

SB 100 Joint Agency Report Results

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Senate Bill 100

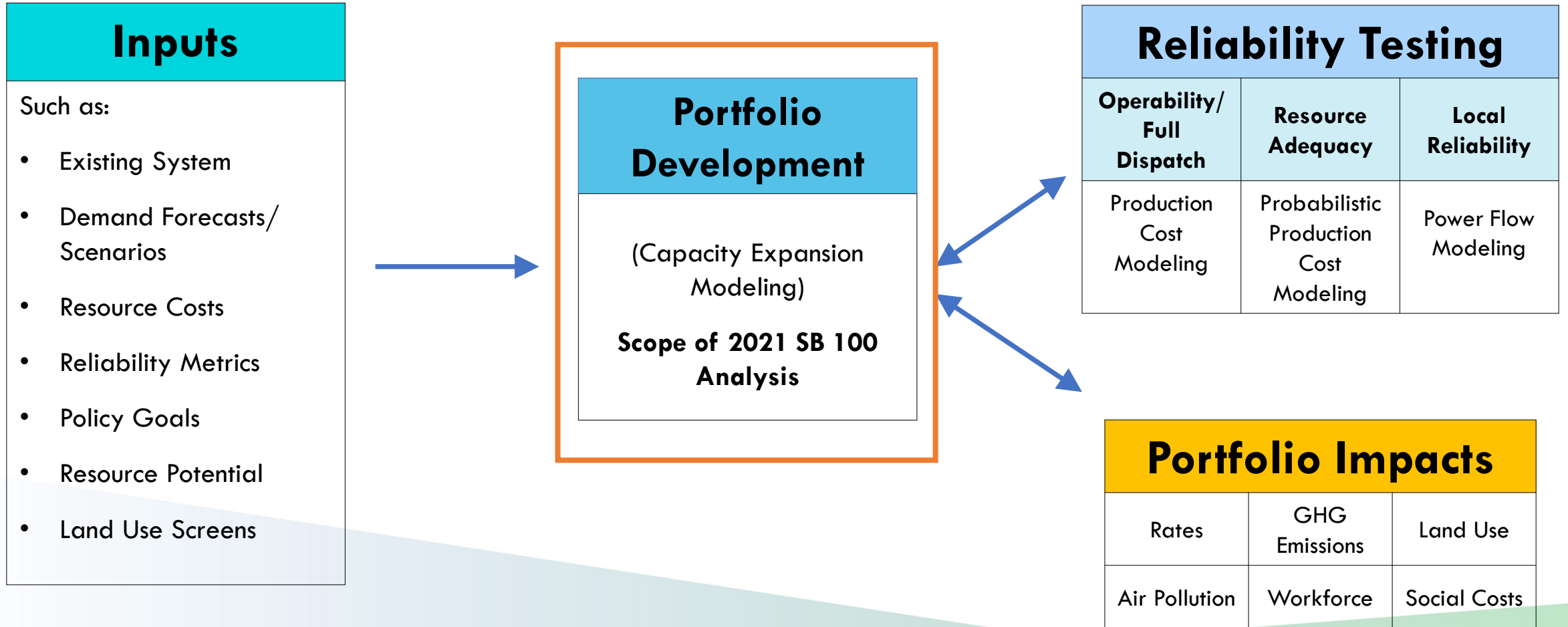
Officially titled “The 100 Percent Clean Energy Act of 2018,”
Senate Bill 100 (SB 100, De León):

- 1** Sets a 2045 goal of powering all retail electricity sold in California and state agency electricity needs with renewable and zero-carbon resources.
- 2** Updates the state’s Renewables Portfolio Standard to ensure that by 2030 at least 60 percent of California’s electricity is renewable.
- 3** Requires the CEC, CPUC, and CARB to use programs under existing laws to achieve 100 percent clean electricity and issue a joint policy report on SB 100 by 2021 and every four years thereafter.





