DOCKETED	
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Description:	N/A
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Docketed Date:	10/27/2022

Clean Energy Alternatives for Reliability

Lead Commissioner Workshop

October 28, 2022 – Session 1

Introduction

- Two sessions
  - Session 1: 10 – 12
  - Session 2: 1:30 – 4
  - Q&A & Comments: In-person or Zoom Q&A function
  - Administrative questions: Zoom Chat function
- Public comments due 5 pm, November 10, 2022
- CEC Docket 21-ESR-01
- RFI (status TBD)

Agenda

Morning – Session 1

- Introduction (10:00 – 10:05)
- Comments from the Dais (10:05 – 10:20)
- Reliability Overview (10:20-10:40)
- 2022 Legislative Requirements (10:40 – 11:20)
- Q&A (11:20 – 11:45)
- Public Comment (11:45 – 12:00)

Afternoon – Session 2

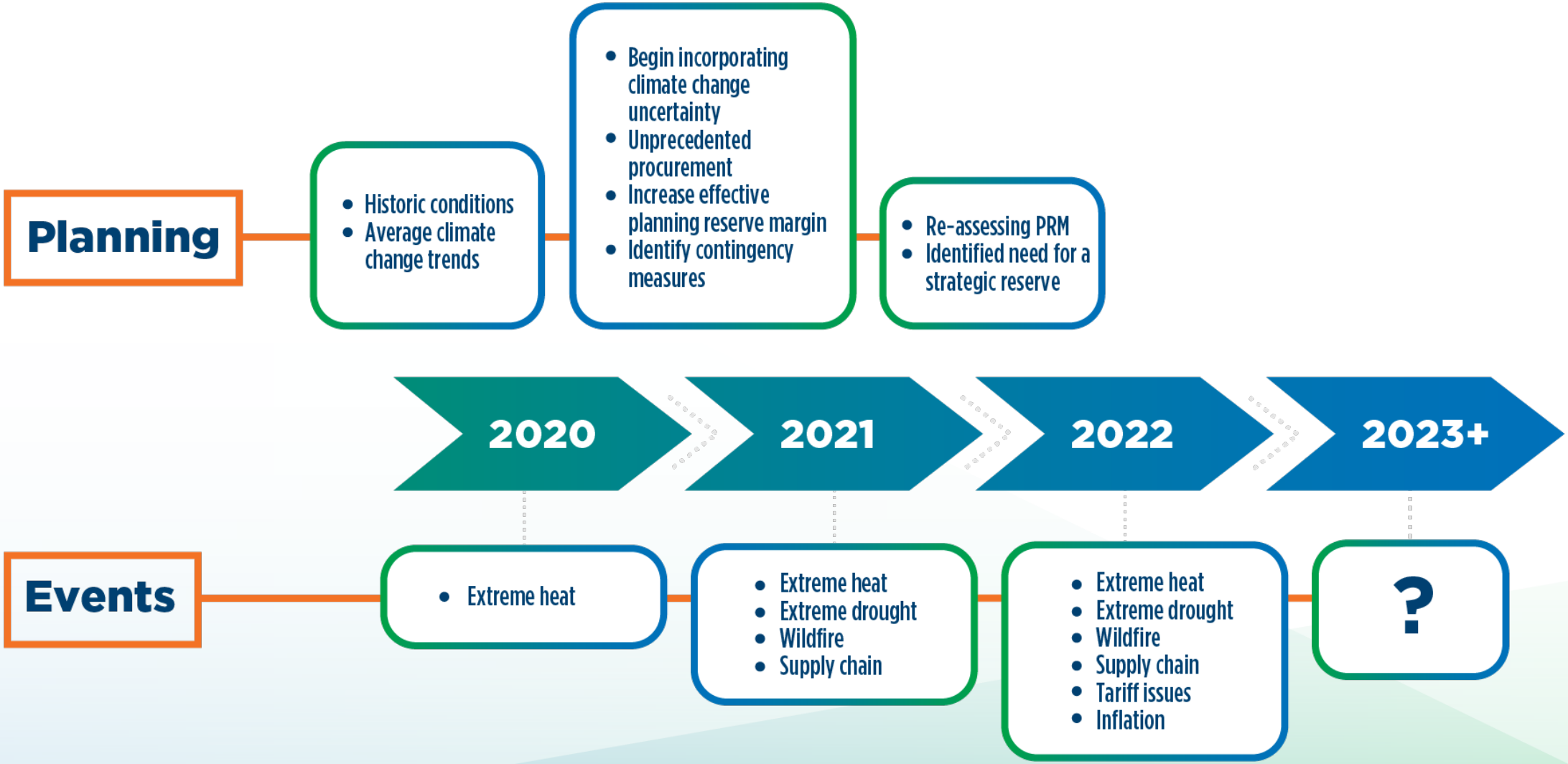
- Introduction (1:30 – 1:35)
- Comments from the Dais (1:35 – 1:45)
- Clean Energy Options Evaluation with Q&A (1:45 – 3:00)
- Public Comment (3:00 – 3:30)
- Closing Comments (3:30 – 3:45)

