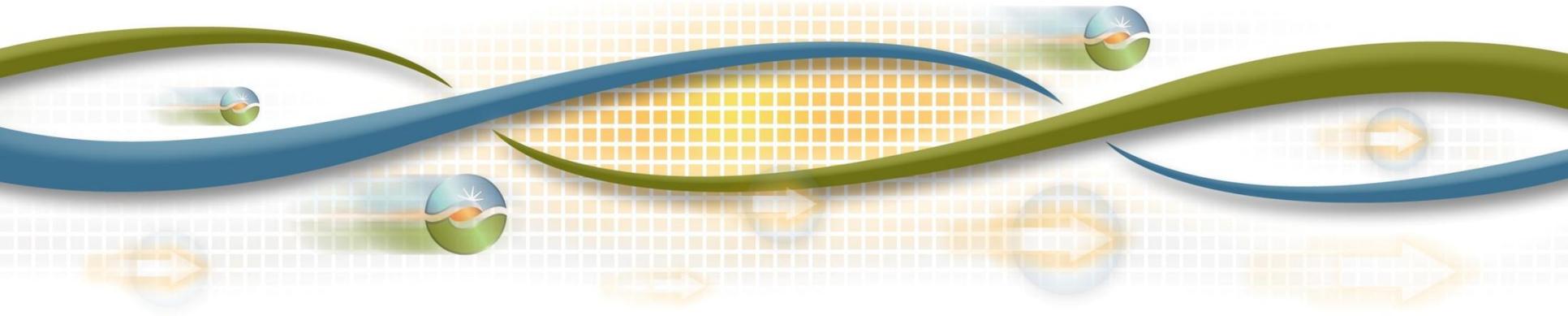




Introduction & Overview Transmission Plan Development

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

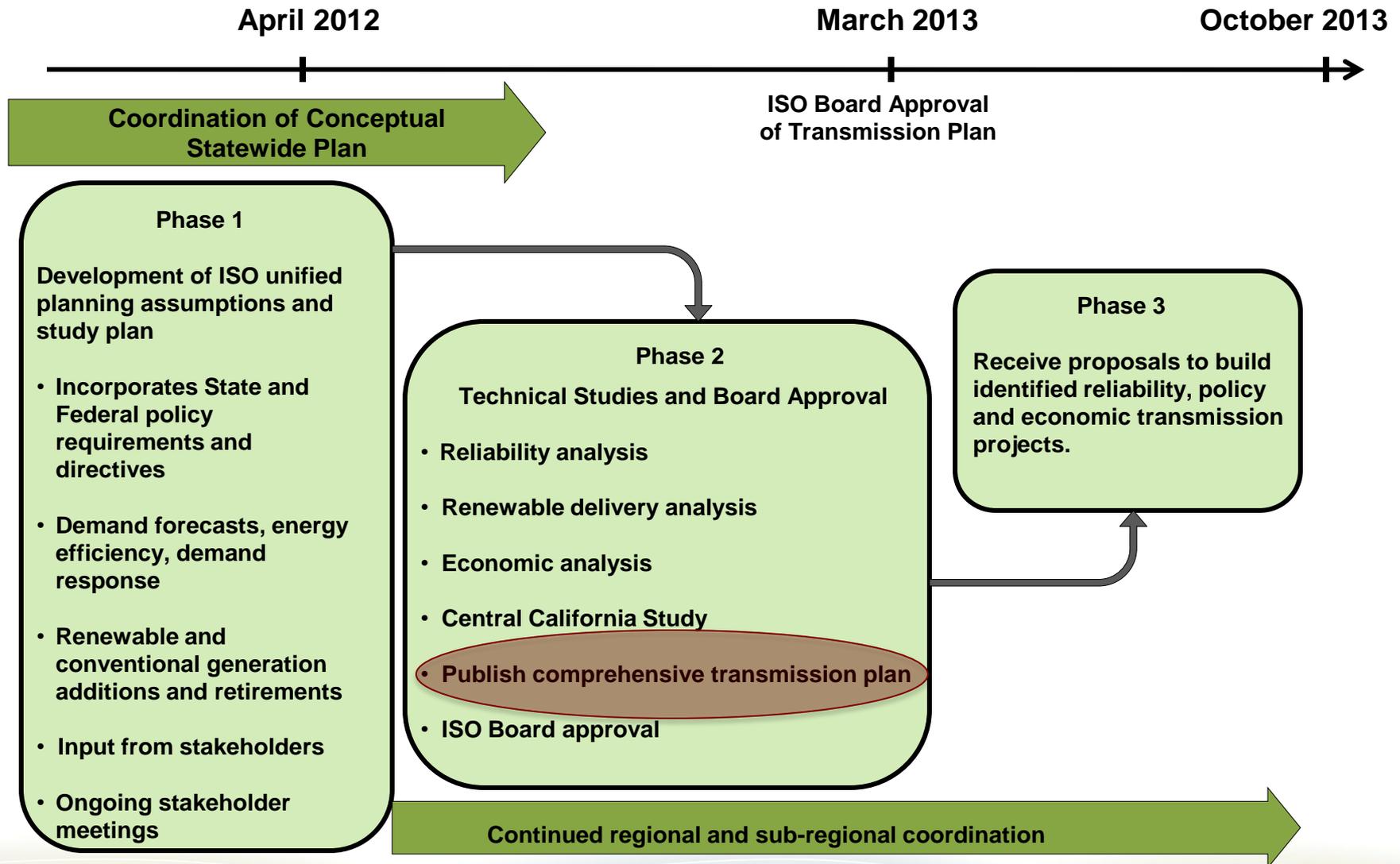
Neil Millar
Executive Director - Infrastructure Development
February 11, 2013