SB 100 Results are Directional



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

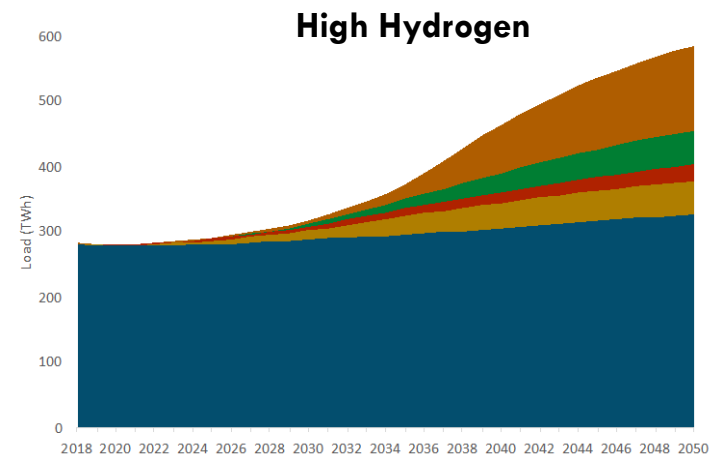
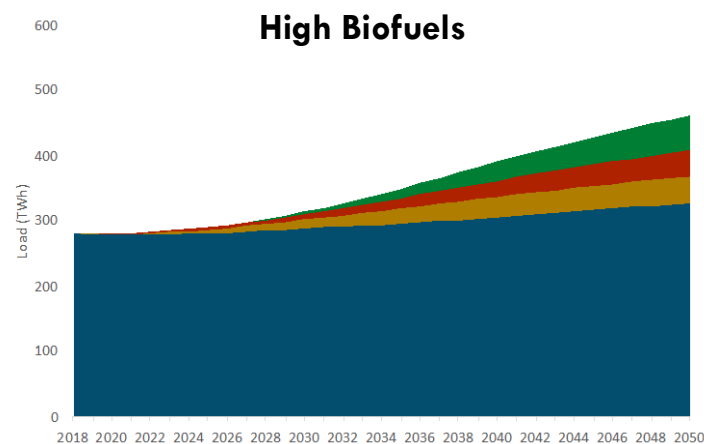
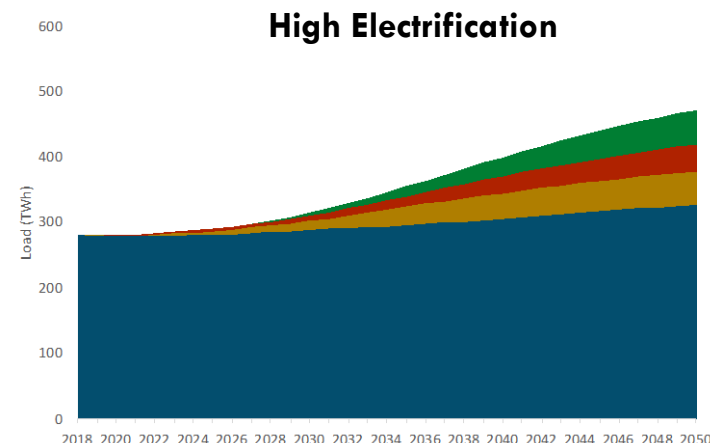
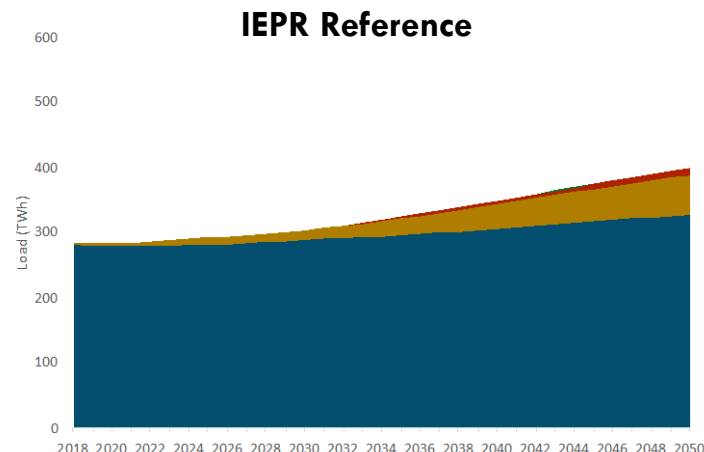
Technology	Eligibility Basis	Scenarios
Solar PV	RPS	Core and Study
Solar Thermal (existing only)	RPS	Core and Study
Onshore Wind	RPS	Core and Study
Offshore Wind	RPS	Core and Study
Geothermal	RPS	Core and Study
Bioenergy	RPS	Core and Study
Fuel Cells (green H2)	RPS	Core and Study
Small Hydro (existing)	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:

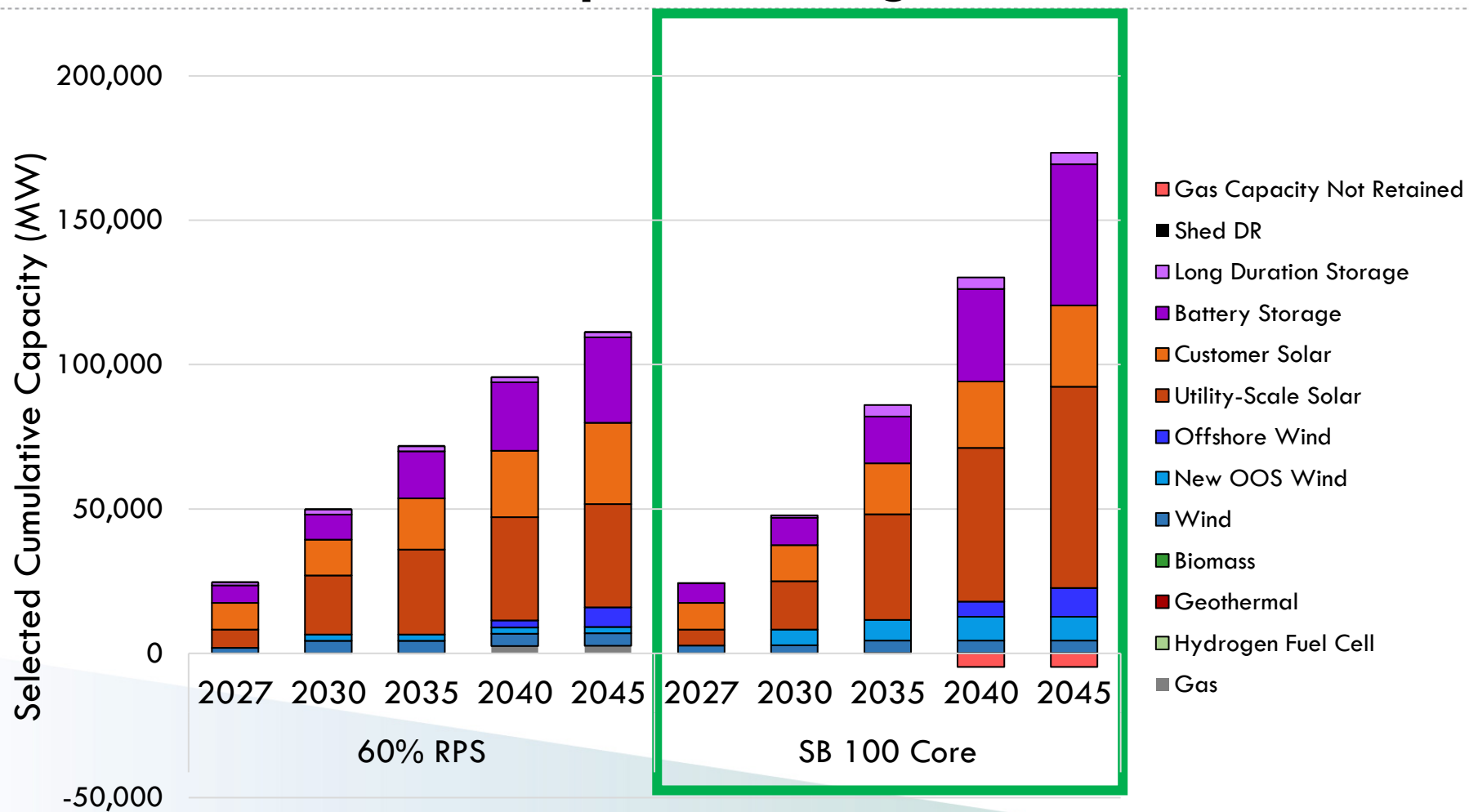
- Annual loads by category (TWh/yr)
- Some load shape information for load modifiers



