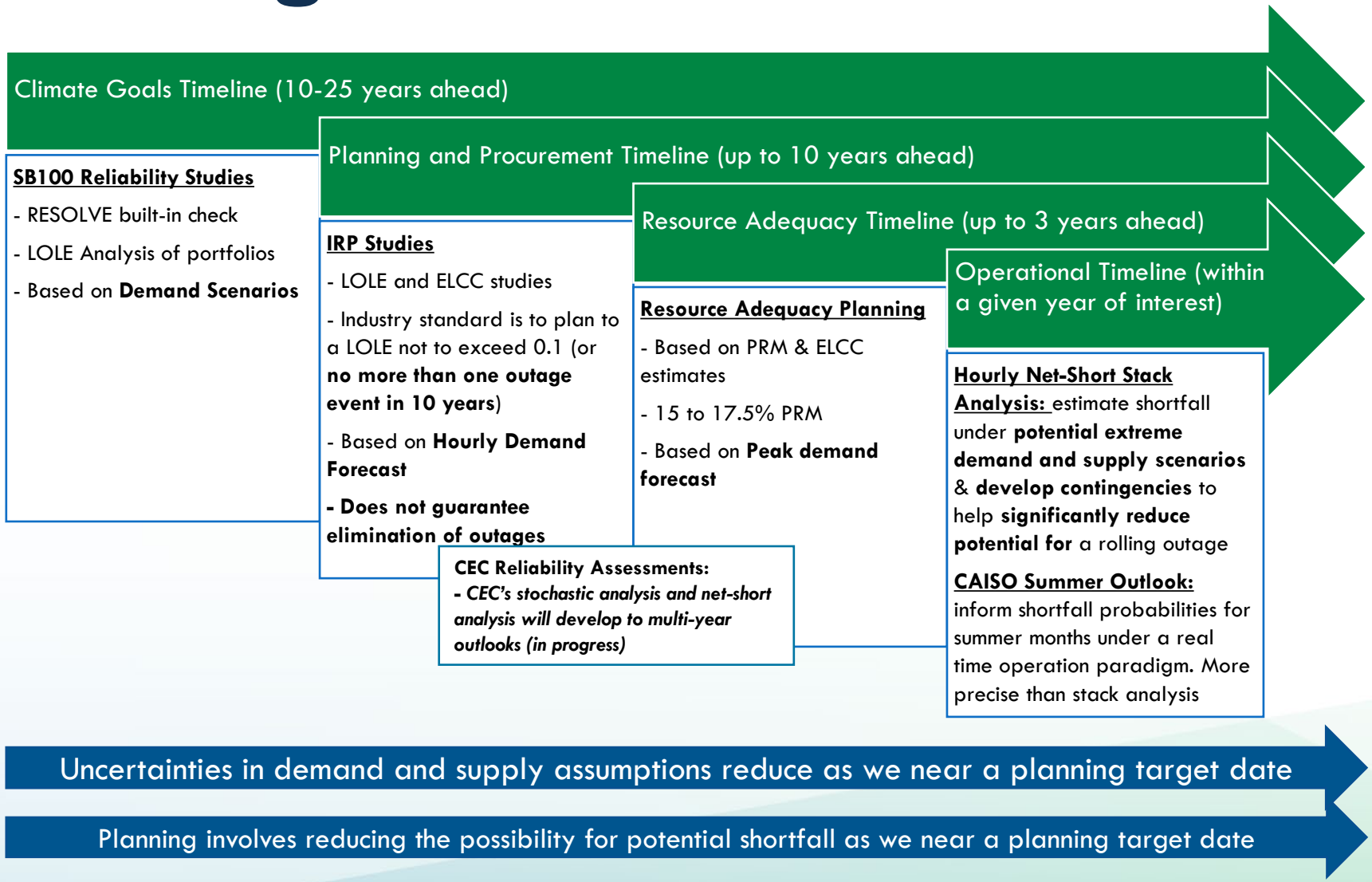
DOCKETED	
Docket Number:	21-ESR-01
Project Title:	Energy System Reliability
TN #:	241166
Document Title:	Presentation - January 14 2022 Summer Stack Analysis Update
Description:	N/A
Filer:	Courtney Wagner
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	1/14/2022 11:42:09 AM
Docketed Date:	1/14/2022