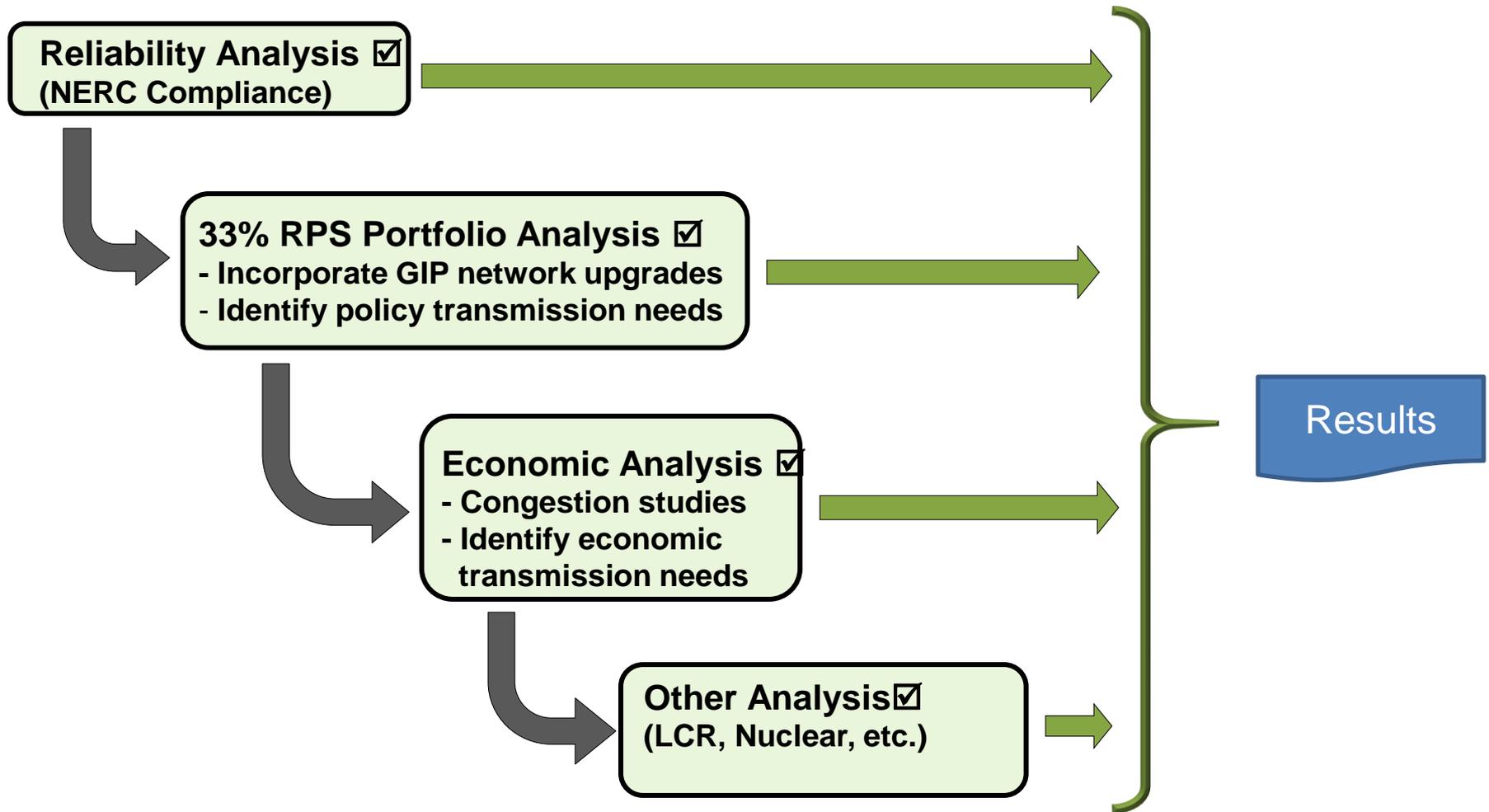
2012-2013 Draft Transmission Plan Stakeholder Meeting - Today's Agenda

