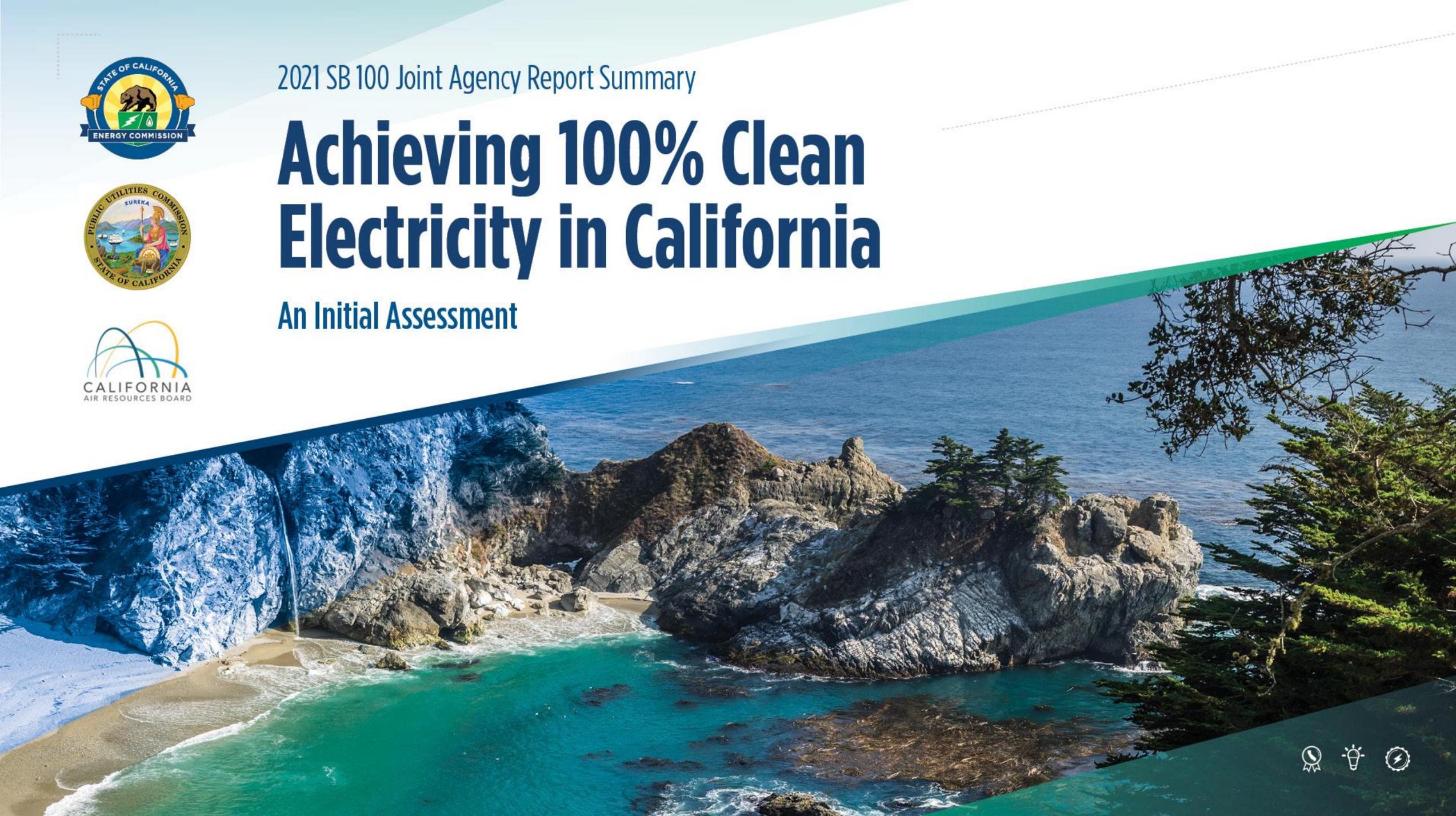




2021 SB 100 Joint Agency Report Summary

Achieving 100% Clean Electricity in California

An Initial Assessment



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.