- Hydrogen
- Building Electrification
- Other Transport
- Electric Vehicles
- Baseload net of EE



SB 100 Requires Significant Resource Build

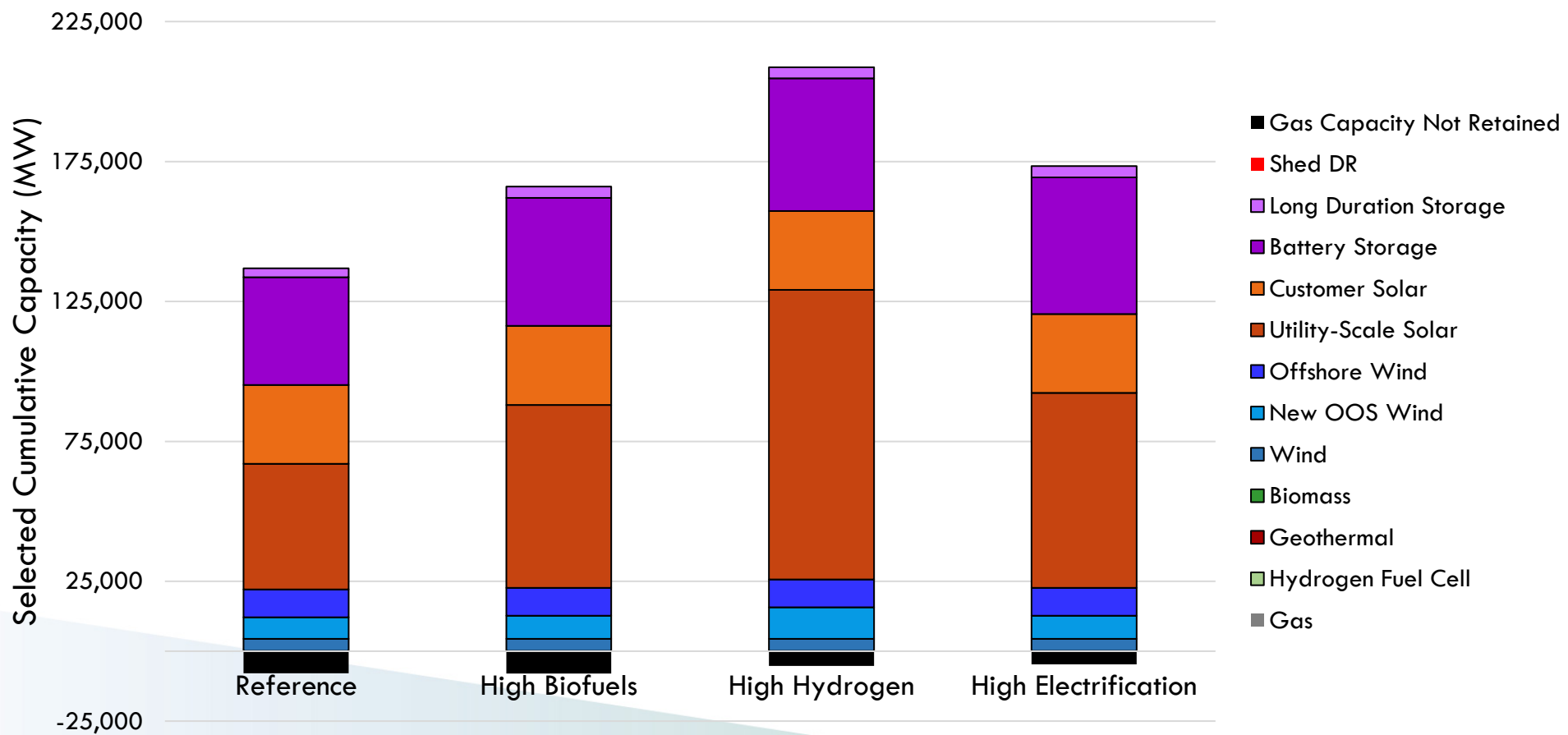


Customer solar shown here is a demand-side assumption. No additional customer solar was selected.

