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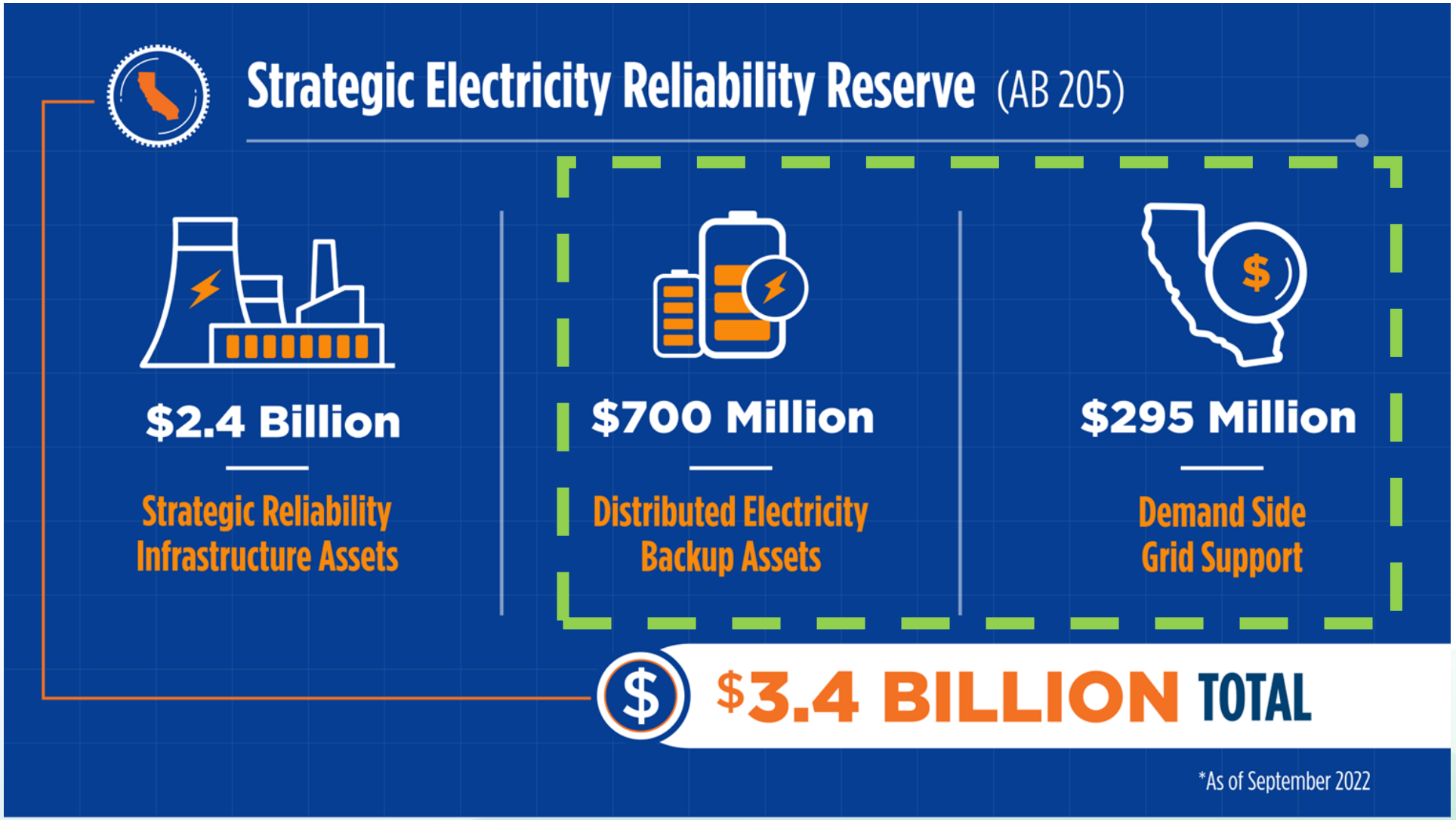
Item 5(b): CEC Staff Presentation on Demand Side Grid Support Program and Distributed Electricity Backup Assets Program

Presenter: Ashley Emery, Manager, Reliability Reserve Incentives Branch
Reliability, Renewable Energy & Decarbonization Incentives (RREDI) Division