Comments from the Dais

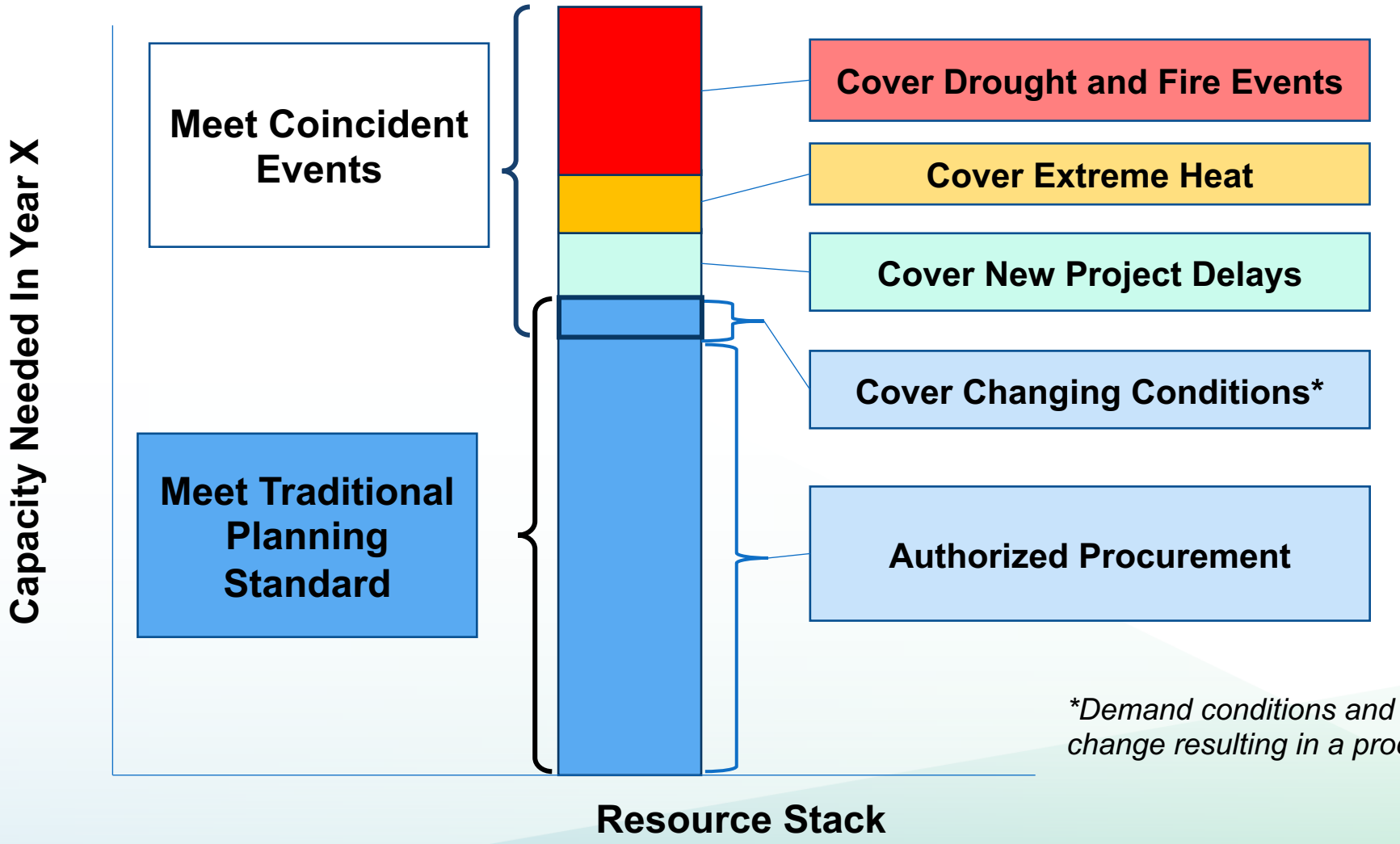
Reliability Overview

Presenter: David Erne, Deputy Director, Energy Assessments Division

Compounding Reliability Risks



Reliability Impacts



*Demand conditions and assumptions may change resulting in a procurement lag

2022 Estimated Impact on Reliability

Issue	2022	2025
Inherent difference between procurement and updated forecast	1,700 MWs	1,800 MWs
Project Development Delay Scenarios (estimated)	600 MWs	1,600-3800 MWs
Extreme weather and fire risks	4,000-5,000 MWs	

In total the risk in a coincidental situation could be 7,000MW in 2022 & 10,000MW in 2025

2022 Contingencies

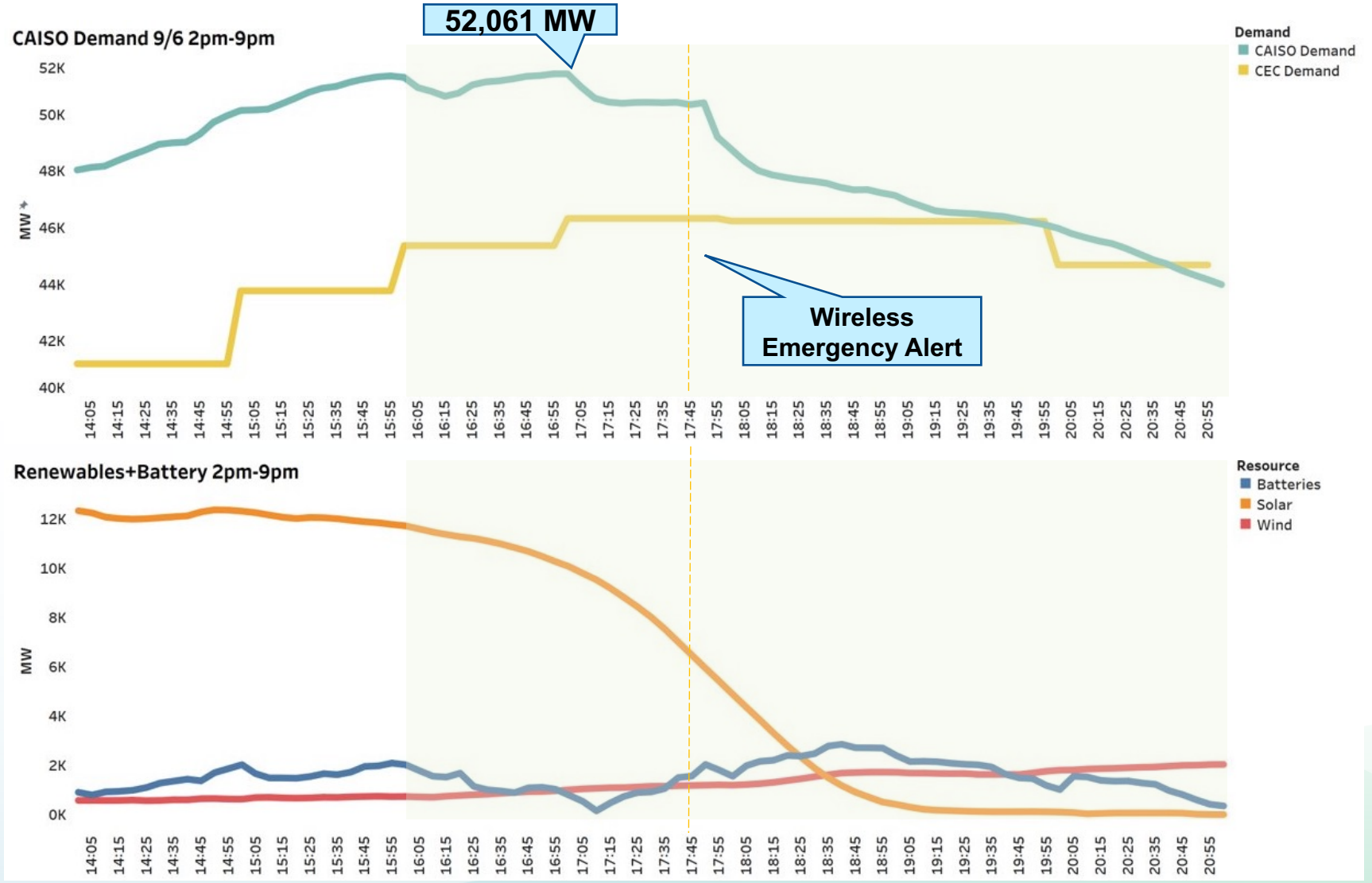
Operational
- Coordination with other balancing authorities
- Increasing CAISO Generation Limits (may also require 202C)

Supply-side
- Temporary generators
- Efficiency improvements

Demand-side
- Flex Alert
- Emergency Load Reduction Program
- Demand Side Grid Support
- Shift DWR pumping loads
- Voluntary reductions by large users