2022 Summer Stack Analysis Update

January 14, 2021 – Staff Workshop

Hannah Craig
Energy Assessments Division

Reliability Analysis Over Different Planning Horizons



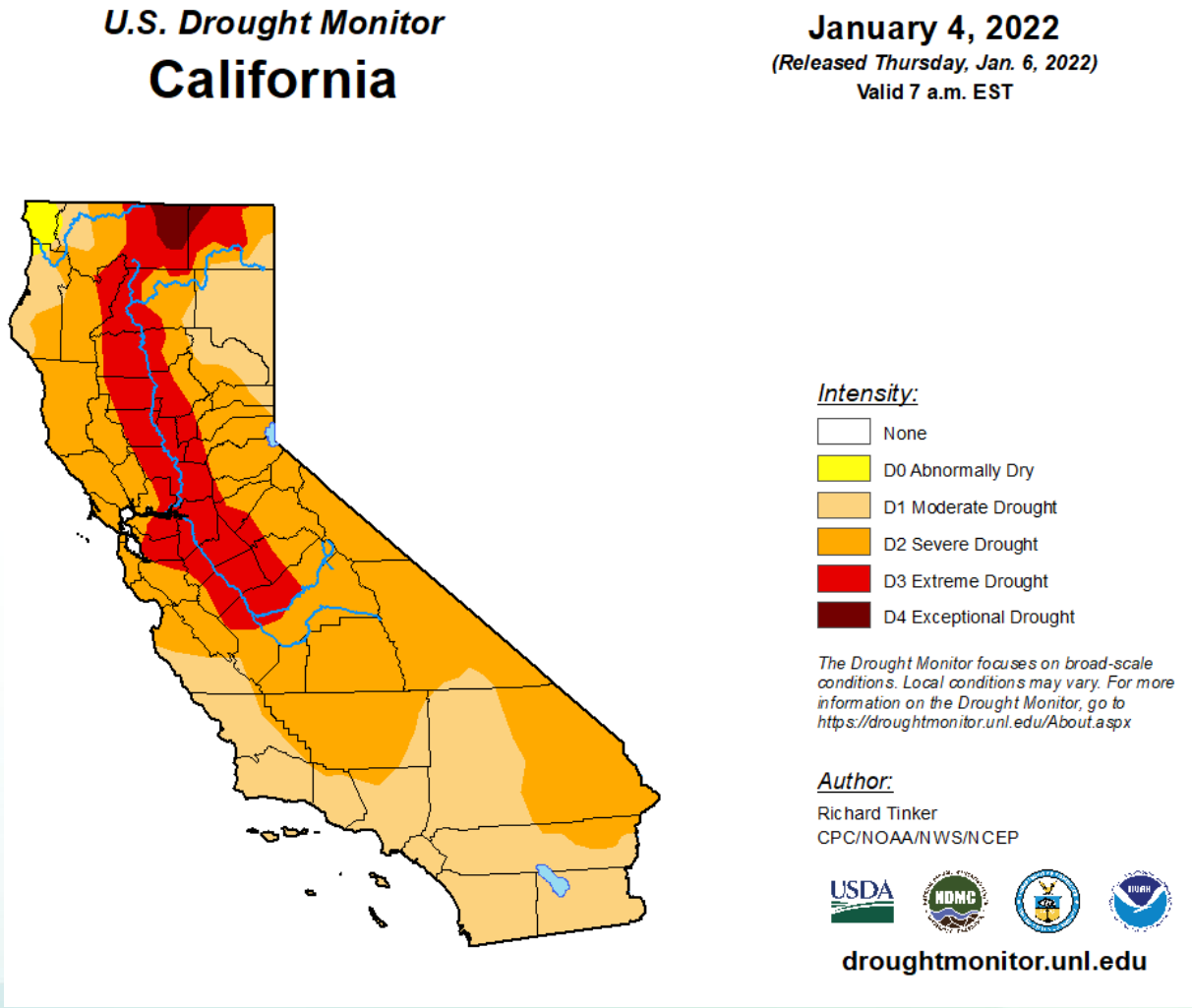
Summer Stack Analysis

Purpose:

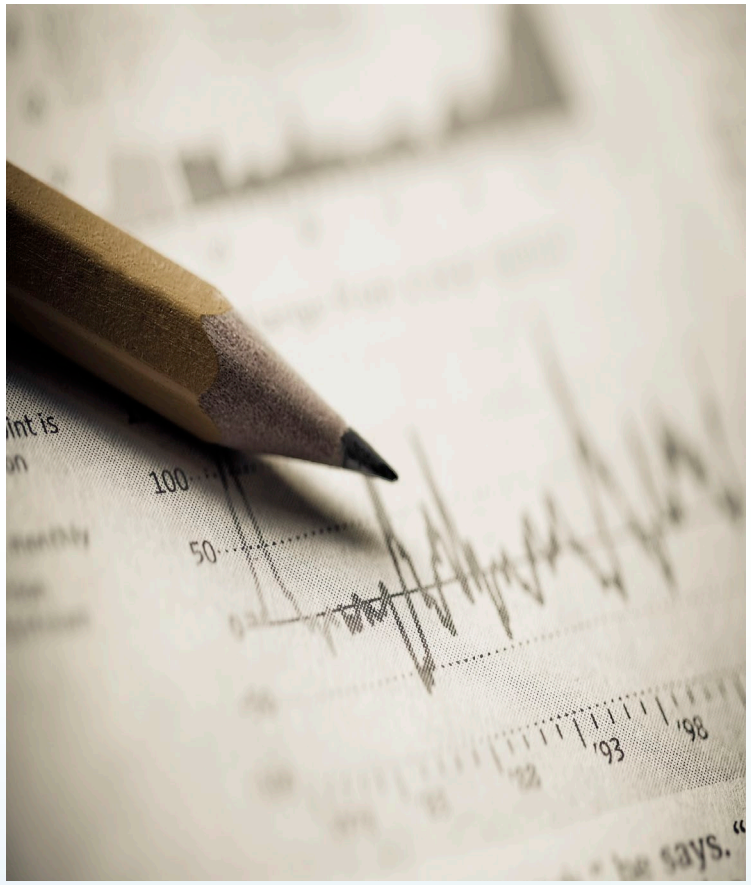
- Assess average and extreme conditions
- Inform need for contingencies

Considers extreme conditions:

- High demand days like summer 2020
- Low import availability
- Drought impacts on hydro



Background



- Developed in 2021 in response to Root Cause Analysis
- Inputs and assumptions developed in collaboration with CPUC, DWR and CAISO
- Preliminary summer 2022 results first presented at the reliability workshop in July 2021 and a preliminary version was adopted in September 2021

January Update

- Changes since the September Business Meeting Adoption:
  - Redondo retirement extended to December 31, 2023
  - Additional procurements from multiple CPUC proceedings
  - Updated to Final NQC list for 2022 (dated for October 2021)
- Potential additional changes in Final Stack Analysis:
  - Summer hydro conditions will be updated by DWR in April/May
  - Demand forecast may change before adoption
  - Estimates of new projects will improve as we get closer to summer

Basic Assumptions

- Demand
  - Peak day of each month from the CED Draft 2021 hourly forecast
- Supply
  - Final Net Qualifying Capacity list published by CAISO in October 2021
  - CPUC estimates of additional procurement
- Imports
  - Average RA filings from 2016-2021 and LD contracts for POUs

Megawatts	July	August	Sept
Demand at 7-8PM	44,600	45,030	46,460
NQC List	48,170	46,380	43,950
Average RA Imports	6,010	6,440	6,560
New Supply	2,720	3,380	3,380

Supply Modifications

- Wind and solar
  - Hourly profiles based on generation on high-load days from 2014-2020
- Hydro
  - Derated by 500 MW for all months as placeholder
- 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

Megawatts	July	August	Sept
Solar MW at 7-8PM	540	110	0
Wind MW at 7-8PM	2,470	1,990	1,170
Hydro Capacity with Derate	4,600	4,360	3,820
Demand Response with DLF/Reserve	1,360	1,420	1,420

Hourly Wind and Solar Shapes

- Based on historic generation on the 5 highest load days of each month from 2014-2020, for a total of 35 days
- The proposed hourly shapes are weighted with 80% of the weight going to the median generation and 20% of the weight going to the 20th percentile.