June 2023

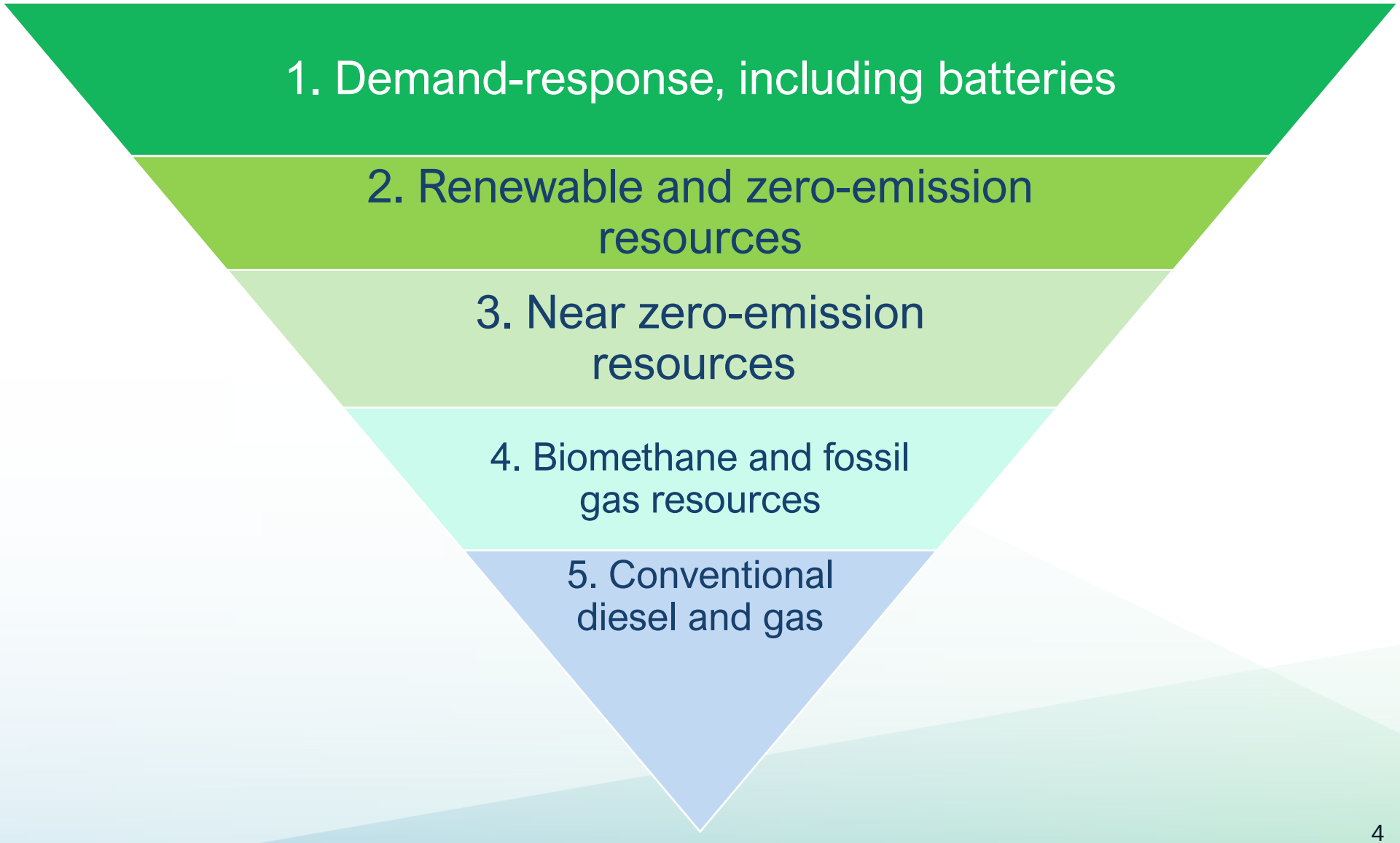
Strategic Reliability Reserve (AB 205)



CEC Reliability Reserve Incentive Programs (AB 205 & AB 209)

	Demand Side Grid Support (DSGS)	Distributed Electricity Backup Assets (DEBA)
Funding	$295 Million (Over 5 Years)	$700 Million (Over 5 Years)
Incentivized Activities	Use of load reduction resources during extreme events	Purchase of cleaner and more efficient distributed energy assets that would serve as on-call emergency supply or load reduction
Eligibility	Statewide	Statewide
Program Status	Launched Aug 2022 Incorporation lessons learns	Under Development