Total contingencies: More than 2,000 MW

September 6 Demand and Generation



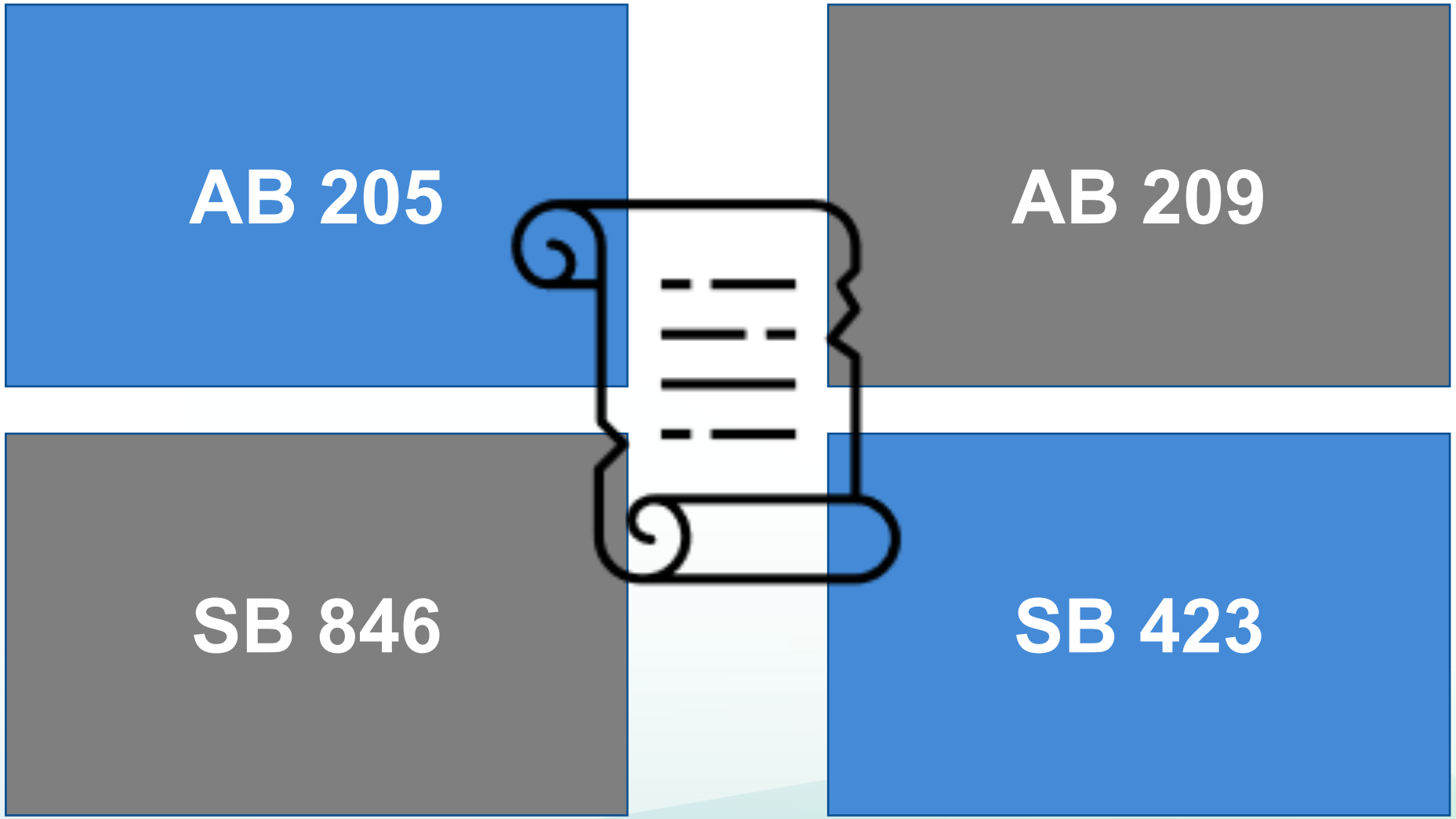
Collective Actions

- Strategic Reserve (more than 1,600MW)
  - Additional generation and imports
  - Demand Side Grid Support
- Contingencies (assessing)
  - Flex Alert
  - Emergency Load Reduction Program
  - Increased generation limits
  - Transfers from other balancing authorities
- Other Resources (assessing)
  - Maximized hydro / minimized pumping
  - State buildings

2022 Legislative Requirements

Presenter: Lisa DeCarlo, CEC, Senior Attorney, Chief Counsel's Office

CEC Legislative Requirements



Key Legislative Requirements

Assembly Bill 205

- Strategic Reliability Reserve Fund
  - Distributed Electricity Assets Program
  - Demand Side Grid Support Program
  - Certification of DWR SRR Facilities
- Opt-In Permitting
- Long-Duration Energy Storage
- Summer 2022 Reliability Report

Assembly Bill 209

- Planning Reserve Margin
- Climate Innovation Program
- Clean Energy Programs
- Offshore Wind Infrastructure

Senate Bill 846

- Reliability Planning Assessment
- Clean Energy Reliability Investment Plan (CERIP)
- Report on the Need for Extension of Diablo Canyon
- Report on Diablo Canyon Operations
- Load Shift Goal and Policies
- Cost Comparison of Diablo Canyon
- Reevaluating Cost Effectiveness of Diablo Canyon

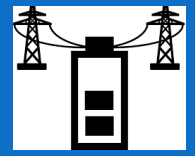
Senate Bill 424

- Assessment of Firm Zero-Carbon Resources

AB 205 - Strategic Reliability Reserve

Demand Side Grid Support Program (DSGS)	Distributed Electricity Backup Assets Program (DEBA)	Permitting DWR SRR Facilities
		

AB 205 - Opt-in Permitting Program

Solar photovoltaic power plant of at least 50 MW	Terrestrial wind power plant of at least 50 MW	Energy storage system of at least 200MWh
		
Non-fossil-fueled thermal power plant of at least 50 MW	Manufacturing/assembly facility for renewable energy/energy storage systems or components with at least $250 million investment	Transmission from a power plant eligible under this law to the first point of interconnection
		

AB 205 - Long Duration Storage Program

Eligible technologies

- Compressed air or liquid air
- Flow batteries
- Advanced chemistry batteries
- Mechanical storage
- Thermal storage
- Aqueous battery systems

Not eligible

- Pumped storage
- Lithium-ion

AB 205 – Summer 2022 Reliability Report

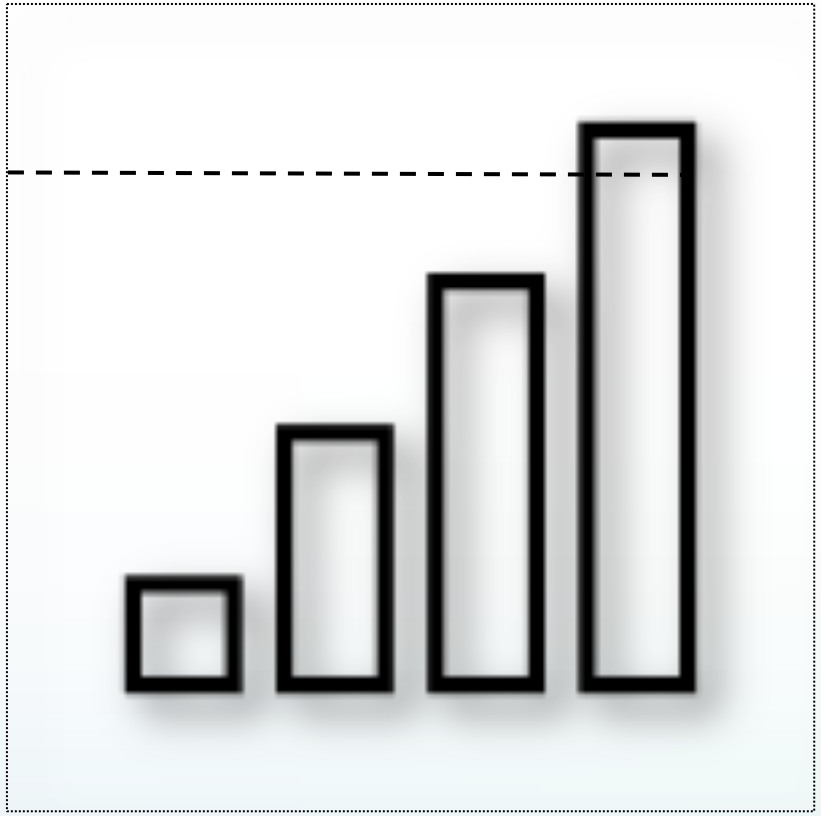
JANUARY 31, 2023

Three elements to the report:

- How summer 2022 reliability was managed
- Magnitude of projected reliability problems for 2023-2026
- Potential solutions

AB 209 - Planning Reserve Margin

DECEMBER 31, 2023



Product

- Recommendations for minimum planning reserve margin
- Implementation timeline

Process

- Transparent public process
- Input from stakeholders
- Direct collaboration with POUs and CAISO

