DOCKETED	
Docket Number:	21-SIT-01
Project Title:	21-SIT-01, SB100 Implementation Planning for SB100 Resource Build
TN #:	238078
Document Title:	Presentation - Joint Agency Workshop - Next Steps to Plan for Senate Bill 100 Resource Build
Description:	Presentation by CEC, CPUC and California ISO
Filer:	Patty Paul
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	6/2/2021 8:26:34 AM
Docketed Date:	6/2/2021

Joint Agency Workshop:
Next Steps to Plan for Senate Bill 100 Resource Build

Session 1

June 2, 2021

Session 1 Public Comment Instructions

Rules

- 3 minutes per person
- 1 person per organization

Zoom

- Click "raise hand"

Telephone

- Press *9 to raise hand
- Press *6 to (un)mute

When called upon

- Unmute, spell name, state affiliation, if any

Written Comments:

- Due: 6/22 by 5:00 p.m.
- Docket: 21-SIT-01
- Submit at: https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=21-SIT-01

3-MINUTE TIMER

Agency Leadership Remarks

- **Karen Douglas**, CEC Commissioner
- **Kate Gordon**, Director, Governor's Office of Planning and Research
  Chair, California Strategic Growth Council
  Senior Policy Advisor to the Governor on Climate
- **Marybel Batjer**, CPUC President
- **Siva Gunda**, CEC Commissioner
- **Neil Millar**, Vice President, Transmission Planning & Infrastructure Development

Current Status of Resource and Transmission Planning

- **Liz Gill** - CEC presentation of statewide SB 100 portfolios and resource builds
- **James McGarry** - CPUC presentation on the Integrated Resource Plan status
- **Jeff Billinton** - CAISO presentation on the annual transmission planning process, the 20-year transmission outlook and the interconnection queue

California Energy Commission
Liz Gill

SB 100 Report Resource Builds

Liz Gill, PhD
California Energy Commission

SB 100

Expands RPS

60% by Dec 31, 2030

PUC 399.11(a), 454.53 (a)

Establishes 100% Policy

It is the policy of the state that **eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales** of electricity to California end-use customers by December 31, 2045 and 100 percent of electricity procured to serve all state agencies by December 31, 2045.

SB 100 Joint Agency Report

CEC, CPUC, and CARB to issue a Joint-Agency report every four years including the following:

A. **A review of the policy** (technical, safety, affordability, reliability)

B. **Reliability benefits and impacts**

C. **Financial costs/benefits**

D. **Barriers/Benefits of achieving the policy**

E. **Alternative scenarios and costs/benefits of each**

SB 100 Modeling

All modeling was conducted by consultant E3.

- RESOLVE California model:
  - Co-optimizes NPV of investment and operational costs, given reliability and policy constraints, to develop a *least-cost resource portfolio*

SB 100 portfolios are *not precise* but can inform tradeoffs around different pathways.

- A reliability assessment was *not* included in the scope of work for the 2021 Report.
- Portfolios do not reflect individual BA or LSE goals or decision-making.

SB 100 Scope of Analysis

Inputs

Such as:

- Existing System
- Demand Forecasts/ Scenarios
- Resource Costs
- Reliability Metrics
- Policy Goals
- Resource Potential
- Land Use Screens

Portfolio Development

(Capacity Expansion Modeling)

Scope of 2021 SB 100 Analysis

Reliability Testing

Operability/ Full Dispatch	Resource Adequacy	Local Reliability
Production Cost Modeling	Probabilistic Production Cost Modeling	Power Flow Modeling

Portfolio Impacts

Rates	GHG Emissions	Land Use
Air Pollution	Workforce	Social Costs

Inputs, impacts, and tools listed are for illustrative purposes

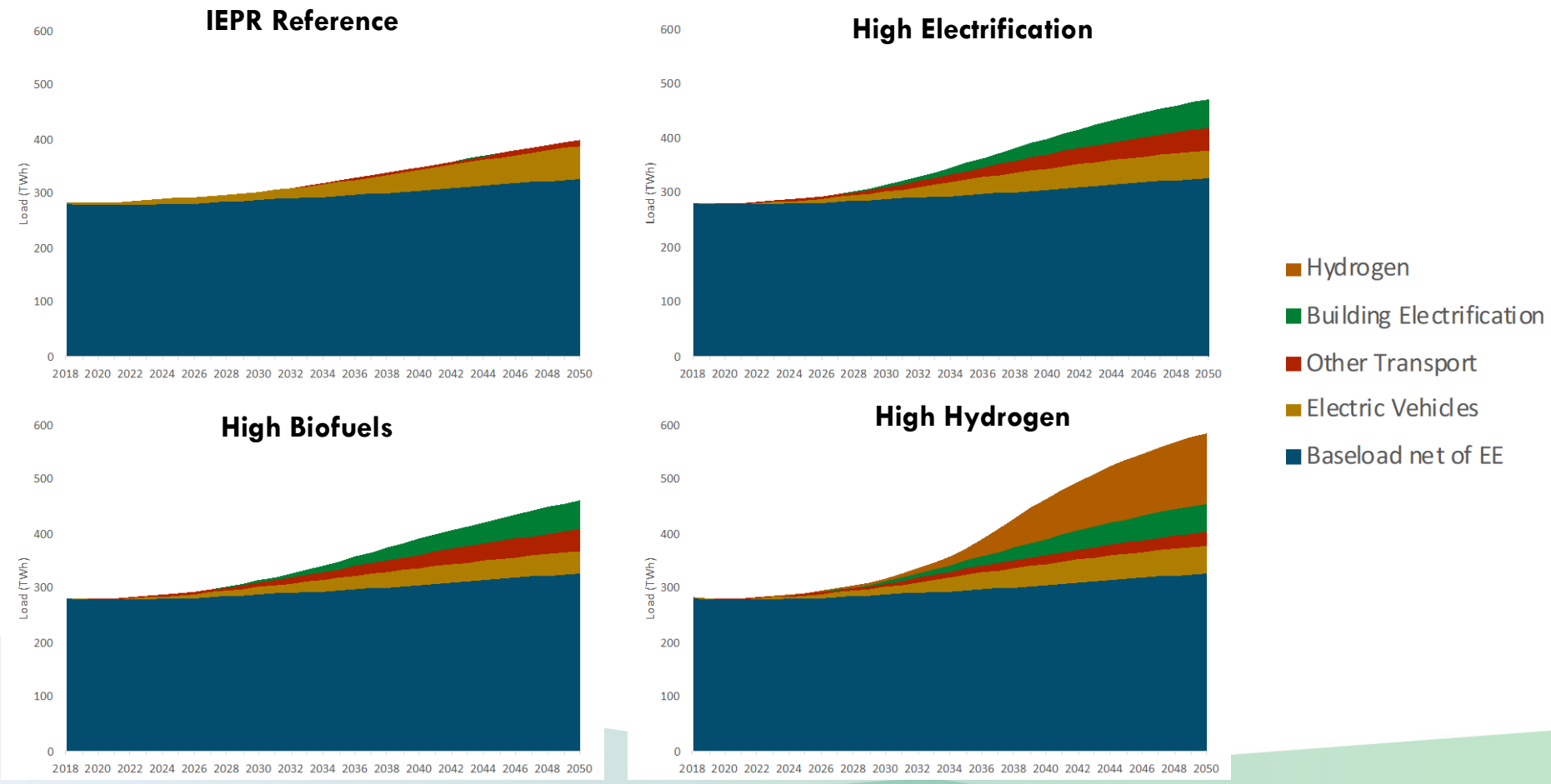
Zero-Carbon Resources Included in Modeling

Technology	Eligibility Basis	Scenarios
Solar PV	RPS	Core and Study
Solar Thermal (existing only)	RPS	Core and Study
Onshore Wind	RPS	Core and Study
Offshore Wind	RPS	Core and Study
Geothermal	RPS	Core and Study
Bioenergy	RPS	Core and Study
Fuel Cells (green H2)	RPS	Core and Study
Small Hydro (existing)	RPS	Core and Study
Large Hydro (existing)	Zero-Carbon	Core and Study
Nuclear (existing)	Zero-Carbon	Core and Study
Zero-Carbon Firm Dispatchable Resource	Zero-Carbon	Study Only
Zero-Carbon Firm Baseload Resource	Zero-Carbon	Study Only