Wind (MW)	July	August	Sept
ELCC Tech Factors	1,390	1,270	910
Stack Analysis Values at 5-6 PM (peak)	2,240	1,590	750
Stack Analysis Values at 7-8PM (net peak)	2,460	1,990	1,170

Solar (MW)	July	August	Sept
ELCC Tech Factors	4,290	2,990	1,580
Stack Analysis Values at 5-6 PM (peak)	5,770	4,910	3,350
Stack Analysis Values at 7-8PM (net peak)	540	110	0

Planning Reserve Margin

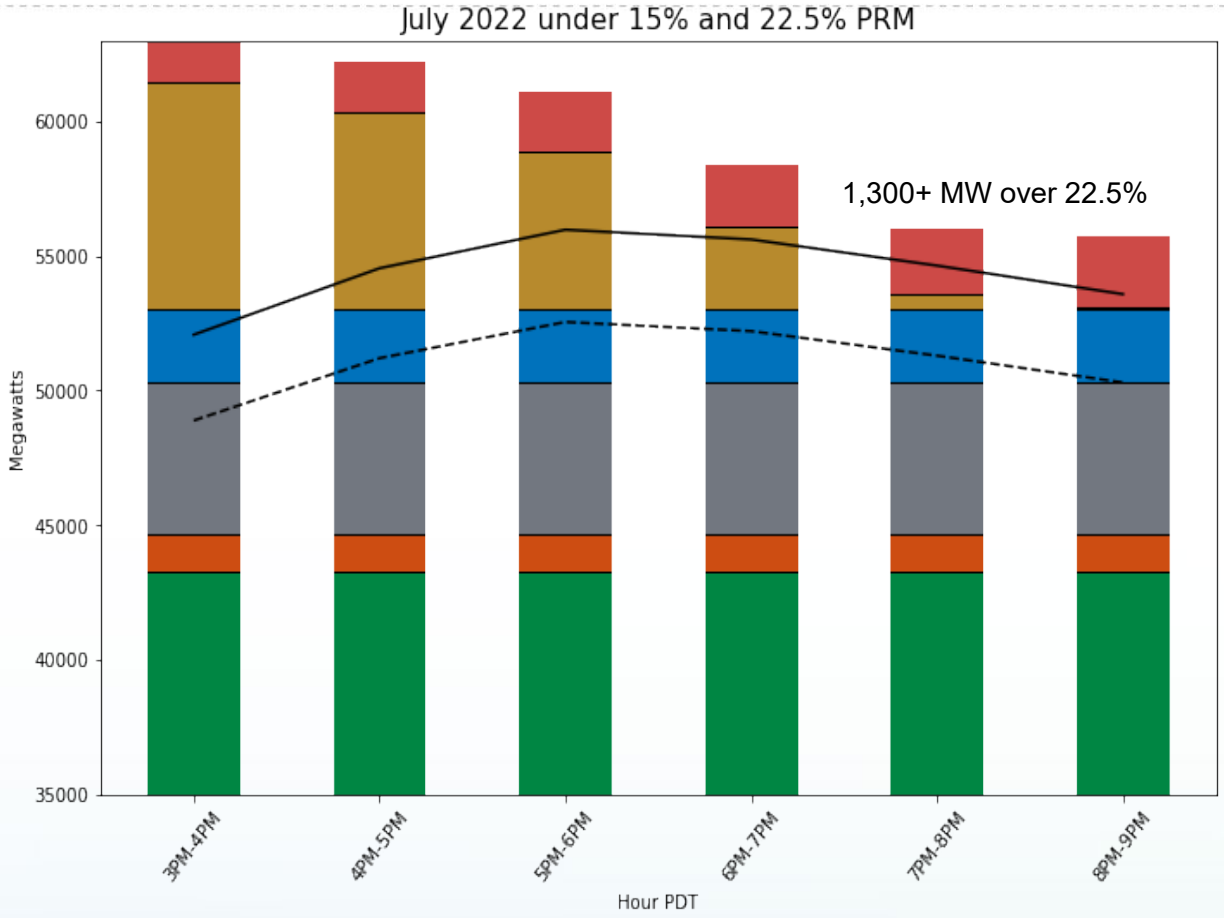
15% PRM

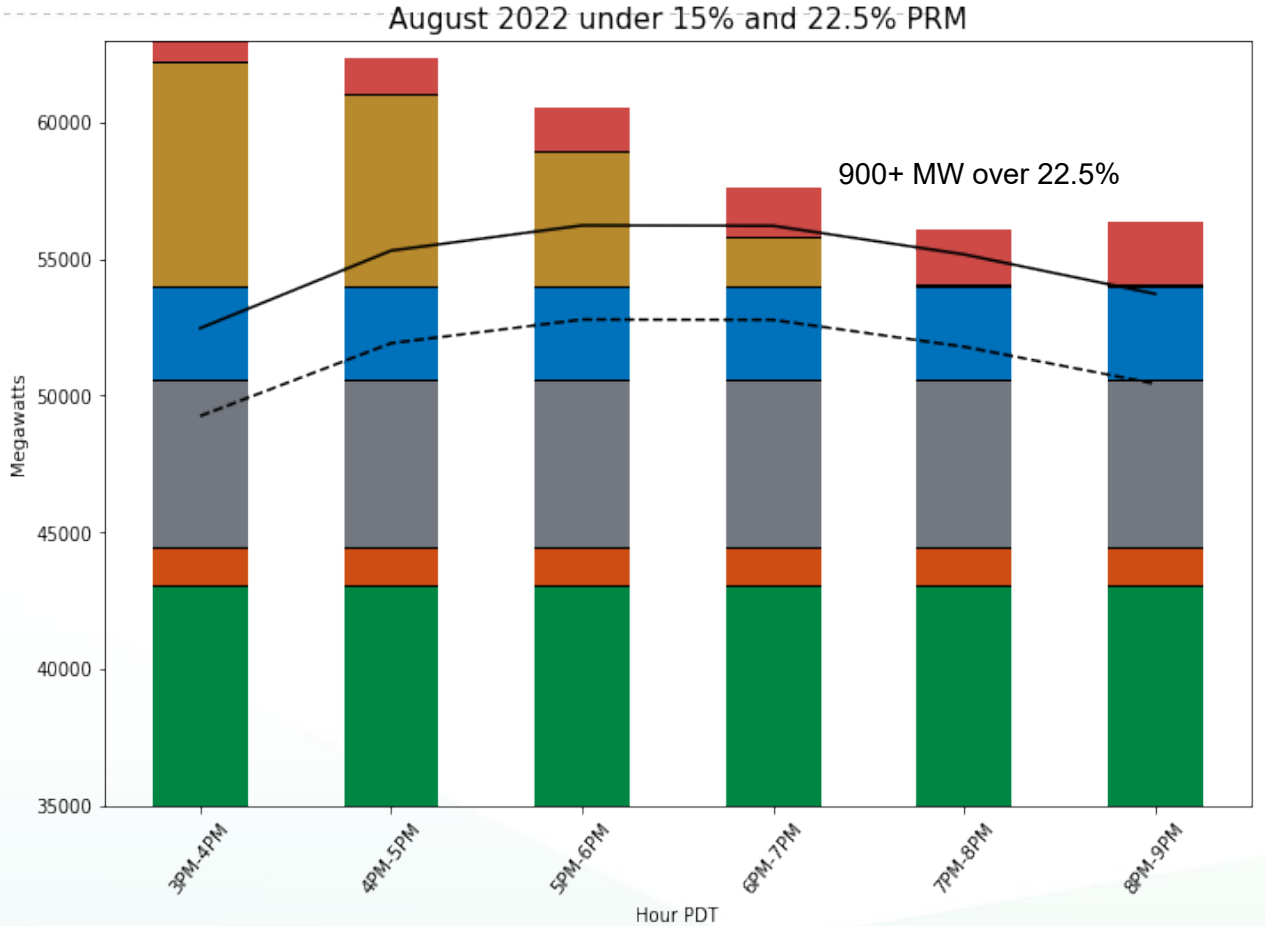
- 6 % Operating Reserves
- 5 % Unplanned Outages
- 4 % Demand Variability
- 7,000 MW Total at Net Peak (September 7-8PM)

