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Defining the Need for LA Basin and Dispatchable Resources

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CAISO Recognized that Dispatchable Resources will be Required to Integrate more Intermittent Resources

- ◆ CAISO issued a report entitled “Integration of Renewable Resources”, in November 2007.
- ◆ The report concluded that operating the grid with a 20% RPS is feasible provided that most of the existing generation, or an equivalent amount of new generation, remains available to provide grid support services.
- ◆ Higher future RPS targets are expected to present significantly greater operating challenges. More, or more flexible, resources may be required.



The Nexant Study indicated that about 2,250 MW of Flexible Resources were needed to achieve 33% RPS

- ◆ PG&E, SDG&E, and SCE with CAISO input participated in a study to identify the integration needs for higher renewable levels in the state.
- ◆ A minimum of 2,250 MW of new quick-start and load following resources were required in the state to meet operating requirements at 33% RPS
- ◆ Morning ramps and Evening ramping needs were increased significantly with higher levels of renewables (2025 with 33%)

	2006 CAISO Need (MW)	2025 With 33% RPS (MW)
Morning	6,800-10,000	12,000-19,000
Evening	7,800-11,500	13,500-16,500



Dispatchable Resources are needed for reliable grid operations and to meet local operations requirements

- ◆ Southern California Import Transmission (SCIT) limitations (dynamic not static requirements)
 - Imports limits into southern California on the interconnected transmission system depend on the amount of inertia in southern California. At higher levels of inertia, it is feasible to import more power and vice versa.
 - Retirement of older OTC units, and replacement with in-basin DG or peakers, will most likely reduce the amount of available inertia
 - Importing more renewables from outside the LA Basin may require higher levels of inertia
- ◆ Local Capacity Requirements of LA basin and sub-areas in LA basin.
 - Dispatchable capacity is needed to maintain transmission loadings within acceptable limits and voltage ranges



The Potential Retirements are three times more than the expected additions

Potential Additions and Retirements

- ◆ Assumed **Additions** (1,992 MW)
 - Inland Empire Unit 2 (405 MW)
 - Riverside Energy Center expansion (96 MW)
 - Canyon (200 MW)
 - Watson Cogen (85 MW)
 - Blythe 1 (520 MW) [near the Arizona border]
 - Otay Mesa (590 MW) [near the Mexico border]
 - Orange Grove (96 MW)

- ◆ Assumed **Retirements** (7,552 MW)
 - CAISO's Los Angeles Basin LRA (4,973 MW)
 - Alamitos (2,056 MW)
 - El Segundo (670 MW)
 - Huntington Beach (904 MW)
 - Redondo Beach (1,343 MW)
 - LADWP (2,579 MW)
 - Harbor (224 MW)
 - Haynes (1,569 MW)
 - Scattergood (803 MW)

Units with
lower inertia
potential

Units with
significant
inertia
potential



What about the signed contracts seeking PM₁₀ credits?

- ◆ SCE has four contracts that are signed and seeking PM₁₀ credits in order to start construction.
 - El Segundo Repower
 - Sentinel (1st contact)
 - Sentinel (2nd contact)
 - Walnut Creek

- ◆ These units have about 1,800 MW of capacity and are located within the LA Basin

- ◆ The Sentinel and Walnut Creek units are smaller quick start resources with less expected running hours and lower levels of potential inertia.



SCE modeled anticipated operations using updated planning assumptions.

Modeling assumptions for estimating PM₁₀ emissions for the signed contracts:

- ◆ Used Ventyx's Market Analytics model
 - WECC-wide least cost dispatch
 - PPA units in, PPA units replaced with out-of-basin resources
- ◆ Utilized recent SCE-internal load forecast that reflects internal expectations regarding:
 - Economic conditions
 - AB 32 combined heat and power additions
 - Some photovoltaic distributed generation
 - Significant levels of electrification
- ◆ Updated RPS assumptions throughout the WECC
- ◆ Once-through cooling unit retirements in the SCE territory included 1,000 MW by 2016, 2,800 MW by 2018, and 3,200 MW in 2020.



New Gen In-Basin System Estimated PM₁₀ and Offsets (Lb/Day)

PM₁₀ credits or offsets are needed to bring on new generation in the LA Basin*

PPA Power Plant	2015 PM10(lb/day) C.F(%)	2018 PM10(lb/day) C.F(%)	2020 PM10(lb/day) C.F(%)
El Segundo	47 5.09	76 8.23	69 7.41
CPV sentinel	236 15.78	307 20.64	273 18.54
EMG Walnut	118 13.58	169 19.65	147 17.24
Change in PM ₁₀ Emissions (IN-OUT)	402	556	490
SCE System PM ₁₀ Equivalent Offsets	482	668	588

*Assumes the offsets are perfectly predictable and generators can purchase only that which is needed.

Additional Planning studies that are needed to determine future resource needs

- ◆ Resource Planning studies
 - Changing RPS scenarios
 - Type
 - Location
 - Changing load
 - Load growth
 - ◆ Electrification
 - ◆ DG (solar and CHP)

- ◆ Transmission Planning studies
 - Voltage
 - Grid Stability
 - Other NERC and WECC Violation studies

- ◆ Grid Operability Studies



Conclusions

- ◆ The quantity of future CAISO dispatchability needs are still uncertain
 - The first CAISO study is underway with phase 1 completion anticipated this year
- ◆ LA Basin generation needs, intertie requirements, and local capacity needs still need more study
 - Additional studies by the CAISO and IOU's are definitely needed
- ◆ Transmission planning analysis of future conditions, including new RPS resource additions and generation retirements, still need significant study