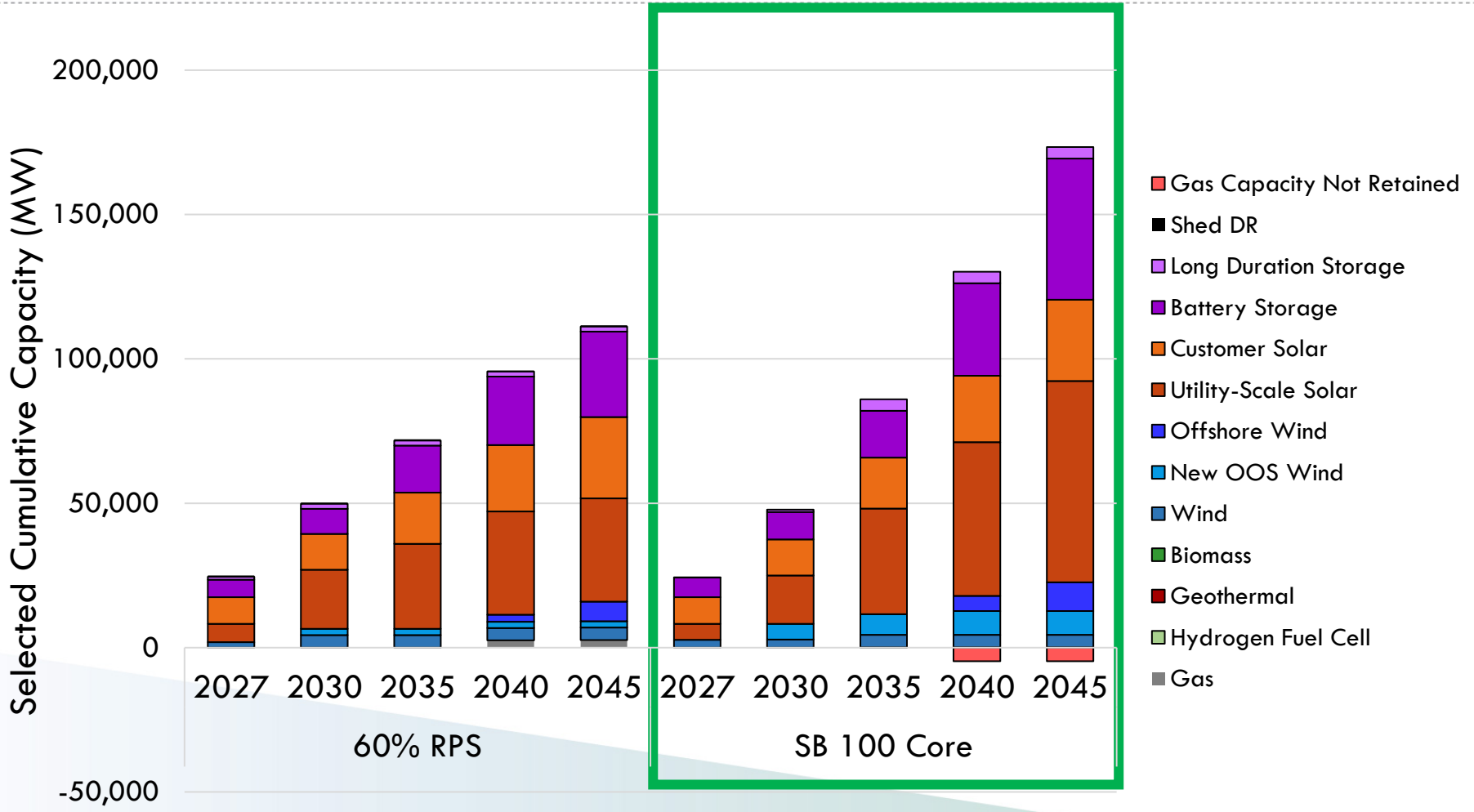
Core Assumptions: Demand Scenarios

PATHWAYS provides RESOLVE:

- Annual loads by category (GWh/yr)
- Some load shape information for load modifiers



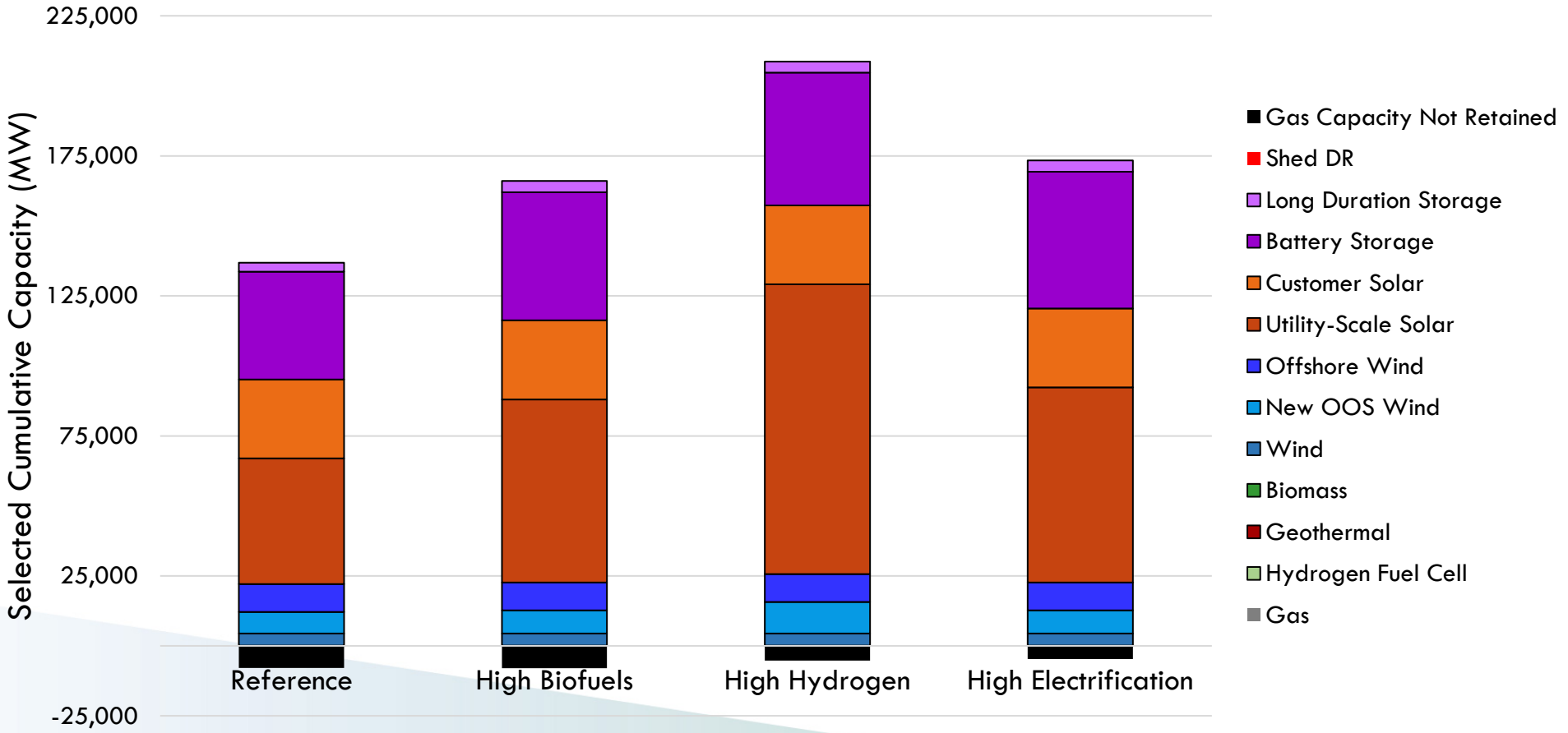
SB 100 Requires Significant Resource Build



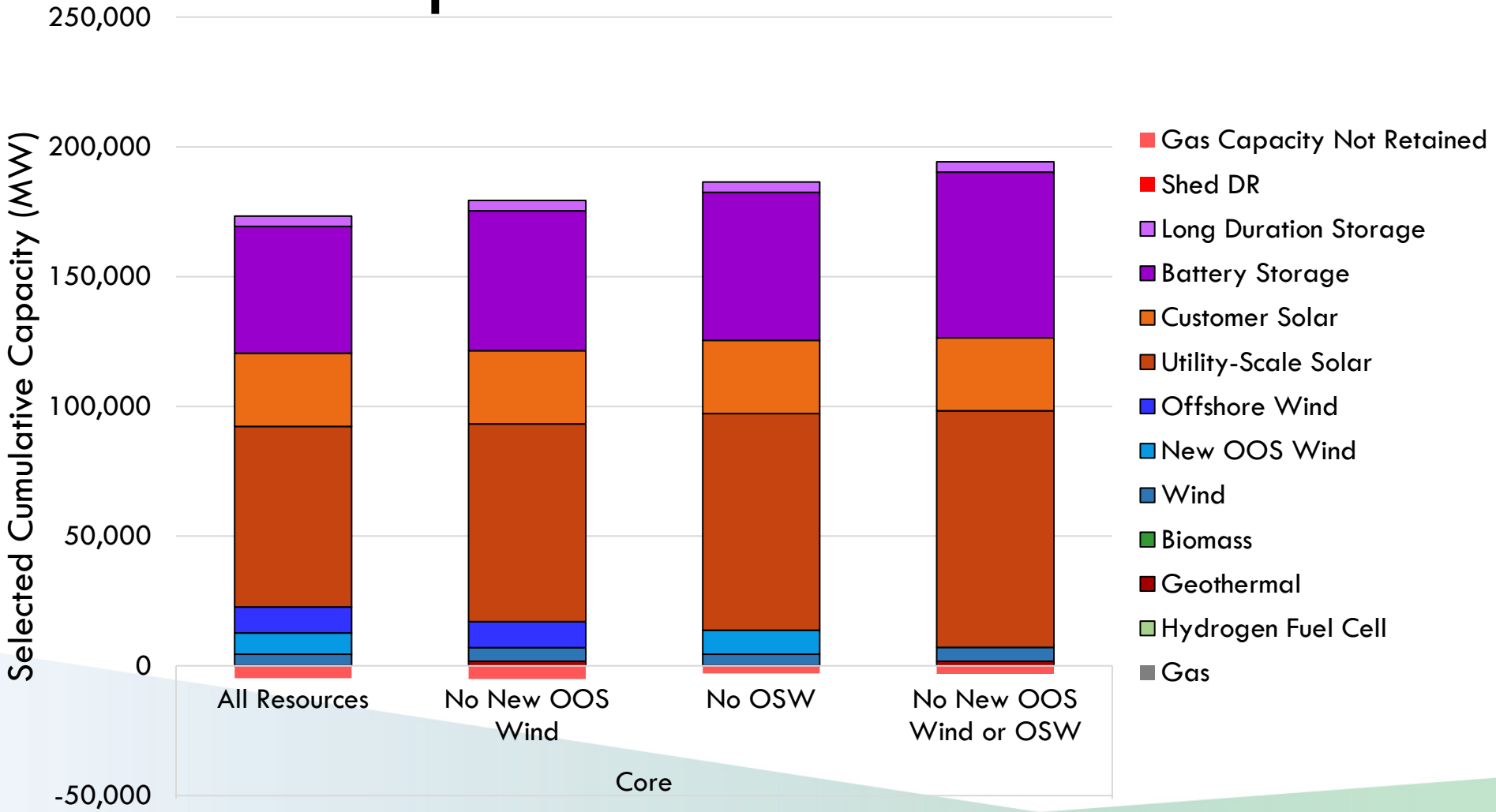
Customer solar shown here is a demand-side assumption. No additional customer solar was selected.

