presentation: Overcoming Challenges to Implementation of SB 100 Goal
12:25 AM	Public Comments
12:40 PM	Closing Remarks & Adjourn

* Includes time for questions from the Dais and from the public

SB 100's Statutory Requirements

- Establishes a target for renewable and zero-carbon resources to supply 100 percent of retail sales and electricity procured to serve all state agencies by 2045.
  - SB 1020 sets goals for California to achieve 90% clean energy by 2035 and 95% by 2040 and requires state agencies to use 100% renewable and zero-carbon for their own facilities by 2035.
- Increases the state's Renewables Portfolio Standard (RPS) to 60 percent of retail sales by December 31, 2030
- Requires all state agencies to incorporate these targets into their relevant planning.
- Calls upon the California Public Utilities Commission (CPUC), California Energy Commission (CEC), and the California Air Resources Board (CARB) to:
  - Use programs under existing statutes to achieve this policy.
  - Issue a joint policy report to the Legislature by January 1, 2021, and every four years thereafter.

California's Clean Energy Development in Context

- California historically relied on coal and other fossil resources for electricity generation
- The State was an early mover on clean energy and just crossed an important threshold, getting 60% of its electricity from clean energy
- Existing state programs enabled and continue to enable reductions in GHG emissions
- The state will have to work to overcome a suite of challenges to develop the resources needed to meet SB 100's goals
- To meet SB 100 targets, the state is pushing forward on adding clean energy and transitioning to a fully clean grid

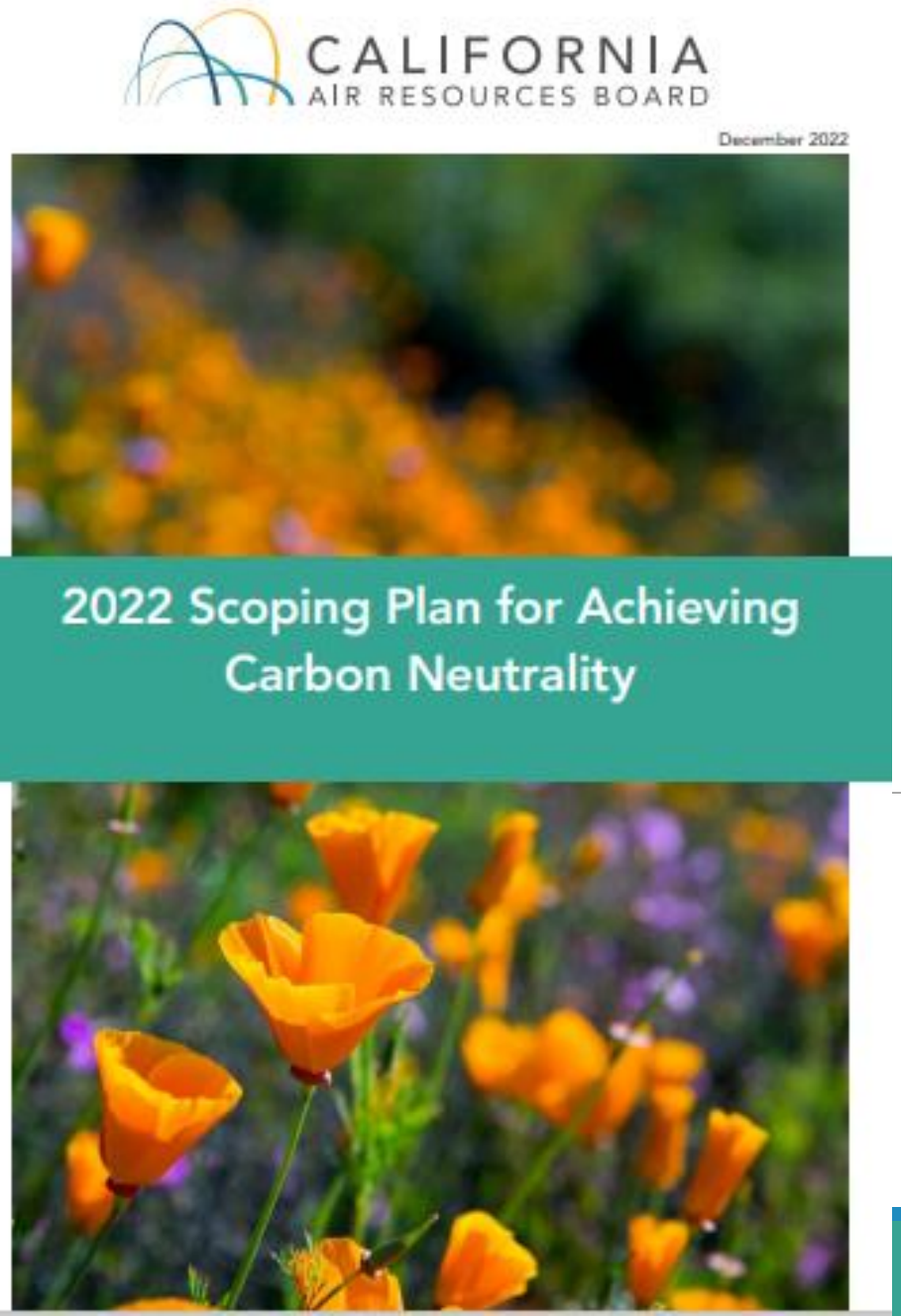
State Agency Resource Planning and Procurement to meet SB 100 Goals

Stephanie Kato, Staff Air Pollution Specialist, Energy Section, CARB

Heidi Javanbakht, Manager, Demand Analysis Branch, Energy Assessments Division, CEC

Molly Sterkel, Program Manager, Energy Division, Electric Planning and Market Design Branch, CPUC

California Public Utilities Commission



Scoping Plan Overview

California's Strategy for Achieving Carbon Neutrality

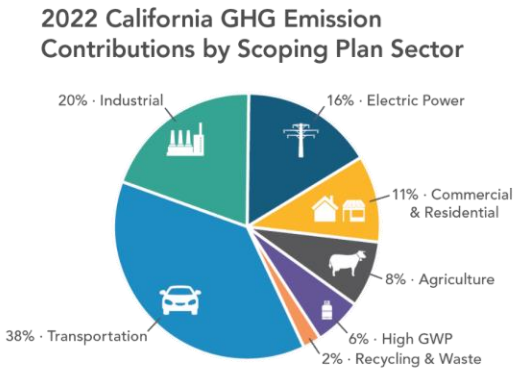
COMMISSIONER WORKSHOP: SB 100 UTILITIES' PROGRESS TOWARD STATUTORY GOALS

NOVEMBER 22, 2024

California's Climate Policy Framework

GHG Targets & Goals

Legislation & Executive Orders: Total GHGs (AB 32/SB 32) or sector targets (SB 1383/SB 100), etc.



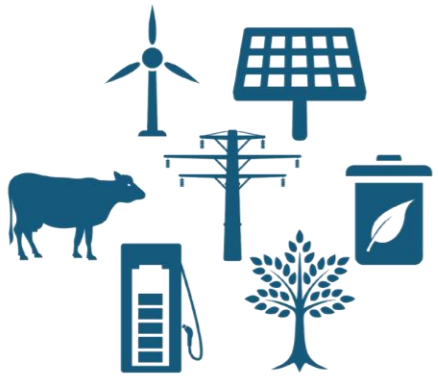
Scoping Plan

Actionable plan across all sectors

Updated every 5 years

Action

Regulations & Incentives: Advanced Clean Cars, climate change investments, Integrated Resource Plan (IRP), etc.

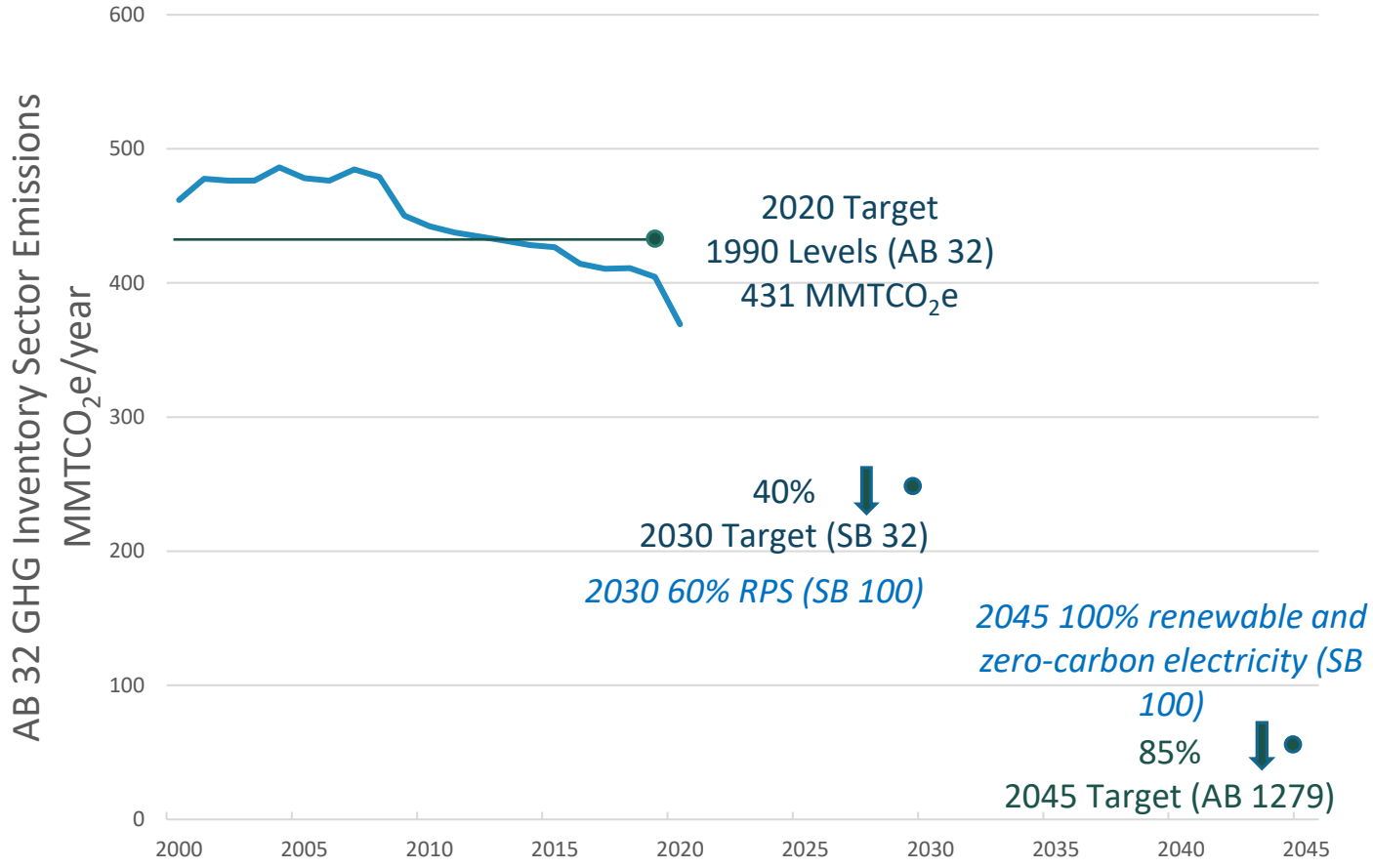


Projects

Examples: Zero-emission trucks, energy infrastructure and renewables, compost facilities, digesters, etc.

GHG Reduction Targets

Achieved AB 32 Target in 2014



ACHIEVING

CARBON

NEUTRALITY

BY **2045**

GHGs included in statute: Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF_6), Nitrogen trifluoride (NF_3)

The Scoping Plan Scenario

The path to build our way out of over a 100 years of existing fossil energy and the built environment landscapes

AB 32 GHG Inventory Sectors

Carbon neutrality by 2045, deploy a broad portfolio of existing and emerging fossil fuel alternatives and clean technologies, and align with statutes and Executive Orders

Natural and Working Lands (NWL)

Land management activities that prioritize restoration and enhancement of ecosystem functions to improve resilience to climate change impacts, including more stable carbon stocks

Ambitious Action Delivers Huge Benefits

Unprecedented Deployment of Clean Technology and Nature-Based Climate Solutions

- 37x total on-road ZEVs
- 6x electric appliances in residences
- 1700x hydrogen supply
- 4x installed wind/solar generation capacity
- 9x battery storage
- > 2.5 Million acres of NWL climate action per year

Significant GHG Reductions

- 94% decrease in liquid petroleum fuel demand
- 91% decrease in fossil gas used in buildings
- 66% decrease in methane emissions from agriculture
- 10% reduction in wildfire emissions

In 2045 relative to 2022

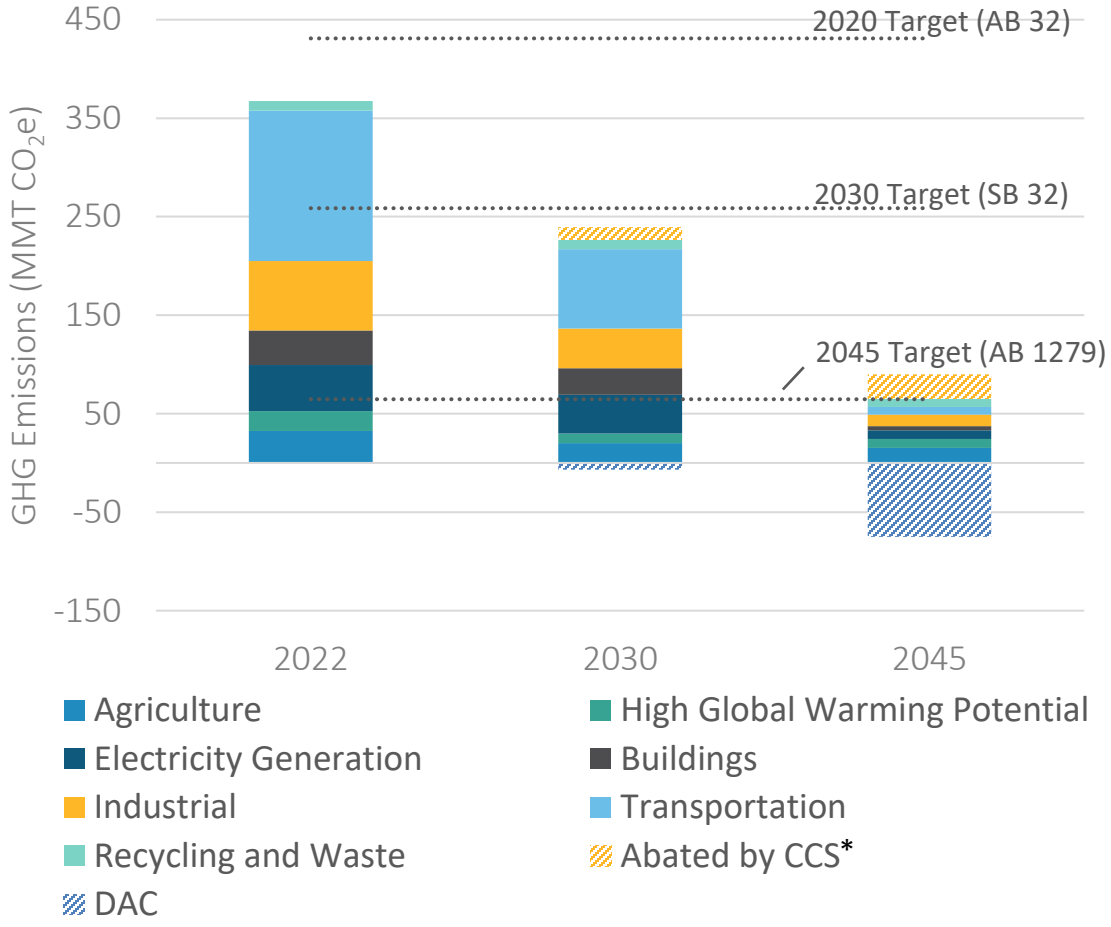
2022 Scoping Plan Update
A Plan for Science-Driven Climate Action

