

# CTPG's Draft Phase 3 Study Report

Presentation to RETI  
Transmission Working Group  
(June 17, 2020)

# Scenario: A-Q\_CO2

- **Objective:** Minimize carbon footprint
- **Load:** No. CA 1-in-10 July peak load
- **Renewable Additions:** CTPG queue case
- **Fossil-Fired Decrements:** 98% out-of-state coal
- **Power flows:** East of River flows are west to east at low levels
- **Results:** Overloads on
  - Bannister-El Centro
  - Barren Ridge-Haskell Canyon
  - Path 15
  - Mirage-Eagle Mountain system
  - Lugo-Kramer
  - San Diego area

# Scenario: B-Q\_CO2

- **Objective:** Minimize carbon footprint
- **Load:** So. CA 1-in-10 July peak load
- **Renewable Additions:** CTPG queue case
- **Fossil-Fired Decrements:** 98% out-of-state coal
- **Power flows:** East of River flows are west to east at low levels
- **Results:** Overloads on
  - Bannister-El Centro
  - Barren Ridge-Haskell Canyon
  - Path 15
  - Mirage-Eagle Mountain system
  - Lugo-Kramer
  - San Diego area

# Scenario: Autumn

- **Objective:** Study a high south-to-north flows on Path 15 during light load conditions
- **Load:** Typical load at 8:00 am in September
- **Renewable Additions:** CTPG queue case
- **Fossil-Fired Decrements:** 70%/30% in/out-of-state gas
- **Power flows:** Prior to adding renewables, south-to-north flows on Path 15 were doubled from July summer peak case (to 5032 MW)
- **Results:** Major overloads on Path 15 plus an overload of the Eldorado-Pisgah series capacitor

# Alternative: 500 kV Talega- Escondido/Valley-Serrano (TE/VS)

- **Objective:** Determine if TE/VS addresses needs in Los Angeles basin and/or San Diego areas
- **Load:** So. CA 1-in-10 July peak load
- **Renewable Additions:** CTPG queue case
- **Fossil-Fired Decrements:** 70%/30% in/out-of-state gas
- **Power flows:** When TE/VS phase shifters are set to 1000 MW
  - flows along coast swing in the opposite direction by 700 MW
  - changes flows in Orange County and on the eastern side of San Diego area asystem.
- **Results:** Mitigates several Los Angeles basin overloads, but creates new overloads in the both the Los Angeles basin and San Diego areas depending on the phase shifter settings.

# Alternative: 500 kV Double Circuit North Gila-Highline-Imperial Valley

- **Objective:** Determine if new 500 kV NG-HL-IV and NG-IV lines will address needs in the Imperial Valley area
- **Load:** So. CA 1-in-10 July peak load
- **Renewable Additions:** CTPG Southwest scenario
- **Fossil-Fired Decrements:** 70%/30% in/out-of-state gas
- **Power flows:**
  - B-Q scenario has the highest flows on the existing 500 kV NG-IV line.
  - Adding the 500 kV NG-HL-IV and NG-IV lines increases flows into the San Diego area and decreases flows on the West of Devers system.
- **Results:**
  - Exacerbates previously-identified overloads in the San Diego area.
  - May represent an alternative to 230 kV upgrades in the southern portion of the IID system, although the study raises the question if some of those upgrades (e.g., the 230 kV El Centro-Highline upgrade) actually contribute to reaching a power flow solution to begin with.