Loading Order



Demand Side Grid Support (DSGS) Program

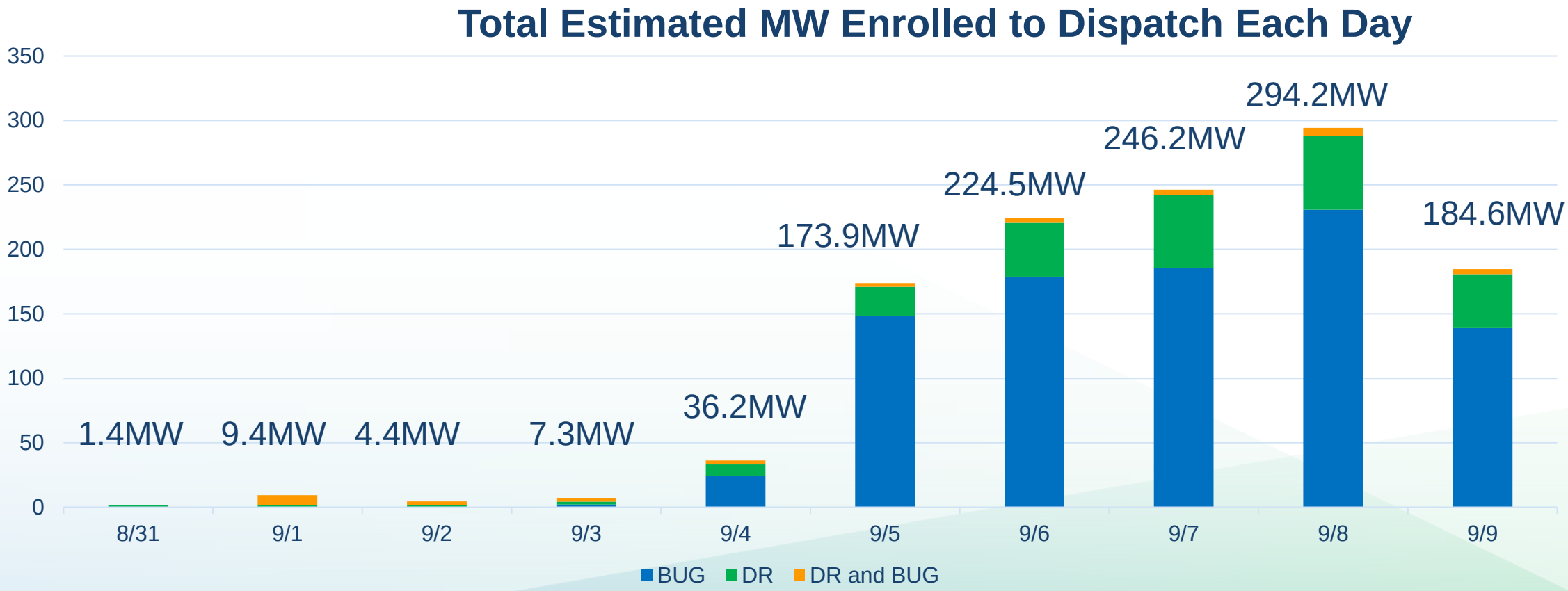
DSGS Program Overview

Enrollment	Participation	Payment
• DSGS providers (utilities and aggregators) enroll with CEC • Electric customers enroll with DSGS providers (or CEC in limited circumstances) • DSGS providers report participation to CEC	• Balancing authority issues an energy emergency alert (EEA) • DSGS providers notify customers • Customers reduce load	• DSGS provider pays incentives to customers for incremental load reduction • CEC pays DSGS providers incentives and administrative costs

DSGS Impact: Estimates Based on Enrollment

Over 44 Individual Entities Participated

Over 315 MW Enrolled



Distributed Electricity Backup Assets Program

DEBA Program Eligibility

- Available statewide
- Funding recipients must participate as an on-call emergency resource
- Eligible Projects:

Efficiency Upgrades to Existing Power Plants	Incremental Clean Energy Additions at Existing Power Plants
Distributed Clean On-Peak Electricity Supply (Generation and/or Storage)	Equipment or Systems to Enable Demand Flexibility