2030: 48% reduction below 1990

- Increased ambition from SB 32 40% target
- SP scenario incorporates 20 MMTCO$_2$e of mechanical carbon dioxide removal (CCUS/DAC*) in 2030
- 462x increase in renewable hydrogen

2045: 85% reduction below 1990

- Need CCUS and carbon dioxide removal to compensate for residual emissions to achieve carbon neutrality



*CCUS: carbon capture, utilization, and storage; DAC: direct air capture; CCS: carbon capture and sequestration

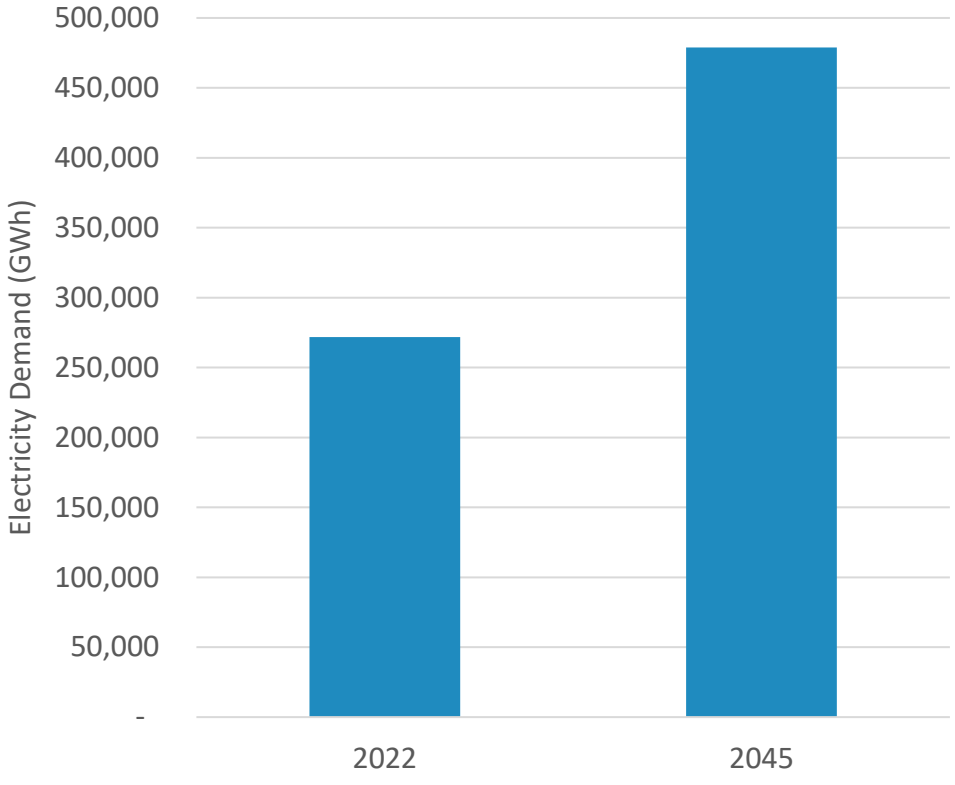
Scoping Plan Scenario
Electric Sector Actions

- Electric Sector emissions and resource-related assumptions
  - 38 $MMTCO_2e$ target by 2030*
  - 30 $MMTCO_2e$ target by 2035
  - SB 100 2030 and 2045 goals for renewable and zero-carbon electricity
- Other resource assumptions per Governor's direction
  - 20 GW of offshore wind by 2045
  - Meet increased demand for electrification without new fossil gas-fired resources
- Applied carbon removal to reach statutory target for 85% economy-wide anthropogenic emissions reductions by 2045

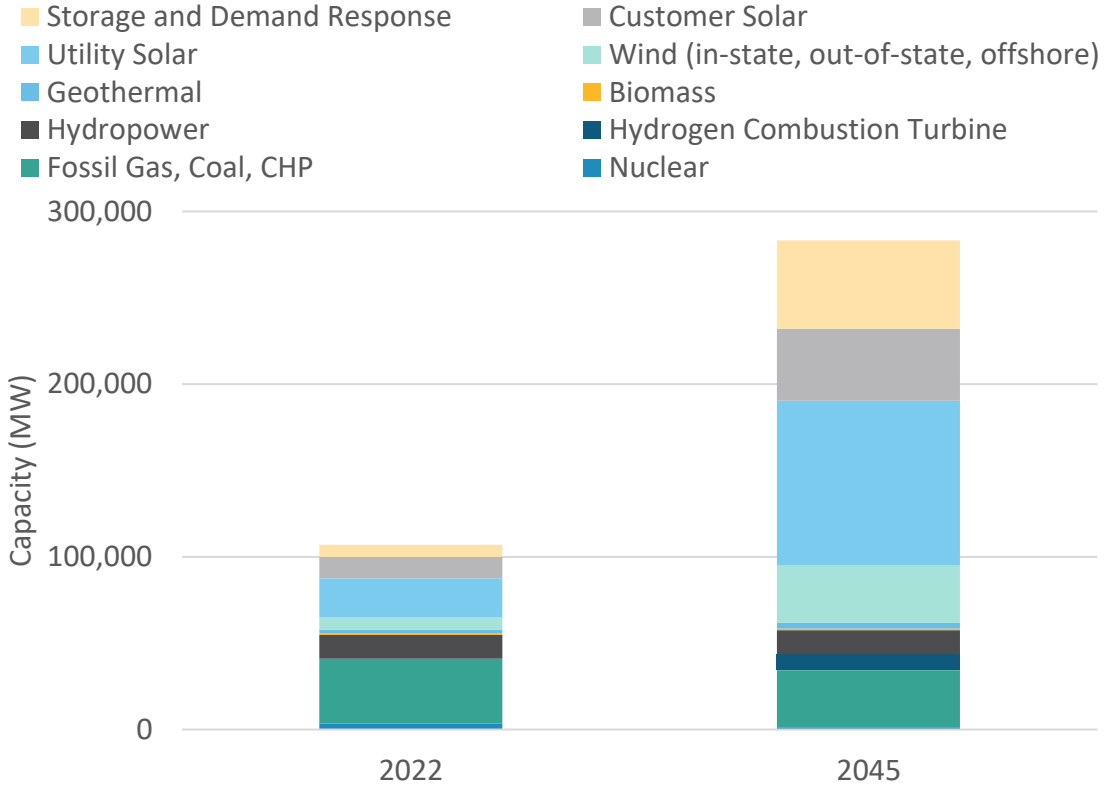
*Electric sector 2030 GHG planning target range of 30-38 $MMTCO_2e$ established in Scoping Plan Board Resolution 22-21

Building a Clean, Affordable, Reliable Grid

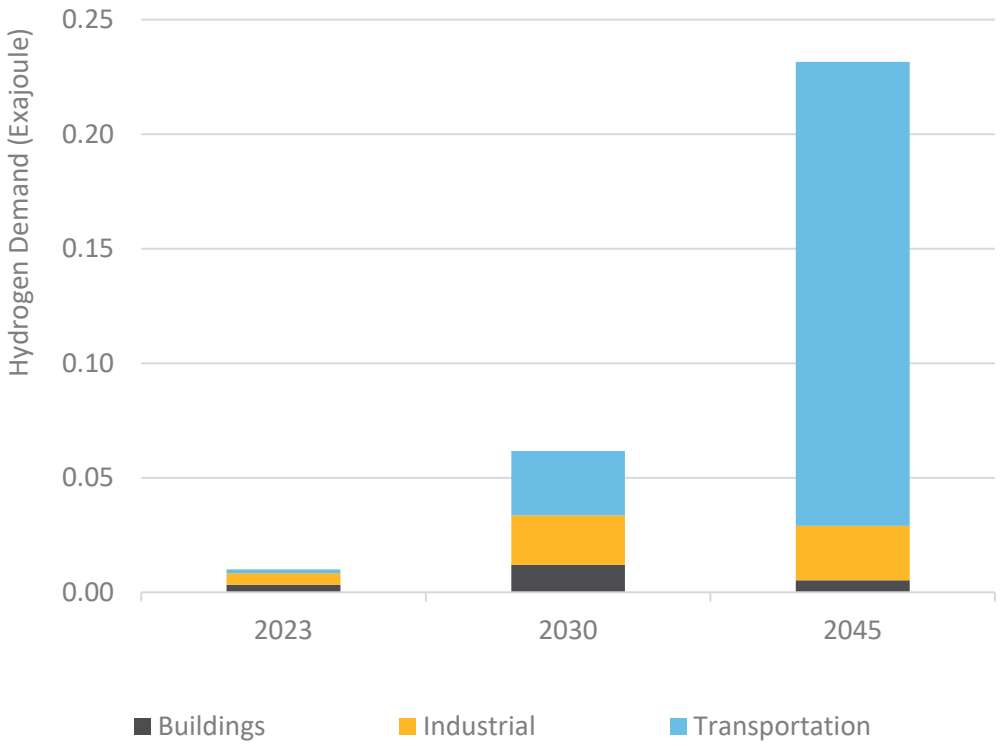
2x existing electricity generation



4x existing wind and solar capacity in 2045



Hydrogen Use by Sector in the Scoping Plan



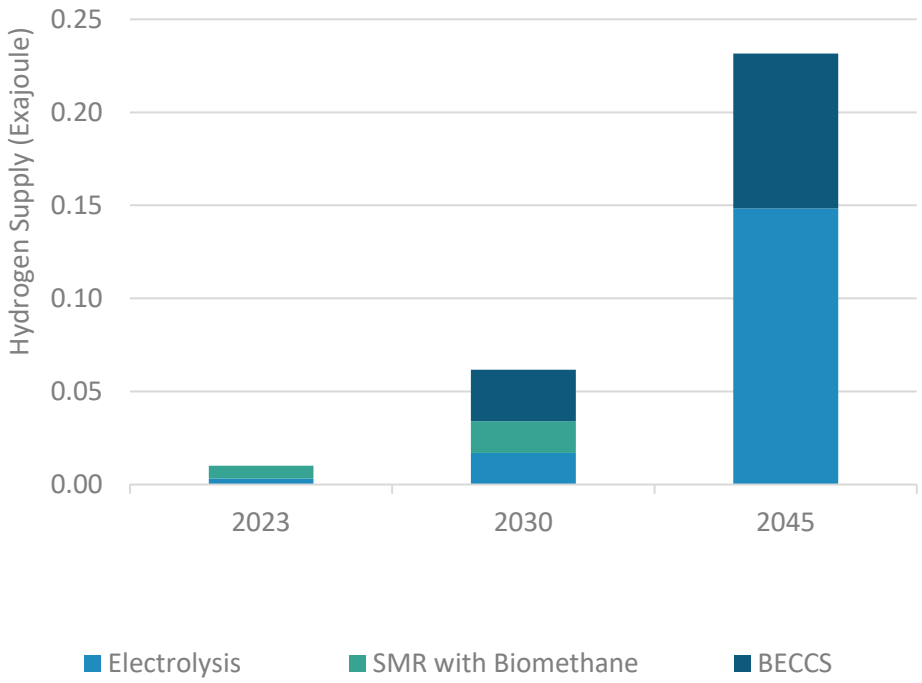
Hydrogen demand largely driven by non-combustion uses in transportation sector:

- Fuel cells for light-, medium-, and heavy-duty vehicles, aviation, ocean-going vessels, freight and passenger rail

Other end-uses with relatively smaller volumes:

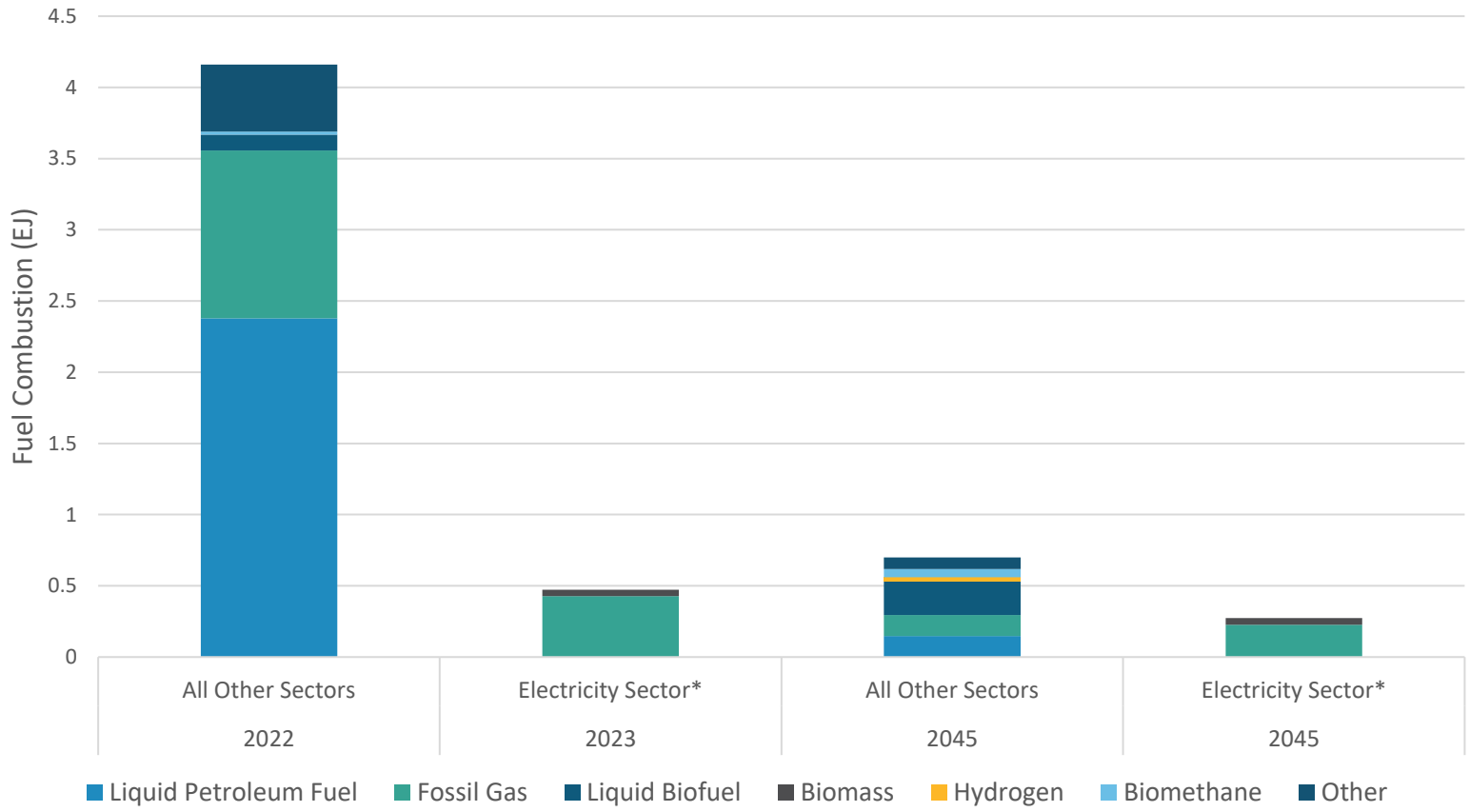
- Gas replacement to reduce fossil gas use in buildings and industrial sectors
- Hydrogen turbines in electric sector