22.5% PRM

- 6 % Operating Reserves
- 7.5 % Unplanned Outages
- 9 % Demand Variability
- 10,500 MW Total at Net Peak (September 7-8PM)

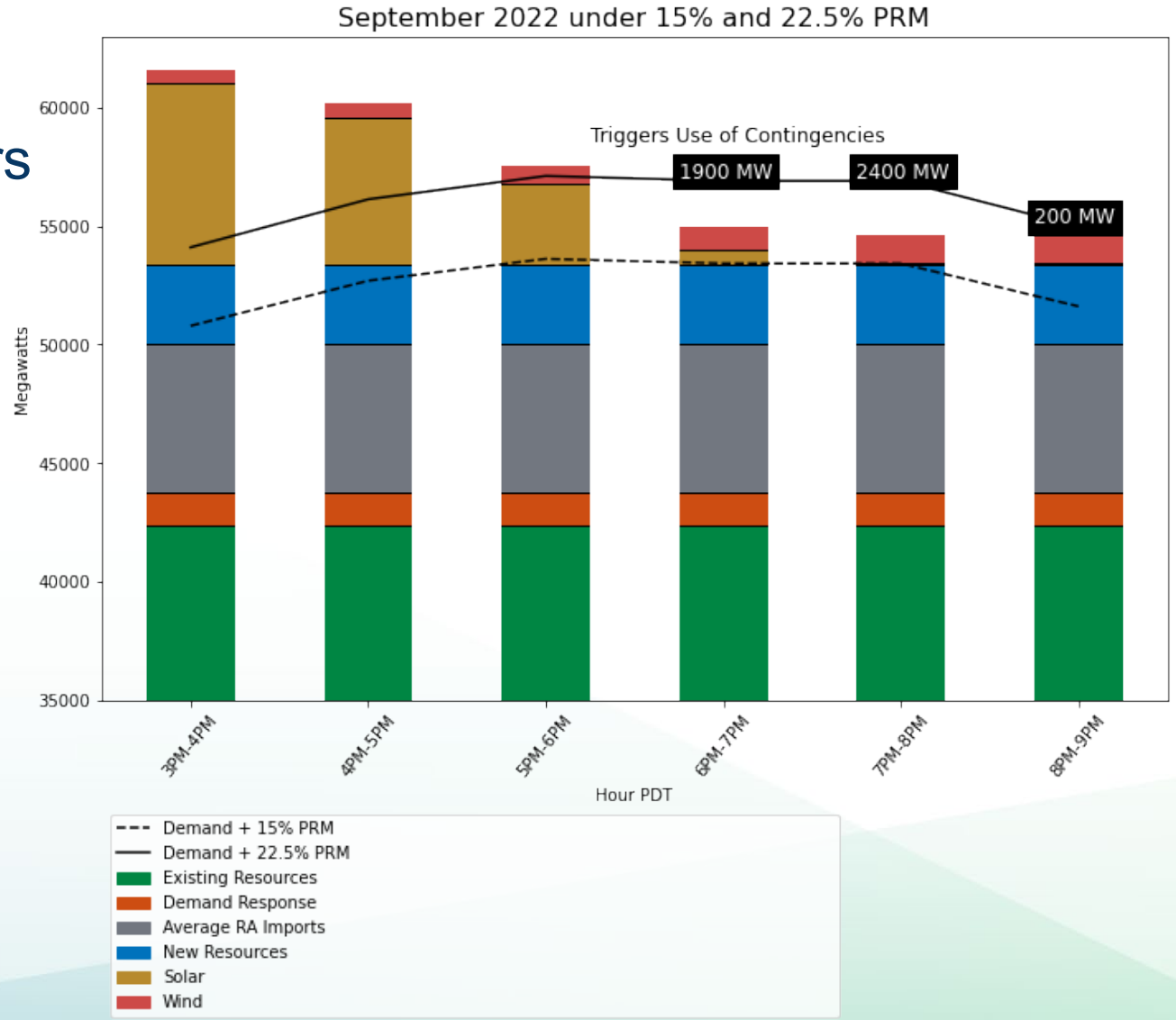
July and August 2022





September 2022 – Not Meeting 22.5%

- Meets 15% PRM for all hours
- Potential need for contingencies at net peak



Contingencies Expected

Contingencies
Import above 15% PRM
Contract and Resource Modifications (e.g., CHP call options & plant efficiency upgrades)
Increasing Generator Limits (CAISO)
Coordination with other BAAs (e.g., LADWP)
DWR Temporary Generators
Power Plant Beyond Operational Limits
Emergency Load Reduction Program
Other CPUC Programs – New & Expansions of Existing (e.g., smart thermostat programs and additional energy efficiency)
Flex Alert