DEBA Potential Projects

Bulk Grid Investments

Efficiency upgrades, maintenance, and capacity additions to existing power generators

- Equipment upgrades
- Clean back-up generation or storage
- Waste heat to energy

Distributed Resources

New zero- or low-emission technologies, including, but not limited to, fuel cells or energy storage, at existing or new facilities

- Load flexibility controls, SCADA systems, demand-response aggregation software
- Battery storage
- Fuel cells
- Linear generators
- Microgrids
- Vehicle-to-grid integration
- Pumped hydro
- Combined heat and power
- Other emerging technologies

Potential DEBA Project Evaluation Criteria

Portfolio Diversity	• Project selections will support a diverse portfolio of resources
Loading Order	• Aims to achieve electricity reliability and prioritizes feasible, cost-effective demand response and efficiency resources, then feasible, cost-effective renewable and zero-emission resources, and then feasible, cost-effective conventional resources (statute)
Resource Longevity	• Anticipated useful life of the resources in relation to the state's climate and air quality requirements (statute)
Capacity	• Emergency supply and/or load reduction available to the state • Maximum hours available for dispatch during peak load events (4-10pm)
Cost	• $/MW for portion of project budget requested from DEBA • Eligible matching funds or other committed project financing
Readiness	• Estimated project completion date • Anticipated interconnection or supply chain delays
Equity	• Benefits to Disadvantaged Communities and/or low-to moderate income communities • Tribal resiliency
Co-Benefits	• Benefits beyond energy system reliability, including critical infrastructure resilience (emergency services, potable water, wastewater)

DEBA Development Plan

Phase 1: Summer/Fall 2023

- Guidelines with basic program parameters
- Grant Funding Opportunities for MW available Summer 2024

Phase 2: Winter 2023–Spring 2024

- Evaluate lessons learned from 2023
- Revise guidelines based on lessons learned
- Additional Grant Funding Opportunities

Phase 3: On-going

- Continue to evaluate program effectiveness and address lessons learned

CEC Contacts

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Docket: 22-RENEW-01

Item 5(c): CEC Staff Presentation on Stack Analysis

Disadvantaged Communities Advisory Group Meeting

June 16, 2023

Introduction & Context

David Erne, Deputy Director, Reliability and Emergency Planning, Energy Assessments Division

Three Reliability Challenges in California

Planning Processes

- Improve ability to account for climate change-induced weather variability
- Ensure timely and sufficient procurement across all jurisdictions
- Improve processes associated with interconnection and permitting

Scaling Resources

- Expand diversity of resources
  - Demand-side (e.g., more demand flexibility)
  - Supply-side (e.g., long-lead resources)

Extreme Events

- Augment Strategic Reliability Reserve

Challenges Remain to Timely Deployment of Authorized Resources

- Success requires record resource build rates, which are impacted by:
  - Supply chain vulnerabilities
  - Interconnection and permitting delays
  - Increasing prices and competition for equipment
- Uncertainties in availability of existing resources
  - Hydro
  - West-wide tight RA market