Topic	Presenter
Opening	Tom Cuccia - ISO
Introduction & Overview	Neil Millar
Nuclear Generation Backup Plan Study Results	ISO Regional Transmission Engineers
Reliability Project Recommendations	ISO Regional Transmission Engineers
Policy Project Recommendations	ISO Regional Transmission Engineers
Economic Planning Study – Final Results	ISO Regional Transmission Engineers
Competitive Solicitation, Impact on HV TAC & Next Steps	Neil Millar

2012/2013 Transmission Planning Cycle



Development of 2012/2013 Annual Transmission Plan



Summary of Needed Reliability Driven Transmission Projects

Service Territory	Number of Projects	Cost
Pacific Gas & Electric (PG&E)	31	\$1,168 M
Southern California Edison Co. (SCE)	1	\$75 M
San Diego Gas & Electric Co. (SDG&E)	4	\$100 M
Valley Electric Association (VEA)	0	0
Total	36 *	\$1,343 M *

* Includes two reliability projects receiving further consideration before the March Board of Governors meeting.

Policy and Economic driven elements:

- Five Category 1 policy driven elements have been identified:
 - Lugo-Eldorado 500 kV line re-route
 - Ludo-Eldorado series capacitor and terminal equipment upgrade
 - Warnerville-Bellota 230 kV line reconductoring
 - Wilson-Le Grand 115 kV line reconductoring
 - Sycamore-Penasquitos 230 kV transmission line *
- One economically driven element has been identified:
 - Delaney-Colorado River 500 kV transmission line

* The ISO's recommendation for this project is receiving further consideration before the March Board of Governors meeting.

Eligibility for competitive solicitation:

- Reliability project element with additional policy benefits:
 - Gregg-Gates 230 kV transmission line
- Policy driven element:
 - Sycamore-Penasquitos 230 kV transmission line *
 - The ISO's recommendation for this project is receiving further consideration before the March Board of Governors meeting.
- Economically driven element:
 - Delaney-Colorado River 500 kV transmission line

2012/2013 Transmission Plan – Initial Comments

- Presentation of economic study results
- Nuclear generation-related planning studies
- San Francisco peninsula analysis
- Management approval of projects under \$50 million
- Coolwater-Lugo Alternatives – examination of the AV Clearview alternative
- High out-of-state import scenario
- Eligible projects for competitive solicitation process
- Transmission plan impact on high voltage TAC