AB 209 Clean Energy Programs

$100 Million
Industrial Decarbonization

$922 Million
Building Decarbonization

$45 Million
Offshore Wind Infrastructure

$100 Million
Carbon Removal

$525 Million
Climate Innovation Program

$75 Million
Food Production Investment Program

$100 Million
Green Hydrogen Grants

$10 Million
Energy Modeling, Offshore Wind & Opt-In Permitting

SB 846 – Joint Reliability Planning Assessment

DECEMBER 15, 2022

Assessment must contain several elements, including:

- Estimates for electrical supply and demand balance
- Identify online and expected loads and resources
- Prospective information about existing and expected resources
- Report on significant delays or barriers
- Recommendations on actions to resolve
- Report on any regulatory barriers

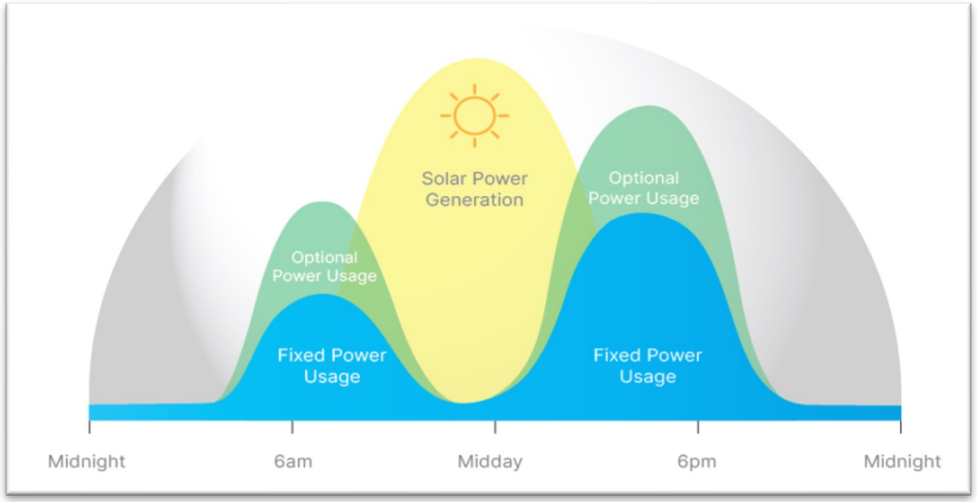
Submitted quarterly after initial deadline

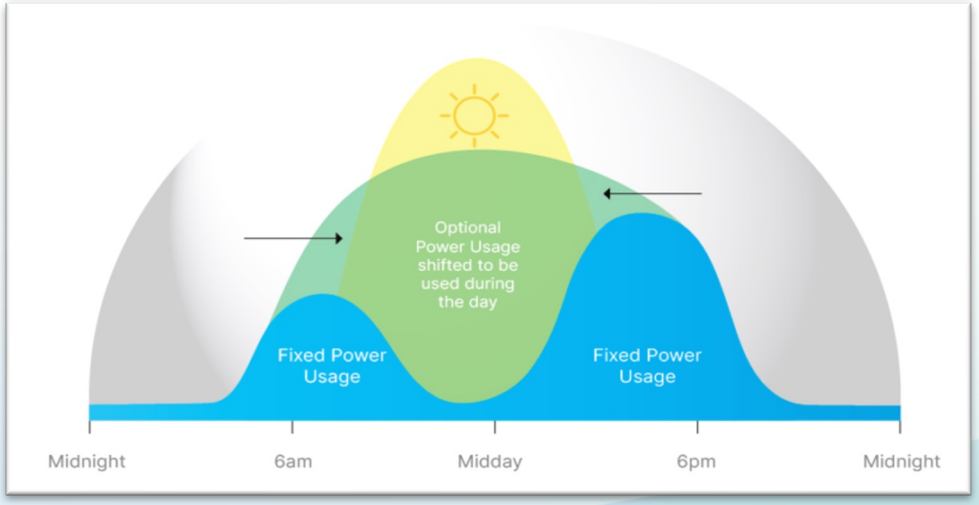
SB 846 – Diablo Canyon Powerplant

- Determine whether there is potential for reliability deficiencies and whether extension is prudent
- Assess the operation of the powerplant
- Present a cost comparison
- Reevaluate cost-effectiveness

SB 846 – Load Shift Goals

JUNE 1, 2023





- In consultation with CPUC and CAISO
- Adopt a goal for load shifting to reduce net peak electrical demand
- Must consider Berkeley National Lab report on Shift Resource, etc.
- Adjust target in biennial IEPRs

SB 846 – Clean Energy Reliability Investment Plan

MARCH 1, 2023

Support investments that take into account:

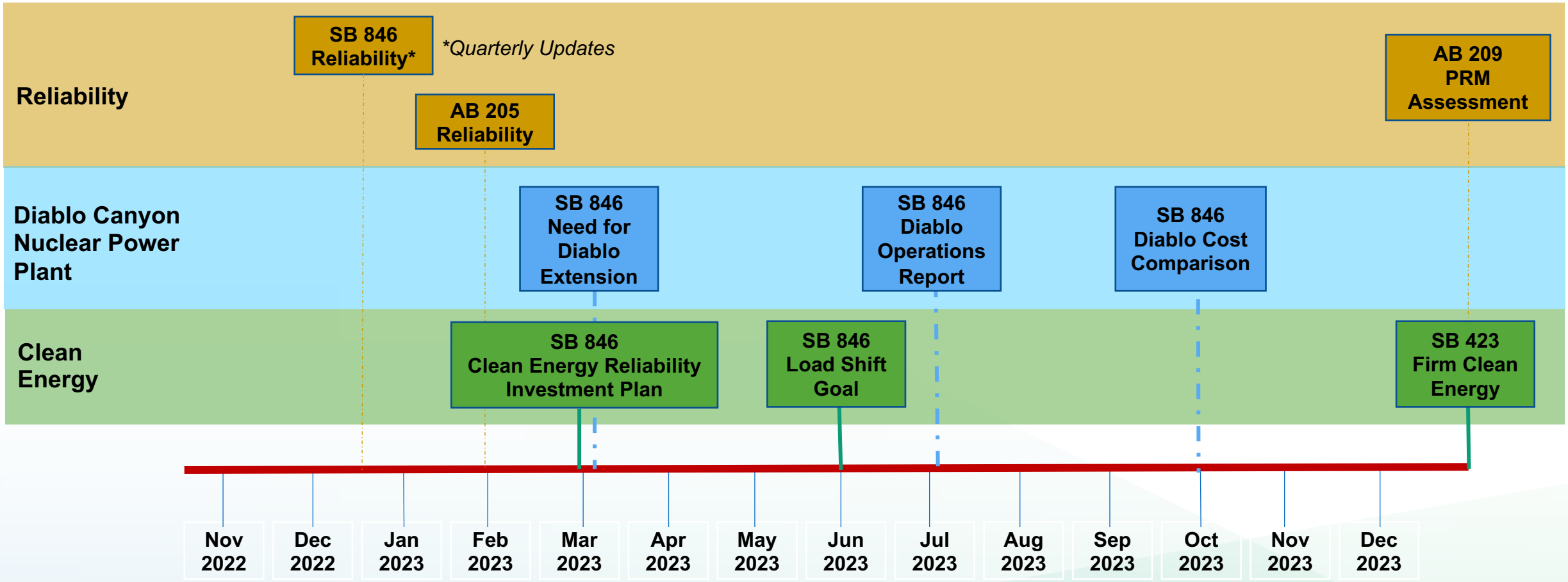
- Anticipated supply and demand needs for near- and mid-term reliability
- Advancement of 100% zero carbon and renewable resources policies
- GHG reduction target for electricity sector

SB 423 Firm Zero-carbon Resources

DECEMBER 31, 2023

- In consultation with CPUC, CAISO, and CARB
- Identify all available commercially feasible or near-commercially feasible
- Evaluate magnitude of potential needs
- Identify barriers to development
- Recommend changes
- Evaluate reliability of LSE IRPs