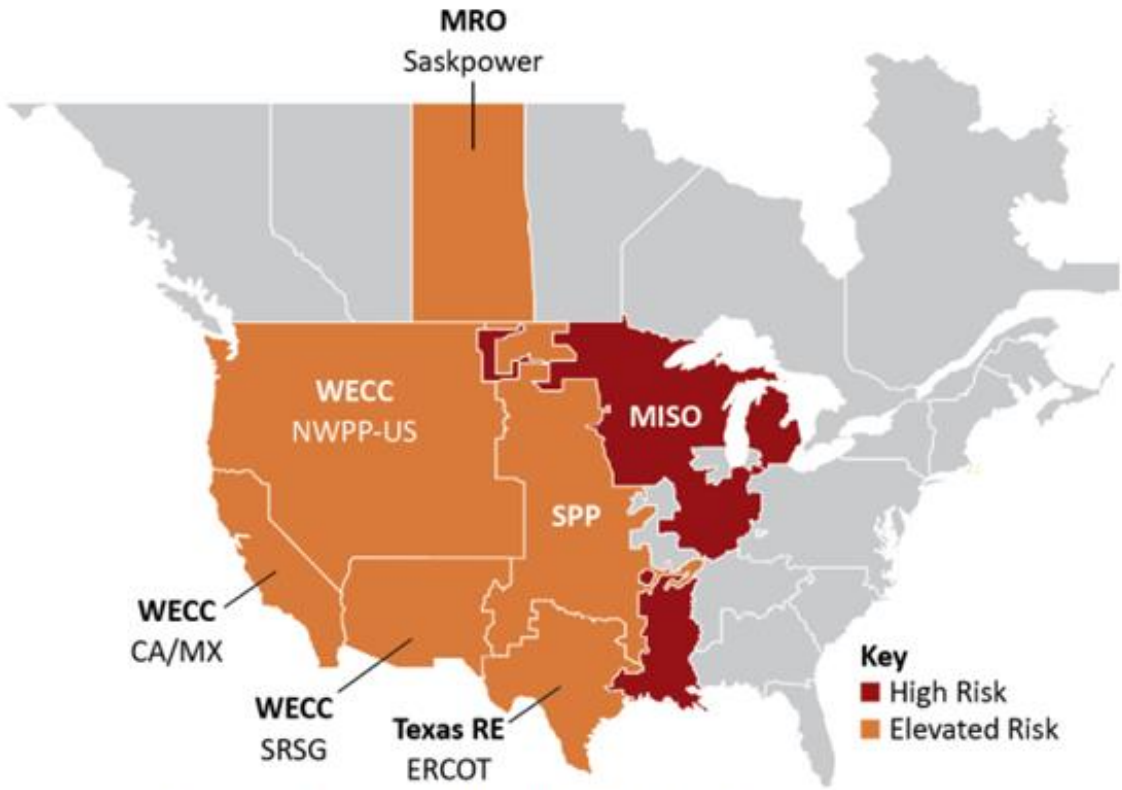
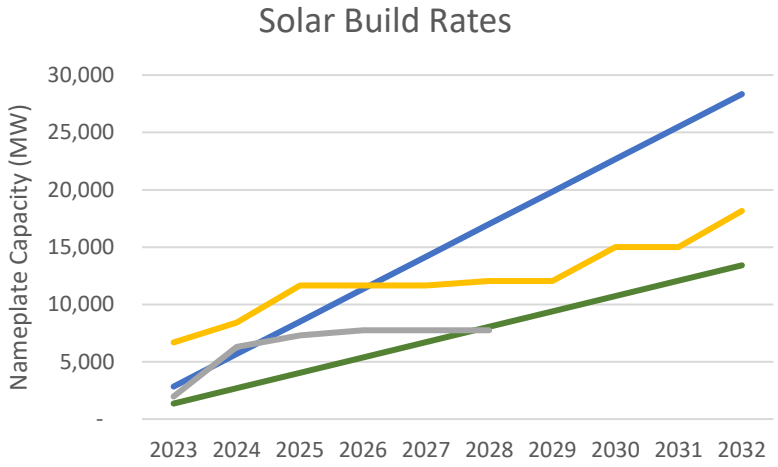


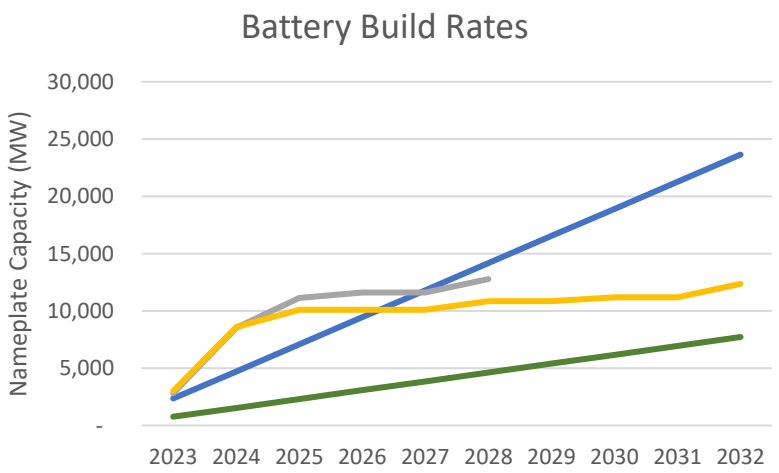
Figure 1: Summer Reliability Risk Area Summary