As of 2019, there is 80 GW of in-state capacity in California.

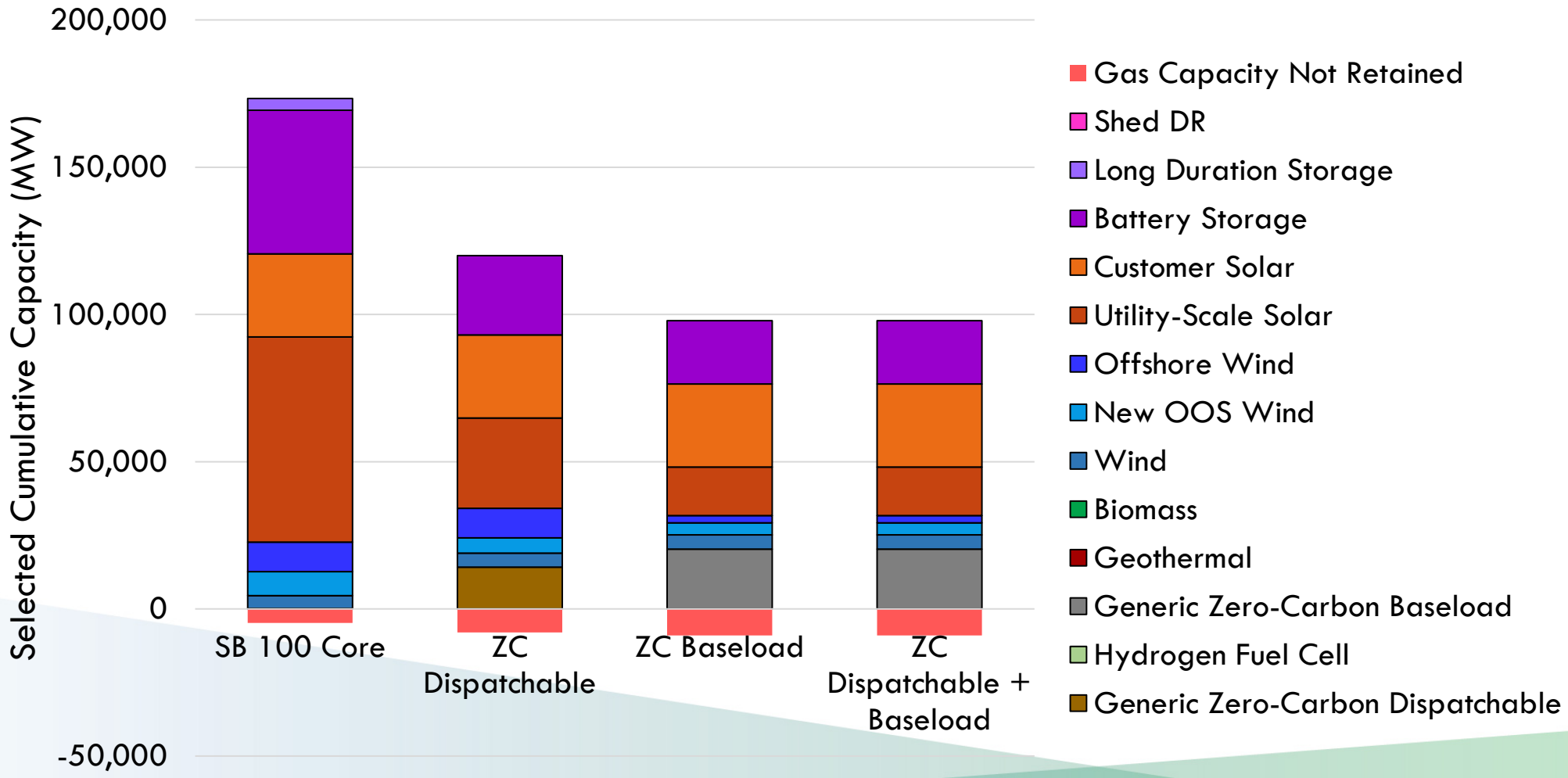
Economy-wide Decarbonization Impacts Resource Requirements



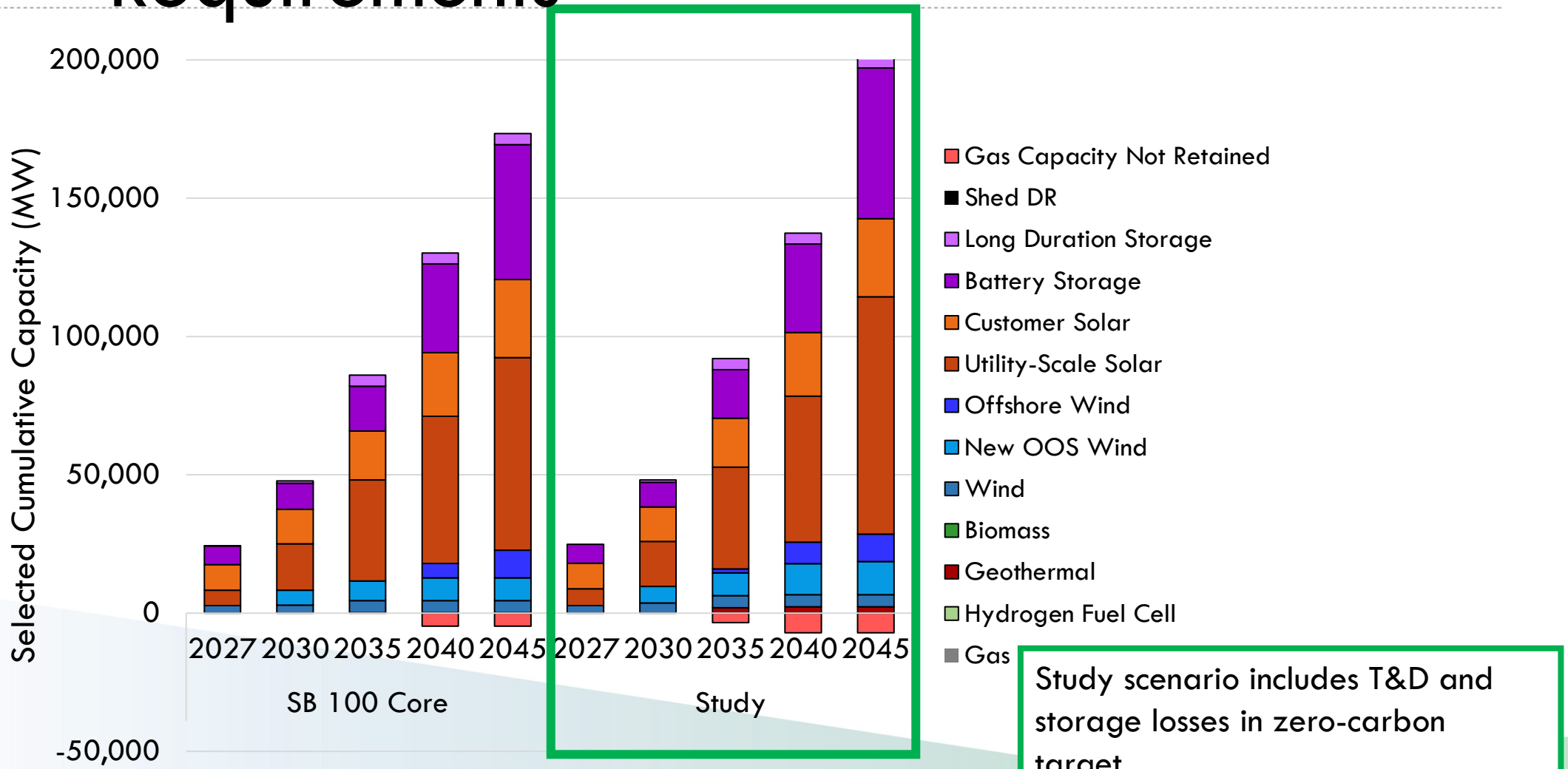
Resource Technology Pursued Impacts Resource Requirements



Resource Technology Pursued Impacts Resource Requirements cntd.