Nuclear Generation Backup Plan Study Results

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

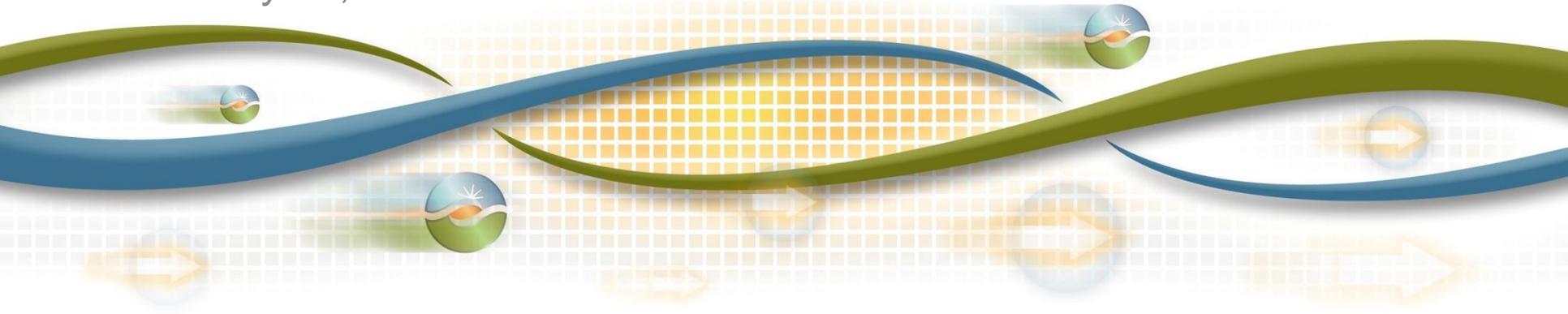
Irina Green

Regional Transmission Engineer Lead

David Le

Senior Advisor Regional Transmission Engineer

February 11, 2013



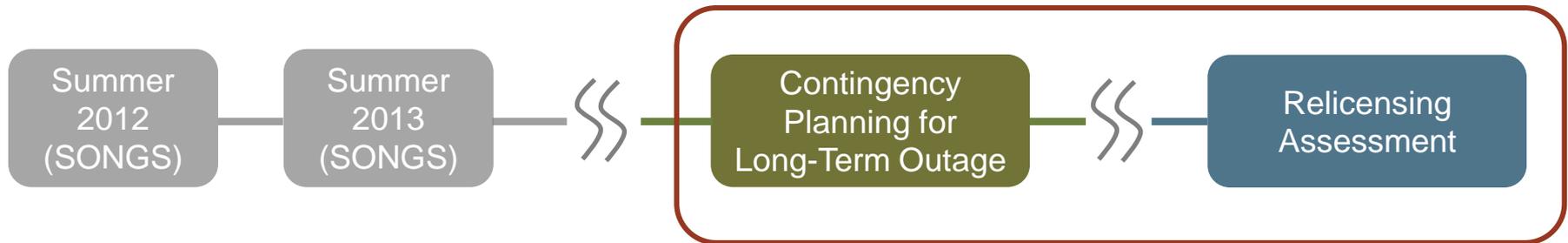
Studying the impact of absence of the Diablo Canyon and San Onofre nuclear power plants



Studying Grid Reliability Impact In the Absence of Nuclear Generation

- Studies included the following evaluations:
 - Potential transmission reliability concerns
 - Potential mitigation options
- These studies are not sufficient to base a decision to keep or retire the two nuclear generating power plants
- Other studies would be needed to provide a more completed assessment:
 - Asset valuations
 - Environmental impacts of green-house gas emissions and compliance with AB 32
 - Impacts on flexible generation requirements
 - Least-cost best-fit replacement options
 - Generation planning reserve margin
 - Market price impacts
 - Customer electricity rate impacts
 - Impacts to natural gas systems for replacement generation