Hydrogen Supply in the Scoping Plan



- Hydrogen identified as important tool to displace fossil fuel use
- Assumed hydrogen is supplied by 3 methods: electrolysis powered from zero-carbon electricity, steam methane reformation (SMR) of biomethane, and biomass gasification with CCS (BECCS)
- Electrolytic hydrogen modeled as additional ~21 GW of off-grid solar capacity in 2045
- Hydrogen production will be further studied through Senate Bill 1075 Report

Fossil Fuel Combustion Declines Significantly Across all Sectors

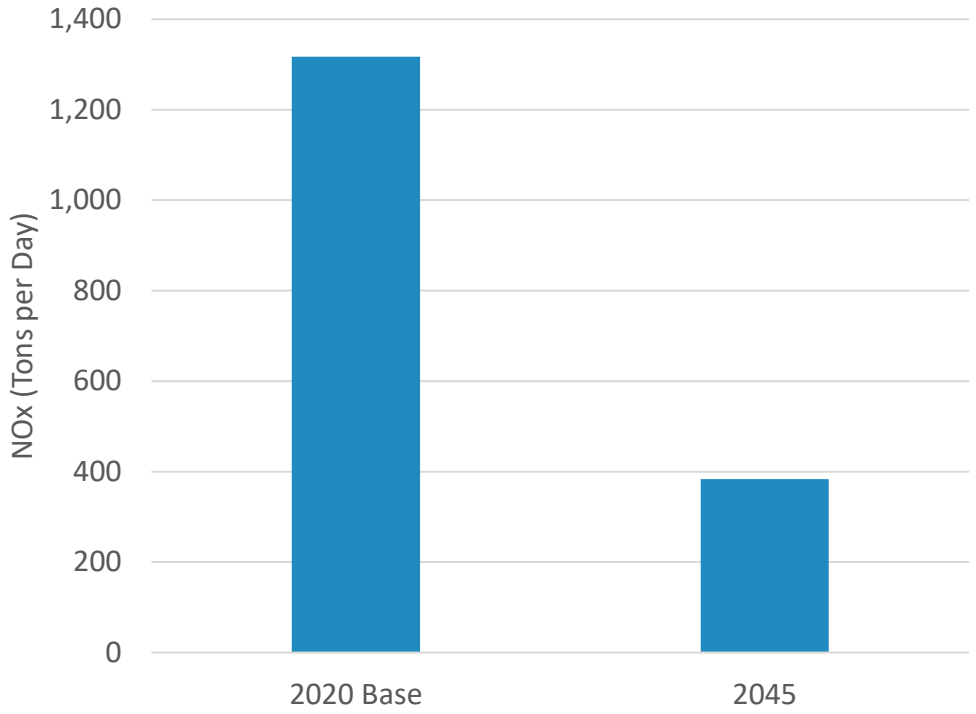


- Fossil gas use by electricity sector decreases by 47% in 2045 compared to today
- Electricity sector emissions in 2045 of ~8 MMTCO_2e (reflects 16.7 MMT CO_2 captured emissions to achieve AB 1279)

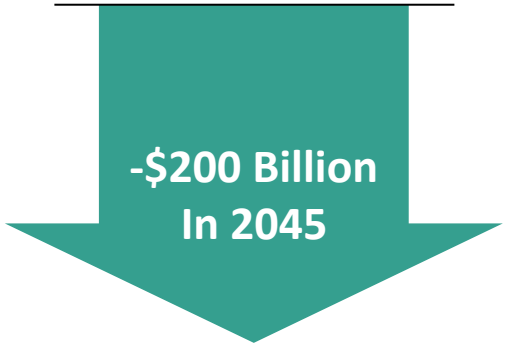
*RESOLVE outputs start with 2023. Excludes fuel combustion from imported electricity.

Air Quality Benefits of Reduced Fossil Fuel Combustion

71% reduction in NOx



$200 Billion in health cost savings from decreased fuel combustion



Thank You

Overview of IEPR Forecast

Heidi Javanbakht
SB 100 Workshop

November 22, 2024

List of Acronyms

AA - additional achievable

AAFS - additional achievable fuel substitution

BTM - behind-the-meter

CAISO - California Independent System Operator

CARB - California Air Resources Board

CEC - California Energy Commission

CPUC - California Public Utilities Commission

DAWG - Demand Analysis Working Group

DPP - distribution planning process

IEPR - Integrated Energy Policy Report

IOU - investor-owned utility

IRP - integrated resource planning

NAICS - North American Industry Classification System

PRM - planning reserve margin

PV - Photovoltaics

QFER - quarterly fuel and energy report

TPP - transmission planning process

ZEAS - zero emission appliance standard

Why does CEC forecast energy demand?

Warren-Alquist Act

Established the CEC

Public Resources Code 25301(a)

Requires the CEC to "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices."

CA Energy Demand Forecast

- Foundational for procurement and system planning in the state
- Informs:
  - Resource adequacy requirements (including the PRM)
  - Integrated resource planning (which drives procurement)
  - Reliability assessments
  - Transmission system planning
  - Distribution system planning
- Relation to SB 100:
  - CEC's long-term demand scenarios project is an input to the SB 100 assessments
  - The reference case is an extension of the IEPR forecast

CEC IEPR Forecast Products

- Updated annually, with a full refresh in odd years
- 15+ year system-level forecast of electricity demand
  - Annual electricity demand
  - 8760 hourly electricity loads for a 1-in-2 year
  - Scenarios for distributed generation, energy efficiency, building electrification, and transportation electrification
  - 1-in-5, 1-in-10, and 1-in-20 year net electricity peak
- Final results posted in mid-January
- Single Forecast Set agreement with CPUC, CAISO, and CARB documented in IEPR

Forecasting Impacts of Climate Change and State Decarb Strategies

Improving incorporation of climate change

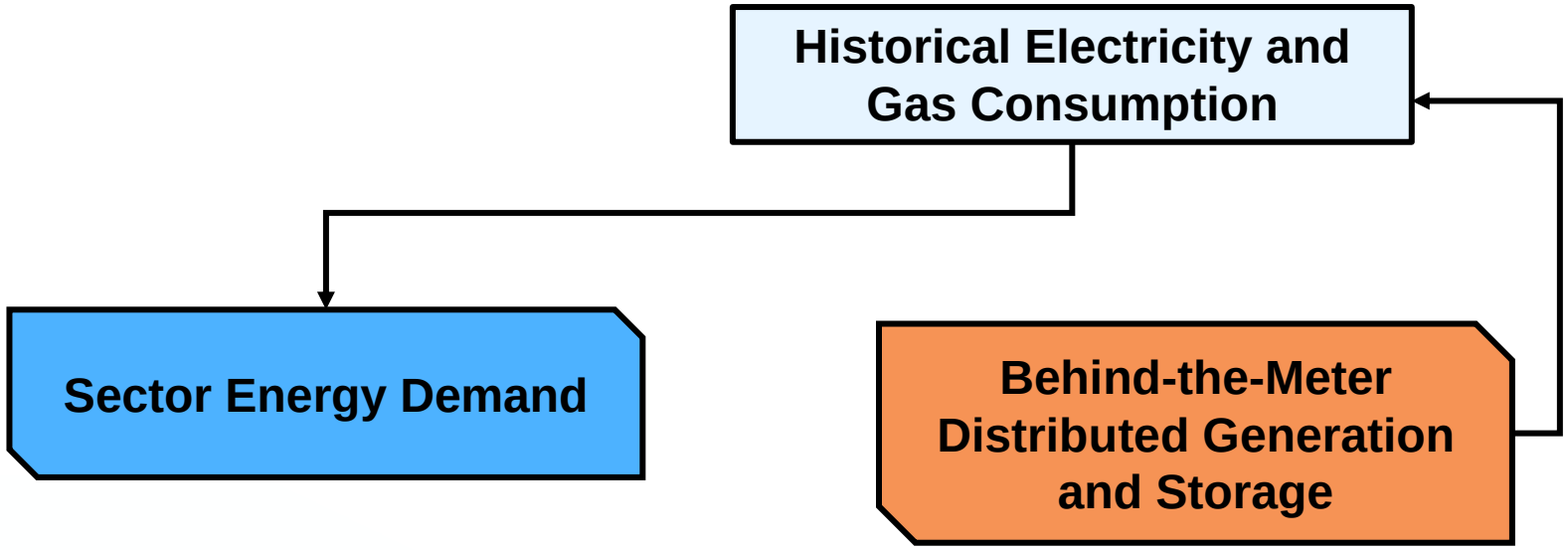
- Incremental updates, with full implementation for 2025 IEPR
- Shift from using historical weather data to using climate projections (as of the 2023 IEPR)
- Probabilistic hourly dataset

Incorporating strategies to achieve GHG emission reduction goals and economywide carbon neutrality by 2045

- Goals or proposed strategies without sufficient details or certainty are outside the scope of the forecast
- As relevant regulations and programs are developed, these are incorporated into the forecast

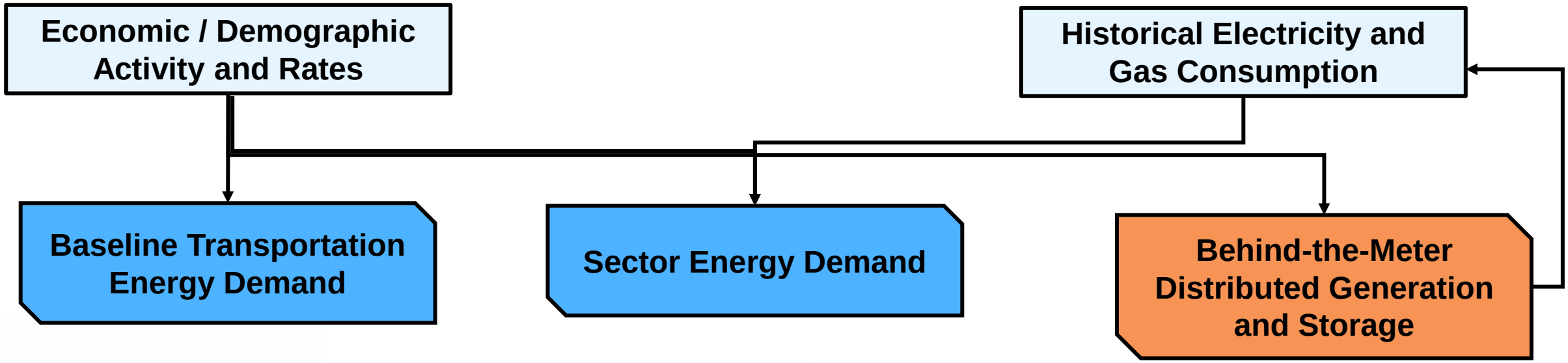
Forecast Approach

Energy Demand Model System (1)



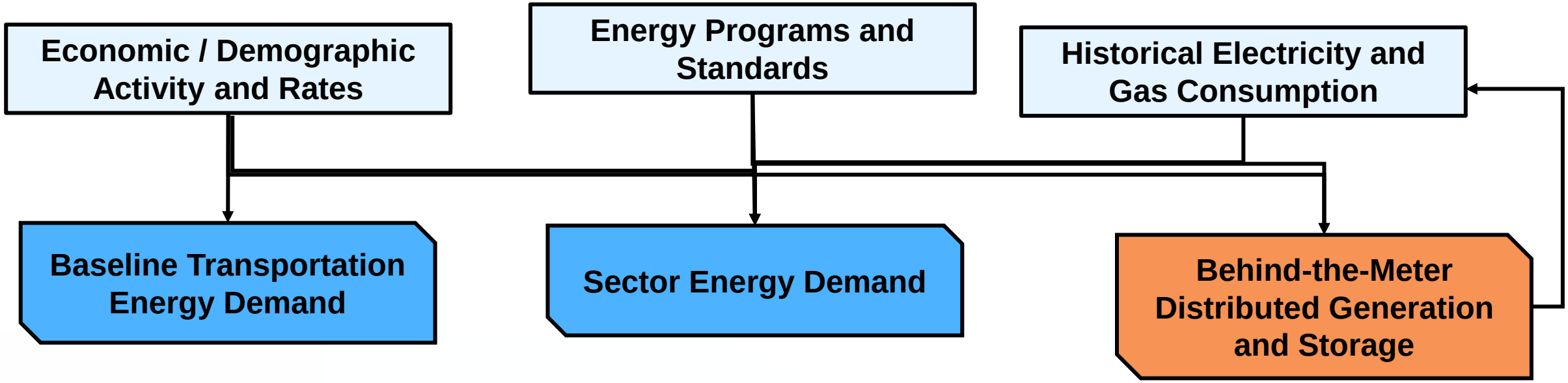
- Historical energy demand starts with latest sales data from QFER
- Estimates of historical distributed generation are added to historical sales data to estimate historical consumption
- Historical consumption data are provided to end use and NAICS based forecast models

Energy Demand Model System (2)



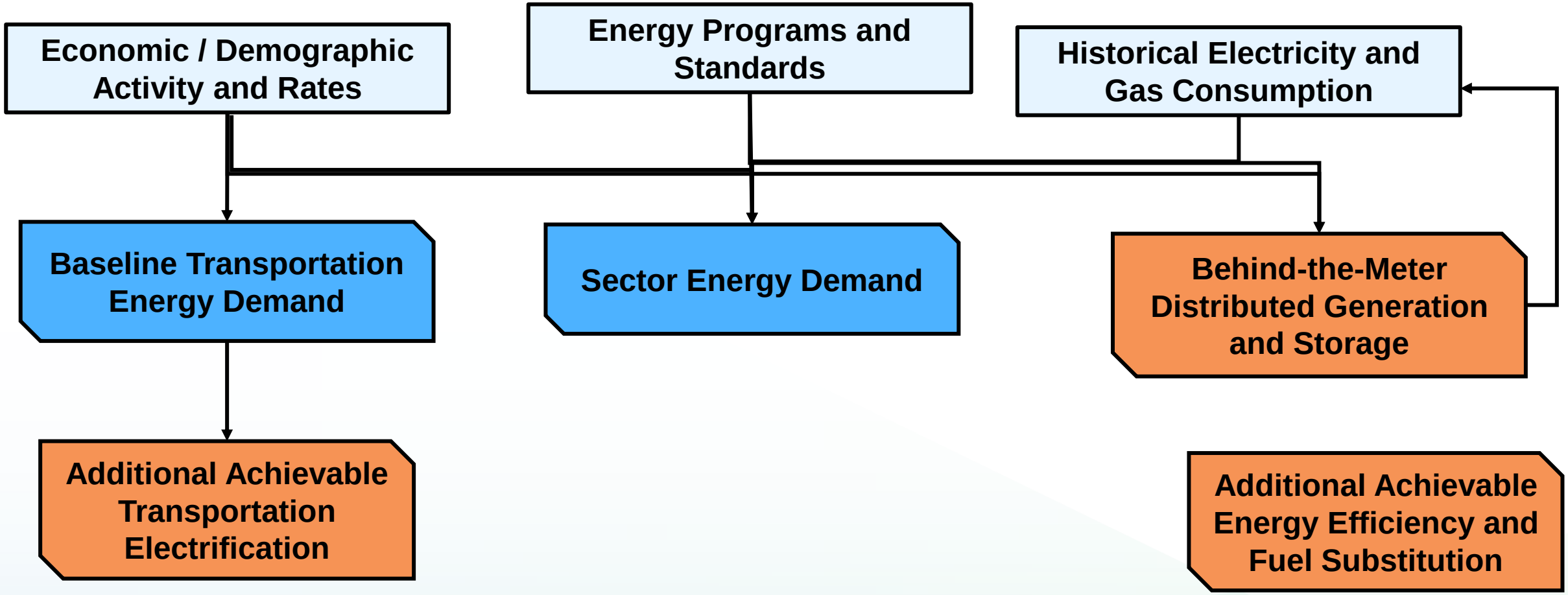
- Economic and demographic assumptions along with rate forecasts are inputs to the sector, distributed generation, and transportation models