Statutory Deadlines



2022 Legislative Requirements

Presenter: Pete Skala, CPUC, Director Electricity Supply, Planning, and Cost

SB 846 – CPUC Requirements

- Within 120 days, CPUC to issue a decision authorizing PG&E to (1) take actions to extend the operations of DCPP and (2) track all costs (DWR loan and CPUC jurisdictional ratepayers)
- By 12/31/23, determine final closure dates for the two units.
- Within an "Energy Resource Recovery Account Like Proceeding":
  - Enable PG&E to recover the reasonable costs and expenses of operating DCPP
  - Authorize PG&E to recover in rates an operating fee for each megawatt-hour generated by DCPP during the period of extended operations.
  - Determine whether PG&E is liable for any above-market costs resulting from any extended outages
- Establish a new Cost Allocation Mechanism to recover costs from all CPUC jurisdictional entities.
- Authorize PG&E to recover reasonable replacement power costs, if incurred, during any DCPP unplanned outage periods.
- Determine whether and how much additional Decommissioning funding is needed and authorize PG&E to collect as needed.

SB 846 – CPUC Requirements (Cont'd)

- Ensure sufficient funding for the Diablo Canyon Independent Safety Committee to attract qualified experts and require PG&E to (1) respond to the findings and recommendations of the Committee, and (2) distribute the response to various public entities.
- Determine the disposition of DCPP properties in a manner that best serves the interests of the local community, ratepayers, California Native America tribes, and the state.
- Ensure that the energy, capacity, or attributes of DCPP is excluded from all IRP portfolios developed by the CPUC or CPUC-jurisdictional load serving entities (beyond current license expiration dates).
- At any point during the license renewal process or extended operations period, determine whether continued operations are reasonable or not as a result of the cost of performing upgrades needed to continue operations of one or both units exceeding the benefits to ratepayers.
- Verify at the conclusion of extended operations that PG&E's sole compensation during the period of extended operations is limited to the volumetric and fixed payments.

SB 846 – CPUC Joint Requirements / Support Role

- Jointly with the CEC, provide to the Legislature a quarterly Reliability Planning Assessment that identifies estimates for the electrical supply and demand balance for the forward 5- and 10-year period under high-, medium-, and low-risk scenarios.
- DWR is to conduct a semi-annual loan costs true-up, with the support of CPUC.
- The CEC, in consultation with the CPUC and CAISO, is to adopt a goal for load shifting to reduce net peak electrical demand and adjust this target in each biennial integrated energy policy report thereafter.
- All relevant state agencies directed to consult and work collaboratively with local California Native American tribes, including designating a tribal liaison to consider tribal access, use, conservation, and co-management of DCPP lands and agencies are directed to work cooperatively with tribes interested in acquiring DCPP lands.
- In coordination with the CEC, CAISO, and DWR, submit a report to the Legislature each year on the status of new resource additions and revisions to the state's electric demand forecast.
- Support the CEC in developing , an assessment of the DCPP operations that includes, but is not limited to, outage information (either in a new report or including in an existing report)

AB 205 and AB 209 – Relevant CPUC Requirements

- **AB 205:**
  - Requires the CPUC to develop an income graduated fixed charge for residential rates that results in a lower average monthly bill for low-income without making any changes in usage.
  - Requires the CPUC to ensure that the approved fixed charges do not unreasonably impair incentives for beneficial electrification and greenhouse gas reduction and prohibits.

- **AB 209:**
  - Allows solar-only projects that were previously ineligible in the Self-Generation Incentive Program (SGIP) to receive incentives, and requires any additional incentives for solar-only and solar + storage (above SGIP's previously authorized ratepayer-funded budget) to come from legislative appropriation.
  - Allows CPUC staff to share confidential information with the CAISO.

2022 Legislative Requirements

Presenter: Ted Craddock, DWR, Deputy Director

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Electricity Supply Strategic Reliability Reserve

CEC Workshop, October 28, 2022

Ted Craddock, Deputy Director

Legislative Drivers

- Proclamation of State of Emergency (July 30, 2021)
  Energy Emergency Proclamation Text
- AB 205 Energy (June 30, 2022)
  Bill Text - AB-205 Energy
- SB 846 Diablo Canyon Powerplant: Extension of Operations (September 2, 2022) Bill Text - SB-846 Diablo Canyon powerplant: extension of operations
- AB 209 Energy and Climate Change (September 6, 2022)
  Bill Text - AB-209 Energy and climate change

California Department of Water Resources (DWR)

Tasked to deploy and manage additional energy resources to support the State's energy grid through a newly created **Strategic Reliability Reserve**

CALIFORNIA DEPARTMENT OF
WATER RESOURCES

DWR's Role

- Identify, prioritize and select new generation projects
- Develop and execute contracts
- Oversee engineering, procurement and construction of projects
- Implement state certification and environmental compliance
- Administer Electricity Supply Strategic Reliability Reserve Fund
- Coordinate with State agencies and partners
  - CAISO, CARB, CEC, CPUC, SWRCB, etc.
- Report progress

Types of Projects

- Extended operations of retiring facilities
- Emergency and temporary power generators of 5 MW or more
- Energy storage systems ≥ 20 MW; capable of 2-hr discharge minimum
- Zero-emission fuel technology generation facilities
- Imported energy / import capacity products

2022 Investments

- 200 MW of emergency and temporary power generators
- 1,400 MW of imported energy / capacity imports
- Provided critical support to State's electric grid during September heatwave

Future Planned Investments

- Additional temporary power generators
- Extend operations of retiring facilities
- Will provide additional details during November 16 CEC Business Meeting

Q&A

Public Comment

- Zoom
  - Use the “raise hand” feature to make verbal comments
- Telephone
  - Dial *9 to raise your hand
  - *6 to mute/unmute your phone line. You may also use the mute feature on your phone
- When called upon
  - Your microphone will be opened
  - Unmute your line
  - Spell your name and identify your organization, then start your comment

Clean Energy Alternatives for Reliability

Lead Commissioner Workshop

October 28, 2022 – Session 2

Comments from the Dais

Agenda

Morning – Session 1

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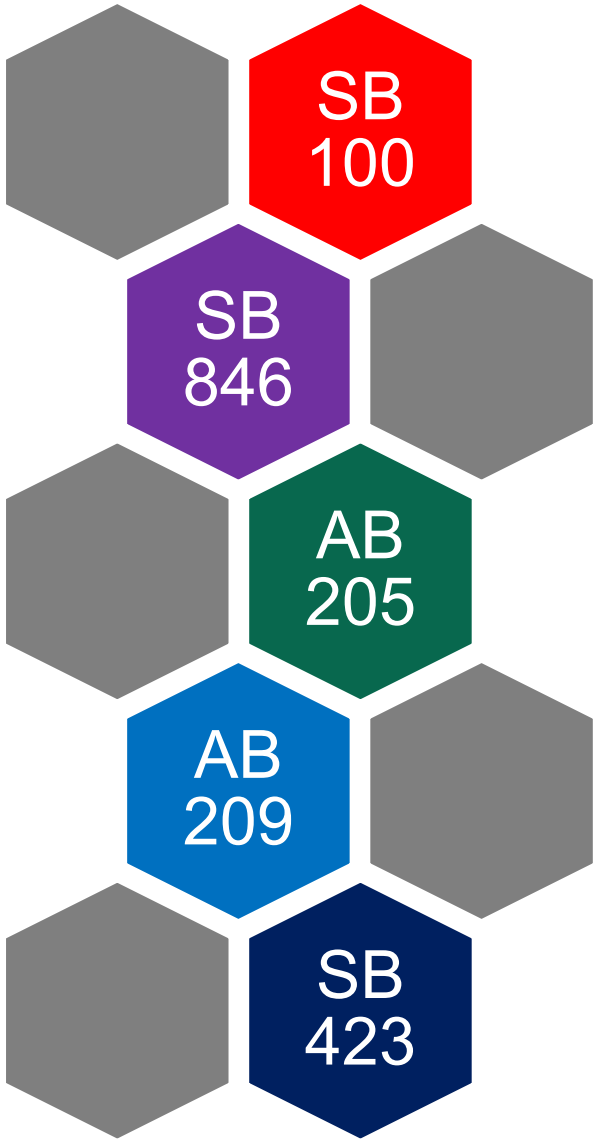
Energy Transition Goal

- Safe
- Reliable
- Clean
- Resilient
- Equitable
- Affordable



Path to Meeting our Goal

Improve Frameworks & Analytics

- How to incorporate climate change?
- Need to reassess planning reserve margin?
- Do all load serving entities have sufficient resource adequacy programs?
- Rethink assumptions?