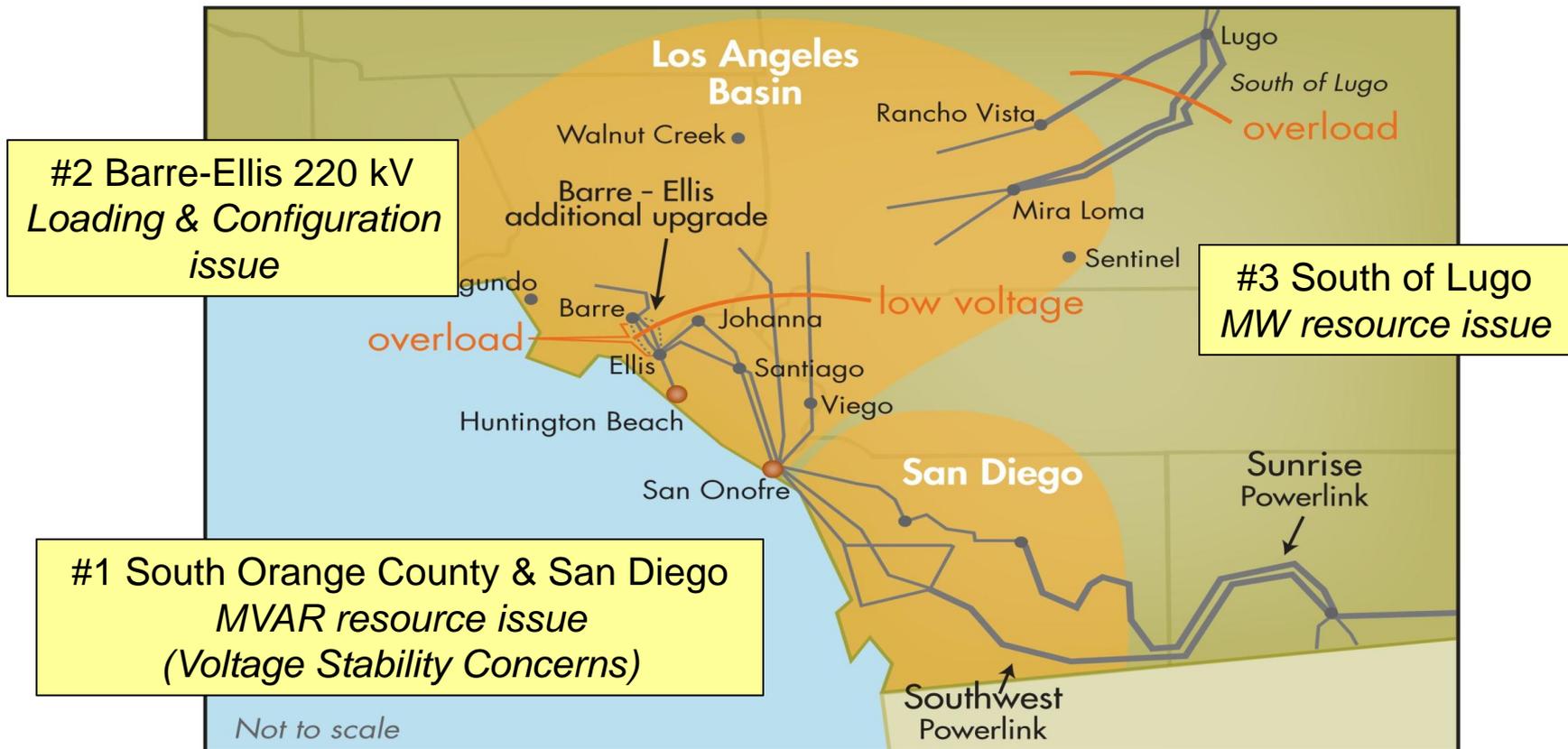
Study efforts completed in ISO 2012/2013 TPP



- Summer 2012 and 2013 Preparedness
 - Addendum to 2013 LCR studies (without SONGS) was posted
- Mid Term Study – Contingency Planning (2018)
 - Considers what elements of the long term plan should be initiated immediately to help mitigate future unplanned extended outages
- Long Term Study – Relicensing Assessment (2022)
 - Studies focus on transmission system implications of loss of SONGS and DCPP
- ■ Study results are documented in the Draft ISO 2012/2013 Transmission Plan posted on 2/1/2013

Recap of Summer 2013 Preparedness Studies

Focus is on non-generation alternatives to mitigate load shed risk for multiple-contingency events



The 2013 solutions being pursued balance reliability needs without excessive reliance on load-dropping schemes:

1. Convert Huntington Beach 3&4 into synchronous condensers
 - FERC approved RMR agreement on January 4th
 - Project on a viable schedule for June operation
 - Contractual limitations remain, despite recent FERC rulings
 - Alternatives for 2014 being considered
2. Install capacitors (80 MVAR each at Santiago and Johanna, 160 MVAR at Viejo)
 - Management approval after September Board of Governors meeting
 - SCE on track for July 1 completion
3. Split Barre-Ellis 220 kV circuits (from 2 to 4 lines)
 - Management approval after September Board of Governors meeting
 - Completion expected in late 2013 (for summer of 2014)

The 2013 solutions being pursued balance reliability needs without excessive reliance on load-dropping schemes:

4. Confirm new resources South of Lugo
 - Walnut Creek Energy Center (500 MW) – scheduled completion and start of commercial operation on 5/1/2013
 - Huntington Beach Units 3 & 4 retired as generation (452 MW)
 - El Segundo Power Redevelopment (560 MW) – scheduled commercial operation is targeted for 6/1/2013
 - PPA with SCE does not start until 8/1/2013
 - El Segundo Unit 3 (335 MW) retired as generation
 - Sentinel Energy Project (850 MW) – scheduled commercial operation is targeted for 8/1/2013
5. Refinements to load curtailment safety nets
 - SDG&E received WECC Reliability Subcommittee RAS approval
 - adequacy of design
6. Continue to explore demand response that is feasible and applicable for mitigating local reliability
 - Work with SCE and SDG&E through the 2013-14 DR Application Process.