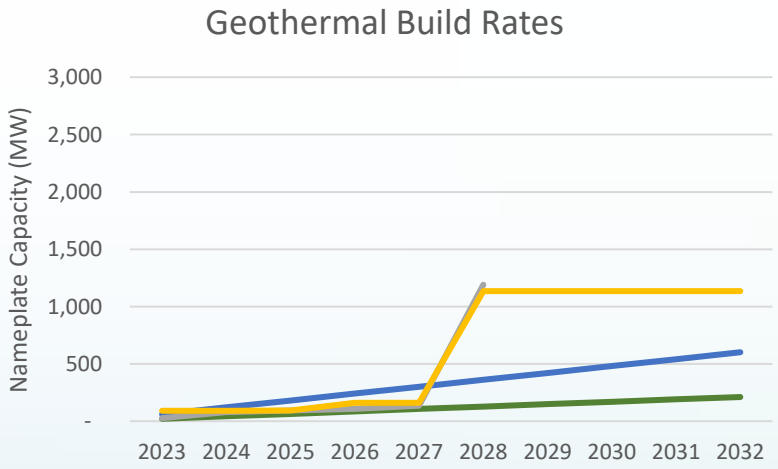
Seasonal Risk Assessment Summary	
High	Potential for insufficient operating reserves in normal peak conditions
Elevated	Potential for insufficient operating reserves in above-normal conditions
Low	Sufficient operating reserves expected

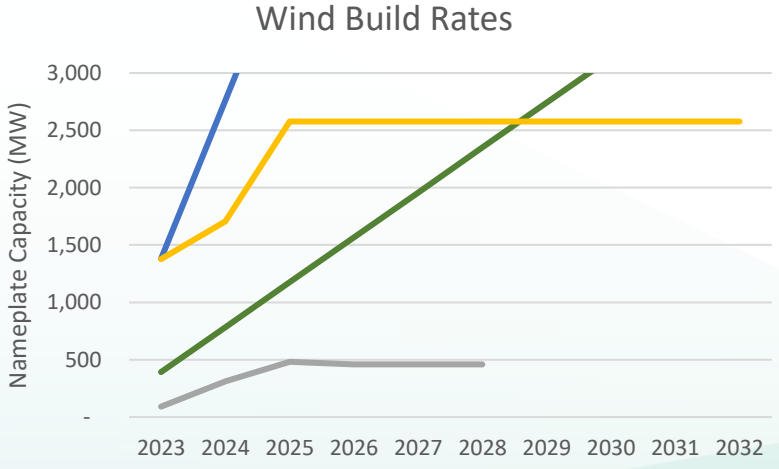
Source: NERC 2022 Summer Reliability Assessment

Success Requires Sustained Record Build Rates









CAISO Maximum Since 2011
CAISO Average Since 2011
CPUC Procurement Order
CPUC Preferred System Plan

- CAISO maximum and average build rates since 2011 by technology type
- Average build rates are generally insufficient
- Maximum build insufficient in the near terr

Actions Taken – Expanded Summer Planning

Coordinated activities

- Reliability analyses
- Resource tracking
- Contingency tracking
- Entity-specific emergency actions tied to CAISO System Operations Emergency Plan
- Real-time communication at senior levels

Summer 2023 Reliability Outlook

Summer Reliability

June 16, 2023

CEC Summer Stack Analysis

Purpose:

- Deterministic approach
- Assess average and extreme conditions
- Inform need for contingencies