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



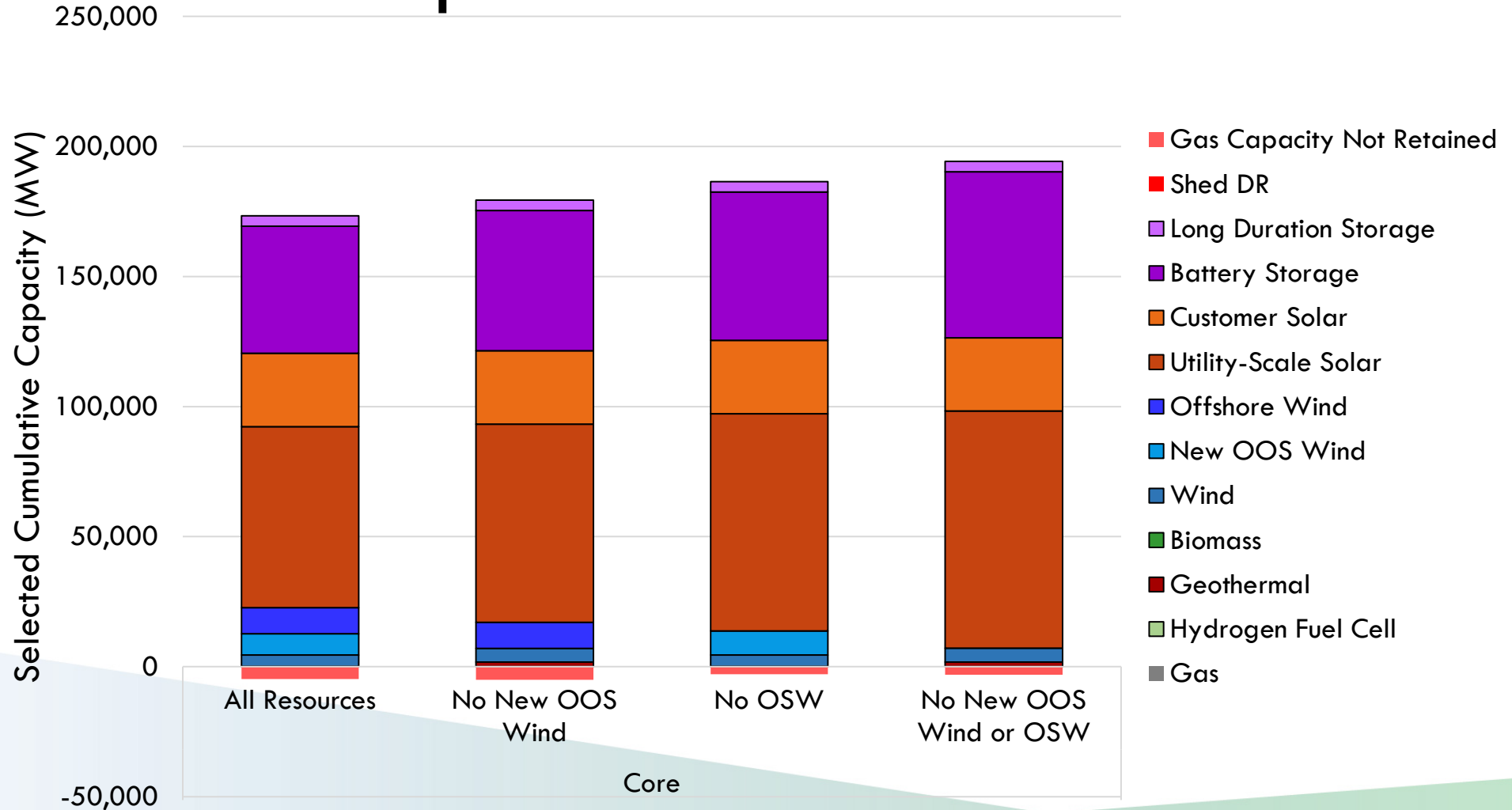
Economy-wide Decarbonization Impacts Resource Requirements