Energy Demand Model System (3)



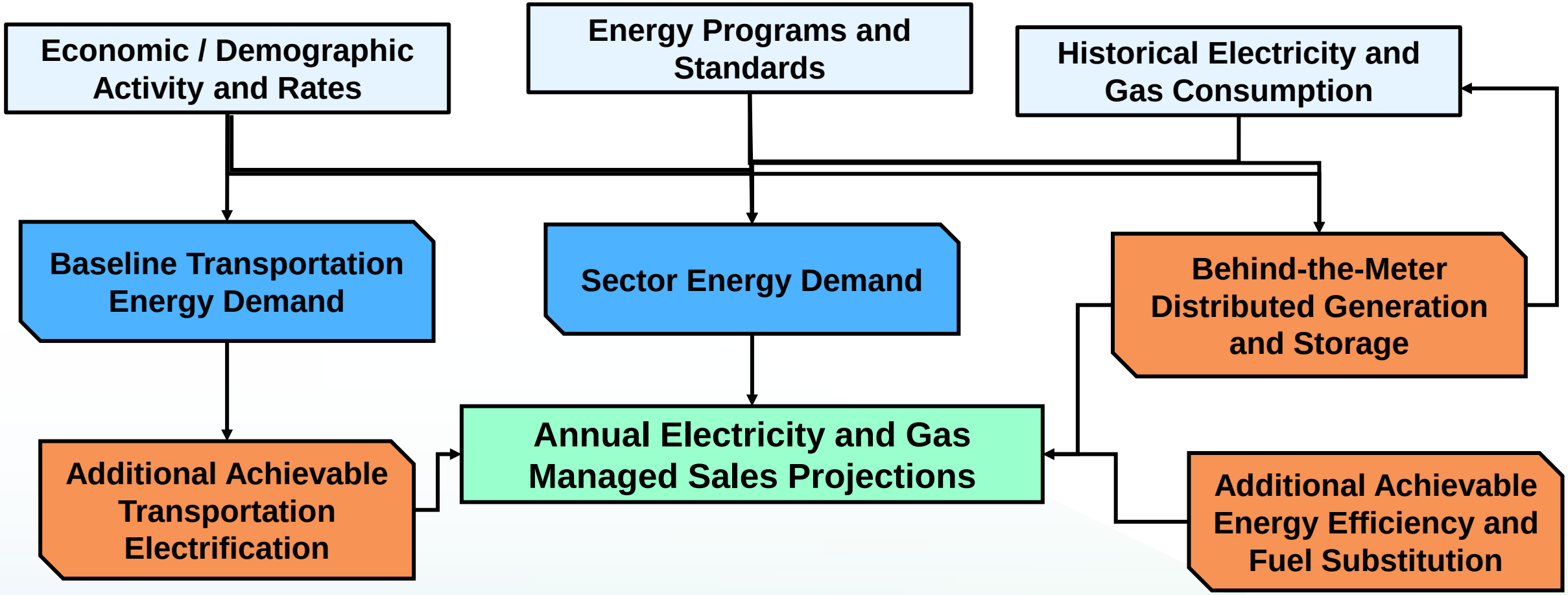
- Latest energy programs and standards estimates are provided to sector end use models
- BTM PV and storage projections consider Title 24 mandates for new construction

Energy Demand Model System (4)



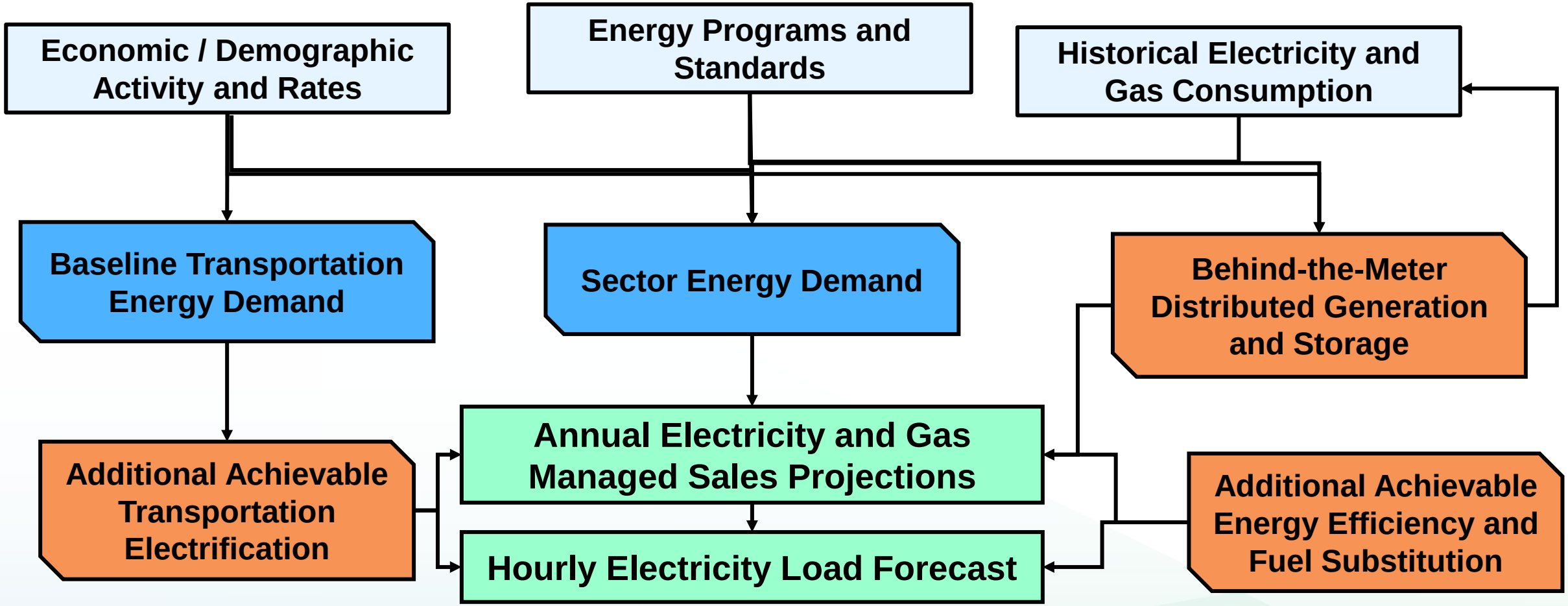
- Additional Achievable scenarios are developed for Energy Efficiency, Fuel Substitution, and Transportation Electrification

Energy Demand Model System (5)



- Load modifier results are combined with baseline consumption to create managed sales forecast scenarios

Energy Demand Model System (6)



- Electricity Results are fed into the hourly electricity load forecast
- Hourly load modifier profiles are integrated to create the managed hourly load forecast

AA Scenario Framework

Increasing uncertainty

Scenario	Guidelines
1	Firm commitments not included in the baseline forecast
2	Will occur, but some uncertainty around impacts
3	Very likely to occur with greater uncertainty about impact magnitudes
4	Likely to occur but still in planning phase
5	More speculative programs, perhaps in early planning phases
6	Programs that could exist in the future and would be required to meet some policy goals

2024 Electricity Forecast Framework

Name ⟶	Planning Forecast	Local Reliability Scenario
Example Use Cases ⟶	**Resource Adequacy CPUC IRP**	**CAISO TPP IOU DPP**
Economic, Demographic, and Price Scenarios	Baseline	Baseline
BTM PV and Storage	TBD	TBD
Additional Achievable Energy Efficiency Scenario	Scenario 3	Scenario 2
Additional Achievable Fuel Substitution Scenario	Scenario 3	Scenario 4
Additional Achievable Transportation Electrification Scenario	Scenario 3	Scenario 3

2024 IEPR Forecast Updates

- Improved characterization of data center load growth
- BTM PV and storage revisions
- AAFS revisions to reflect updates to zero emission appliance standards
- Transportation forecast uses a new travel model

2024 IEPR Forecast Timeline

Meeting Type	Topic	Date
IEPR Workshop	Electricity Load Growth Areas	May 16
IEPR Workshop	Forecast Methodology Updates	July 30
DAWG Meeting	BTM DG Updates, Econ/Demo Inputs, AAEE/AAFS Updates	August 21
IEPR Workshop	Forecast Use in Electricity System Planning	October 2
DAWG Meeting	Draft Load Modifier Results	October 21
IEPR Workshop	Draft Load Modifier Results	November 7
DAWG Meeting	Draft Overall Forecast Results	November 21
IEPR Workshop	**Draft Overall Forecast Results**	**December 12**
CEC Business Meeting	**Forecast Adoption**	**January 21, 2025**

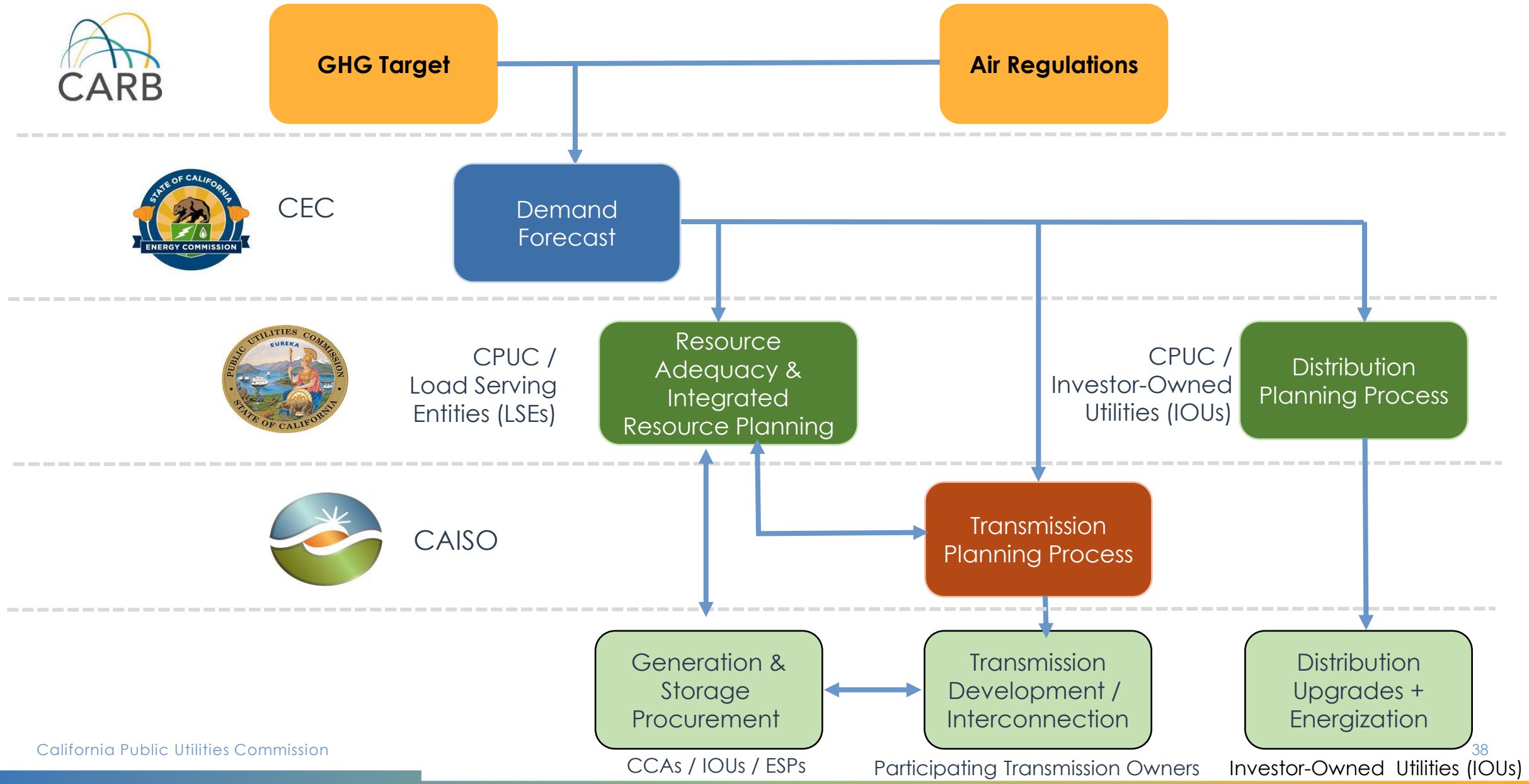
CPUC Jurisdictional LSEs' Procurement Progress

Molly Sterkel, Program Manager, Energy Division, Electric Planning and Market Design Branch CPUC

November 22, 2024

California Public Utilities Commission

California Statewide Energy Planning Processes – High Level Overview



Planning and Procurement for Reliability and GHG Reductions at Least Cost

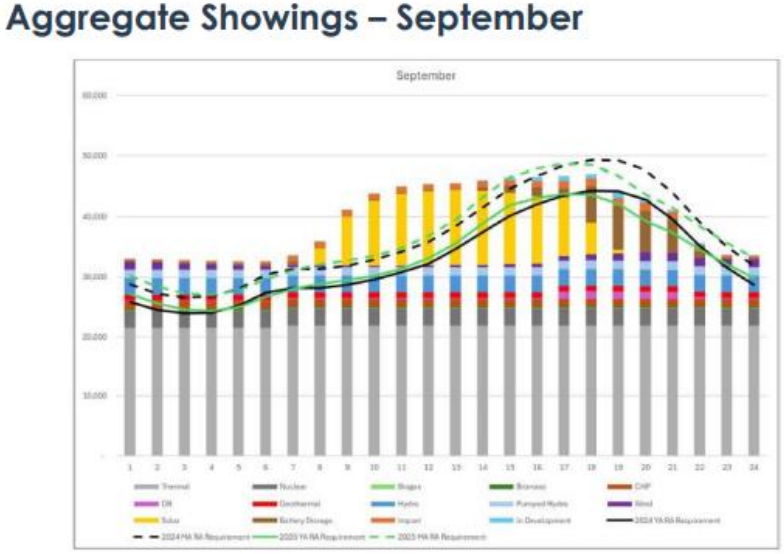
Procurement needed to meet SB 100 is facilitated by CPUC's programs:

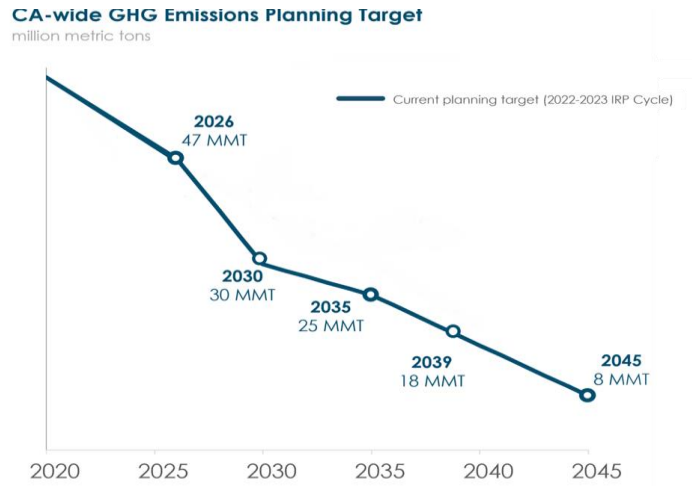
Resource Adequacy (RA): Near-term horizon