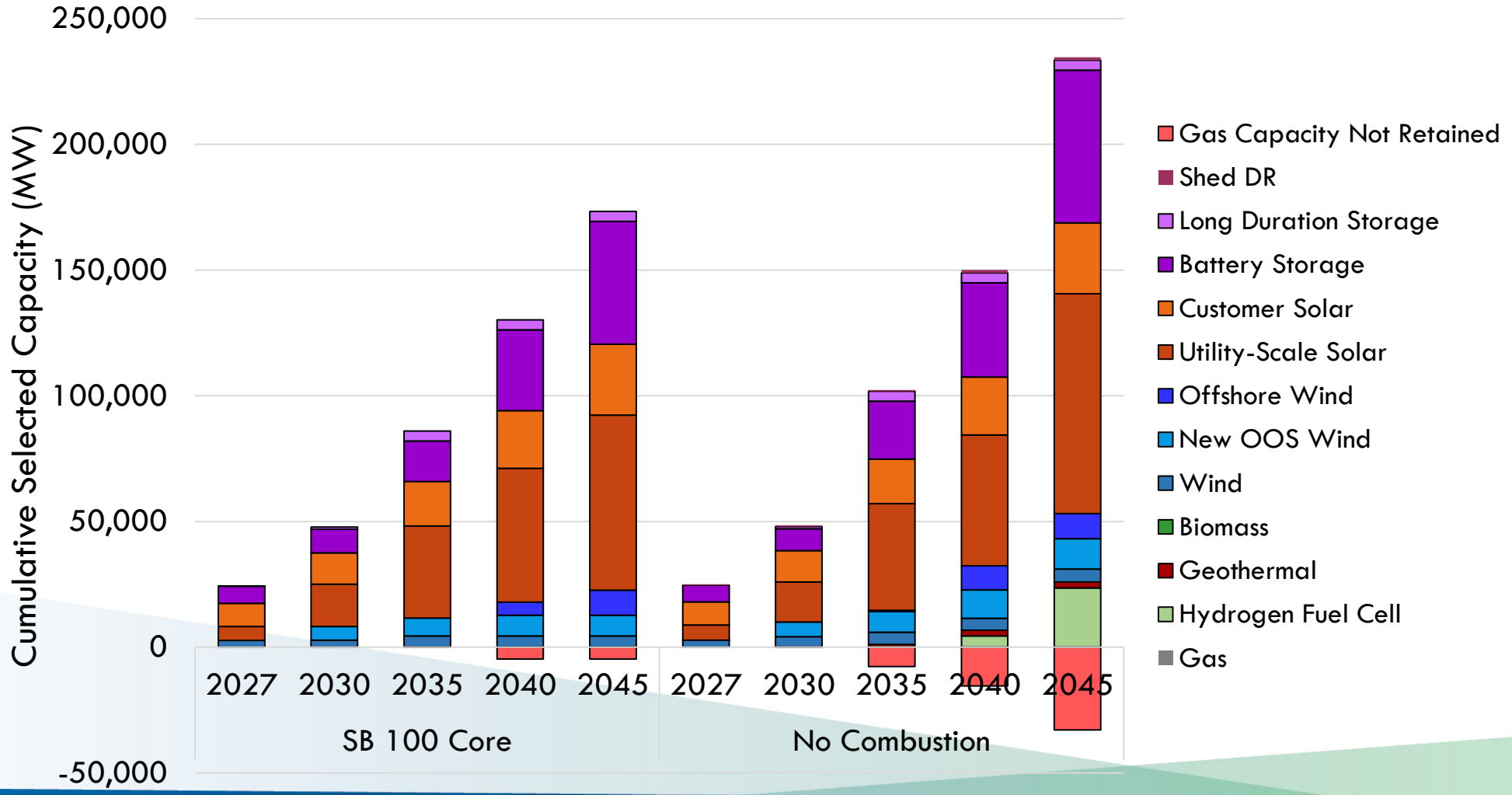


Going Beyond SB 100 Impacts Resource Requirements



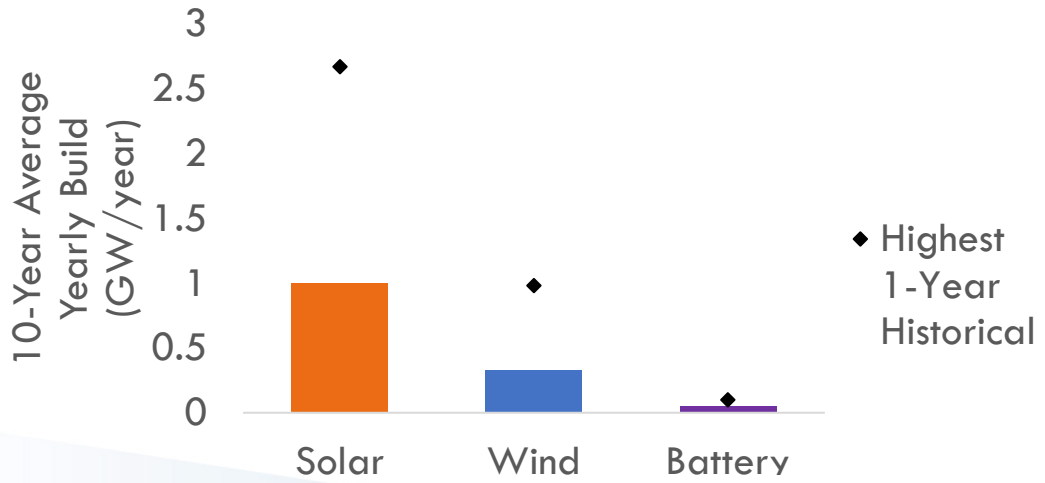
Study scenario includes T&D and storage losses in zero-carbon target.

Going Beyond SB 100 Impacts Resource Requirements cntd.



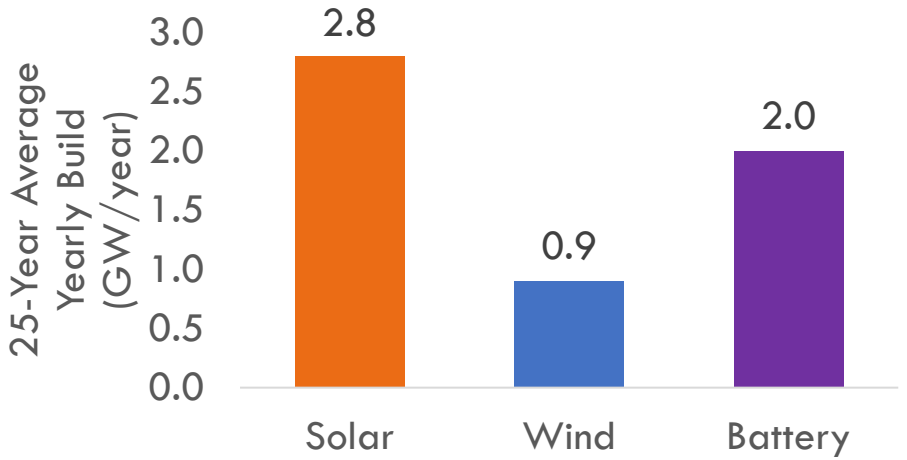
Resource Build Rates

Average Build Rate to Date



Average Build Rate to 2045

SB 100 Core
High Electrification Demand



Factors that May Impact Resource Build

- Electrification/electric demand
- Changes to gas fleet
- Portfolio diversity
  - Offshore wind, out-of-state wind, geothermal, etc
  - Clean firm resource development/deployment
  - DER deployment
  - Load flexibility
- Land-use constraints

Key Takeaways from Modeling

The initial analysis suggests SB 100 is technically achievable though multiple pathways. Construction of clean electricity generation and storage resources must be sustained at record setting build rates.

Diversity in energy resources lowers overall costs.

Retaining some natural gas power capacity may minimize costs while ensuring an uninterrupted power supply during the transition to 100 percent clean energy.

- Increased energy storage and advancements in zero-carbon firm resources and storage can reduce natural gas needs.

Further analysis is needed.

Further Analysis Recommendations

- Verifying that scenario results satisfy the state's grid reliability requirements across a range of conditions.
- Continuing to evaluate the potential effects of cost-saving emerging resources, such as offshore wind, long-duration storage, green hydrogen technologies, and demand flexibility.
- Assessing environmental, social, and economic costs and benefits of the additional clean electricity generation capacity and storage needed to implement SB 100.
- Holding annual workshops to support alignment among the joint agencies and continuity between SB 100 reports.

