

13th Annual Lesley K. McAllister Symposium on Climate and Energy Law

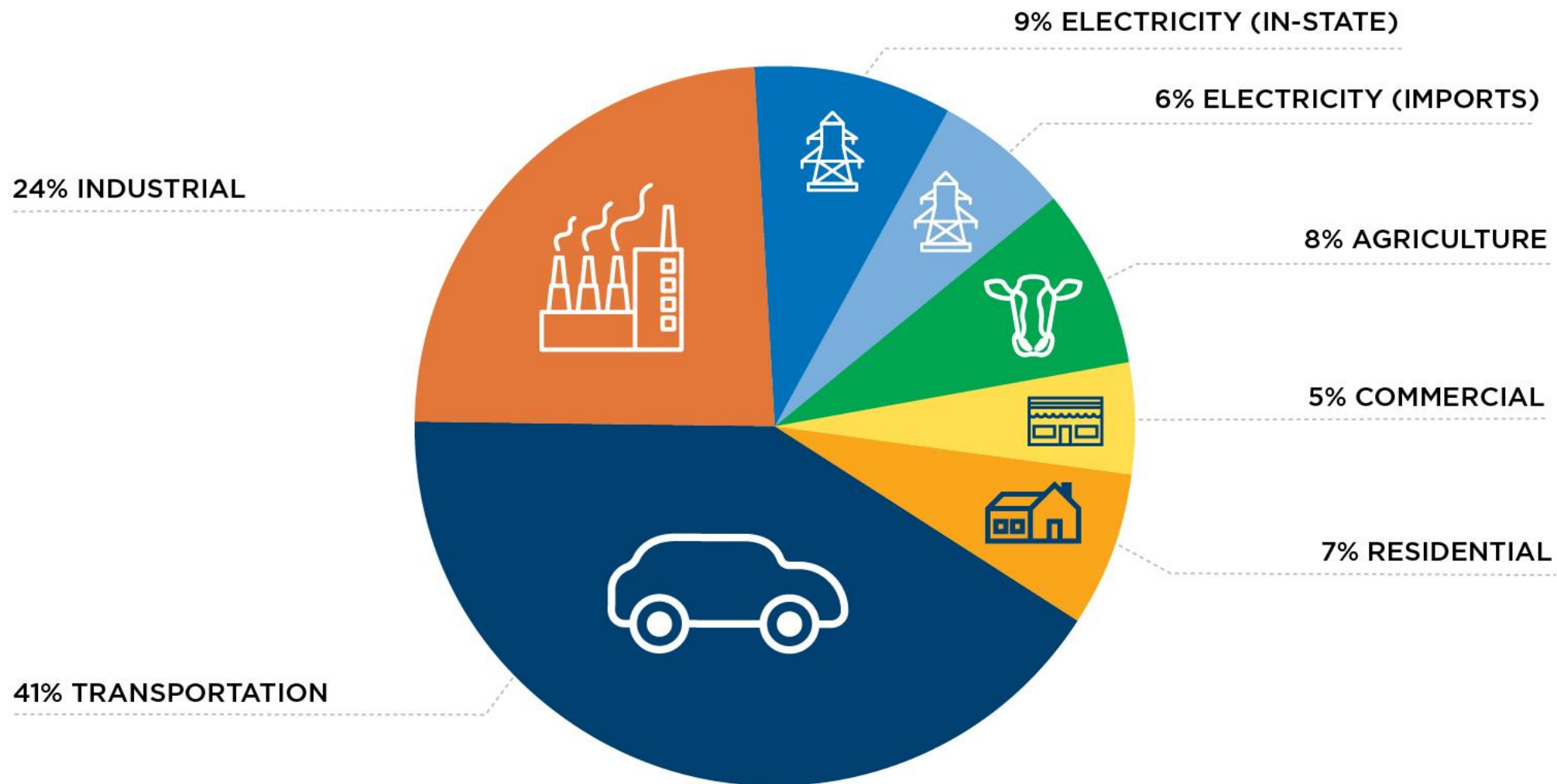
Webinar 1: Energy Resilience and Extreme
Weather Events

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California's

2018 Greenhouse Gas Emissions



Source: California Air Resources Board

Lessons from 2020 and 2021

- Climate crisis is here
 - Heat waves, drought, fires
 - Historically high volatility of load
- Climate impacts not adequately incorporated into demand and supply modeling
- Net peak period continues to be very tight
 - Imports play a critical role
- The electric system and markets are rapidly transitioning and not enough historical information
 - Diversity of resources is important
- Reliability and equity are key to a clean transition

Mid-August 2020 Extreme Heat Event

- Smoke during peak 2020 fire season blocked sunlight, causing solar generation to drop
 - Somewhat offset by lower air conditioning loads.
- High ambient temperatures caused gas generation output to decline.
- Storm patterns reduced wind output during part of the events.
- Likely recurrence of such events compound reliability risks.