Benefits

of 100% Clean Energy

Achieving 100% Clean Electricity in California



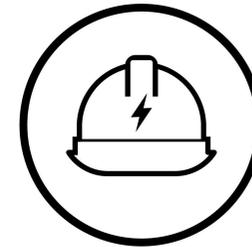
Improves Public Health

The phaseout of fossil fuel-generated electricity is expected to reduce criteria air pollution and related deaths and illnesses.



Advances Energy Equity

Disadvantaged communities—low-income neighborhoods that have historically suffered poor health, dirty air and other burdens — will reap the highest health benefits from clean electricity.



Restores and Creates Clean Energy Jobs

SB 100-driven growth will restore thousands of clean energy jobs lost during the pandemic and create thousands of new high-quality clean energy jobs.



The 2021 SB 100 Joint Agency Report

The 2021 report is a first step to evaluate the challenges and opportunities in implementing SB 100.

It includes an initial assessment of the additional energy resources and the resource building rates needed to achieve 100 percent clean electricity, along with the associated costs.

The estimates in this report will change over time as additional factors, such as system reliability, land use, energy equity, and workforce needs, are more closely examined.



Public Outreach



A diverse array of interests informed this report through a year-long series of public workshops and comment opportunities. Participants included:

Community leaders

Energy experts with utilities, technology companies and trade groups

University researchers

Environmental groups

Environmental justice organizations

The joint agencies also consulted with:

The California Balancing Authorities

The Disadvantaged Communities Advisory Group

Renewable/Zero-Carbon Technologies Modeled:



Solar, photovoltaic
and thermal (existing only)



Wind, onshore and offshore



Geothermal



Bioenergy



Fuels cells



Hydroelectric, existing
large and small operations only



Nuclear, existing
power plants only



California

Clean Electricity Resources

**Projected to increase annual costs
6% above a 60% RPS baseline**

* Includes in-state

** Includes in-state and out of state capacity

† New hydro and nuclear resources were not candidate technologies for this round of modeling and could not be selected



Achieving 100% Clean Electricity in California

	Existing Resources		Projected New Resources	
	2019*	2030**	2045**	
 Solar (Utility-Scale)	12.5 GW	16.9 GW	69.4 GW	
 Solar (Customer)	8.0 GW	12.5 GW	28.2 GW	
 Storage (Battery)	0.2 GW	9.5 GW	48.8 GW	
 Storage (Long Duration)	3.7 GW	0.9 GW	4.0 GW	
 Wind (Onshore)	6.0 GW	8.2 GW	12.6 GW	
 Wind (Offshore)	0 GW	0 GW	10.0 GW	
 Geothermal	2.7 GW	0 GW	0.1 GW	
 Biomass	1.3 GW	0 GW	0 GW	
 Hydrogen Fuel Cells	0 GW	0 GW	0 GW	
 Hydro (Large)	12.3 GW	N/A†	N/A†	
 Hydro (Small)	1.8 GW	N/A†	N/A†	
 Nuclear	2.4 GW	N/A†	N/A†	

To Achieve Clean Energy

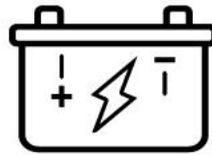
Development Needs
To Rapidly Accelerate



Solar & Wind

3X

Solar and wind build rates need to nearly triple*



Battery

8X

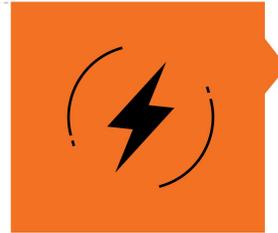
Battery build rates need to increase by nearly eightfold**



*Based on 10-year average | **Based on 2020



Additional Scenarios: Preliminary Findings



High Demand Flexibility:

Increased flexibility may lower overall resource needs and systems costs

Study Scenarios

The agencies also explored scenarios outside their interpretation of SB 100 to inform broader state planning efforts



No-Combustion:

Reduces criteria air pollution but results in higher costs



Zero-Carbon Firm Resources:

Commercialization of emerging technologies or cost decreases in existing firm resources may lower overall system costs



Accelerated Timeline:

These targets may be achievable but may increase overall costs

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.



Thank You

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

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