Further Analysis and Related Work

Inputs

Such as:

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Follow-on work goals:
Further quantitative assessment of reliability and portfolio impacts

Inputs, impacts, and tools listed are for illustrative purposes

Further Analysis and Related Work cntd.

- SB 100
  - Alterative resource build options
  - Net-energy benefits
  - Reliability (long-term)
- Related Work
  - Role of DERs
  - Load Flexibility
  - Reliability (near- and mid-term)
  - Demand Scenarios

SB 100 Annual Workshop: Fall 2021/Winter 2022

Thank you!

The 2021 SB 100 Joint Agency Report and Summary Document can be found at:

https://www.energy.ca.gov/sb100

California Public Utilities Commission
James McGarry

CPUC Integrated Resource Planning (IRP)

SB 100 Workshop

June 2021

California Public Utilities Commission

Integrated Resource Planning (IRP) in California Today

- The objective of integrated resource planning is to reduce the cost of achieving GHG reductions and other policy goals by looking across individual LSE boundaries and resource types to identify solutions to reliability, cost, or other concerns that might not otherwise be found.
- Goal of 2019-21 IRP cycle is to ensure that the electric sector is on track to help California reduce economy-wide GHG emissions 40% from 1990 levels by 2030, and to explore how achievement of SB 100 2045 goals could inform IRP resource planning in the 2020 to 2030 timeframe.

- California today is a complex landscape for resource planning:
  - Multiple Load Serving Entities (LSEs) including:
    - Investor-Owned Utilities (IOUs)
    - Community Choice Aggregators (CCAs)
    - Energy Service Providers (ESPs)
  - Multiple state agencies (CPUC, CEC, Air Resources Board) and CAISO.

Statutory Basis of IRP: SB 350 (De León, 2015)

The Commission shall…

PU Code Section 454.51

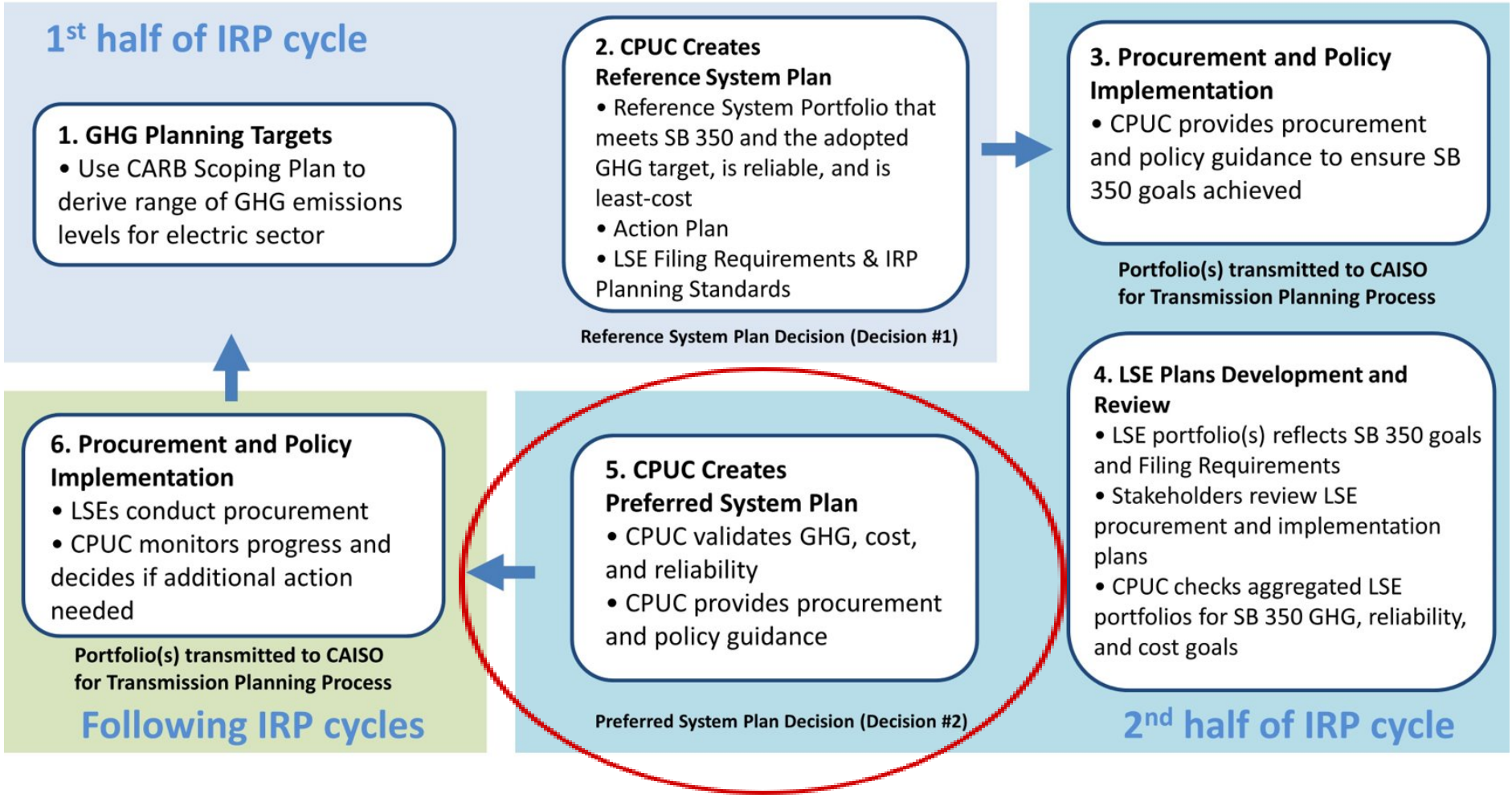
Identify a diverse and balanced portfolio of resources… that provides optimal integration of renewable energy in a cost-effective manner

PU Code Section 454.52

…adopt a process for each load-serving entity…to file an integrated resource plan…to ensure that load-serving entities do the following…

- Meet statewide GHG emission reduction targets
- Comply with state RPS target
- Ensure just and reasonable rates for customers of electrical corporations
- Minimize impacts on ratepayer bills
- Ensure system and local reliability
- Strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities
- Enhance distribution system and demand-side energy management
- Minimize air pollutants with early priority on disadvantaged communities