Identify Technologies & Approaches

- What portfolio helps meet state clean energy goals?
- What are cost-effective options for Diablo Canyon?

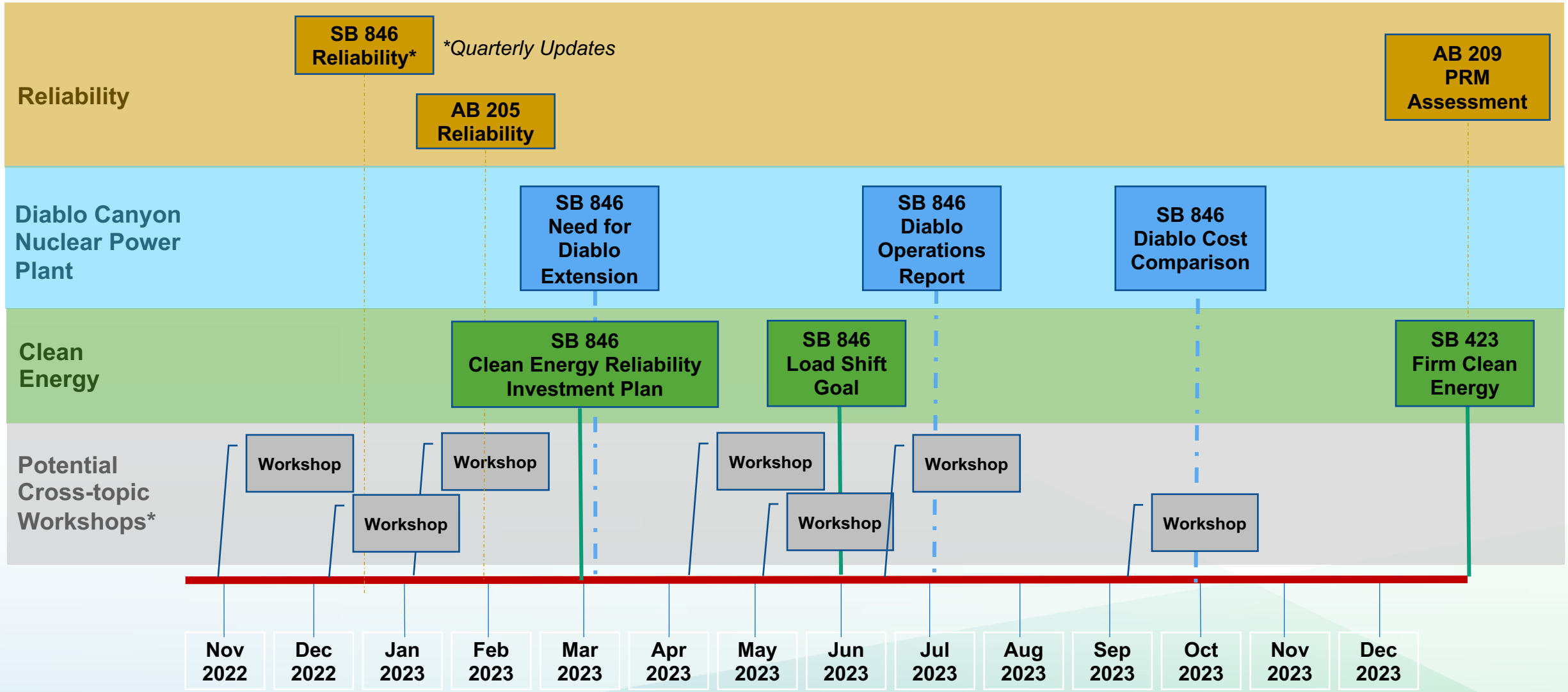
Identify Barriers & Solutions

- What barriers are tech/approach specific?
- How do we overcome supply chain, interconnection, & permitting barriers?

Recommend Strategies

- What policy, planning, and investment strategies will expedite our ability to meet clean energy goals

Work Schedule



*Specific number of workshop will be reassessed continuously and scheduled, as needed

Today's Focus Areas

Improve Frameworks & Analytics

- How to incorporate climate change?
- Need to reassess planning reserve margin?
- Do all load serving entities have sufficient resource adequacy programs?
- Rethink assumptions?

Identify Technologies & Approaches

- What portfolio helps meet state clean energy goals?
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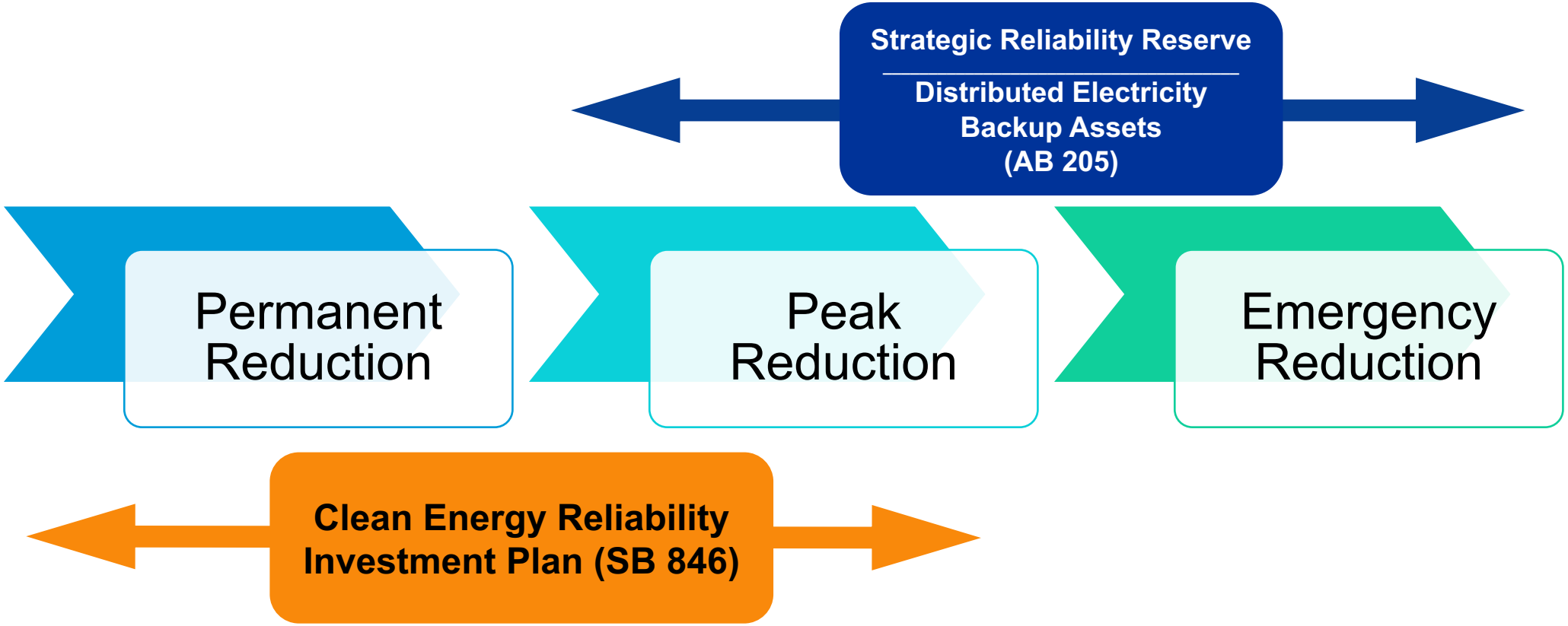
Recommend Strategies