- **Capacity requirements** procured by each Load Serving Entity (LSE), per their share of near-term load forecast plus a planning reserve margin (PRM) per PU Code 380.
- **Must offer obligation** on RA ensures resources bid into CAISO energy markets
  - Includes obligations for System, Flexible and Local RA
  - Program transitioning in a 24 hour "slice of day" obligation in 2025

Integrated Resource Planning (IRP): Long-term horizon

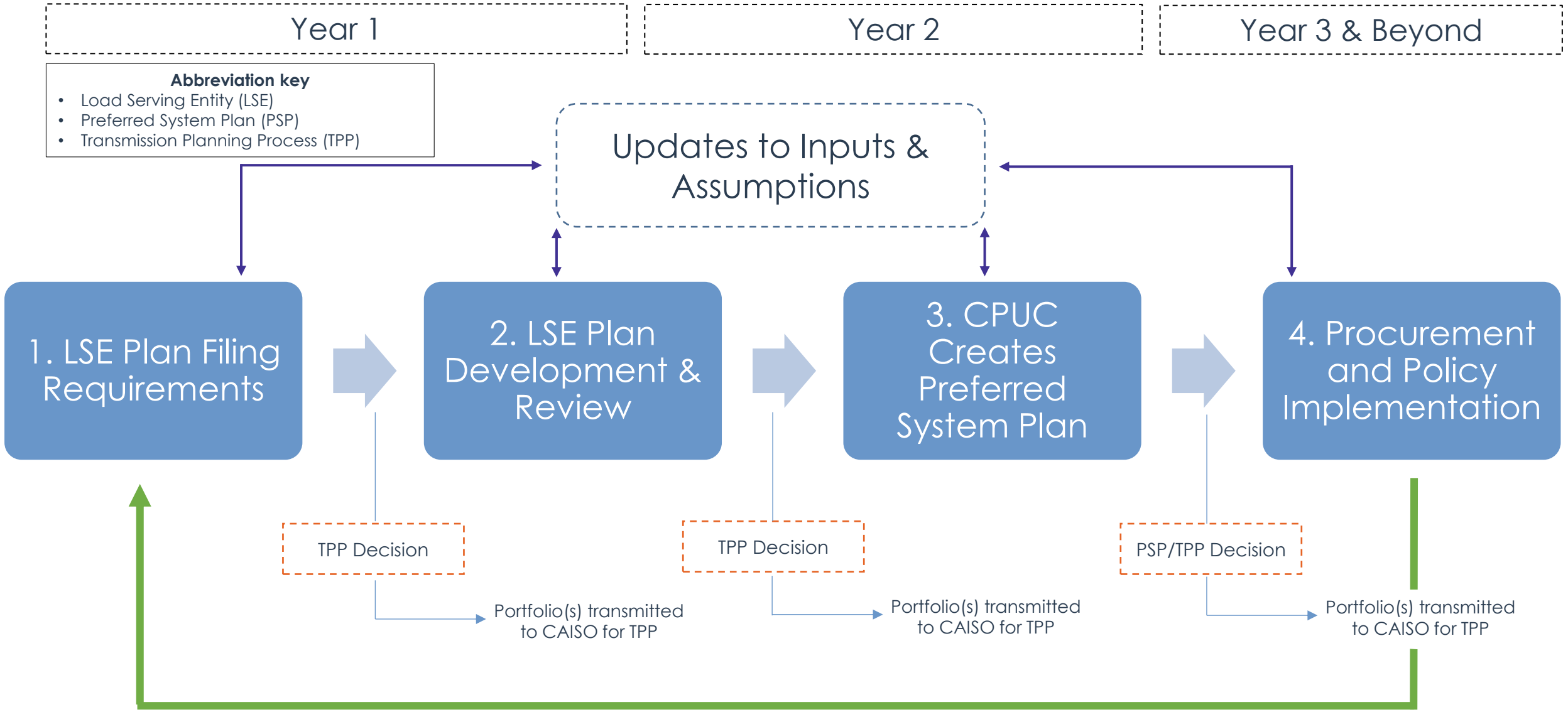
- **Planning process build Resource Portfolios** with input from LSEs and stakeholders per PU Code 454, as directed by SB 350 (2015) and SB 100 (2018)
  - "...adopt a process for each load-serving entity…to file an integrated resource plan…to ensure that load-serving entities…" meet a host of policy aims and objectives (PU Code 454.52).
- **Reliability and GHG Reduction** ensured via identification of portfolio of resources to meet reliability for long term forecast & other assumptions
  - "identify a diverse and balance portfolio of resources...that provides optimal integration of renewable energy in a cost-effective manner" (PU Code Section 454.51).
- **IRP Procurement Orders** drive contracting of new resources by LSEs to support statutory goals and RA or RPS obligations
- **Transmission Planning** at CAISO is informed by CPUC IRP resource portfolios





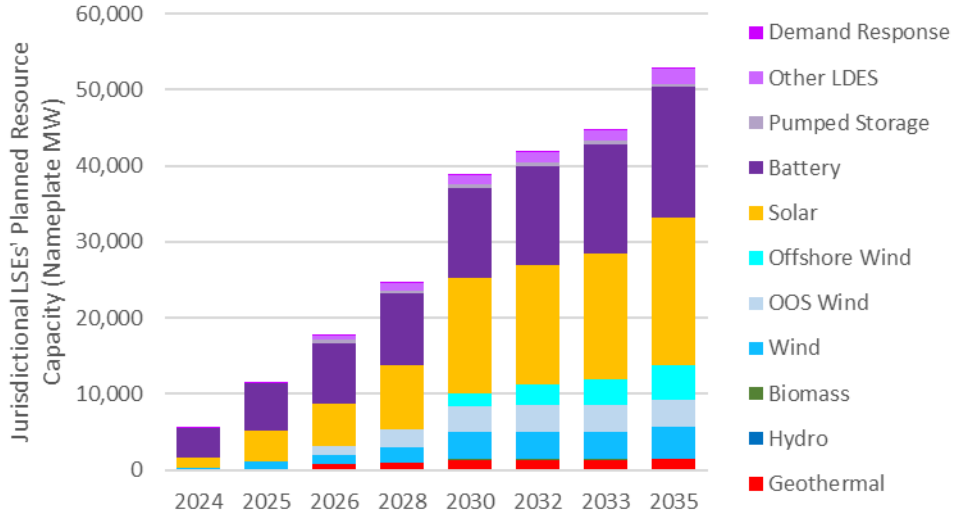
CPUC February 2024 IRP "Preferred System Plan", which plans for a portfolio that could reduce GHGs by 58% in 2035 compared to 2020 levels

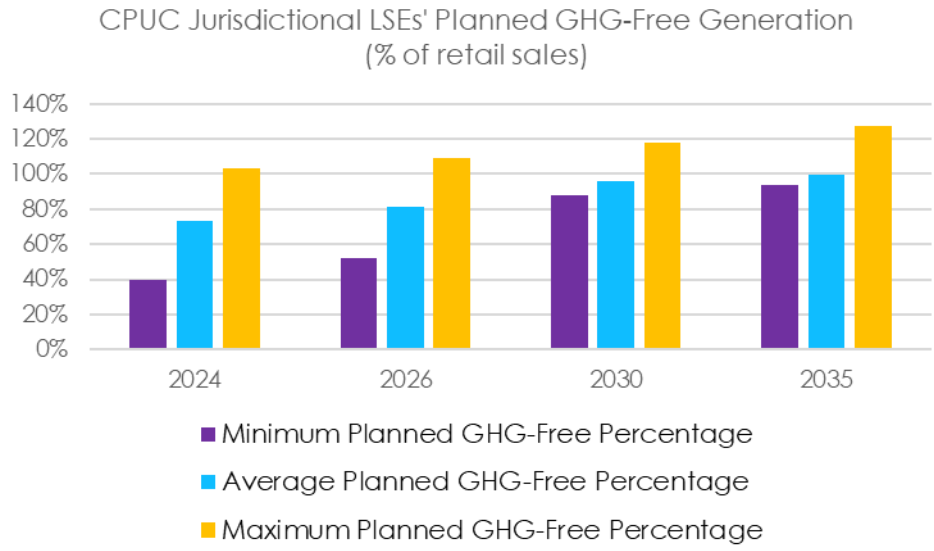
Overview of an IRP Cycle (3 years)



CPUC Jurisdictional LSEs' Plans to surpass SB 100 Interim Targets

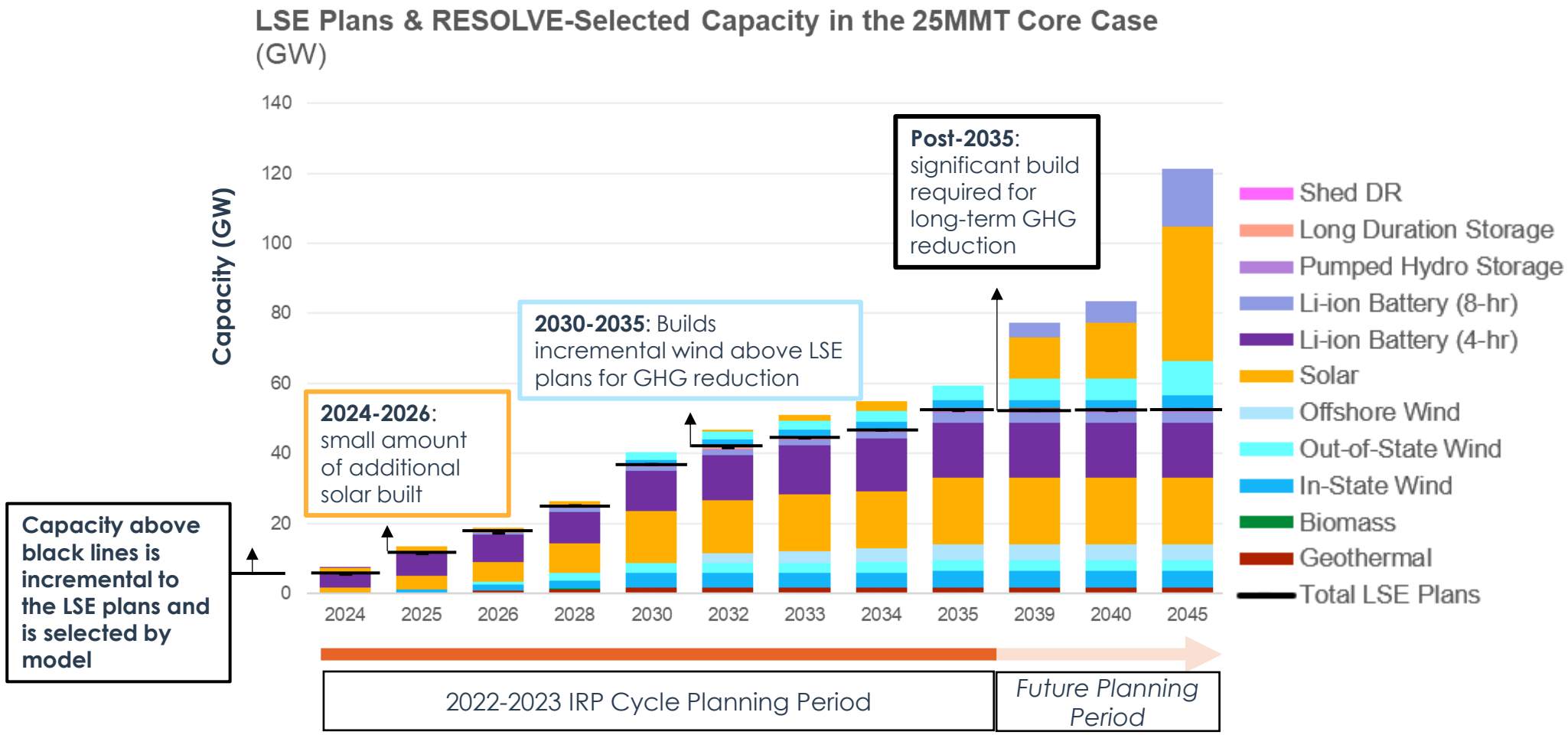
- CPUC Jurisdictional LSEs collectively planned for targets of:
  - 18.6 million metric ton (MMT) (2030) and 15.0 MMT (2035), which is the CPUC-jurisdictional share of the statewide 30 MMT (2030) and 25 MMT (2035) statewide electric sector targets.
- **Actual plans showed in excess of required reductions:** All LSEs met their assigned greenhouse gas (GHG) benchmarks, with some achieving emissions well below their assigned benchmarks:
  - LSE Emissions in 2030, per aggregated LSE clean system power (CSP) results: **15.1 MMT**
  - LSE Emissions in 2035, per aggregated LSE CSP results: **12.2 MMT**
- When aggregated, CPUC Jurisdictional LSEs demonstrated collective intentions to exceed their proportional GHG requirements.
  - Their aggregated 25 MMT Portfolios reduced GHG emissions by ~3 MMT below their GHG emissions targets



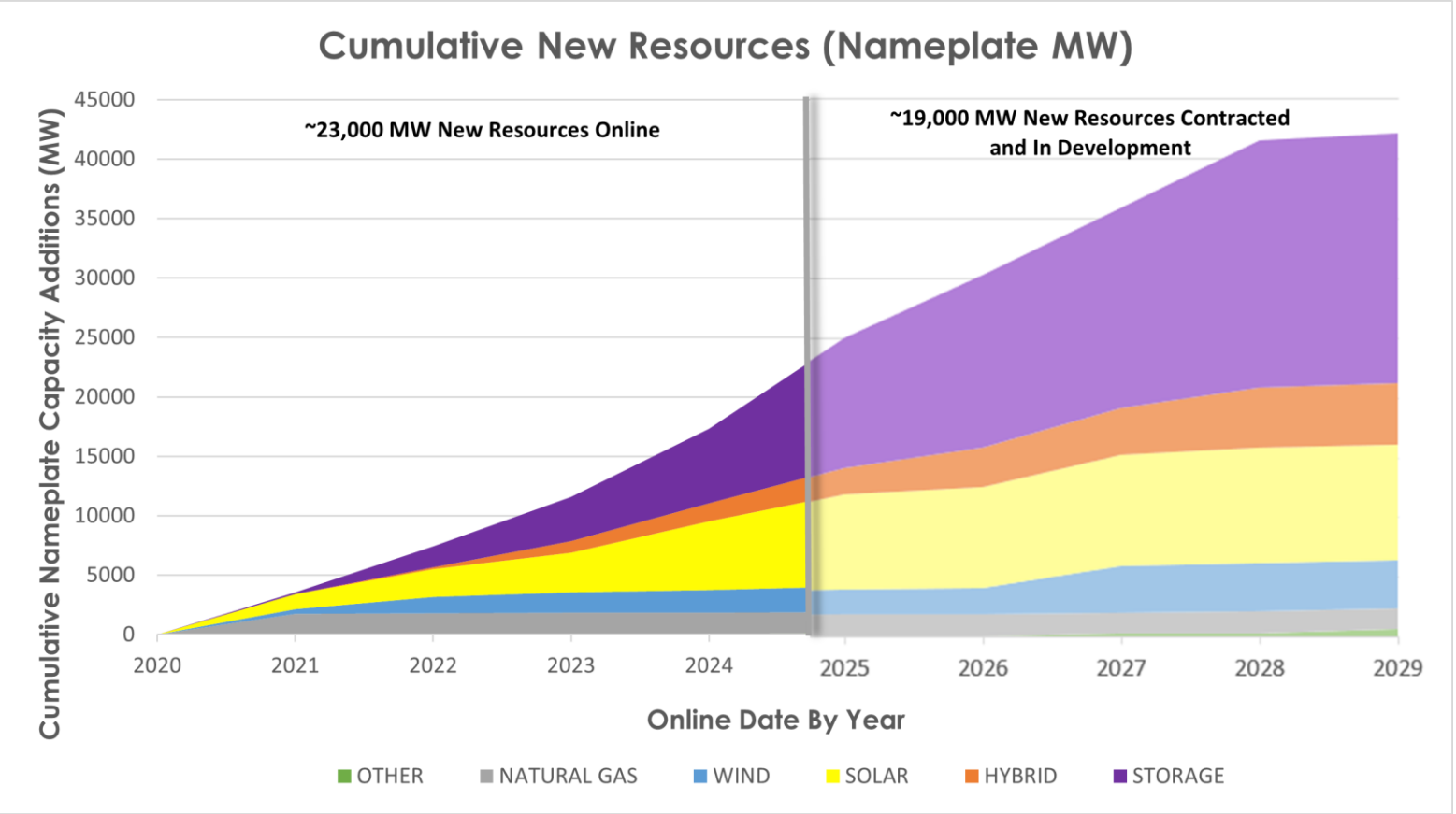


Resource Portfolio: LSE-Planned Builds vs. Model Builds

Planning for 25 MMT GHG by 2035 (Core Case – 2023 PSP Portfolio, D.24-02-047)



New Energy Resources Online and Under Contract



Note: 1000 MW = 1 Gigawatt (GW)
Data shown here shows a snapshot of new resources added to CAISO grid Jan 2020 – Sept 2024, including specified CAISO imports. Also shown is a projection of future new resources through 2027 based on contracts in place by September 2024. "Other" resources includes geothermal, biomass, biogas, and hydropower.
Based on IRP's Planning Portfolios, there could be as much as 50,000 MW Nameplate MW new online by 2030.