Where we are in the IRP Process

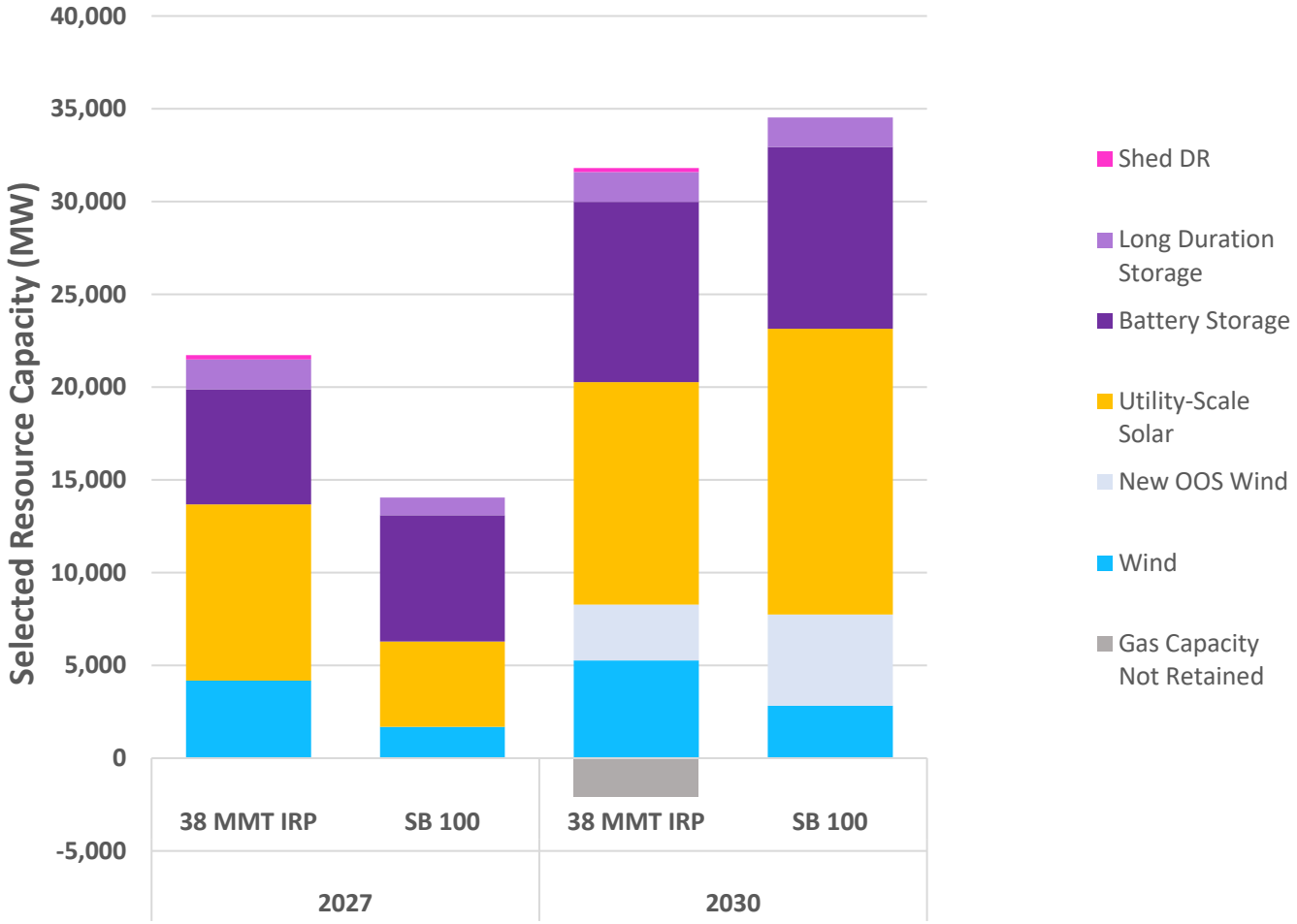


Background on the CPUC IRP 2019-21 Cycle

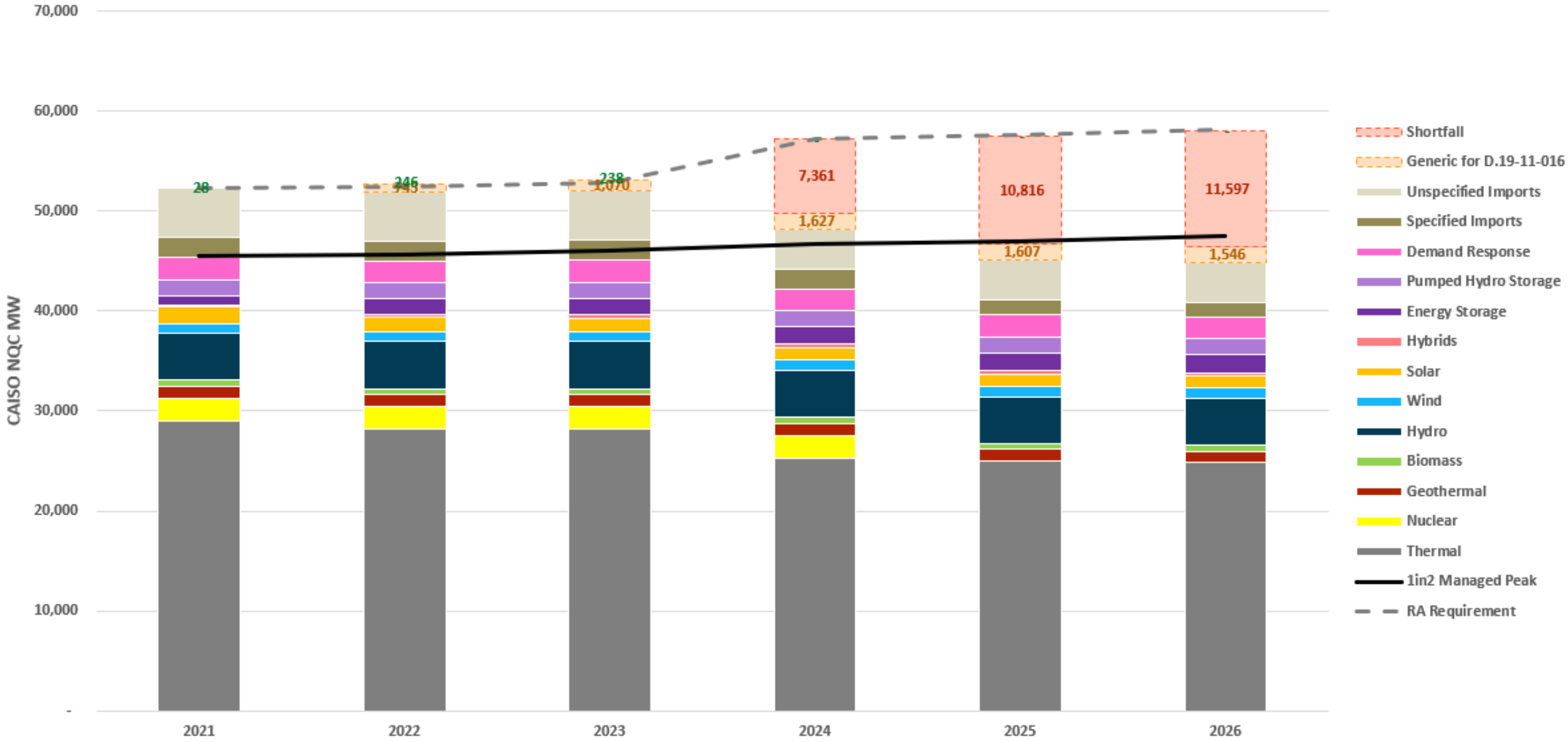
- The first year of the current IRP cycle was spent developing the Reference System Plan using the RESOLVE and SERVM models
- In March 2020, the Commission adopted D.20-03-028, establishing an optimal "Reference System Portfolio" of resources to meet an electric sector GHG planning target of 46 MMT by 2030
- The RSP decision also included an optimal portfolio based on a 38 MMT GHG planning target, asking parties submit IRPs aligning with both a 46 MMT and 38 MMT planning target to help the CPUC better consider both targets when putting together the PSP
- LSEs used the guidance provided in the Commission's decision to develop individual IRPs ("LSE Plans"), and they filed their IRPs with the Commission on September 1, 2020
- CPUC staff is aggregating and adjusting the portfolios submitted in LSE Plans to create aggregated 46 MMT and 38 MMT system portfolios, to be further analyzed for reliability and GHG through production cost modeling

SB 100 and IRP 38 MMT Comparison

- The SB 100 "Core Scenario" results align closely with the 38 MMT scenario in the IRP RSP decision throughout this decade
- Differences in resource additions largely explained by technical differences
  - IRP 2027 are an interpolation between 2026 and 2030 modeled years, which may overstate 2027 IRP resource additions and explain differences in that year
  - OOS Wind additions by 2030 were capped in IRP modeling at 3,000 MW, and unconstrained in SB 100 modeling
- IRP and SB 100 assumed the same amount of customer solar additions, but the amounts are excluded here because they are an input rather than an output of the model



CAISO RA Stack by Resource Type (High Need (2020 IEPR))



Conclusions

- The CPUC will continue to coordinate with CARB, the CEC, and other stakeholders to ensure that the electric sector stays on track toward achieving SB 100 and supporting the state's economy-wide GHG reduction goals
- IRP planning supports the findings of the SB 100 Joint Agency Report, identifying a similar scale and composition of resources needed over the next decade
- IRP's procurement track has ordered or proposed the development of nearly 15 GW of new "net qualifying capacity" over the next 5-7 years to maintain system reliability and support the state's transition to a 100% renewable and zero-carbon grid
- Future IRP procurement orders may lead to further development of new GHG-free resources to support the achievement of SB 100 and state climate goals
- The next IRP cycle starts in 2022 and will provide another opportunity to evaluate the state's SB 100 implementation progress