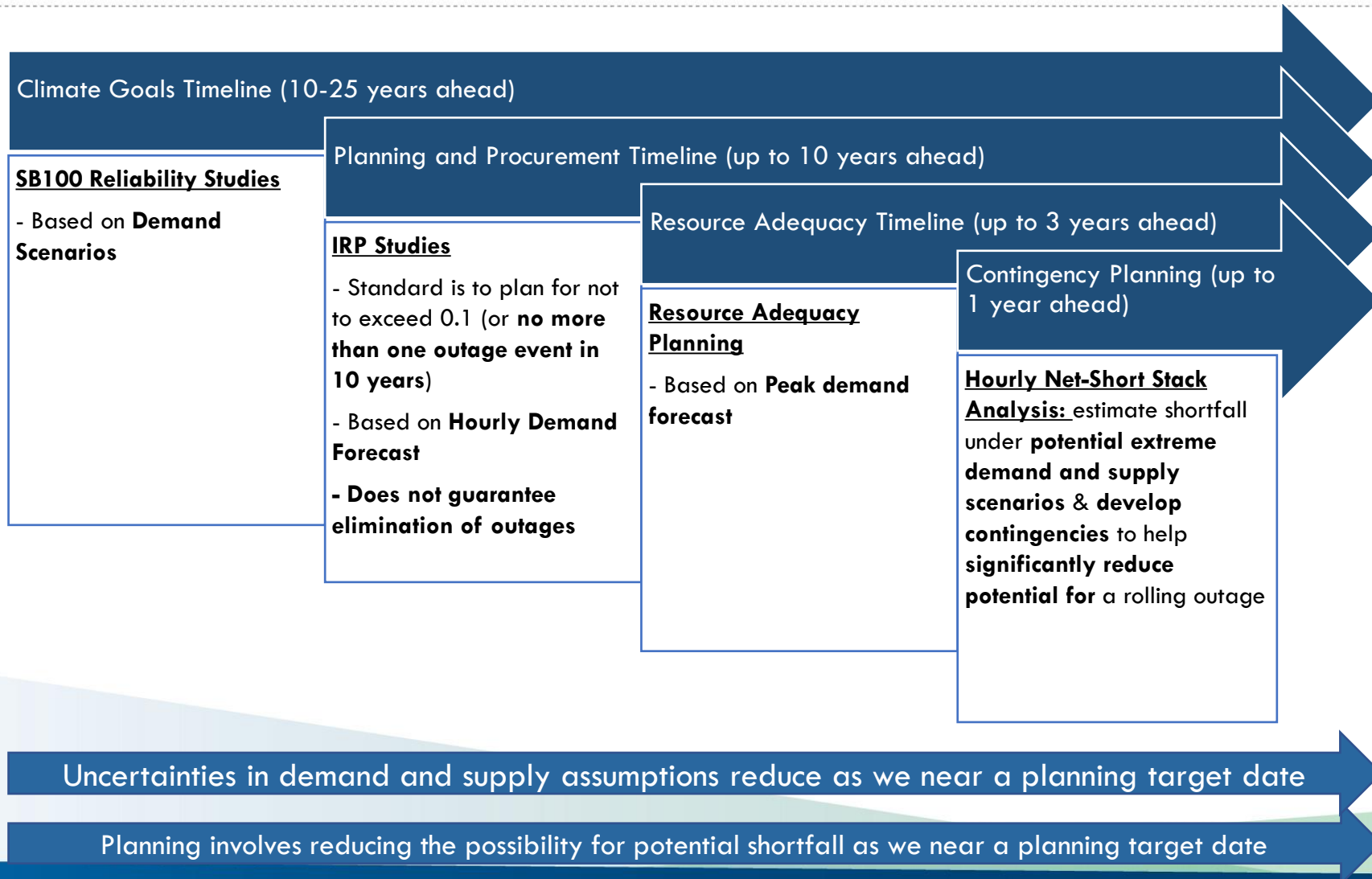
2021 Extreme Heat Events

- Extreme heat in June and July.
- Transmission infrastructure threatened by wildfire.
- Two Emergency Proclamations from the Governor increased supply and load reduction.

All Major Import Paths at Risk

- All major import paths cross many miles of high fire-risk areas both inside and outside state boundaries.
- California has some of the largest load centers on the Western Interconnection.
- California relies on imported power for about a third of its load, delivered on hundreds of miles of transmission lines from the Pacific Northwest and the Desert Southwest.