# Alternative: Path 52 Upgrade for Nevada Resources

- **Objective:** Determine whether an upgrade to Path 52 would address needs in the Owens Valley area
- **Load:** Load levels are not a determinative factor.
- **Renewable Additions:**
  - All CTPG renewable development scenarios were considered.
  - Terra-Gen Power's suggestion to assume 1000 MW in northern NV was not considered.
- **Fossil-Fired Decrements:** Fossil generation decrements not a determinative factor.
- **Power flows:**
  - CTPG modeled northern NV resources as delivered via the proposed Ravendale-Zeta1 500 kV system.
  - CTPG modeled central NV resources as delivered via the existing Dixie Valley-Control line as far south as a new Aurora substation, with a new 230 kV line parallel to the existing Dixie Valley-Control line from Aurora south to a new NewSub substation near Control, and then south to Inyokern substation.
- **Results:**
  - Because Path 52 is radial to the weak 115 kV system south of Control, an upgrade of Path 52 will not contribute to reaching a power flow solution and will not mitigate any identified reliability criteria violations south of Control.
  - Path 52 could be an alternative to the new 230 kV line between Aurora and NewSub, but only if renewable resource development in NV takes place along the Silver Peak-Control line rather than the Dixie Valley-Control corridor.

# Alternative: +/- 500 kV DC Devers-Mira Loma Line

- **Objective:** Determine if a +/- 500 kV DC Devers-Mira Loma line will address needs on the West of Devers system
- **Load:** So. CA 1-in-10 July peak load
- **Renewable Additions:** CTPG queue case
- **Fossil-Fired Decrements:** 70%/30% in/out-of-state gas
- **Power flows:**
  - The inverters were set to deliver 2000 MW from Devers to Mira Loma.
  - This reduces the loading on the West of Devers lines.
- **Results:** Mitigates the West of Devers overloads.

# Alternative: +/- 500 kV DC Marketplace-Rancho Vista Line

- **Objective:** Determine if a +/- 500 kV double circuit line between Marketplace and Rancho Vista (Los Angeles basin) will mitigate reliability criteria violations along the So. NV-East of Lugo corridor.
- **Load:** Load levels do not appear to be a determinative factor.
- **Renewable Additions:** All CTPG renewable resource development scenarios are relevant.
- **Fossil-Fired Decrements:** 70%/30% in/out-of-state gas
- **Power flows:** All scenarios are applicable.
- **Results:**
  - There are no reliability criteria violations along the So. NV-East of Lugo corridor in the summer peak cases.
  - However, the Autumn case identified an overload of the series capacitor on the existing 500 kV El Dorado-Pisgah line. The proposed alternative would mitigate the overload of the series capacitor.

# Alternative: +/- 500 kV DC El Dorado-Devers (Pony Express Project)

- **Objective:** Determine if a +/- 500 kV line between El Dorado and Devers will mitigate reliability criteria violations along the So. NV-East of Lugo corridor.
- **Load:** Load levels do not appear to be a determinative factor.
- **Renewable Additions:** All CTPG renewable resource development scenarios are relevant.
- **Fossil-Fired Decrements:** 70%/30% in/out-of-state gas
- **Power flows:** All scenarios are applicable.
- **Results:**
  - There are no reliability criteria violations along the So. NV-East of Lugo corridor in the summer peak cases.
  - However, the Autumn case identified an overload of the series capacitor on the existing 500 kV El Dorado-Pisgah line. The proposed alternative would mitigate the overload of the series capacitor.

# Alternative: 500 kV Double Circuit Green Energy Express Project

- **Objective:** Determine if a 500 kV double circuit line between Red Bluff and Devers will mitigate reliability criteria violations on the existing Eagle Mountain-Mirage system.\*
- **Load:** So. CA 1-in-10 July peak load
- **Renewable Additions:**
  - CTPG queue case.
  - No generation or load was modeled as connecting to the new 500 kV Eagle Mountain substation.
- **Fossil-Fired Decrements:** 70%/30% in/out-of-state gas
- **Power flows:** The Green Energy Express project has a limited effect on power flows on the existing Eagle Mountain-Mirage system.
- **Results:** Mitigates only one of the reliability criteria violations on the existing Eagle Mountain-Mirage system.

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\* The Green Energy Express project also includes a double circuit 500 kV line between the planned Red Bluff substation and a new 500 kV Eagle Mountain substation. Because the project proponent does not propose to connect its new substation at Eagle Mountain to MWD's system, this portion of the Green Energy Express project is radial to the existing network and has no effect on Mirage-Eagle Mountain system.