- What policy, planning, and investment strategies will expedite our ability to meet clean energy goals

Multiple Needs for Clean Energy Option Analysis

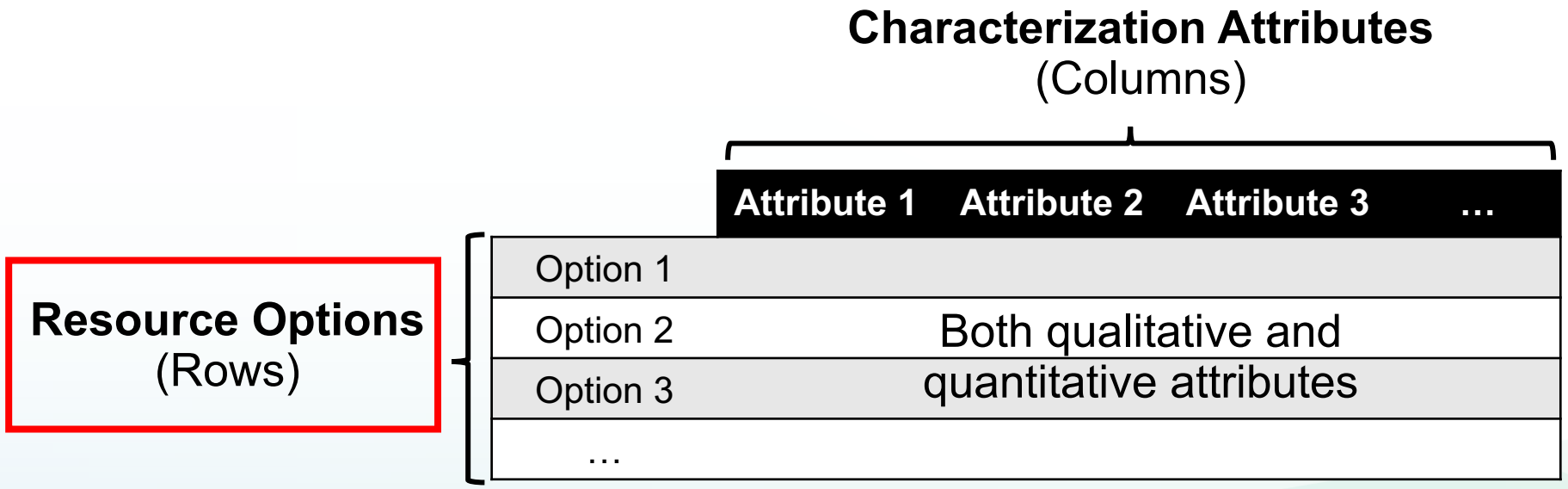
SB 846	• Clean Energy Reliability Investment Plan (Mar 2023) • Comparison to Diablo Canyon Extension (Sep 2023) • Load Shift Goal (Jul 2023)
AB 205	• Reliability Report (Jan 2023)
SB 423	• Clean Firm Resource Report (Dec 2023)
SB 100	• Next Report (Jan 2025)

Example of Overlapping Needs

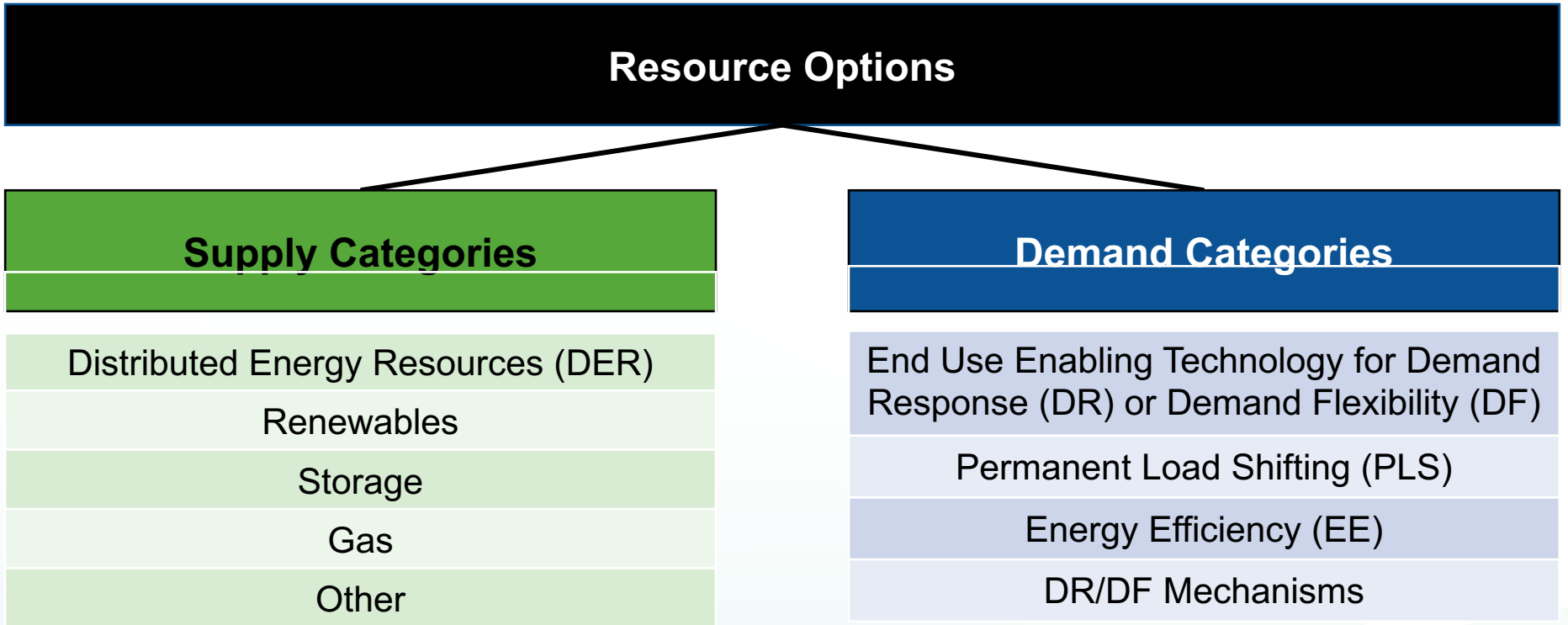


Resource Comparison Framework

- Envision developing a tool to characterize resources
  - Used to categorize, analyze, and characterize resource options
  - Organized as a matrix



Resource Option Categories



Preliminary List of Resource Options

Supply Options	
DERs	Solar (Distributed, <1 MW)
	Fuel Cells (Natural Gas)
	Fuel Cells (Hydrogen)
Renewables	Geothermal
	Hydro (Small)
	Solar (Utility-Scale, >5 MW)
	Solar (1-5 MW Scale)
	Wind (Onshore)
	Wind (Floating Offshore)
Storage	Pumped Hydro
	Energy Storage (Short-Duration; <8 hr.)
	Energy Storage (Long-Duration; ≥8 hr.)
Gas-Fired Generation	Reciprocating Engines
	Air Cooled Gas Turbines
Other	Microgrids (Controls and Switching)
	Imports

Demand Options	
End-Use & Enabling Technology Combinations for DR or DF	Electric Vehicle-to-X (V2X)
	Electric Vehicle Managed Charging (V1G)
	HVAC Control (Smart Thermostats/EMS)
	Appliance Load Control
	Water Heating Control
	Lighting Control
	Commercial Refrigeration Control
	Industrial Process Load Control
	Water/Wastewater Treatment & Pumping Control
	Agricultural Pumping Control
PLS	Energy Storage
EE	Energy Efficiency Measures
Mechanisms*	Existing DR Programs
	New DR/DF Programs
	Time-Varying Rates, Transactive Energy

*Mechanisms refer to programs or rates that can realize DR/DF potential from end-use and enabling technology combinations, and therefore the two categories overlap.