Total estimated contingencies: minimum of 2,000 MW

Filing Comment

- Comments should be submitted by January 21, 2022 to docket 21-ESR-01 at https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-ESR-01

- Technical questions can be submitted to

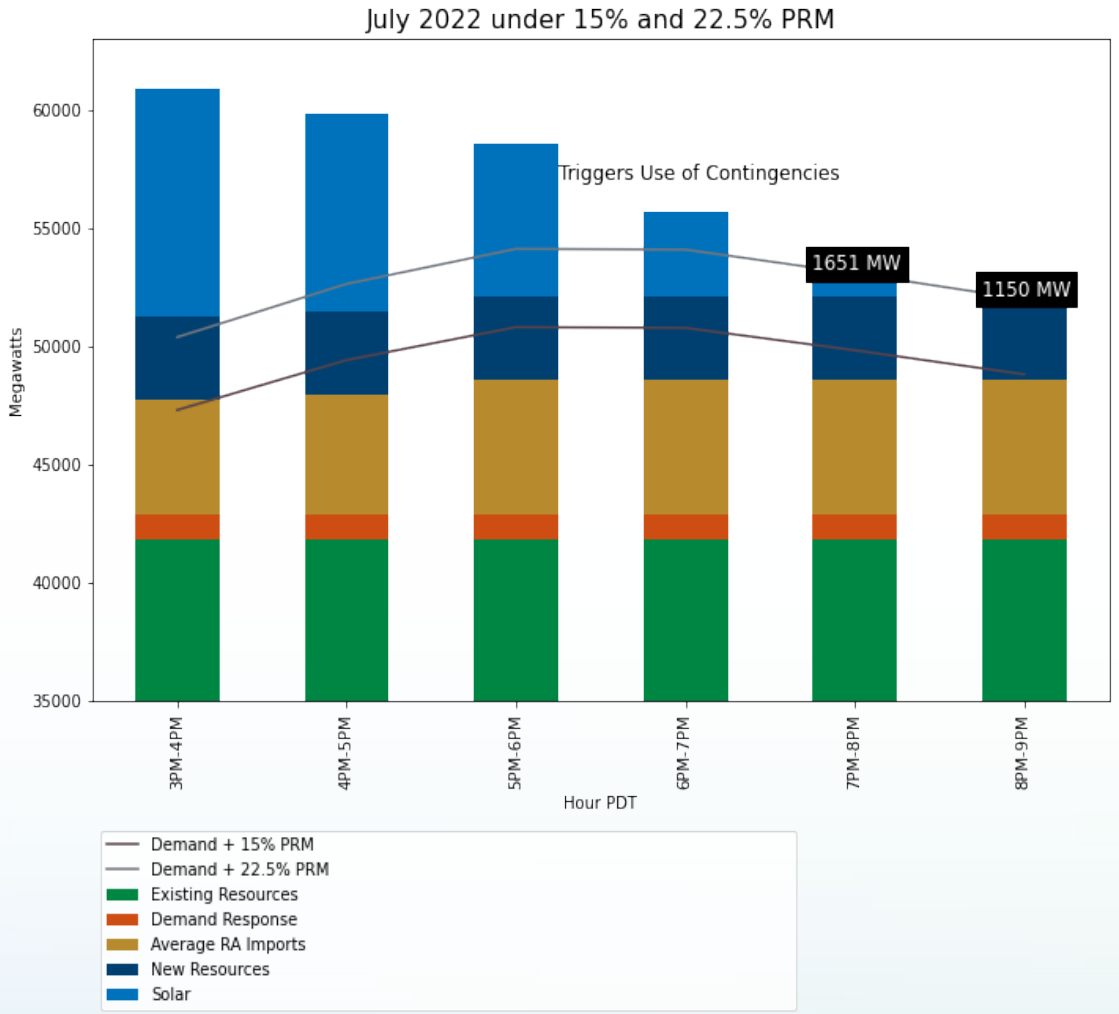
  Hannah Craig at Hannah.Craig@energy.ca.gov or

  Mark Kootstra at Mark.Kootstra@energy.ca.gov

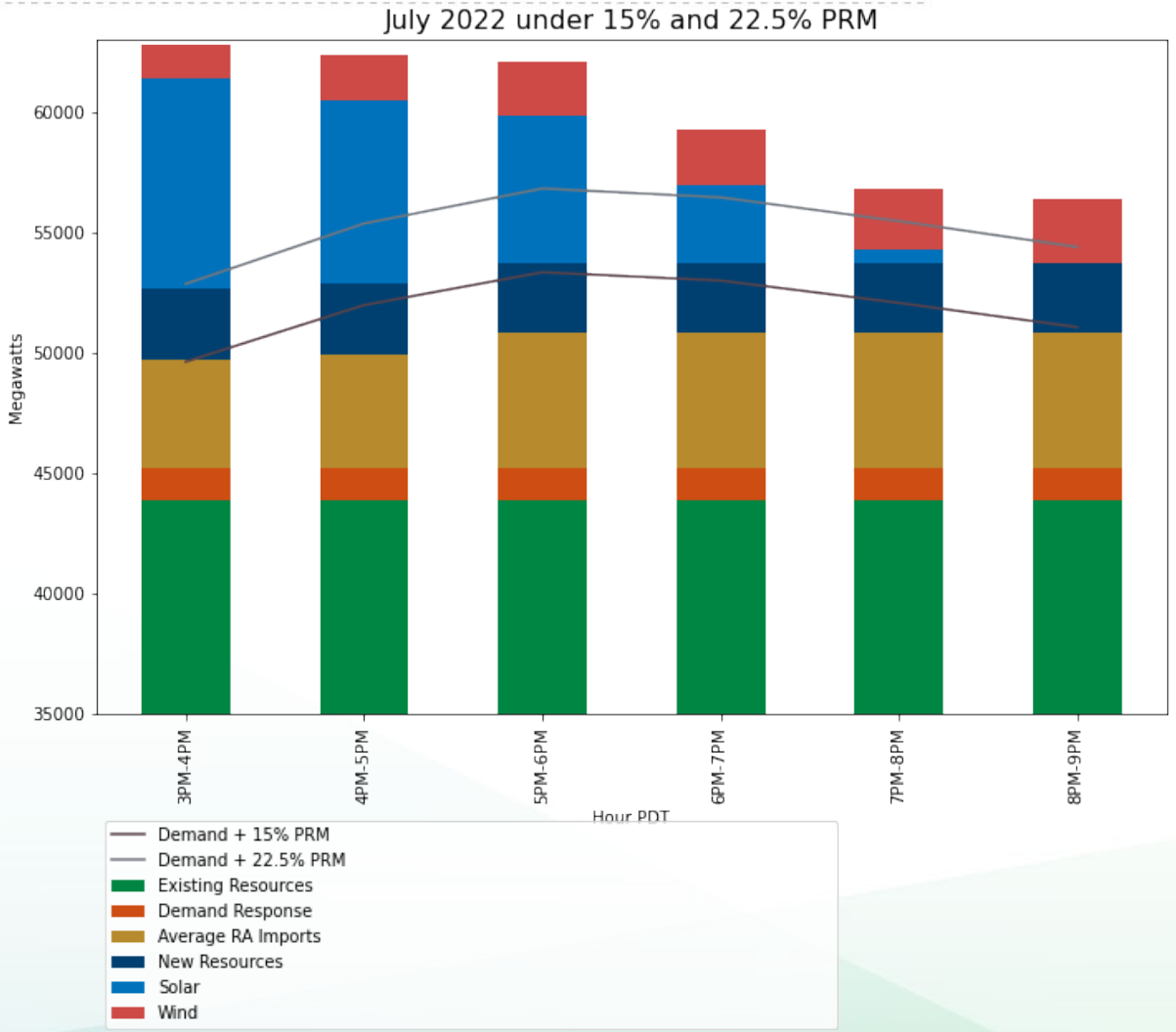
Questions?