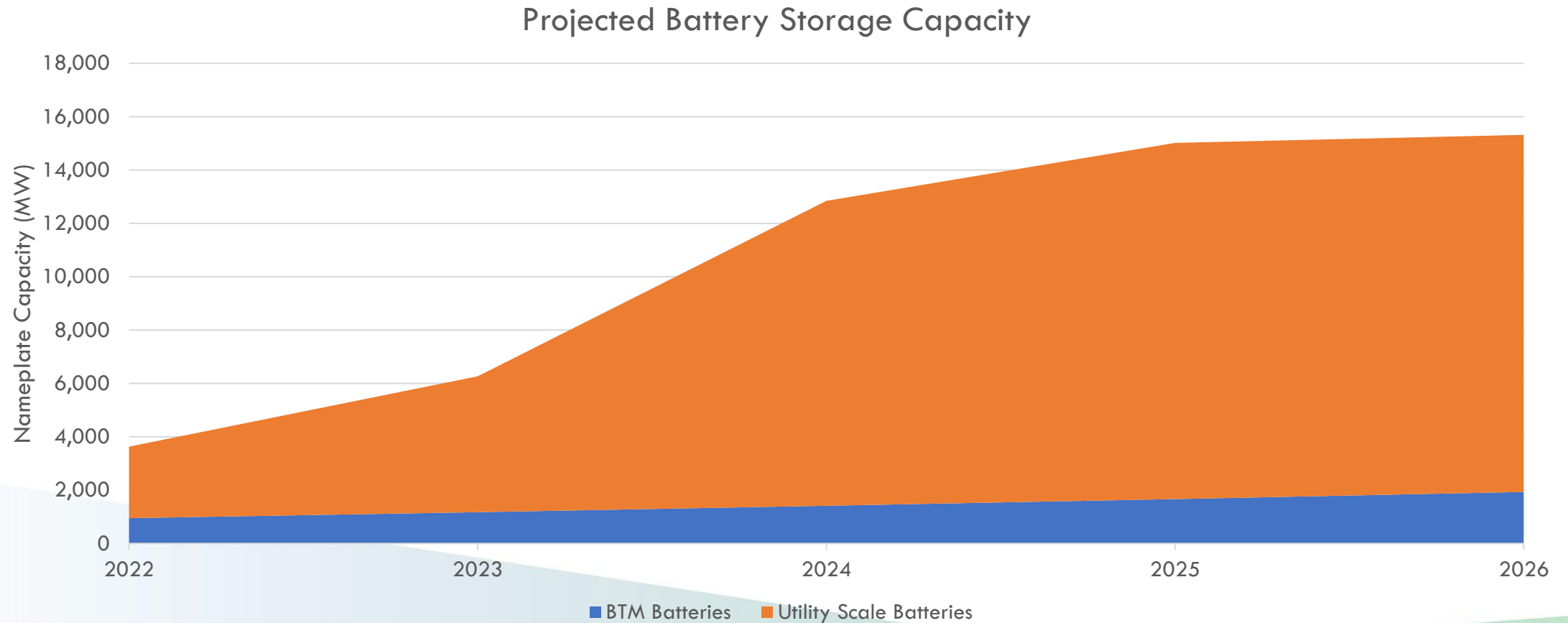
Reliability Analysis Over Different Planning Horizons



July 30 Emergency Proclamation

- Created a new incentive program for 2021 that provides direct payments to customers who reduce load during emergencies.
- Waived air quality rules for power plants, ships and certain portable generators through October 31, 2021, only when the CAISO issues a grid warning.
- Provided funding for a program to mitigate air quality impacts from any emergency measures, especially for sensitive populations.
- Facilitated expedited state procurement of emergency generation to be online by October 31, 2021 to address emergency conditions.
- Streamlined approvals for near-term emergency generation and clean energy projects.
- Requested the CPUC to expand and expedite approval of demand response programs.
- Requested the CAISO to take steps to expedite interconnection for critical resources.
- Directed the Energy Commission to identify actions to accelerate achieving the state's 100 percent clean energy mandate.

Projected Battery Capacity



Mid-Term Considerations: 2023-2026

- CPUC 11,500 MW Procurement Order: Critical step for mid term reliability
 - Meets the reliability standards at a system level
 - A significant step toward SB100 goals
 - Large amount of storage to come online and its performance is critical to mid-term reliability

Nameplate (MW)	2022	2023	2024	2025	2026	2026+
Geothermal	8	26	73	86	86	1,231
Biomass	7	24	67	79	79	79
Shed DR	35	114	321	381	381	381
Wind	248	814	2,286	2,714	2,714	2,714
Solar	800	2,619	7,355	8,733	8,733	8,733
Energy Storage 4 h	960	3,145	8,831	10,485	10,485	10,485
Energy Storage 8 h	-	-	-	-	-	1,279
Total	2,058	6,742	18,932	22,478	22,478	24,902

Ongoing Work

- CPUC Emergency Proceeding
- CEC Stack Analysis Updates for Worst-Case Scenarios
- Interagency Efforts on SB100 Implementation
- CAISO 20-year Conceptual Transmission Plan
- CARB Scoping Plan