California Independent System Operator
Jeff Billinton

California ISO

Transmission Planning
20 Year Transmission Outlook

Jeff Billinton

Director, Transmission Infrastructure Planning

June 2, 2021

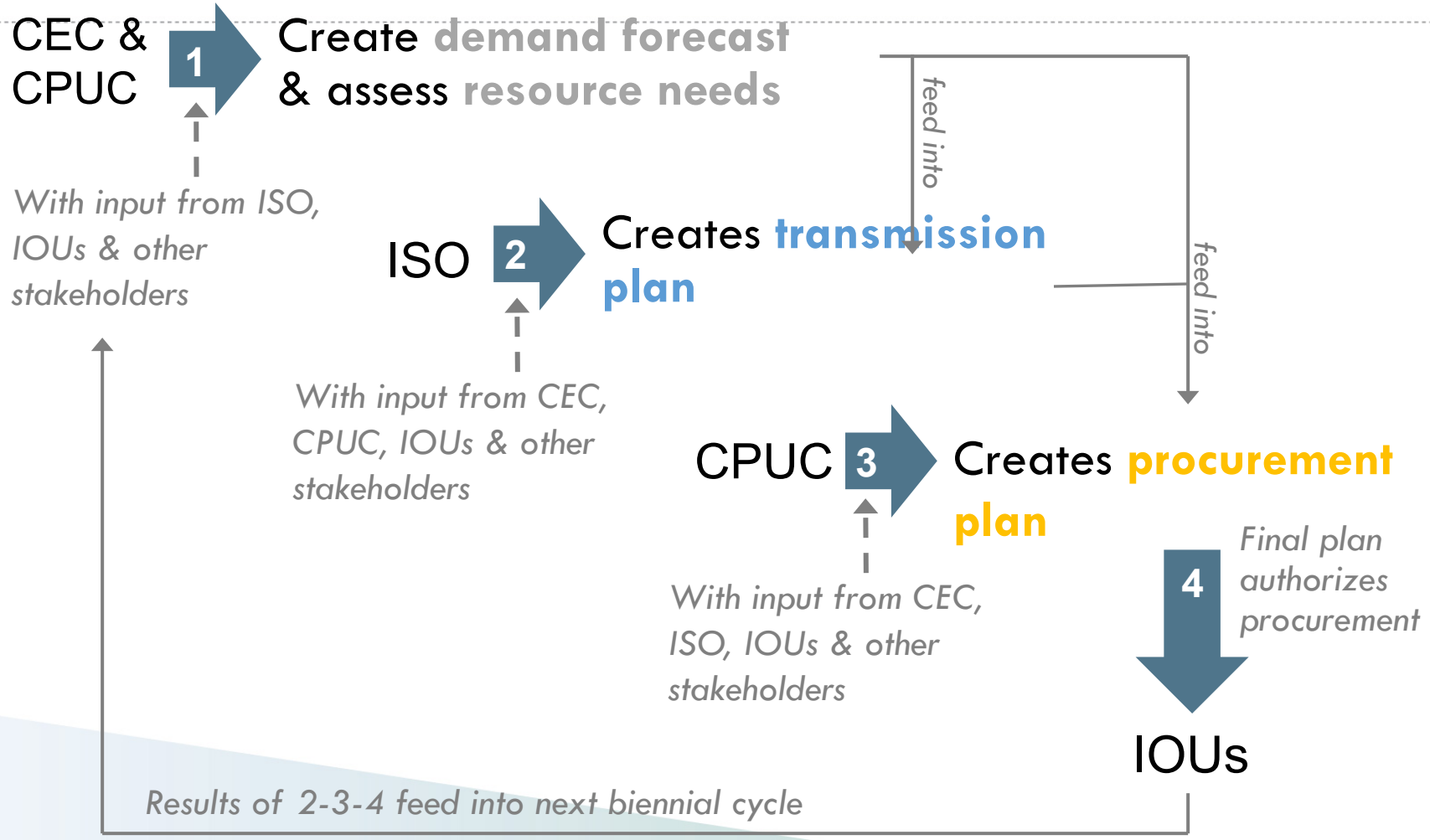
Joint Agency Workshop on Next Steps to Plan for Senate Bill 100 Resource Build

The ISO currently conducts an Annual Transmission Planning Process

- 10 year horizon
- Tariff based process (section 24 CAISO tariff)
- Approval of transmission projects based on:
  - Reliability driven need
  - Policy driven need
  - Economic driven need
- Additional studies are conducted within each planning cycle
  - Other reliability studies (such as frequency response, flexible deliverability)
  - 10 year local capacity technical study (every 2 years)
  - Interregional transmission planning (2 year cycle)
  - Informational special studies

http://www.caiso.com/planning/Pages/TransmissionPlanning/Default.aspx

The process is coordinated with state agency activities



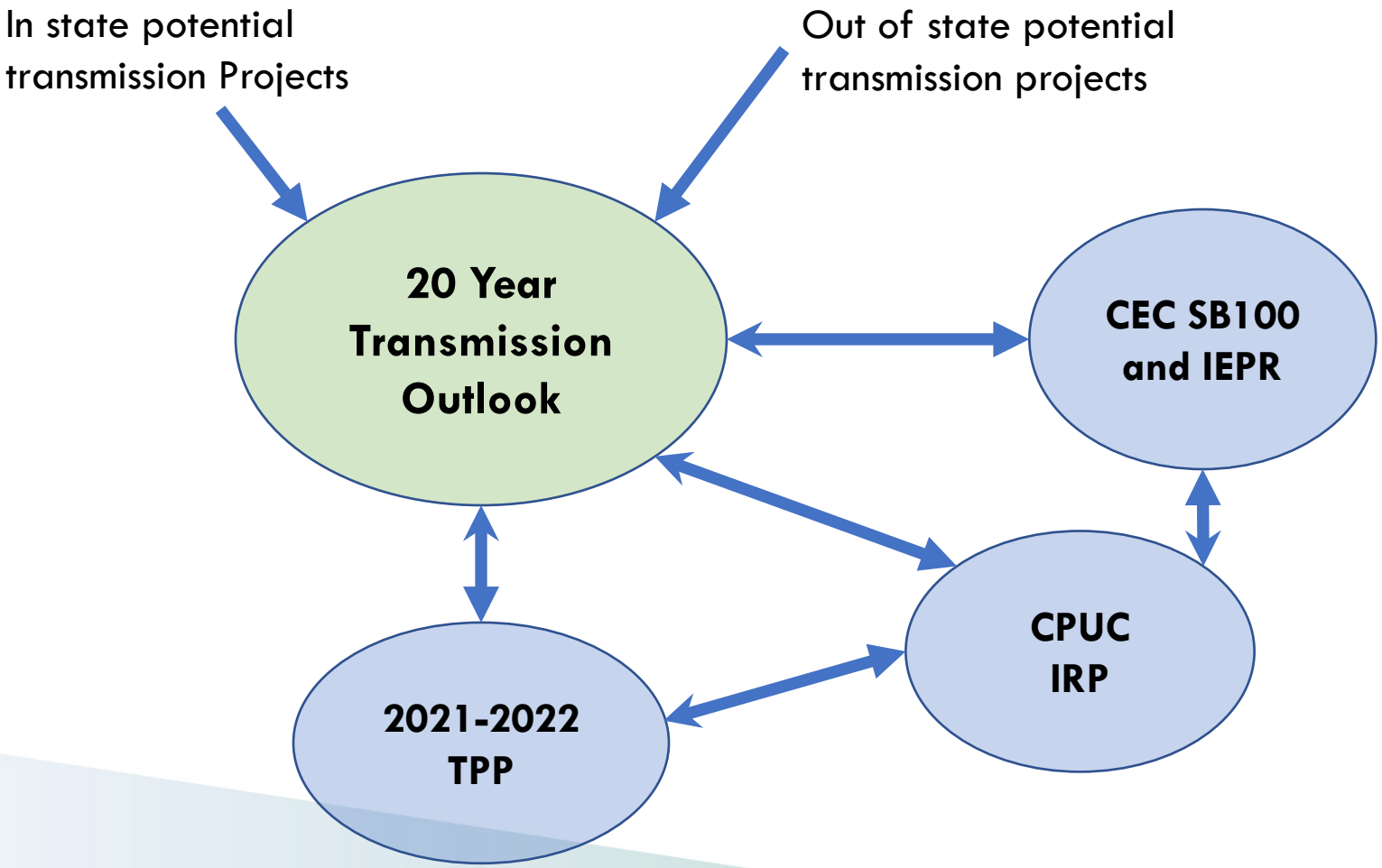
This year, the ISO has introduced a new 20-Year Transmission Outlook initiative

- To explore longer term grid requirements and options for meeting the State's greenhouse gas reduction and renewable energy objectives reliably and cost-effectively,
- To run in parallel with the 2021-2022 annual tariff-based10-year transmission planning process.
- To engage in meaningful discussion without focusing on specific project approvals

The 20-Year Transmission Outlook initiative will provide:

- A less structured framework for open discussion outside of the tariff-based 10-Year Transmission Plan that focuses on transmission project needs and approvals over the 10 year planning horizon
- Longer term context for and framing issues in the 10-Year Transmission Plan
- A transparent process to develop transmission information responsive to supporting and informing the CPUC's Integrated Resource Planning processes, and the CEC's SB 100 and Integrated Energy Policy Report efforts.

Primary Paths for Coordination with Other Initiatives



The initiative will consider:

- Long-term load forecasts such as an emphasis on potential impacts from increased electrification in other sectors,

- Broader ranges of resource transitions including potentially more aggressive gas-fired generation fleet retirement, and

- Increased emphasis on inter-regional opportunities.

The ISO intends to use an SB 100 scenario as the Starting Point for Assumptions

	Scenarios		
Resources	**60 RPS (GW)**	**SB100 Core (GW)**	**SB100 Study (GW)**
Onshore Wind (in state)	4.3	4.3	4.3
Onshore Wind (out of state)	2.2	8.2	11.9
Offshore Wind		10	10
Utility-Scale Solar	36	70	86
Battery Storage	30	49	55
Pumped Storage	1.7		
Long Duration Storage		4	4
Geothermal		0.135	2.3
Shed DR	0.44		
New Gas	2.6		
Total New Resources	**77.2**	**145.6**	**173.5**
Retirement of Gas		-4.7	-7.2

Scenarios are from SB100 Report - Central Core and Study Scenarios

Informational and not scenario we would be studying in Outlook

Need to develop principle for resources to retire

Further outreach on the scenarios is expected with the CEC, CPUC and stakeholders

The new initiative will be coordinated with 2021-2022 transmission planning process

- The process is expected to include higher level technical studies to test feasibility of alternatives, and not the detailed level of comprehensive analysis that underpins the 10-Year Transmission Plan
- Accordingly we will coordinate with currently scheduled 10-Year Transmission Plan stakeholder sessions to the extent possible, and hold separate stakeholder sessions as appropriate.
- The process welcomes and will incorporate stakeholder input and consultation.