Resource Technology Pursued Impacts

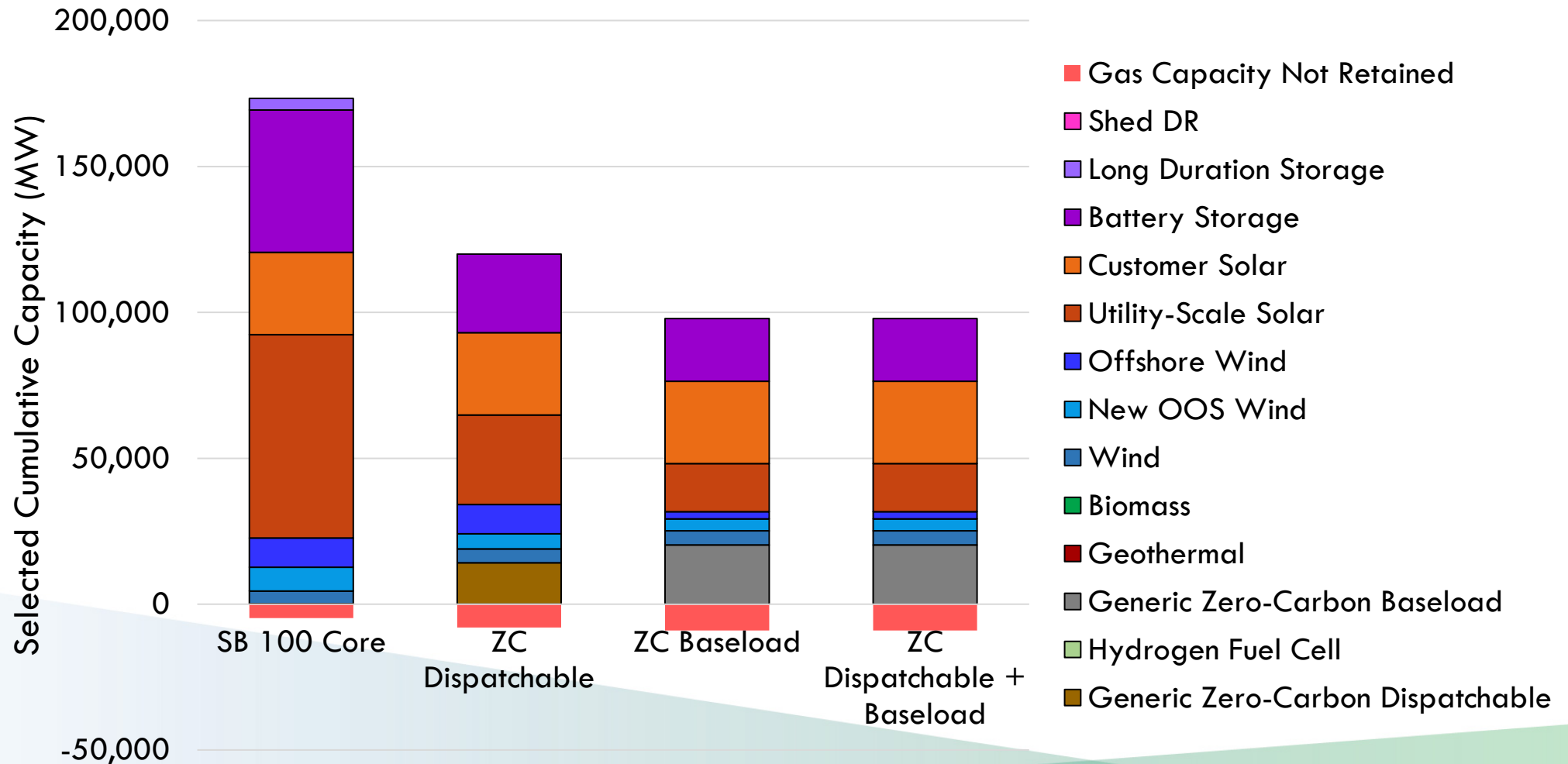
Resource Requirements





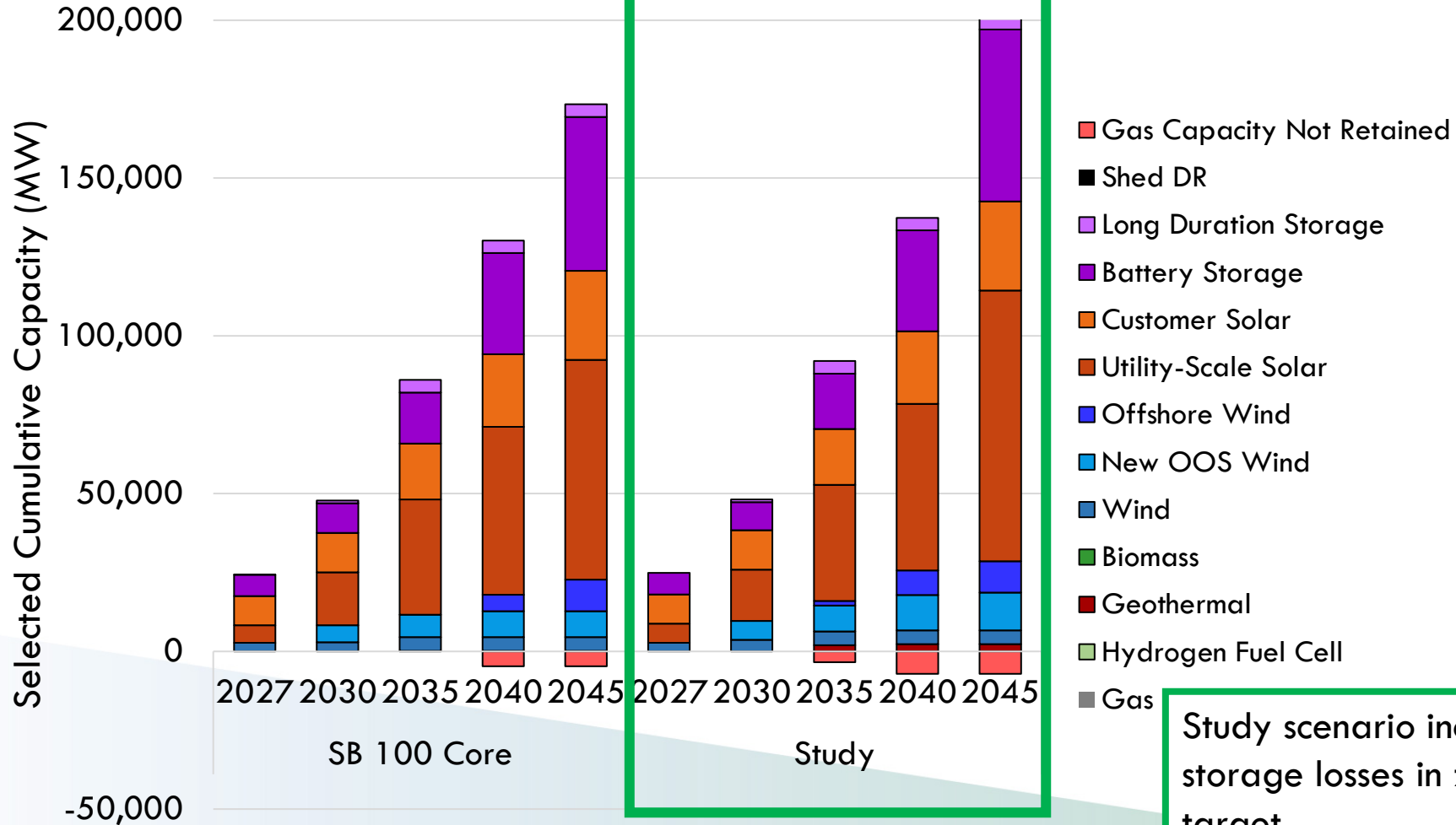