Recent Resource Development Successes

Arica & Victory Pass

- 463 MW Solar + 186 MW Storage
- Riverside County

Strauss Wind

- 98 MW Wind
- Santa Barbara County

Westside Canal

- 131 MW Storage
- San Diego County

Steps to Continue Progress on Actualizing SB 100 Targets

1. Adoption of AB 1373 Central Procurement (CPE) Decision

- Recent order identified up to 7.6 GW of offshore wind, plus up to 1 GW of geothermal, up to 1 GW of multi-day LDES and up to 1 GW of 12+ hour LDES could be considered for procurement by CA Department of Water Resources and costs/benefits allocated to all LSEs

2. Transmission Planning for CAISO 2025-2026 TPP

- Annual cycle of busbar mapping based on current portfolio.

3. Development of Reliable and Clean Power Procurement Program (RCPPP)

- This new procurement program in IRP aims to implement a holistic approach for all CPUC-jurisdictional LSEs, including IOUs, CCAs, and ESPs.
- Establishes longer-term LSE procurement requirements for the electric resources needed to maintain reliability and reduce GHG emissions at least cost.
- Key Components: Need Determination, Need Allocation, Compliance, and Enforcement designed to require LSEs to procure the GHG-free GWh and effective capacity in their plan sufficient to achieve their assigned GHG benchmarks and reliability need.
- Staff Proposal and ALJ Ruling expected around Q4 2024.

Utility Perspective on Progress Towards Meeting SB 100 Goals – Procurement

Moderator: **Simon Baker**, Director of Distributed Energy Resources, Natural Gas & Retail Energy Rates

Panelists:

Dan Hopper, Managing Director, Regulatory Policy, Southern California Energy

Mary Neal, Senior Project Manager with MRW and Associates, consultant to Alliance for Retail Energy Markets

Mandip Samra, General Manager, Burbank Water and Power

Ryan Tracey, Director of Planning and Analytics, Sonoma Clean Power

California Public Utilities Commission

Overcoming Challenges to Implementation of SB 100 Goals

Neil Raffan, Program and Project Supervisor, CPUC

Danielle Osborn Mills, Principal, Infrastructure Policy Development, CAISO

Rohima Moly, Deputy Director, Energy & Climate, GO-Biz

Jon Olson, Director, Energy Trading & Contracts, SMUD

California Public
Utilities Commission

Transmission Development and Tracking

Neil Raffan, Program and Project Supervisor

Integrated Resource Planning – Transmission & Interconnection

California Public
Utilities Commission

Significant Transmission Needed for SB100

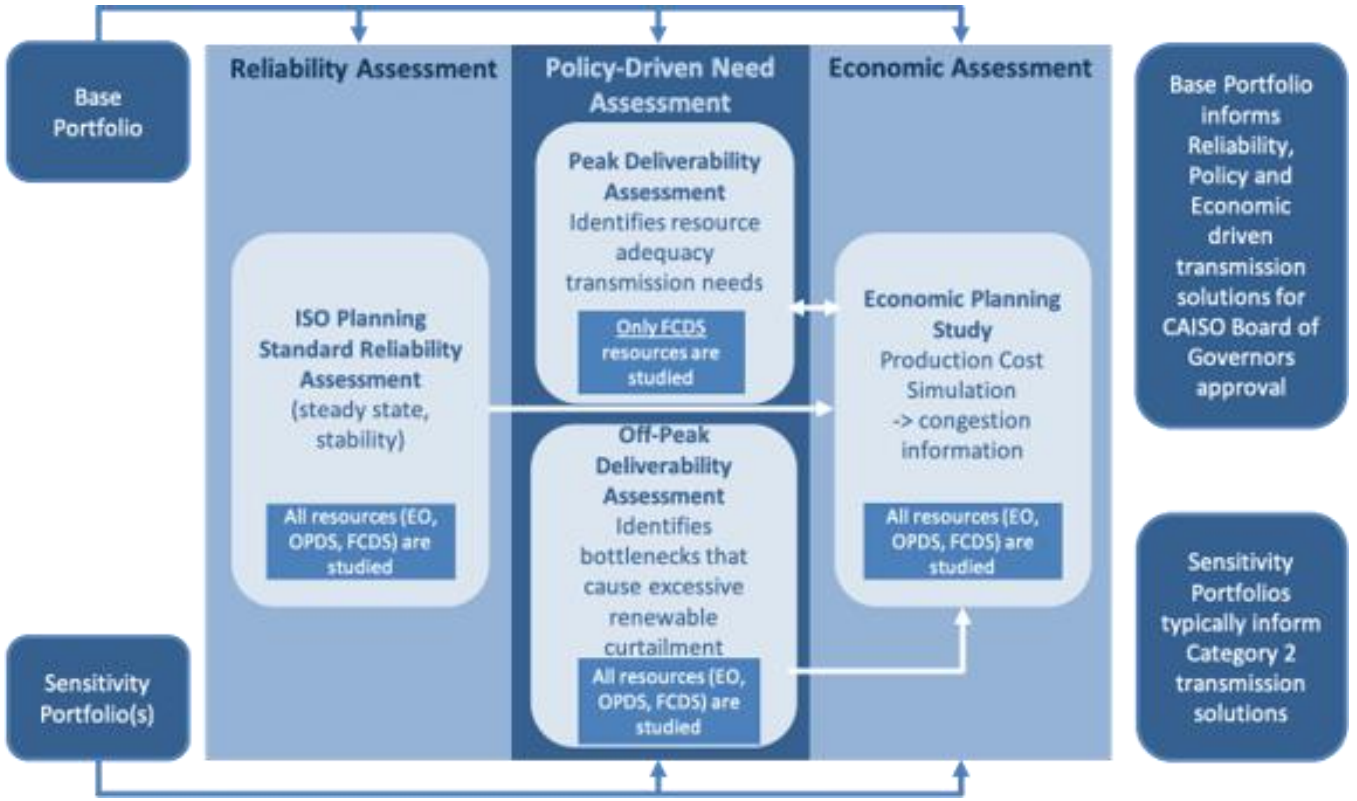
- Meeting SB 100's requirements will require continued transformation of California's electricity generation fleet
- New transmission is critical for adding the necessary new clean generation and storage:
  - Enable in-state resources such as solar, wind, and storage, to serve demand
  - Significant role for new high voltage transmission lines to access out-of-state resources

Planning Coordination in California

- In 2010, the CPUC, CEC, and CAISO entered into a memorandum of understanding (MOU) to coordinate on renewable generation planning and transmission planning
  - The MOU established the **"single forecast set,"** which seeks to, "use [IEPR Forecast] consistently in the transmission planning and resource procurement cycles to the extent possible given the sequencing of the different processes"
- Since then, the entities have taken additional measures to enhance coordination of load forecasting (CEC), resource planning (CPUC), and transmission planning (CAISO) and updated the MOU in 2022
- Coordination among the agencies is key to ensuring transmission is developed to meet future resource needs to meet SB 100 targets

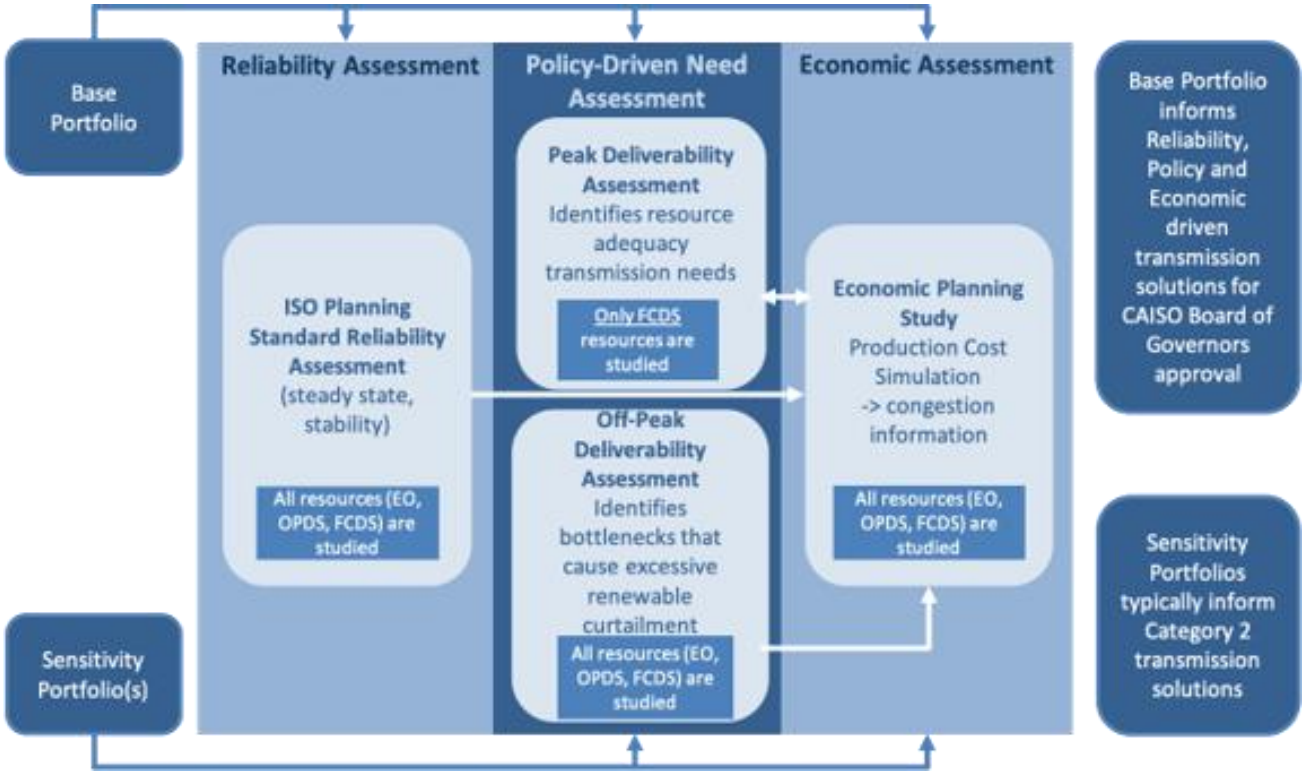
IRP's Role in the CAISO's Transmission Planning Process (1 of 2)

- The CAISO's TPP is an annual comprehensive evaluation of the CAISO's transmission grid to:
  1. Address grid reliability requirements,
  2. Identify projects needed to successfully meet California's policy goals, and
  3. Explore projects that can bring economic benefits to consumers
- CPUC develops resource portfolios and CEC develops load scenarios for use by CAISO in the TPP
  - In accordance with CPUC-CEC-CAISO Memorandum of Understanding agreed to in December 2022
  - Replaced and expanded on the May 2010 MOU between the CAISO and the CPUC.



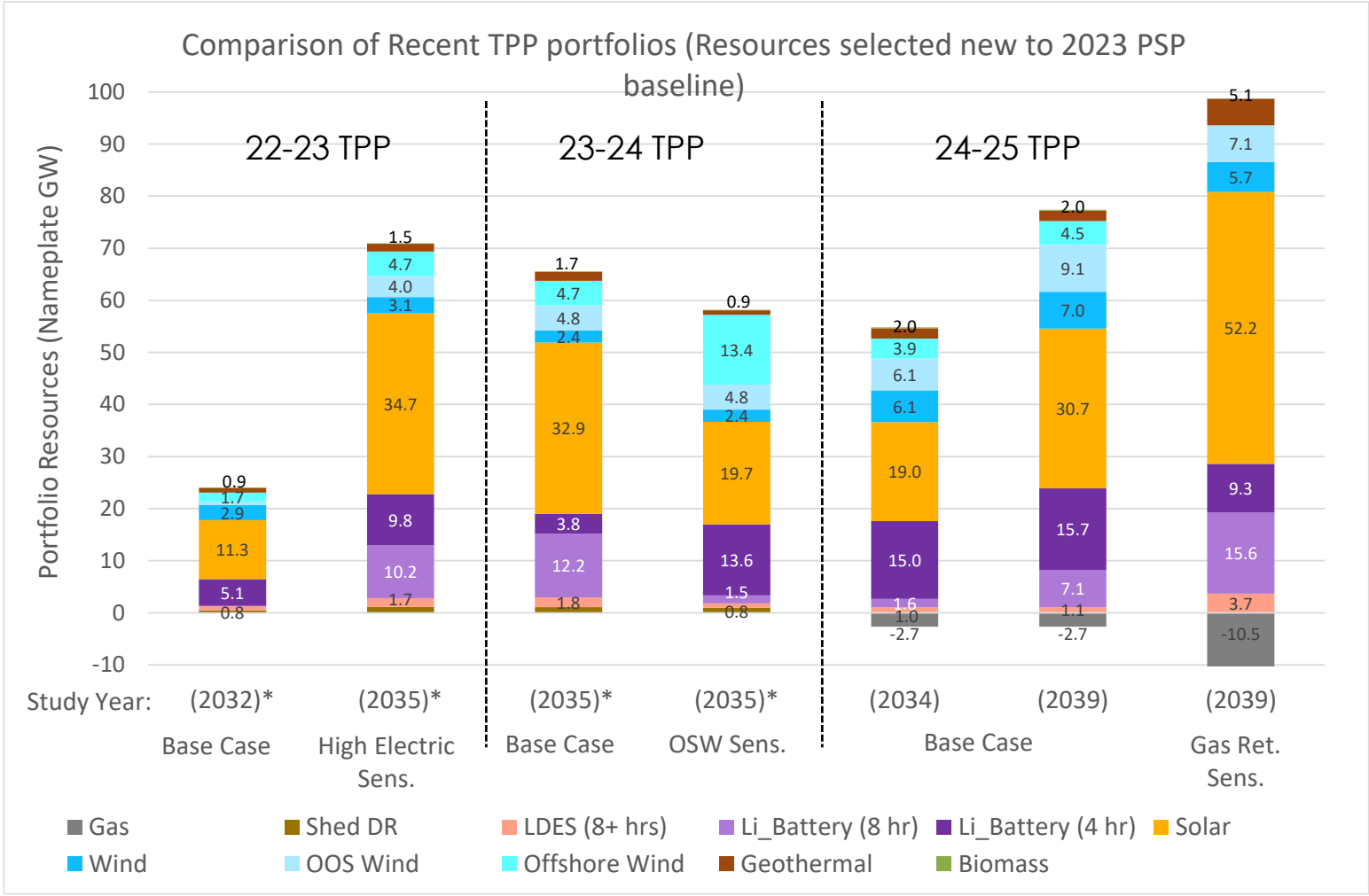
IRP's Role in the CAISO's Transmission Planning Process (2 of 2)