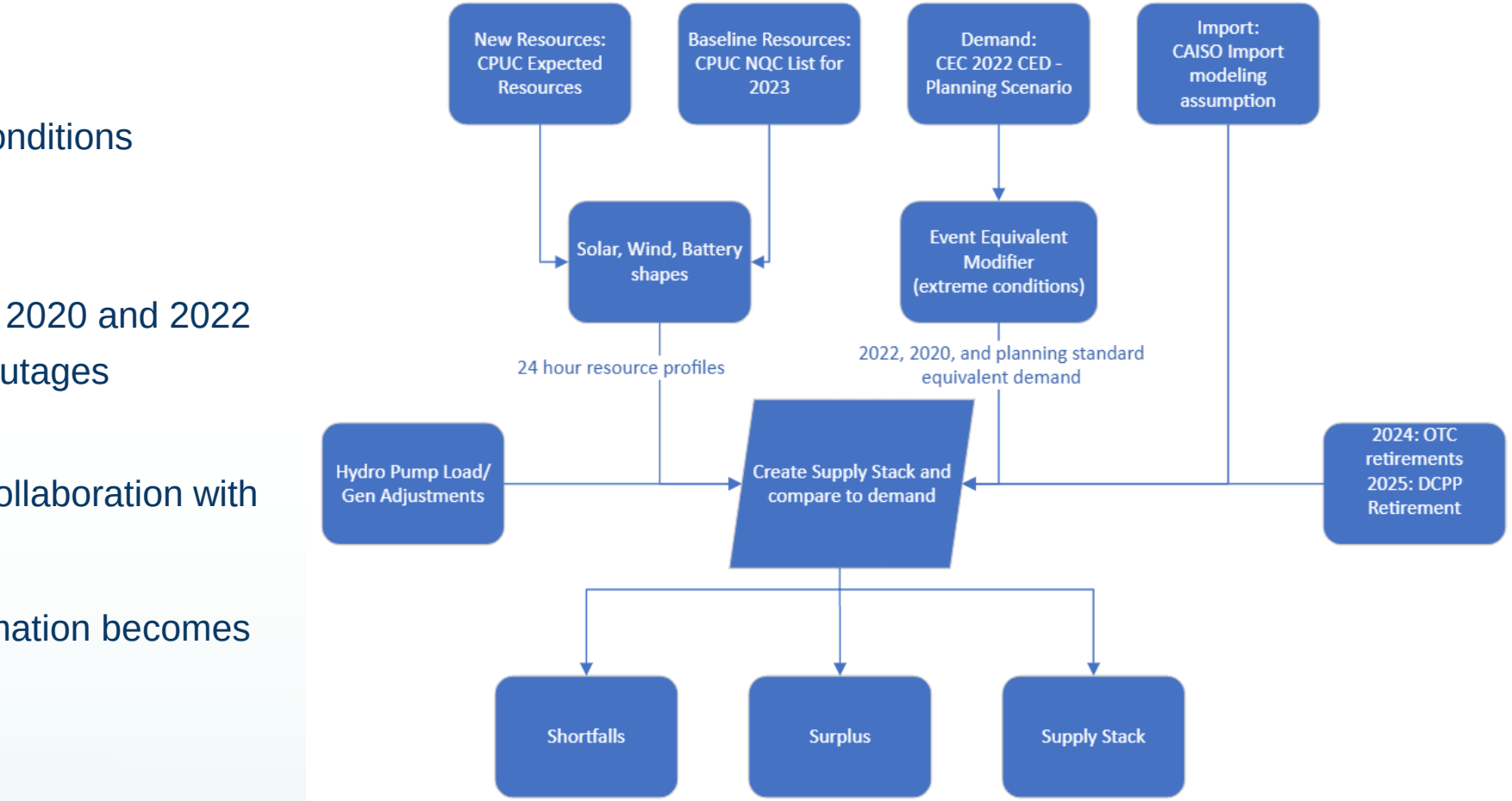
Considers extreme conditions:

- High demand days like summer 2020 and 2022
- Increased levels of unplanned outages
- Import availability

Inputs and assumptions developed in collaboration with

CPUC, DWR and CAISO

Stack analysis is updated as new information becomes available



Source: CEC

Demand Percent Margins

Condition Relative to 1-in-2 Forecast	Operating Reserves	Outages	Demand Variability	Coincidental Fire Risk	Notes
Current RA Planning Standard – 17% (current expected demand)	6%	5%	6%		16% for 2023 & 17% beginning 2024
2020 Equivalent Event: Additional capacity needed to weather heat event like 2020	6%	7.5%	9%	4,000 MW	9% higher demand over median, and 2.5% higher levels of outages
2022 Equivalent Event: Additional capacity needed to weather heat event like 2022	6%	7.5%	12.5%	4,000 MW	12.5% higher demand over median, and 2.5% higher levels of outages

Source: CEC

Supply Modifications

- Wind and solar
  - Hourly profiles based on generation on high-load days from 2014-2022
- Batteries
  - Discharge limited to 4 hours across peak hours
- Demand response
  - From CPUC DR Allocations, adjusted by Load Impact Protocol and distribution loss factors
  - Increased by 6% since operating reserves aren't carried for reduced load
- Hydro
  - adjustments based on CDWR projections