Additional Slides

July 2022 – September Adopted and January Update

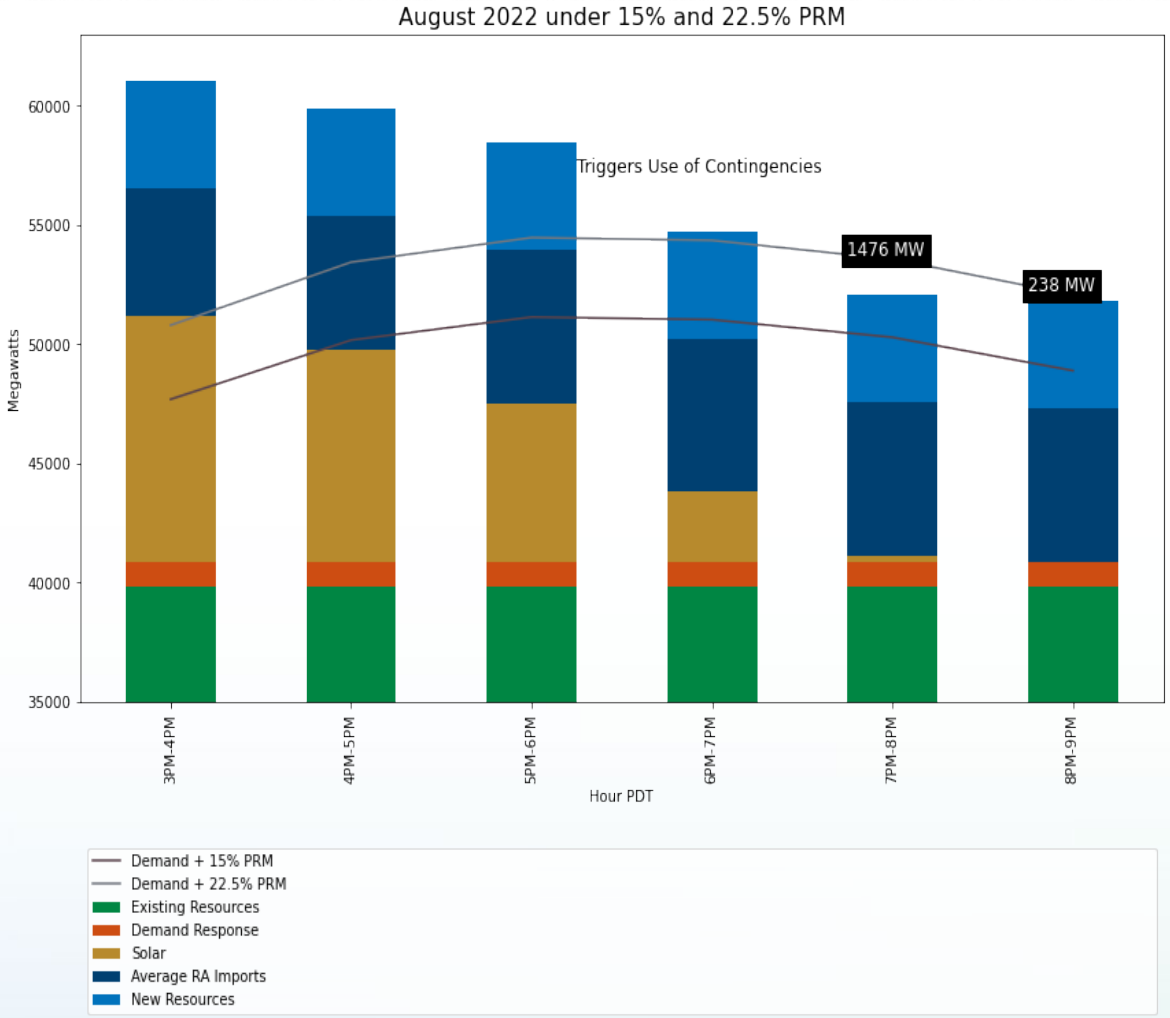


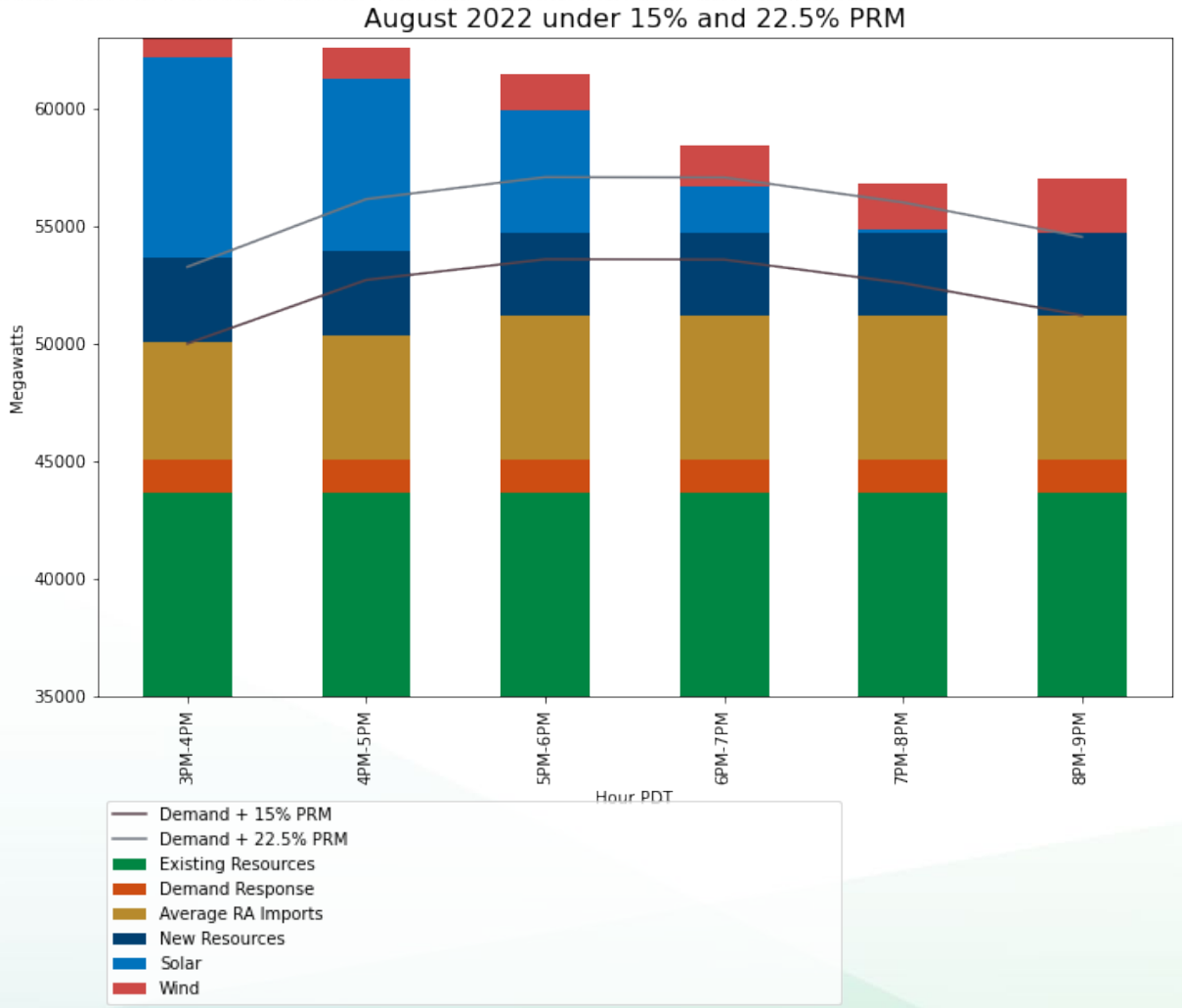
September 2021 Adopted Stack



January 2022 Stack Update

August 2022 –September Adopted and January Update

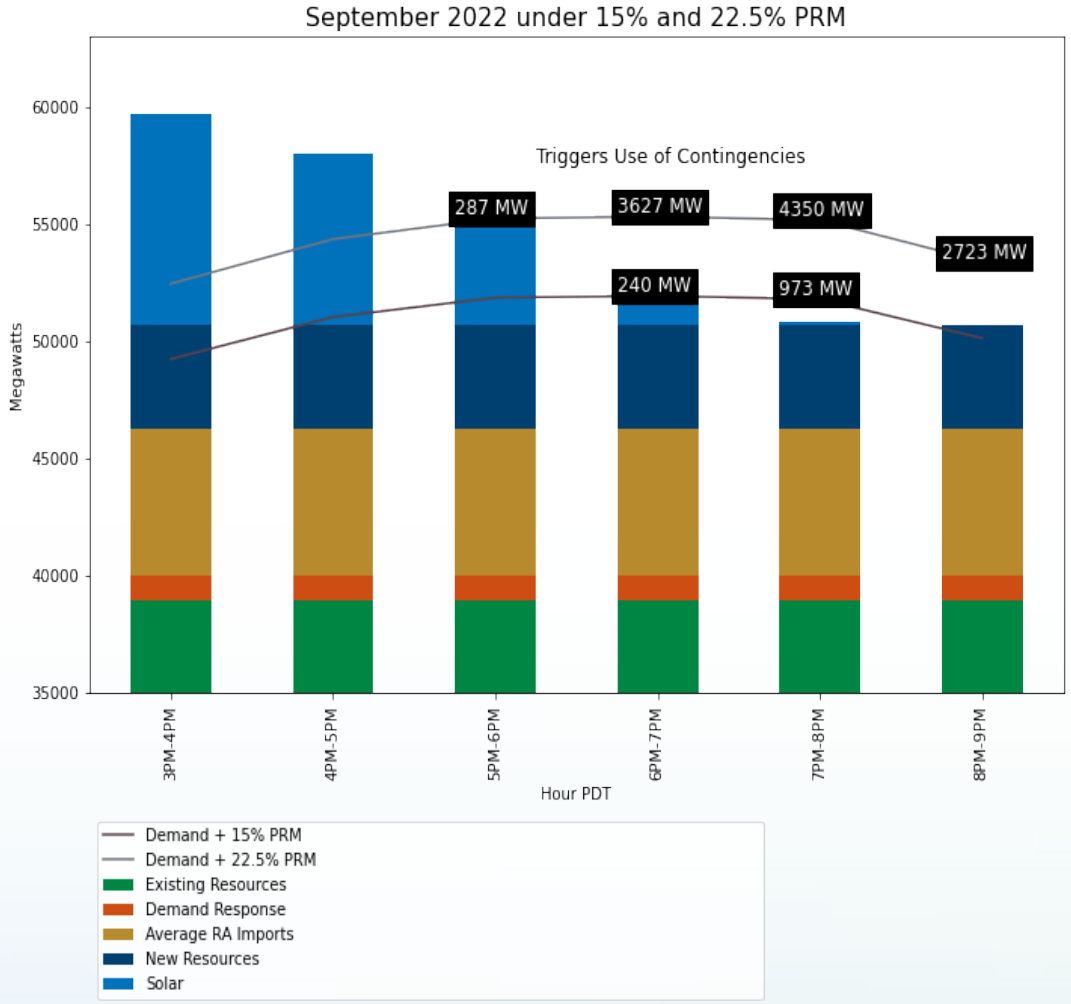


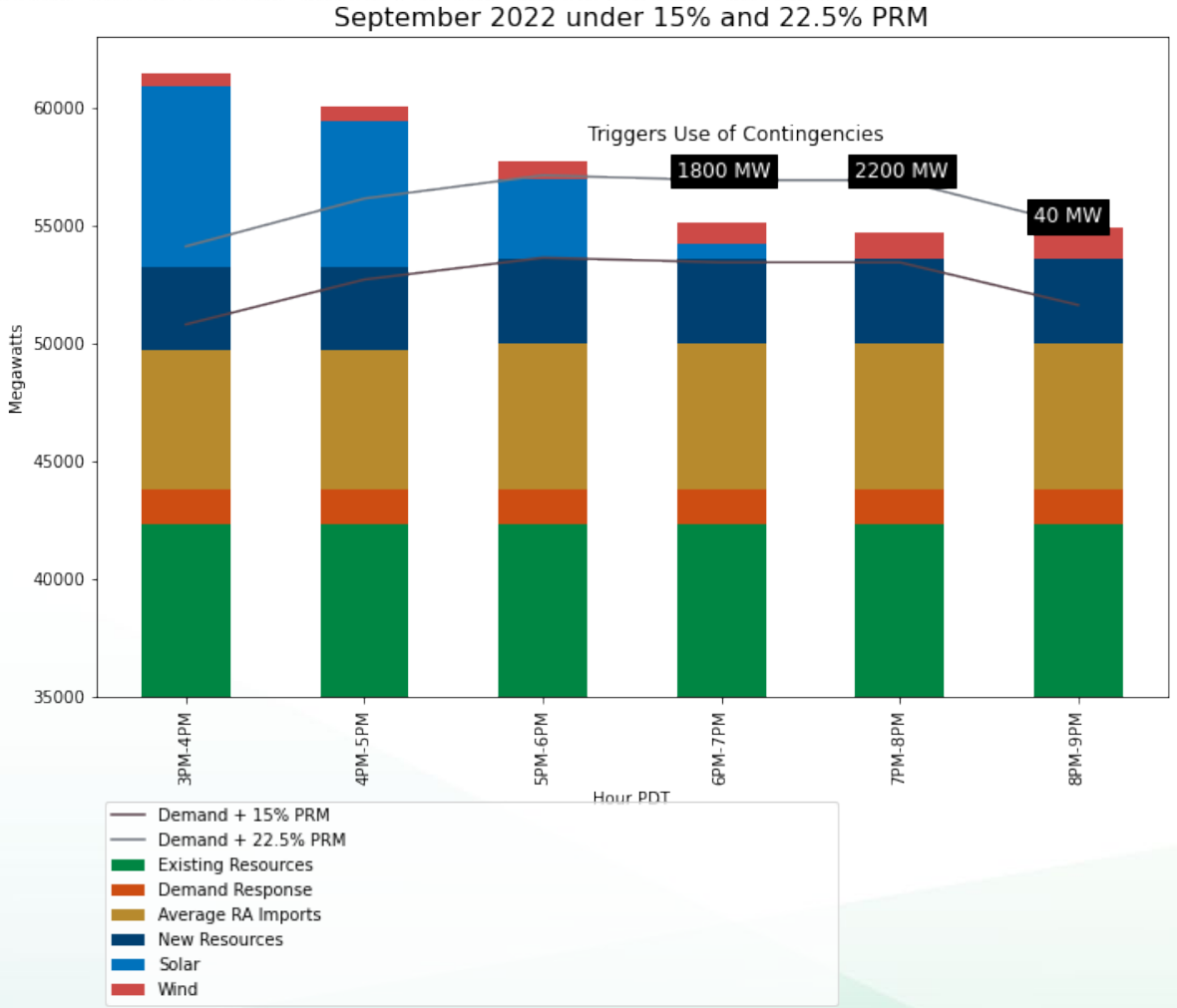


September 2021 Adopted Stack

January 2022 Stack Update

September 2022 - September Adopted and January Update





September 2021 Adopted Stack

January 2022 Stack Update

Impact between Versions

Shortfall in the Stack Analysis adopted in September was 4.3 GW at 7-8PM. This table lists the approximate impact of each change made in