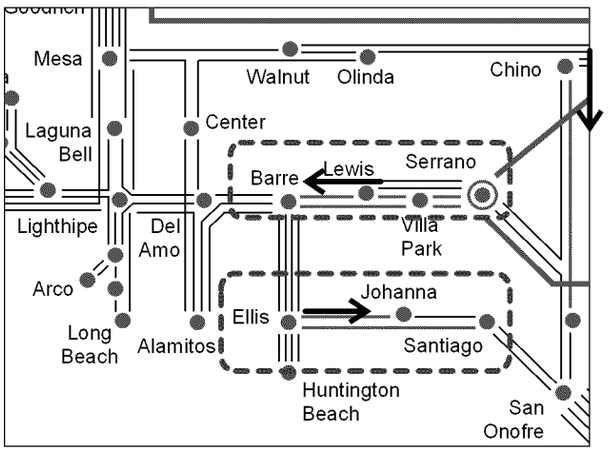
Preferred Resource Pilot Targeted Scope



Generation Site	Effectiveness to Resolve Critical Violations			
	Serrano	Vincent	Johanna	Viejo
Huntington	27%	10%	-17%	11%
Alamitos	24%	13%	-7%	4%
Lighthipe	19%	18%	-5%	3%
Rio Hondo	14%	24%	-4%	2%
Mesa	15%	20%	-4%	2%
Johanna	24%	10%	72%	15%
Santiago	21%	9%	58%	19%
San Onofre	8%	7%	35%	33%
North SD	7%	6%	34%	32%

- Transmission contingencies arising in 2020 due to SONGS retirement and OTC[1] plant closures
- Transmission studies show that in 2022 contingencies in the Serrano and Ellis corridors result from insufficient resources during peak demand. Serrano corridor is more constraining than Ellis corridor.
- The Preferred Resource[2] Pilot will explore the suitability of preferred resources in the Johanna & Santiago areas to mitigate contingencies on the Serrano and Ellis corridors.

[1] OTC – once-through cooling
[2] Preferred resources include energy efficiency, demand response, renewable generation and energy storage

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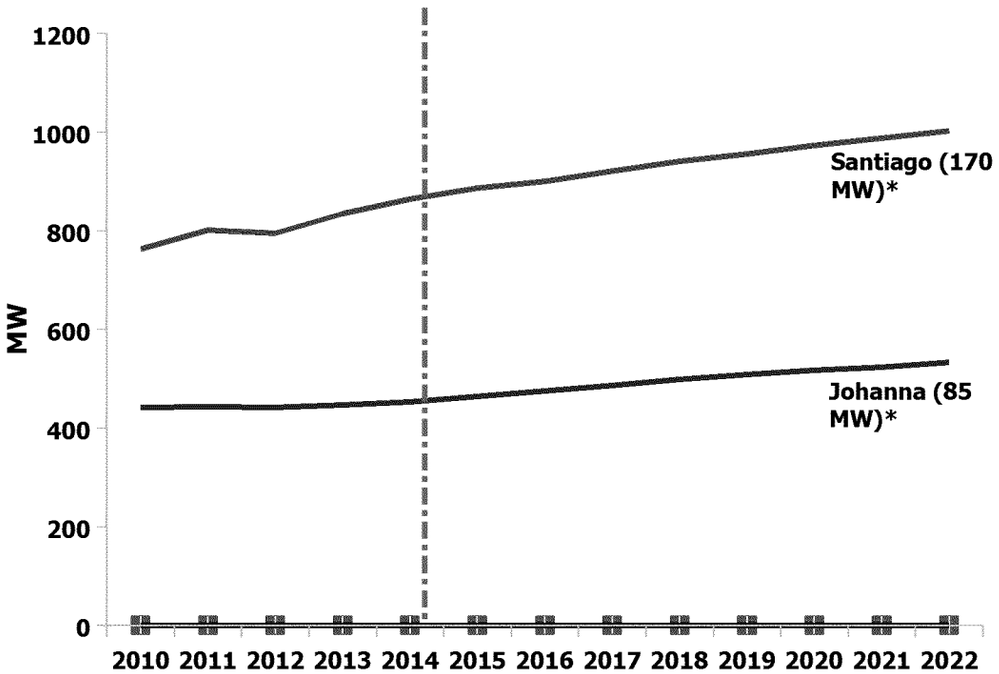
Preferred Resource Pilot Scope



- On average, forecast total peak load growth is ~25 MW per year through 2022
- The system is adequate now, but as substation load grows, meeting peak demand is our first reliability constraint and should be our main near term goal (Phase 1)
- If preferred resources can't solve the LCR requirements, there is substantial risk that gas fired generation will be needed as early as 2020

PRP Scope

- Manage load to zero net growth in the Johanna-Santiago vicinity -- unmanaged growth is expected to be about 25 MW/Year
- Identify lessons learned that may be applied to other areas in the West LA basin to address reliability challenges

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A key aspect of the pilot will be the identification of the appropriate attributes needed to manage LCR reliability.

Operational and Planning Characteristics Attributes Necessary for Alternative Resources to Meet LCR Needs								DRAFT	For Review Purposes Only
Attribute Class	**Description**	**Program Example**	**Activation**	**Duration**	**Availability**	**Frequency of Use**	**Maximum Participation (MW)**	**Telemetry Requirement**	**Triggering Mechanism**
A	**Firm Load Reduction**	Energy Efficiency Peak Load Reduction; Permanent Load Shift	N/A	N/A	Dependable capacity during summer peak periods	N/A	None	None	N/A
B	**Customer Side Intermittent Generation**	Customer Rooftop Solar	N/A	N/A	Dependable capacity during summer peak periods	N/A	30% of peak or 80% of light load at circuit level (see note 1)	None	N/A
C	**Real Time Demand Reduction**	Energy Storage Device; Direct Load Control	Automatic activation (post contingency)	At least 4 hours	Annual availability; storage fully charged upon CAISO request up to 60 times/year	At least 3 times/year	None	4-second or 5-minutes, depending on trigger mechanism	Day ahead request to be available; triggered based on CAISO real time instruction or voltage/frequency relay
D.1	**Scheduled Load Reduction (Low Use)**	Demand Response (BIP)	<= 30 minutes (pre contingency)	At least 2 hours	Dependable capacity during summer peak periods (see note 2)	At least 3 times/year	Up to 5% of area peak load	None (observed at A-station)	Triggered based on CAISO instruction; A-station or below
D.2	**Scheduled Load Reduction (Moderate Use)**	Demand Response (SDP)	<= 30 minutes (pre contingency)	At least 4 hours	Dependable capacity during summer peak periods	At least 20 times/year	Up to 20% of peak load (cumulative with D.1)	None (observed at A station)	Triggered based on CAISO instruction; A-station or below
D.3	**Scheduled Load Reduction (High Use)**	Demand Response Contract (with dispatchable EMS)	<= 6 hours (pre contingency)	At least 6 hours	Dependable capacity during summer peak periods	At least 40 times/year	Up to 30% of peak load (cumulative with D.1 & D.2)	None (observed at A station)	Triggered based on CAISO instruction; A-station or below

Note 1: Cumulative; can be waived based on an interconnection study

Note 1: Could be modified to an annual requirement for some/all MW if appropriate

CAISO engagement is critical to the success of the pilot

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