Wind				Solar				Battery			
Time PDT	Jul	Aug	Sep	Time PDT	Jul	Aug	Sep	Time PDT	Jul	Aug	Sep
4PM-5PM	0.38	0.28	0.17	4PM-5PM	0.71	0.72	0.64	4PM-5PM	0.39	0.31	0.00
5PM-6PM	0.45	0.34	0.21	5PM-6PM	0.57	0.55	0.41	5PM-6PM	0.39	0.31	0.64
6PM-7PM	0.48	0.40	0.24	6PM-7PM	0.33	0.26	0.10	6PM-7PM	0.60	0.95	0.83
7PM-8PM	0.51	0.44	0.29	7PM-8PM	0.07	0.03	0.00	7PM-8PM	1.00	1.00	1.00
8PM-9PM	0.52	0.49	0.34	8PM-9PM	0.00	0.00	0.00	8PM-9PM	1.00	1.00	1.00
9PM-10PM	0.55	0.51	0.32	9PM-10PM	0.00	0.00	0.00	9PM-10PM	0.61	0.43	0.54

Source: California Energy Commission staff with California ISO data

Resource Mix Comparison

- Improvements
  - DWR forecasts greater hydro generation, which contributes 800 MW
  - Average Resource Adequacy imports increased, contributing 500 MW
- Demand Adjustments
  - Updated hydro conditions result in 500 MW of pump load added at peak hours

	September 2023- February Update (MWs)	September 2023- May Update (MWs)	Change (MWs)
Supply			
Demand Response	1,274	1,274	– **0**
Existing Resources	44,817	45,646	▲ **829**
New Batteries (Nameplate)	1,759	2,106	▲ **347**
New Hybrid (Nameplate)	1,061	1,452	▲ **391**
Resource Adequacy Imports	5,500	6,000	▲ **500**
Total	**54,411**	**56,478**	▲ **2067**
Demand			
2022 Forecasted Peak Demand	**46,827**	**46,829**	▲ **2**
Pump Load Adjustment at Net Peak	**0**	**500**	▲ **500**
Shortfalls/Surplus			
Planning Standard	1,538	2,348	▲ **810**
2020 Event Equivalent	-1,038	-228	▲ **810**
2022 Event Equivalent	-2,676	-1,867	▲ **809**

Results are for CAISO for September 2023

Results Summary

Overall improved outlook for the summer under all scenarios due to:

- Improved hydro
- Increased imports

	Projected September Surplus or Need for Contingencies	
	February Update	May Update
Under Expected Demand	1,538	2,348
2020 Equivalent Event	-1,038	-228
2022 Equivalent Event	-2,676	-1,867

Green is surplus, Red is shortfall

Shortfalls do not include coincident catastrophic fire risk

Note: Going into summer 2022, the forecasted shortfalls under **2020 and 2022 equivalent** event would have been **3,000 and 7,000 MW**, respectively.

Contingencies

Type	Contingency Resource	MW Available			Note
		July	August	September	
SRR	DWR ESSRRP*	148	148	148	Recent update
	Demand Side Grid Support	315	400	450	Recent update
	Distributed Energy Backup Assets (under development)	0	0	0	Recent update
CPUC	Ratepayer Programs (ELRP, Smart Thermostats, etc.)**	905	964	984	Recent Update
	Imports Beyond Stack	300	250	250	Recent Update
	Capacity at Co-gen or Gas Units Above Resource Adequacy	518	499	160	Recent Update
DWR	DWR SWP***	0	0	0	Pending
Non-Program	Balancing Authority Emergency Transfers	500	500	500	Recent update
	Thermal Resources Beyond Limits: Gen Limits	60	60	60	Recent update
	Thermal Resources Beyond Limits: Gen Limits Needing 202c	25	25	25	Recent update
	Total	**2,771**	**2,846**	**2,577**	

**Does not include additional 144 MW of projects that are not online yet but expected to be available for summer.*
***Does not reflect actual 2022 ELRP performance. More discussion is needed to project forecasted available MWs.*
****These resources are projected one week ahead, but given current hydro forecasts, several hundred MWs are expected.*

Thank you!