the update. The most significant change is increased expectations of new resources to come online between September 2021 and July 2022.

	Previous Analysis	Update Outlook	Approximate Delta
Baseline Resources and New Expected Procurement	November 2020 NQC List + New Resources expected in July 2021	October 2021 NQC List + New Resources expected in December 2021	(+) 1400 MWs
Demand Forecast	2020 IEPR	2021 IEPR Draft	(-) 1700 MWs
Redondo	Retired	Available	(+) 850 MWs
Hydro Derate	Worse than 2021	Same as 2021	(+) 500 MWs
Demand Response	40% Haircut	None	(+) 400 MWs
Imports	2015-2020 RA Filings	2016-2021 RA Filings	(+) 300 MWs
Wind/Solar Treatment	NQC	Hourly adjustment	(+) 150 MWs

Hourly Wind and Solar Shapes

- Wind and solar profiles are based on historic generation on the 5 highest load days of each month from 2014-2020, for a total of 35 days.
- The proposed hourly shapes are weighted with 80% of the weight going to the median generation and 20% of the weight going to the 20th percentile.

Wind Value, MW	July	August	September
ELCC Tech Factors	1,390	1,270	900
Median Generation at 7-8PM, all Days	2,970	2,820	2,010
Median Generation at 7-8 PM, High Load Days	2,690	2,080	1,290
20th Percentile Generation at 7-8PM, High Load Days	1,577	1,646	672
Stack Analysis Values at 7-8PM	2,460	1,990	1,170

Stack Analysis Values = (0.2 x 20th Percentile) + (0.8 x Median)