Resource Technology Pursued Impacts

Resource Requirements





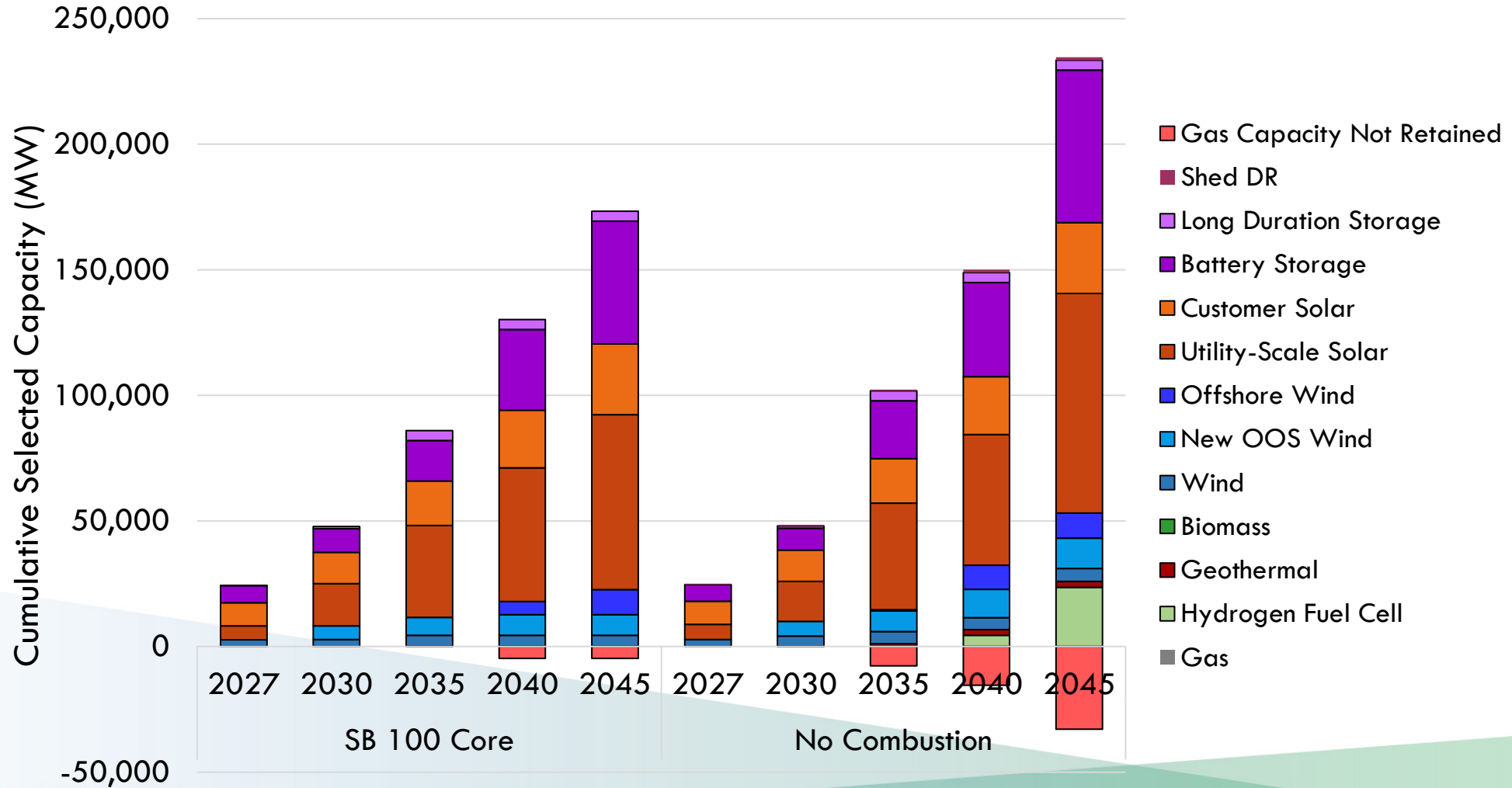
Going Beyond SB 100 Impacts Resource Requirements