- The CPUC typically transmits multiple distinct portfolios developed in the IRP process:
  - Reliability and Policy-Driven Base Case portfolio
  - Policy-Driven Sensitivity portfolio(s)
- Base Cases are designed to reflect CPUC policy guidance, including reliability and GHG reduction targets, and provide regulatory certainty for transmission planning
  - Lead to identified transmission solutions going to the CAISO Board of governors for approval
- Policy-Driven Sensitivities are designed to either:
  - Support a "least regrets" approach that provides a reasonable range of future scenarios that can be linked to the base case, or
  - Gather additional transmission information to support future portfolio development and explore incremental optionality or risk
- Identified transmission solutions in Policy-Driven Sensitivities do not directly go to the CAISO board for approval, but can help inform base case solutions



Recent TPP Portfolios Transmitted to CAISO

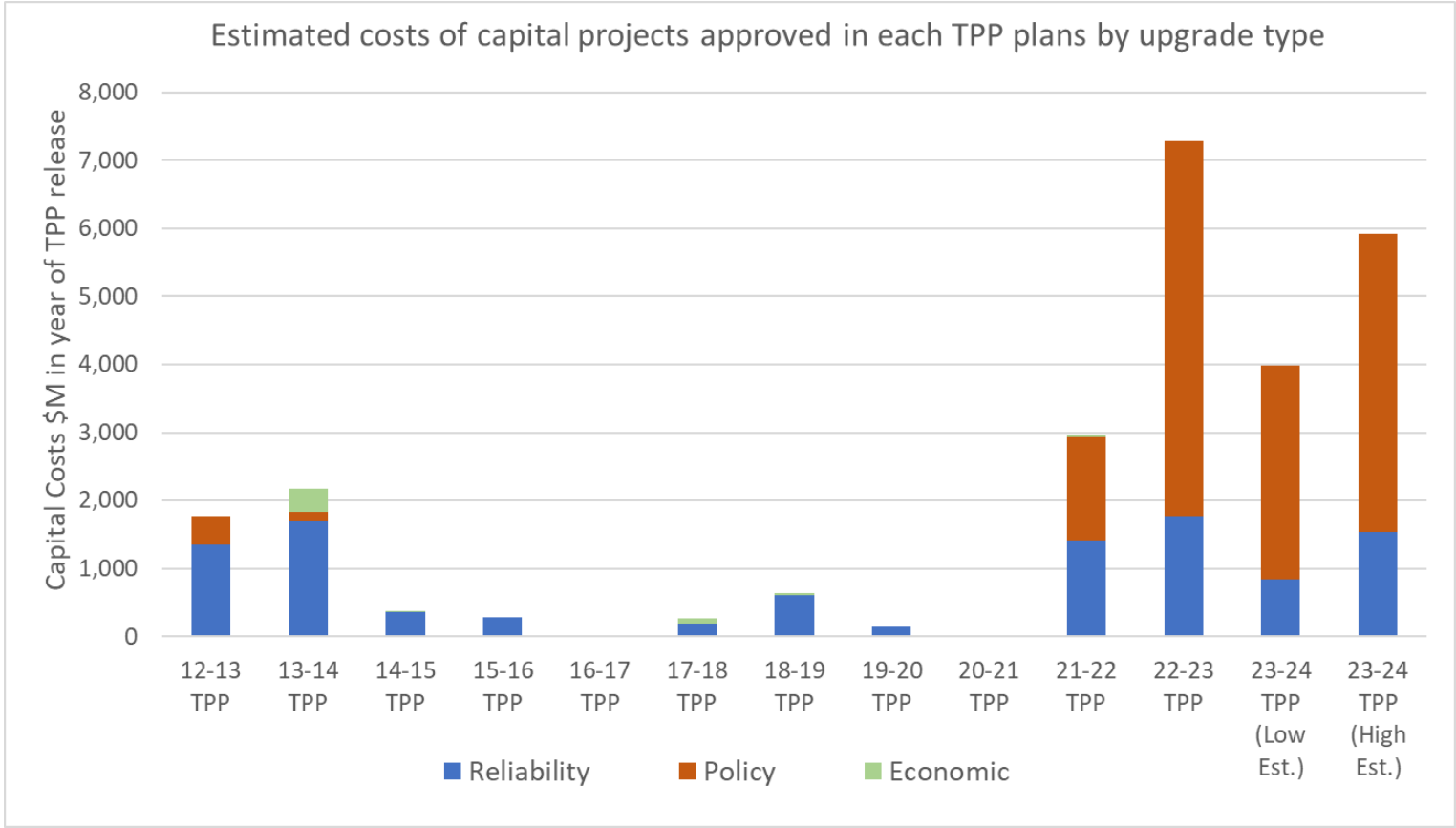
- Historically has focused on grid needs up to 10-years into the future
- Shifted to transmitting portfolios that model further out into the future:
  - Per Public Utilities Code § 454.57 (SB 887, 2022), portfolios passed to the CAISO will model out at least 15 years
  - The 24-25 TPP, transmitted this February, included mapped results for 2034 (10-years out) and 2039 (15-years out)
- For the past few TPP cycles, the CPUC has mapped and transmitted a base case and one sensitivity portfolio



* Resource amounts in graph adjusted to account for updated baseline used for 24-25 TPP portfolios. The 23-24 TPP and earlier portfolio modeled Li Battery durations aggregated. These have been separated to 4- and 8 hr for comparison to 24-25 TPP portfolios.

Recent TPP Results

- The Annual TPP includes summary of transmission projects approved by the CAISO Board
- These projects, depending on size, cost, and location, are then either
  - Constructed by the incumbent transmission operator, or
  - Go out for competitive solicitation, through CAISO's process to select entity to build project
- Chart on right depicts approved transmission projects for each TPP study by cost estimated in that year's TPP report and project type.



Upgrades Approved in TPP		20-21 TPP	21-22 TPP	22-23 TPP	23-24 TPP
Reliability Driven Upgrades	No. of Upgrades	3	16	24	19
	Est. Cost ($billions)	$ 0.02 – 0.04	$ 0.9 – 1.4	$ 1.7	$0.8 – 1.5
Policy Driven Upgrades	No. of Upgrades	None	7	21	7
	Est. Cost ($billions)	0	$1.2 – 1.6	$ 5.2	$3.1 – 4.6

Tracking Transmission Development Towards SB 100

- SB 1174 Statute (2022)

"Each electrical corporation that owns electrical transmission facilities shall annually prepare, and submit to the commission, a report on any changes to previously reported in-service dates of transmission and interconnection facilities necessary to provide transmission deliverability to eligible renewable energy resources or energy storage resources that have executed interconnection agreements."

- SB 1174 Data Request & Narrative Statements
  - IOUs (SDG&E, PG&E, and SCE) reported data on their portfolio of in-development transmission projects that are delayed, and the in-development generation resources that depend on these transmission projects
  - IOUs also provided narrative statements on the impact of transmission development delays on renewable portfolio standard (RPS) compliance obligations, including a discussion of the general magnitude and causes of delays, challenges to overcoming them, and potential solutions

- Analysis of this data and narrative statements will be incorporated into the 2024 RPS report to the legislature, and included in each annual RPS report going forward

SB 1174 Analysis Objectives & Actions

- Analysis Objectives
  - Identify how many gigawatts of generation and storage resources are projected to be delayed or "at risk" of becoming delayed by the delayed transmission projects that these resources depend on
  - Identify specific transmission projects of concern (that are holding up the largest number of GW of resources)
  - Understand the median delay time for each delay reason
- Actions
  - This assessment identifies the reasons for transmission delays that have the highest impact on generation and storage resources, and that are associated with the largest changes in in-service dates
  - This information can be used by CPUC, TED Task Force, developers, and utilities to focus their attention on specific problem projects, and general areas where process improvements are needed

Other Transmission Tracking Efforts Towards SB 100

- Transmission Project Review Process
  - Allows the CPUC and stakeholders to receive robust data from transmission owners, and to inquire about and provide feedback on the IOUs' historical, current, and forecast transmission projects

- Transmission Development Forum
  - The CAISO, in conjunction with the CPUC and the participating transmission owners, hold bi-annual public stakeholder forums to provide status updates on the transmission projects previously approved through the transmission planning process and network upgrades identified in the generation interconnection process

- California Public Advocates Office Transmission Data Dashboard (ca.gov)
  - Offers a snapshot of the status of California's electric transmission network infrastructure, and provides a comprehensive overview of historical, current, and future CAISO-approved transmission projects

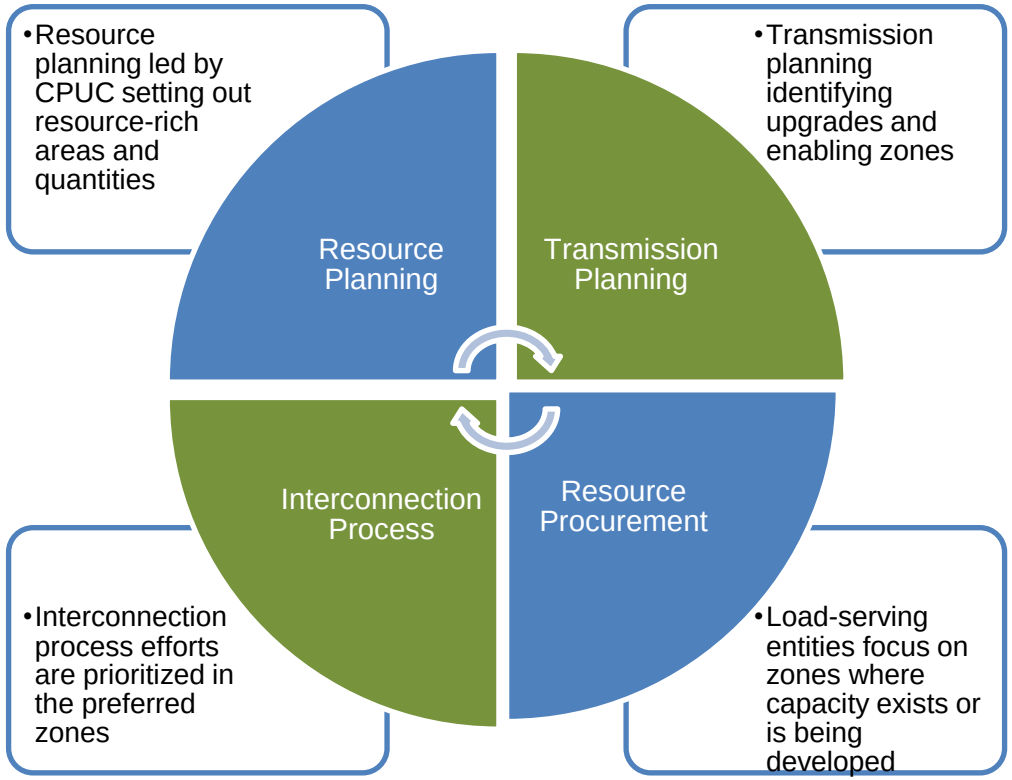
- **To accomplish SB 100 will require existing planning processes to be supported by efforts such as these keeping transmission development on track**

CAISO Transmission and Interconnection Update

November 21, 2024

CEC – SB100 Workshop

Memorandum of Understanding between the CAISO, CPUC, and CEC establishes a strategic direction for long-term electric system planning to meet reliability needs and SB 100 clean energy goals



The CPUC/CEC/ISO Memorandum of Understanding signed in December, 2022 sets the strategic direction to:

- Tighten the linkage between resource and transmission planning, procurement direction, and the CAISO interconnection process to the greatest extent possible.
- Create formal linkage between CEC SB 100/IEPR activities and the ISO and CPUC processes
- Reaffirm the existing state agency and single forecast set coordination
- Update references to current processes and set direction to updating process documentation

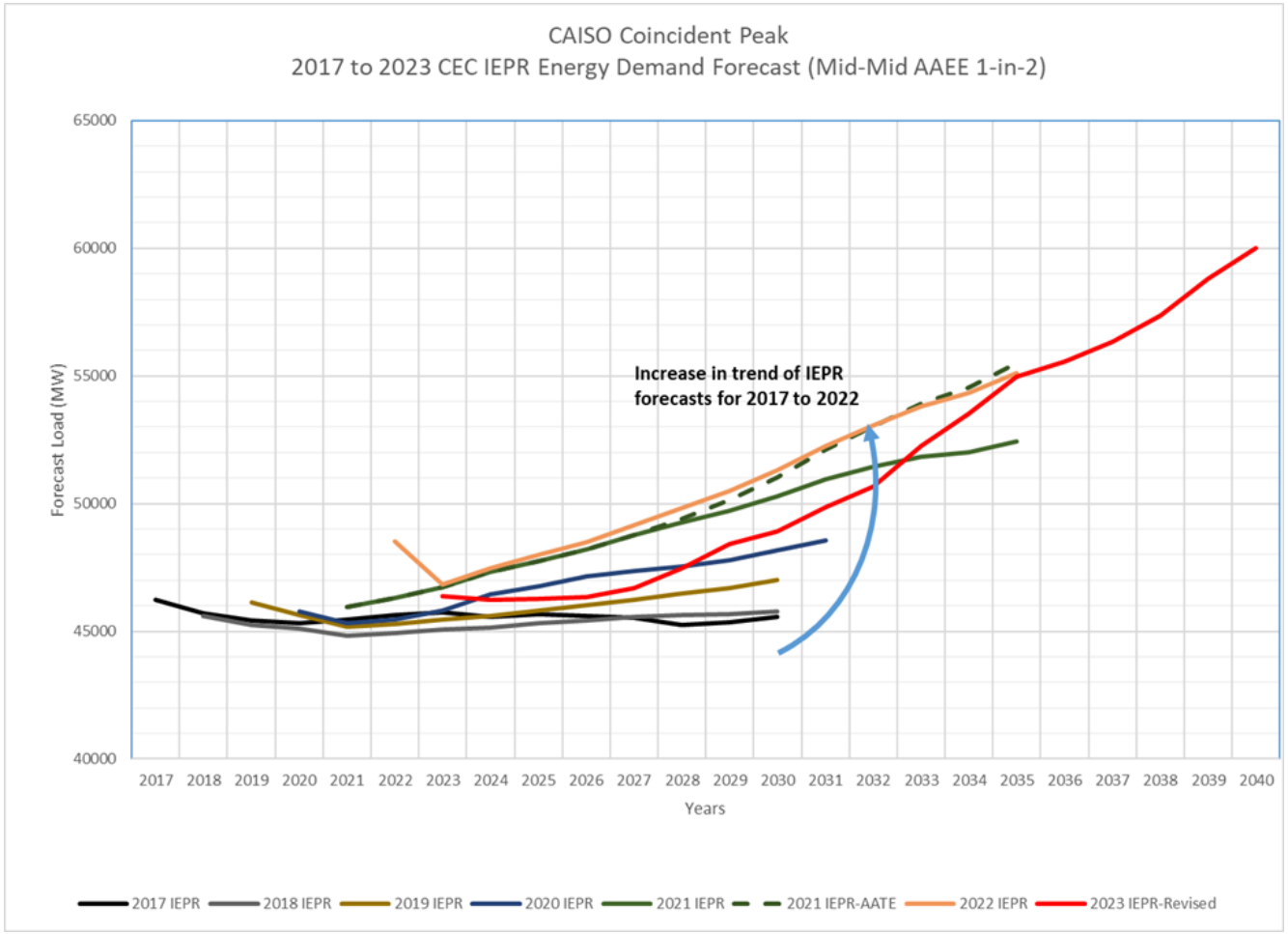
The CAISO leads the transmission planning process for the CAISO footprint, coordinated with load forecasts from the CEC and resource planning from the CPUC