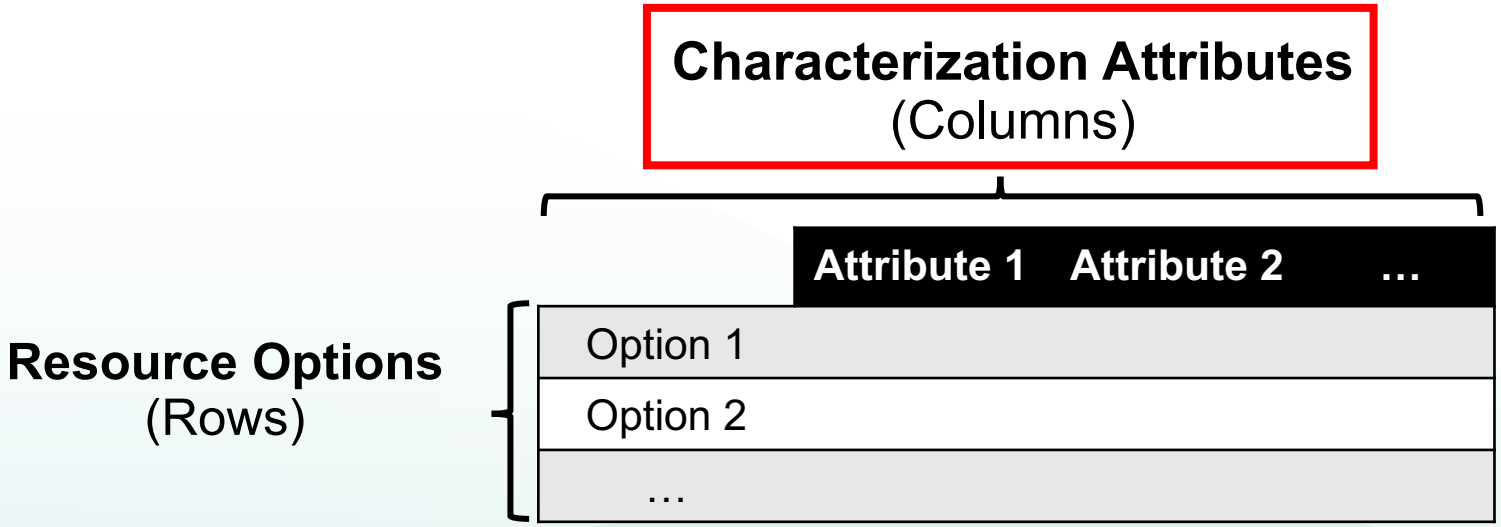
Q&A

Provide feedback on the list of preliminary resource options:

- Do you agree with the distinction between supply and demand options?
- Do you agree with the preliminary categories within the supply and demand options?
- Are there resource options that should be added to or removed from the preliminary list?

Characterize Resource Attributes

Attribute Type	Format
Qualitative Attributes	Qualitative Score
Potential Estimates	Quantitative
Levelized Cost Estimates	Quantitative



Preliminary Qualitative Attributes

Preliminary Qualitative Attributes
Readiness
Permitting
Interconnection
Supply Chain
Customer Acceptance
Cleanliness
Dispatchability
Policy Alignment
Equity

- Develop a list of key resource attributes
  - Definitions on next two slides
  - The first five factors inform Achievability
  - Attributes are not necessarily equally weighted

Preliminary Attributes Described (1 of 2)

Attribute	Definition
Readiness	Technological readiness and maturity
Permitting	Ease of permitting processes (e.g., local, CEQA) required to implement the option
Interconnection	Ease of interconnection and availability of infrastructure (e.g., transmission line access) for successful implementation of the option
Supply Chain	Efficiency and effectiveness of manufacturing and supply chains to support implementation of the option
Customer Acceptance	Operator and end-user acceptance of the technical aspects and value proposition of the Option

Preliminary Attributes Described (2 of 2)

Attribute	Definition
Cleanliness	Low GHG emissions and low criteria pollutant emissions
Dispatchability	Certainty and firmness of an option, including number of events, frequency of events, and event duration
Policy Alignment	Availability of supportive policies and incentives, current and expected
Equity	Equity considerations such as impacts on Low Income and Disadvantaged Communities

Potential Qualitative Analysis

Solar (1-5 MW Scale)

Achievability		Notes
2023	✓	Continued growth
2024	✓	
2025	✓	
2026-2030	✓	Replacements and limited growth
2031-2035	✓	

Attribute		Notes
Readiness	●	Mature
Cleanliness	●	No direct emissions
Dispatchability	○	Low by its… …age and enabling h…
Capacity Facto…		…tor is higher during early part of daily …mmer peaks than during the winter
…	◑	Time consuming but well established
…connection	◑	Time consuming but well established; transmission access varies by project
Supply Chain	◑	Some solar supply chain challenges in short and medium term
Customer Acceptance	◑	Economics can be more challenging than larger projects
Policy Alignment	●	Largely supportive

Illustrative Example

Quantitative Analysis

- Aiming to develop quantitative estimates for each Resource Option over the period 2023-2035
  - Potential Deployment Estimates
    - Capacity (MW)
    - Energy (MWh)
  - Levelized Cost Estimates
    - $/MW
    - $/MWh-yr
- Estimates will include ranges (Low, Expected, High)

Q&A

Provide feedback on the list of preliminary attributes:

- Are there other attributes that should be considered?
- Should any attributes be weighted more than others?
- Do you have data or sources that can help the team characterize any of the following for the preliminary (or other) Resource Options?
  - Qualitative Attributes
  - Achievability
  - Potential Estimates
  - Levelized Cost Estimates

Distributed Electricity Backup Assets

Distributed Electricity Backup Assets

Authority	2022-23 California State Budget (AB 205)
Budget	$700 million (over five years)
Purpose	Incentivize **the construction of cleaner and more efficient distributed energy assets that would serve as on-call emergency supply or load reduction** for the state's electrical grid during extreme events.
Eligibility	• Statewide • **Must participate as an on-call emergency resource under Demand Side Grid Support or similar program**

DEBA - Eligible Projects

- Enabling Investments
- Efficiency upgrades, maintenance, and incremental capacity additions to existing power generators
- Deployment of new zero- or low-emission technologies, including but not limited to, fuel cells or energy storage, at existing or new facilities

Potential Technology Types:

Efficiency Upgrades	Fuel Cells	Energy Storage
Microgrids	Automation Devices	V2G / V2B

DEBA: Next Steps

Fall 2022

Workshop and Initial Stakeholder Input (RFI)

Winter 2022

Program Development

Workshops & Public Feedback

Spring 2023

Launch

Q&A

Public Comment

- Zoom
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Closing Comments