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

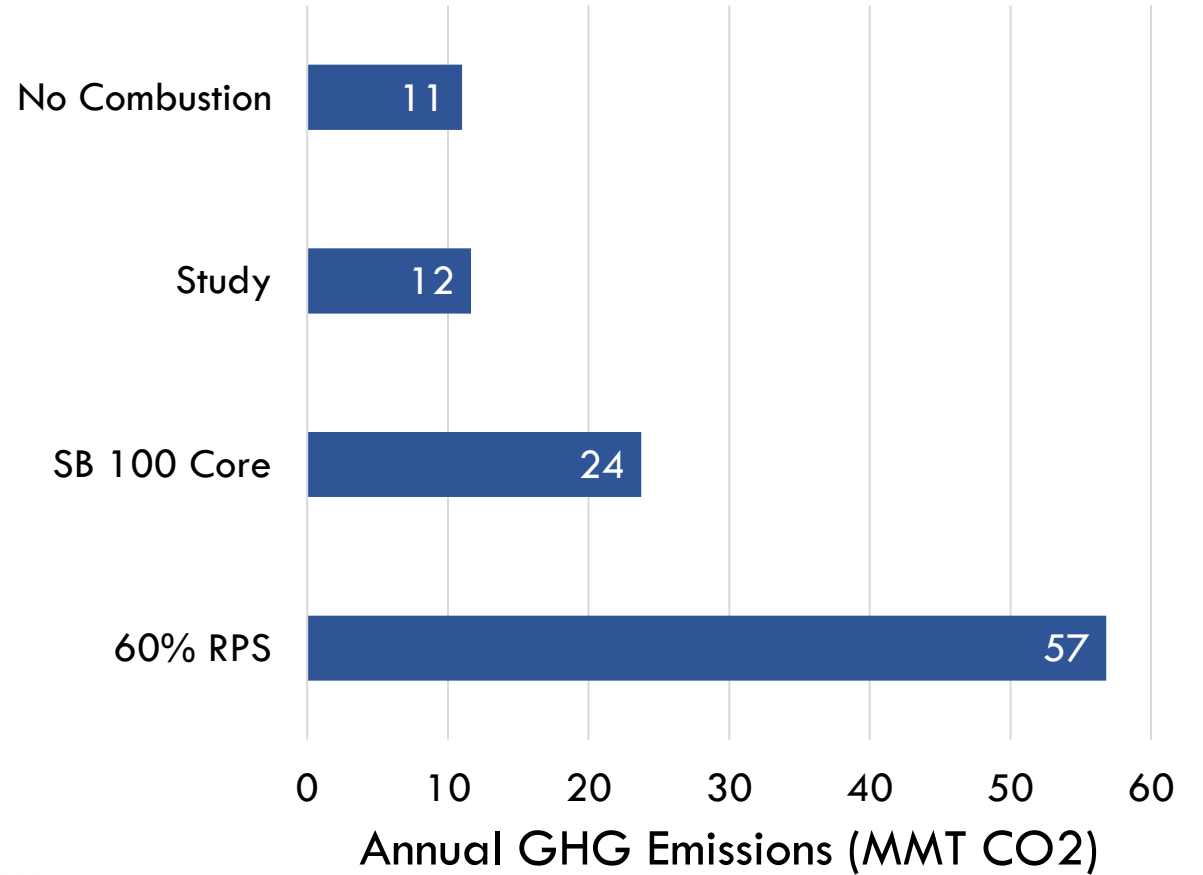
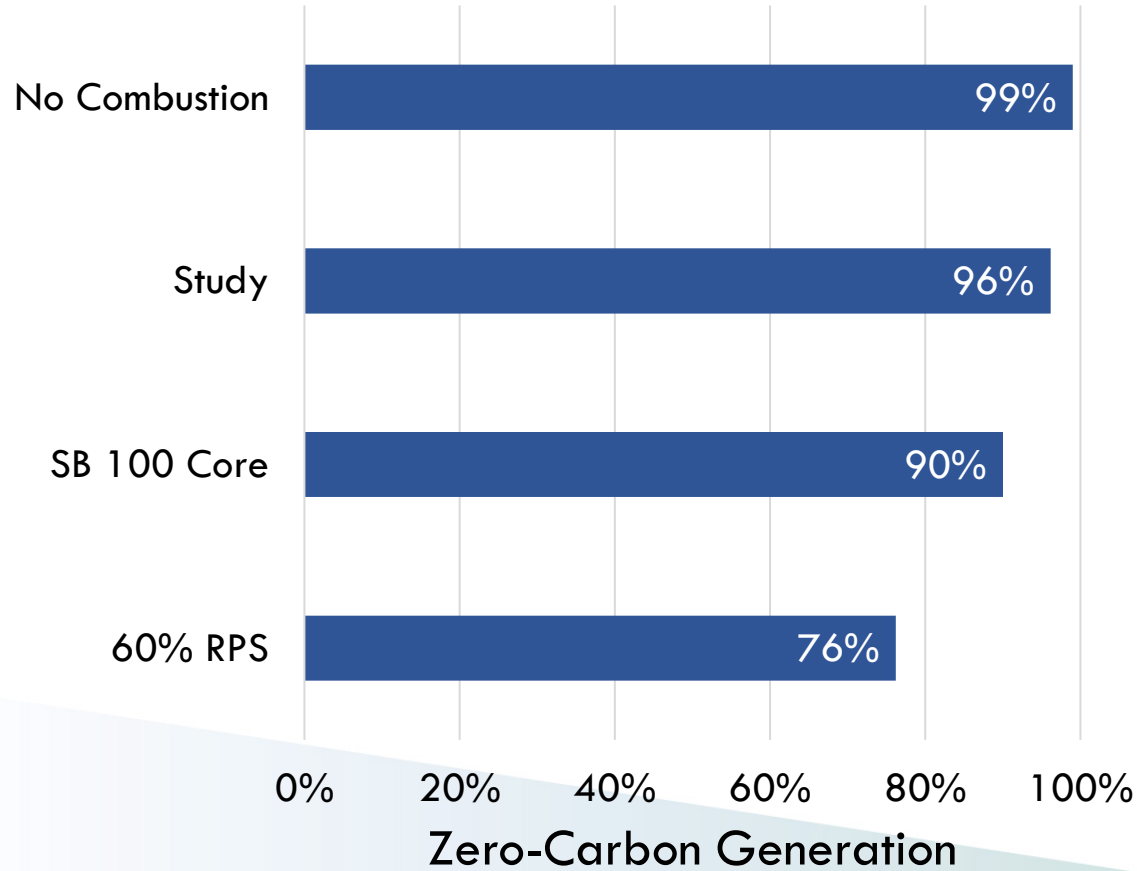