- Annual 10-Year transmission plan is the formal approval document for expansion planning in the CAISO footprint
  - Planned infrastructure has ramped up from 10 year average of $650 million per year to $3 billion in 2021-2022 plan, $8.1 billion in 2022-2023 plan and $6.1 billion in the 2023-2024 plan
  - Responding to accelerating load growth and clean energy needs
  - Focuses on most efficient and effective long-term solutions – including Grid Enhancing Technologies and non-wires solutions

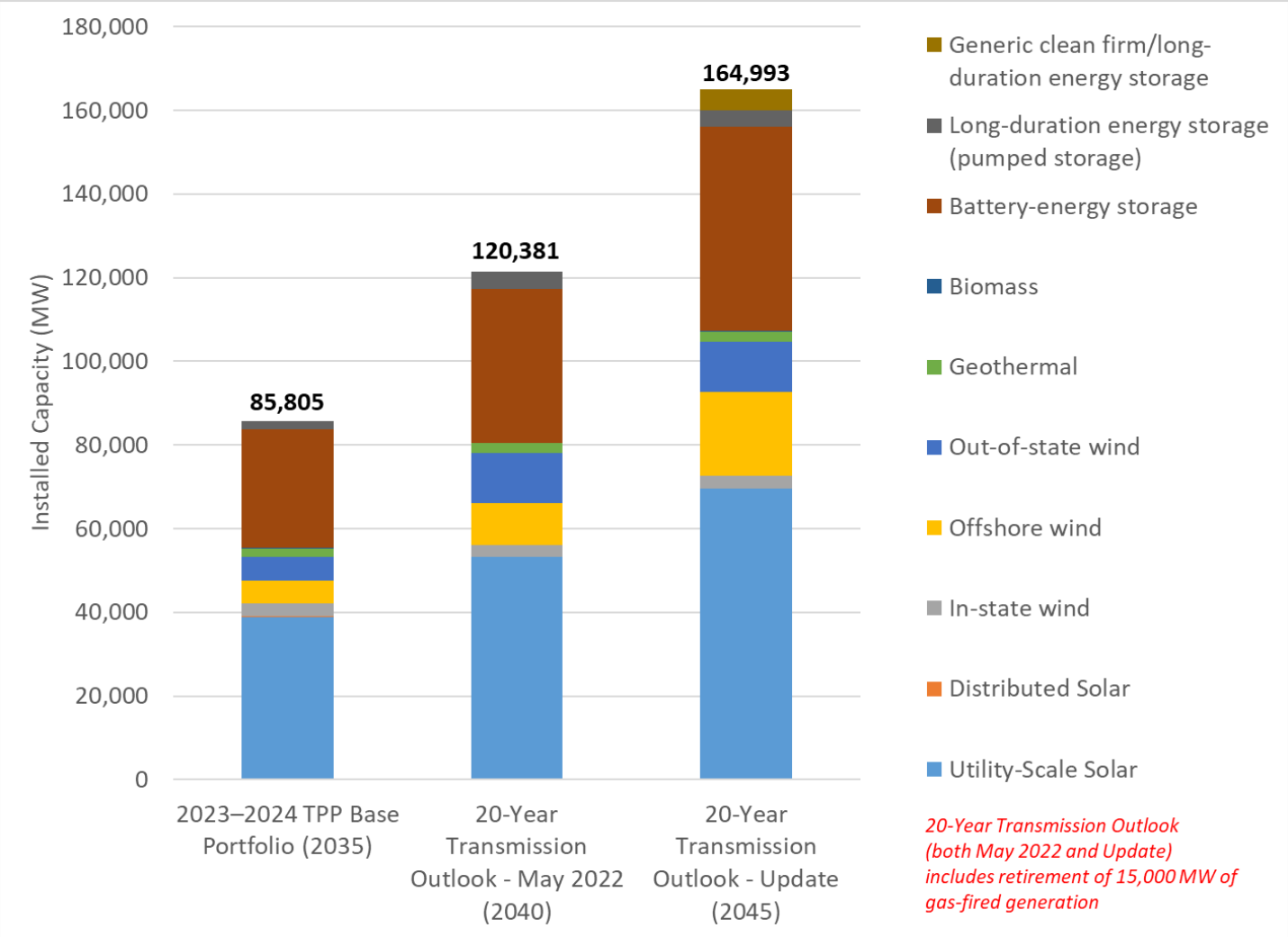
- 20 Year Outlook assesses longer term needs
  - First prepared in 2022, updated in 2024
  - Establishes a longer term direction and strategy
  - Provides context for nearer term decisions
  - Informs going-forward resource planning decisions

California's climate goals are driving escalating load forecasts

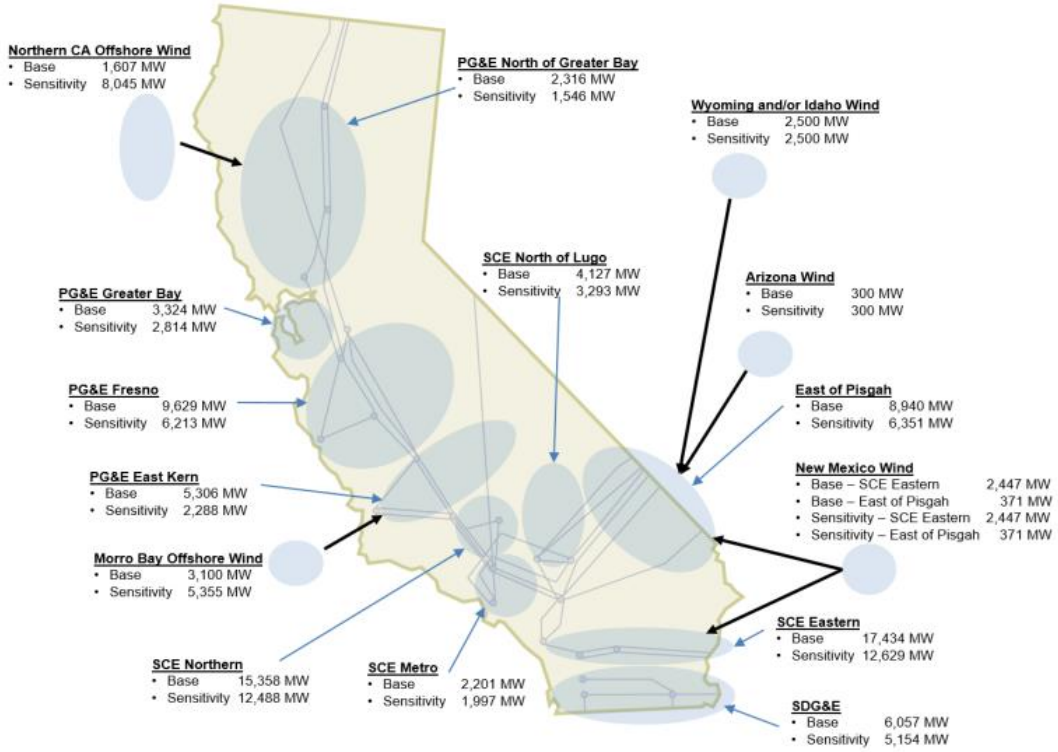
The CEC's load forecast is used in both the CPUC's Integrated Resource Planning process and the CAISO's transmission planning process.



Portfolios – 2023-2024 Transmission Planning Process and 20-Year Transmission Outlook



CAISO's 20 Year Transmission Outlook and 2023-2024 Transmission Plan identify critical new investments to meet reliability, economic, and policy needs.

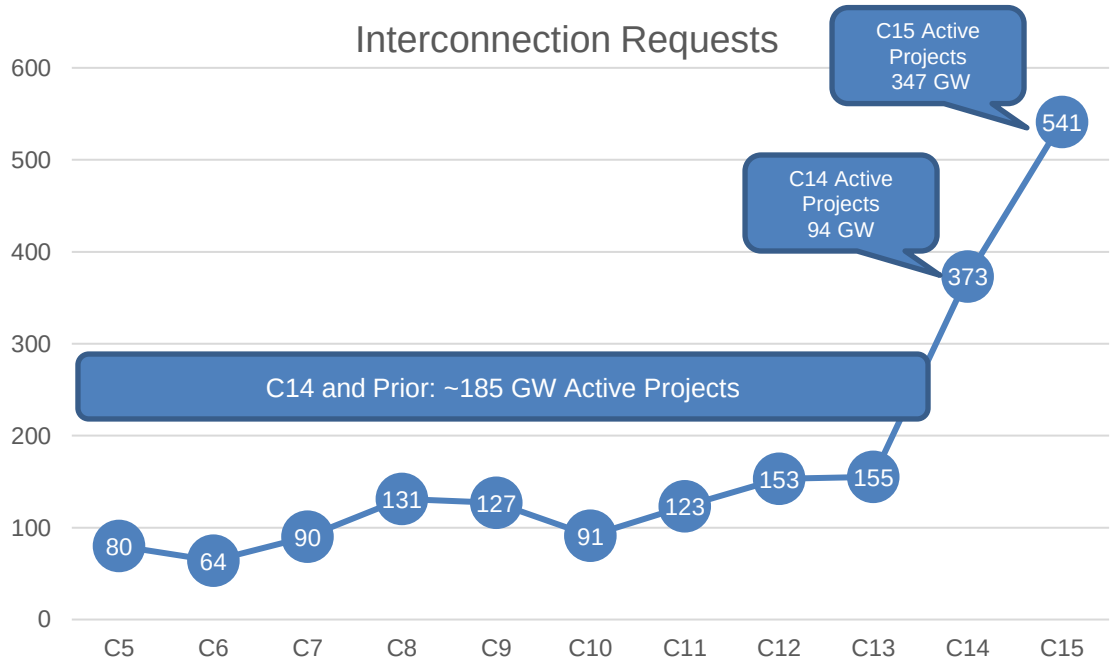


CAISO 2023-2024 Transmission Plan

CAISO 20-year Transmission Outlook - 2024

Current circumstances necessitate transformative changes to the interconnection process

- CPUC resource portfolios called for over 7,000 MW new nameplate capacity per year for the CAISO's 2023-2024 planning cycle
- Interconnection requests skyrocketed in Clusters 14 and 15
  - Many in areas not part of state resource plans, and in high volumes even in those areas
  - Cluster 15 in April 2023 vastly exceeded expectations
  - The CAISO queue now has roughly three times the capacity of that which will be needed to achieve California's 2045 requirements



Transformative change is critical to adapt to increased demand and competition for new generation

- On October 1, 2024, the Federal Energy Regulatory Commission approved a comprehensive set of reforms to CAISO interconnection process; these reforms prioritize:
  - alignment with state and local resource plans
  - transmission availability
  - procurement needs
  - project readiness
- Queue management reforms will drive continued advancement of projects in the queue and provide clear authority for the CAISO to withdraw stagnant projects
- Reforms are critical to address lengthening interconnection timelines

Takeaways and next steps

- Coordinated planning processes in accordance with the 2022 MOU are working, and have identified and initiated new grid infrastructure:
  - New resources have been identified to meet escalating demand forecasts and greenhouse gas reduction targets
  - New transmission infrastructure has been identified and approved to connect and deliver power from new resources – over 60 GW of deliverable capacity is available for procurement based on transmission that exists or is under active development
  - Interconnection reforms will help streamline resource development timelines aligned with the state resource plan
- Focus on timely resource procurement, developing needed infrastructure and keeping development timelines on track to connect new resources and keep pace with state resource planning

CALIFORNIA
BUSINESS AND ECONOMIC DEVELOPMENT

Tracking Energy Development Task Force

CEC - SB 100 Workshop
11.22.2024

TED Task Force

- Executive Order in 2021 directed energy agencies to coordinate on deployment of clean energy projects to reach reliability and climate goals.
- Joint interagency effort to provide project development support for new energy projects to come online in the near-term
- Identify challenges that may impact clean energy deployment and coordinate actions to address those barriers

TED Task Force

Challenges to Renewable Energy Project Deployment

PERMITTING

- Local, state and/or federal
- Environmental reviews
- Staffing capacity/turnover
- Community opposition

SUPPLY CHAIN

- UFLPA
- Global competition
- Very long lead time for circuit breakers/transformers

INTERCONNECTION/TRANSMISSION

- Network upgrades (sometimes linked to supply chain issues)
- Deliverability (queue management)
- Inverter problems
- Grid synchronization
- Other

TED Task Force

Actions Underway to Address Barriers and Challenges

CERIP | GO-Biz Energy Project Permitting Guidebook & Toolkit

- Assessment and report on the barriers to project deployment at local level
- Development of toolkit that will include
  - ✓ smart practices
  - ✓ approaches to undertake to improve processes
  - ✓ strategies that enhances connectivity b/w responsible entities

CEC Opt-In Process

- AB 205 (2022)provides CEC to permit renewable energy projects.
- Complete review within 270 days
- Seven (7) project applications in the queue

SB 149 – Judicial Streamlining

- Expedited judicial review (270-day) to CEQA/environmental challenges for qualified projects
- Eligible projects include energy, transportation, water and semiconductor

TED Task Force

Actions Underway to Address Barriers and Challenges

Energy Infrastructure Strike Team

- Increased coordination between state agencies on energy infrastructure projects
- Facilitate project delivery, where applicable
- Identify opportunities to leverage state and federal funding opportunities

Battery Storage Collaborative

- Convening of state agencies to examine battery storage technologies and safety consideration
  - ✓ Increase coordination
  - ✓ Partner on activities
  - ✓ Improve education and outreach

SB100 – A Long Term SMUD Perspective

Jon Olson, Director Energy Trading & Contracts

11/22/2024

Powering forward.
Together.

SMUD®

Discussion points

- SMUD Alignment with SB100
- Challenges
- Recommendations

SMUD alignment with SB100

- Aggressive decarbonization goals on timelines consistent with and ahead of SB100 requirements
- “All of the above” approach
  - Leverage Proven Clean Technology
  - Access technologies for both a transition period as well as for a fully decarbonized grid
  - Develop DER/DR portfolio that is integrated with the overall energy portfolio
  - Grant & Partnership efforts
- Diversity in everything we do
  - Resources - Fuels & Technology
  - Geographic
  - All rate payers
- Three-legged stool
  - Decarbonization
  - Reliability
  - Affordability

Challenges for the mid and long term

- Everything takes a long time…mostly for good and purposeful reasons
- Decisions today have long term implications on portfolio
- Staying reliable during the transition period to a fully decarbonized grid
- Affordability

Recommendations going forward

- Regulator decisions and alignment needed now for treatment of transitional and long term technologies – absolutely critical for Carbon Capture & Sequestration
- Keep regulatory objectives outcome based, not prescriptive – flexibility is key to address differences community to community

Questions