20 Year Transmission Outlook Milestones

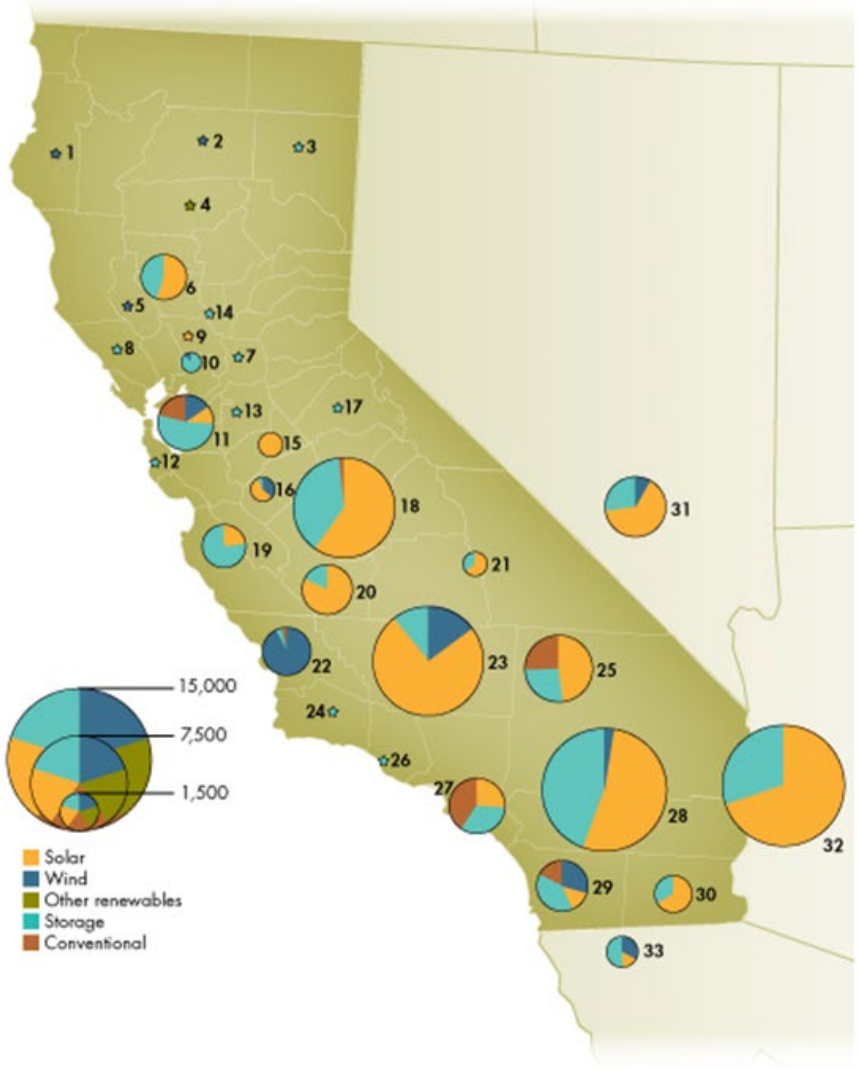
- Stakeholder call initiating Outlook on May 14
  - Comments to be submitted by May 28
- Coordination with CEC workshops on SB100
  - SB 100 Workshop on June 2
  - Stakeholder call on potential transmission projects in June

- Update at 2021-2022 TPP Stakeholder call on September 27 and 28
  - Comments to be submitted by October 12
- Update at 2021-2022 TPP Stakeholder call on November 18
  - Comments to be submitted by December 6
- Draft 20 Year Transmission Outlook as standalone document together with draft 2021-2022 Transmission Plan to be posted on January 31, 2022
- Stakeholder meeting in February

Generation Interconnection to the transmission system under ISO operational control

- Ensuring the safe and reliable interconnection of new resources is an integral part of the CAISO.
- The bulk of new interconnections proceed through the cluster study approach
  - Interconnection requests submitted April 1st – April 15th each year are studied together – in the same cluster
- In the last decade the CAISO has received an average of 113 queue cluster interconnection requests per year.

There are high levels of interest in generator interconnection



Interconnection queue by county

	County	# of Projects	Megawatts: Renewables	Storage	Conventional	Total
1	Humboldt	3	268	28		296
2	Shasta	1	200			200
3	Lassen	2	21	27		48
4	Tehama	2	6			6
5	Lake	3	145	39		184
6	Colusa	7	1,261	1,035		2,296
7	Sacramento	1		59		59
8	Sonoma	1		100		100
9	Yolo	1	12			12
10	Solano	4	92	668		760
11	Alameda-Contra Costa-Santa Clara	27	891	1,818	723	3,432
12	San Mateo	1		40		40
13	San Joaquin	6	51	376		427
14	Sutter	3		171		171
15	Stanislaus	5	898			898
16	Merced	10	814	69		883
17	Tuolumne	1		10		10
18	Fresno-Madera	46	4,827	3,118	123	8,068
19	San Benito-Monterey	6	520	1,709		2,229
20	Kings	14	2,123	465		2,588
21	Tulare-Inyo	5	551	310		861
22	San Luis Obispo	4	2,582	106	100	2,788
23	Kern	65	8,210	974		9,184
24	Santa Barbara	1		32		32
25	San Bernardino	22	2,156	1,202	38	3,396
26	Ventura	1		100		100
27	Los Angeles-Orange	10	820	1,032	1,270	3,122
28	Riverside	31	6,115	4,875		10,990
29	San Diego	21	1,137	1,036	457	2,630
30	Imperial	7	1,025	525		1,550
	In-state Totals	311	34,725	19,924	2,711	57,360
31	Nevada	12	2,714	1,014		3,728
32	Arizona	22	7,549	3,246		10,795
33	Mexico	3	601	628		1,229
	Out-of-state Totals	37	10,864	4,888		15,752
	TOTAL ALL PROJECTS	**347**	**45,289**	**24,184**	**3,711**	**73,112**

CAISO Queue - March 2021

Cluster 14 - April 2021 – exceeded all previous levels and expectations

- 363 Interconnection Requests (almost 2.5 times last year)
- 106 GW
- This volume is creating staffing resource challenges for the ISO and, in particular, for the participating transmission owners
- CAISO exploring with stakeholders study approach for Cluster 14 http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=E4AE7EB1-914F-47B3-8DCD-0AF05B513BD2

Publicly Owned Utilities Panel Discussion

Perspectives on planning needs to meet SB100 goals

- **Barry Moline,** California Municipal Utilities Association - Moderator
- **Henry Martinez,** Imperial Irrigation District
- **Jim Shetler,** Balancing Authority of Northern California
- **James Barner,** Los Angeles Department of Water & Power

Publicly Owned Utilities Panelist Questions

- What are your priorities for how we transition the electric grid to carbon-free resources?
- What priorities may not be adequately accounted for in current planning efforts?
- What factors or values must be considered when assessing whether a particular option or scenario for this transition is a good idea?
- What should be the role of DERs (distributed energy resources) in meeting/addressing reliability concerns?
- How do you see the role of the customer changing during the transition?

Investor-Owned Utilities and Community Choice Aggregator Panel Discussion

Perspectives on planning needs to meet SB100 goals

- Jan Berman, Pacific Gas & Electric
- Jeff Deturi, San Diego Gas & Electric
- Daniel Hopper, Southern California Edison
- Dawn Weisz, Marin Clean Energy

Investor-Owned Utilities and Community Choice Aggregator Panelist Questions

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3-MINUTE TIMER

Session 2 Begins at 2:00 p.m.

Stakeholder Perspectives Roundtable:
https://energy.zoom.us/j/98818304998?pwd=YmVja2lVa2xtTi8rZVA3bVpxSkdaUT09
ID: **988 1830 4998**
PW: **812433**

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Joint Agency Workshop:
Next Steps to Plan for Senate Bill 100 Resource Build

Session 2

June 2, 2021

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3-MINUTE TIMER

Stakeholder Perspectives Roundtable

- **Commissioner Karen Douglas** - Moderator
- **Erica Brand**, The Nature Conservancy
- **Garry George**, Audubon
- **Angela Islas**, Self-Help Enterprises
- **Jana Ganion**, Blue Lake Rancheria
- **Roger Lin**, California Environmental Justice Alliance
- **Jan Smutny-Jones**, Independent Energy Producers
- **Shannon Eddy**, Large Scale Solar Association
- **Danielle Mills**, American Clean Power – California

Roundtable Questions

- What are your priorities for how we transition the electric grid to carbon-free resources?
- What priorities may not be adequately accounted for in current planning efforts?
- What factors or values must be considered when assessing whether a particular option or scenario for this transition is a good idea?
- What should be the role of DERs (distributed energy resources) in meeting/addressing reliability concerns?

Session 2 Public Comment

Rules
- 3 minutes per person
- 1 person per organization

Zoom
- Click "raise hand"

Telephone
- Press *9 to raise hand
- Press *6 to (un)mute

When called upon
- Unmute, spell name, state affiliation, if any

Written Comments:
- Due: 6/22 by 5:00 p.m.
- Docket: 21-SIT-01
- Submit at: https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=21-SIT-01

3-MINUTE TIMER

Thank You! We're Adjourned.