Going Beyond SB 100 Impacts Resource Requirements





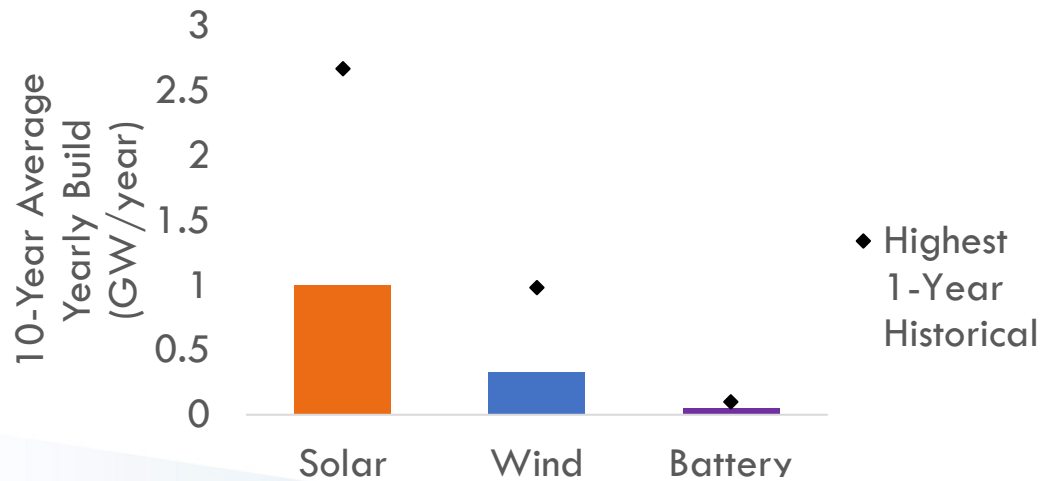
Electric Sector GHG Emissions



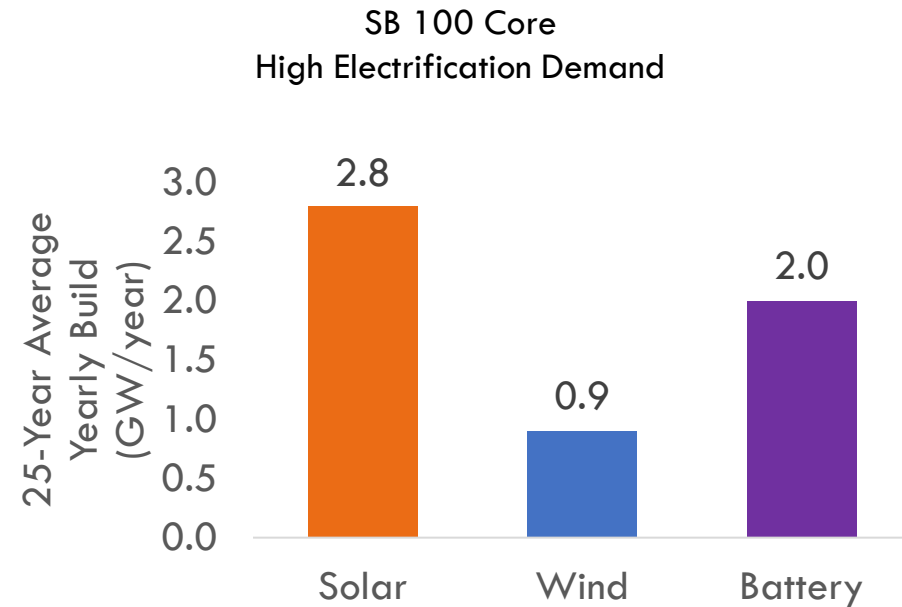


Resource Build Rates

Average Build Rate to Date



Average Build Rate to 2045



Key Takeaways from Modeling

This initial analysis suggests SB 100 is technically achievable through multiple pathways.

Construction of clean electricity generation and storage facilities must be sustained at record-setting rates.

Diversity in energy resources and technologies lowers overall costs.

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

Increased energy storage and advancements in zero-carbon technologies can reduce natural gas capacity needs.

Further analysis is needed.



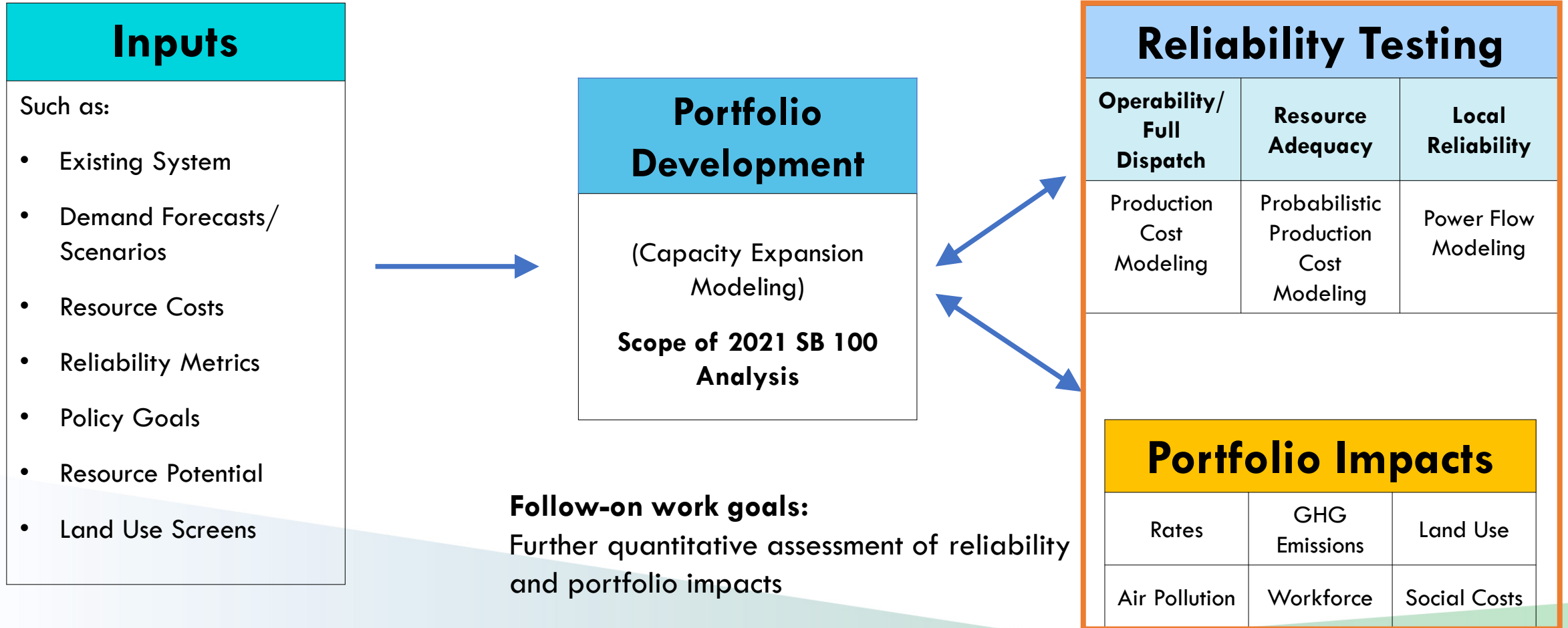
Recommendations for Further Analysis



- 1** Verify that scenario results satisfy the state's grid reliability requirements.
- 2** Continue to evaluate the potential effects of emerging resources, such as offshore wind, long-duration energy storage, green hydrogen technologies, and demand flexibility.
- 3** Assess environmental, social, and economic costs and benefits of the additional clean electricity generation capacity and storage needed to implement SB 100.
- 4** Hold annual workshops to support alignment among the joint agencies and continuity between SB 100 reports.



Further Analysis and Related Work



Inputs, impacts, and tools listed are for illustrative purposes



Thank you!

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

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