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Energy Reliability In Southern California
Joint Agency Workshop

SCE Transmission Projects Update

May 22, 2017

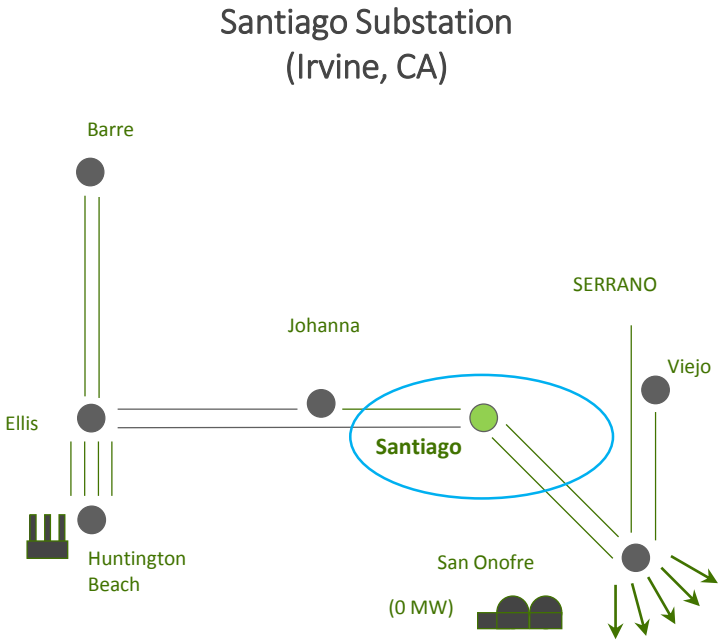
Santiago Synchronous Condenser Project

Background:

- 6/7/13 - SONGS units 2 & 3 officially retired
- CAISO 2013-2014 TPP identified need for dynamic reactive support in the SONGS vicinity by 12/2017
  - SDG&E to install 225 MVAR synchronous condenser at San Onofre Substation
  - SCE to install 225 MVAR synchronous condenser at Santiago Substation

Status:

- General Electric (GE) selected as vendor for SCE's Santiago Synchronous Condenser Project.
- Physical construction commenced August 2016
- Equipment startup and commissioning on track for Q3 2017 completion
- Currently on track to meet in-service date of 12/2017



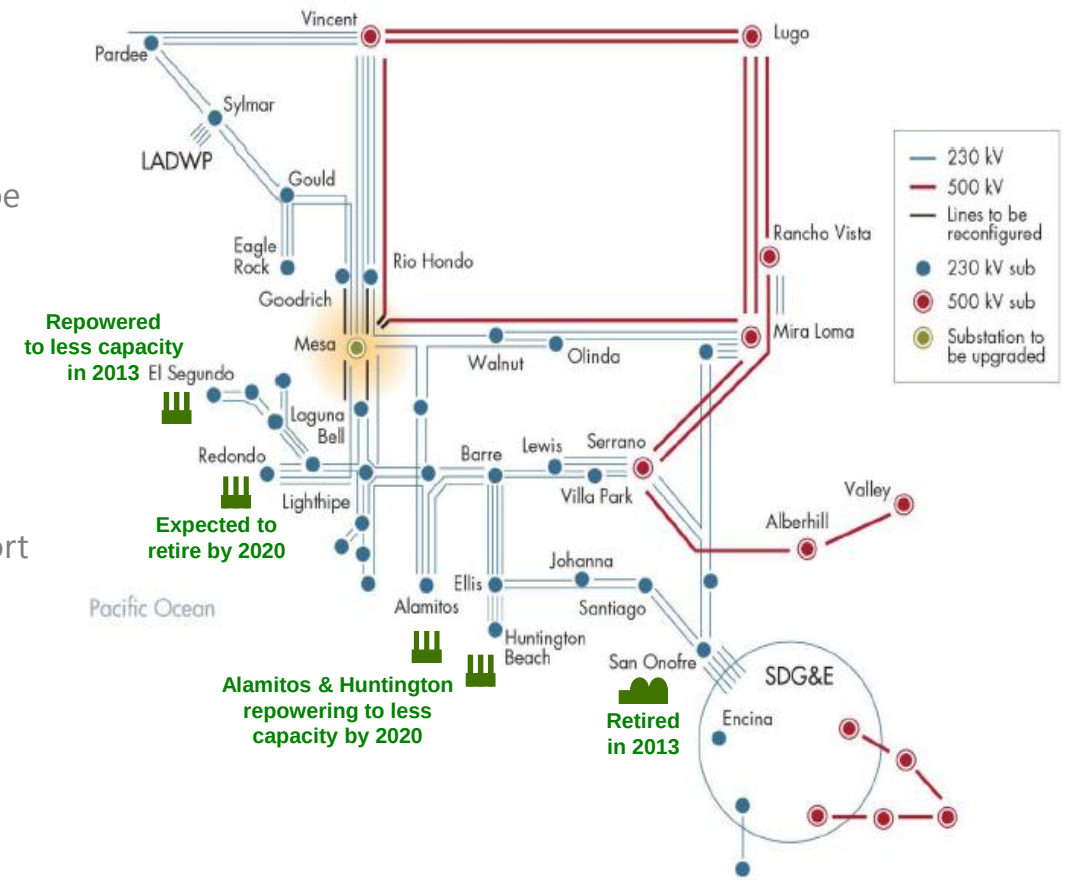
Mesa 500 kV Substation Project

Background:

- Half of SCE's load is served via its 230 kV substations shown in diagram
- Predominant power flow on transmission system during peak periods is toward the coast
- As OTC plants (in green) retire/repower, existing transmission import capability will be insufficient to support summer peak load
- New Mesa 500 kV Substation provides new transmission import capability into the Western L.A. Basin

Status:

- March 2015, filed Permit to Construct (PTC)
- April 2016, draft Environmental Impact Report (EIR) issued
- February 2017, approved PTC and certified Final EIR
- Current projected operating date is March 2022
- SCE is evaluating options to accelerate construction
- OTC compliance date is December 2020 - potential reliability gap in summer 2021



2021 Summer Reliability

- Serrano transmission corridor
  - Composed of 230 kV lines west of Serrano Substation and three 500/230 kV transformers at Serrano Substation
  - Mesa 500 kV Substation Project designed to relieve Serrano corridor
- Based on current planning assumptions and no 500/230 kV banks available at Mesa Substation, N-1-1 contingencies can overload Serrano 500/230 kV banks
- Reliability issues dependent upon several variables
  - Renewable gen development outside Western L.A. Basin
  - Forecasted load in Western L.A. Basin
  - Generation retirements in Western L.A. Basin
  - Aliso Canyon

System Mitigations

- Design Considerations
  - Enable scheduled retirement of OTC units
  - Avoid using load shed in Western L.A. Basin
  - Low cost options that can be on-line by summer 2021
- Options Under Development
  - Temporary Operating Procedure (OP) to manually change system configuration (open Serrano corridor) to redirect power to other transmission corridors after initial N-1 contingency
  - Temporary Remedial Action Scheme (RAS) to automatically change system configuration (open Serrano corridor) after N-1-1 contingency
  - Upgrade terminal equipment of 230 kV line(s) in Serrano corridor to increased emergency rating