The Mid Term (2018) Study is contingency planning for future unplanned long-term outages:

- Addresses 2011 Integrated Energy Policy Report request from California Energy Commission
- Incorporates once-through cooling policy implications
- Focuses on actions reasonably implementable by 2018

The Long Term (2022) Study was undertaken as part of the utilities' relicensing assessments:

Diablo Canyon

Grid reliability implications for northern CA and ISO overall

- Key central transmission paths
- Western Interconnection critical outages (PDCI bipole outage, etc.)

San Onofre

Grid reliability implications for southern CA and ISO overall

- Key southern California transmission paths
- LA Basin
- San Diego
- Western Interconnection critical outages (PDCI bipole outage, etc.)

Focuses on longer term options implementable in 10 years.

Generating Units	Capacity (MW)	License Expiration Dates
Diablo Canyon Unit 1	1122	November 2, 2024
Diablo Canyon Unit 2	1118	August 20, 2025
San Onofre Unit 2	1122	February 16, 2022
San Onofre Unit 3	1124	November 15, 2022

Key load forecast and resource assumptions

- 2012 CEC mid case forecast
 - Latest CEC Commission-adopted mid case forecast (August 2012) was used for the studies
 - Local area studies use 1-in-10 year weather-related peak load
 - System wide studies use 1-in-5 year weather-related peak load
 - Energy efficiency including continued funding of utility programs as in CEC mid forecast (an increase of about 8,000 MW committed EE statewide from 2011 – 2022)
 - Behind the meter distributed generation as in the CEC mid forecast
- CPUC/CEC renewables portfolios
 - Include CPUC/CEC transmission connected resources and system -connected distributed generation
 - Commercial Interest portfolio (Base Case portfolio) and High D.G. portfolio (sensitivity to Base Case studies)
- Demand response is considered a supply resource
 - Continue to explore demand response that is feasible and applicable for mitigating local reliability

PG&E Bulk System Studies for the Diablo Canyon Power Plant Back-up

- Post-transient and transient stability analysis for the cases with and without Diablo Power Plant
- Peak and off-peak conditions
- All single and double 500 kV outages studied, large generation outages, three-phase faults with normal clearing, single-phase faults with normal clearing, single-phase-to-ground faults with delayed clearing
- 2012-2013 Transmission Plan Policy Driven Commercial Interest case used as a starting case
- DCPG generation was replaced by dispatching thermal generation and peakers in PG&E and hydro generation in Northwest



Thermal Overloads in PG&E Bulk System with and without Diablo Canyon Power Plant

Overloaded Facility	Contingency	Category	Category Description	Loading (%)					
				2018 Summer peak		2022 Summer peak		2022 Summer Off-peak	
				w/out Diablo	with Diablo	w/out Diablo	with Diablo	w/out Diablo	with Diablo
DELEVN - CORTINA 230.0	Olinda-Tracy 500 kV	B	L-1	98.1%		101.0%	99.0%		
	DLO 500 kV Round Mt-Table Mtn #1&2	C	L-2	99.7%		102.8%	103.7%		
	DLO 500 kV south of Table Mtn	C	L-2	99.5%		102.7%	100.7%		
	Table Mtn 500 kV stuck breaker	C	BRK			96.0%	95.6%		
	Tesla 500 kV stuck breaker	C	BRK			95.9%	96.4%		
ROUND MTN 500/230	Olinda 500/230 kV	B	T-1					112.3%	107.4%
OLINDA 500/230 kV	Round Mtn 500/230 kV	B	T-1					112.0%	104.9%
TABLE MTN 500/230	DLO 500 kV south of Table Mtn	C	L-2			98.8%			
RIO OSO - BRIGHTON 230	Table Mtn 500/230 no RAS	B	T-1					105.6%	102.7%
ATLANTC - GOLDHILL 230		B	T-1					100.6%	97.2%

Only facilities where absence of DCPP increases overloads or creates new overloads are shown

Transient and Voltage Stability, PG&E Bulk System

- Absence of Diablo Canyon Power Plant did not have impact on transient stability
- Some Category D contingencies (Midway 230 kV substation) may require to trip more load if DCPP is absent

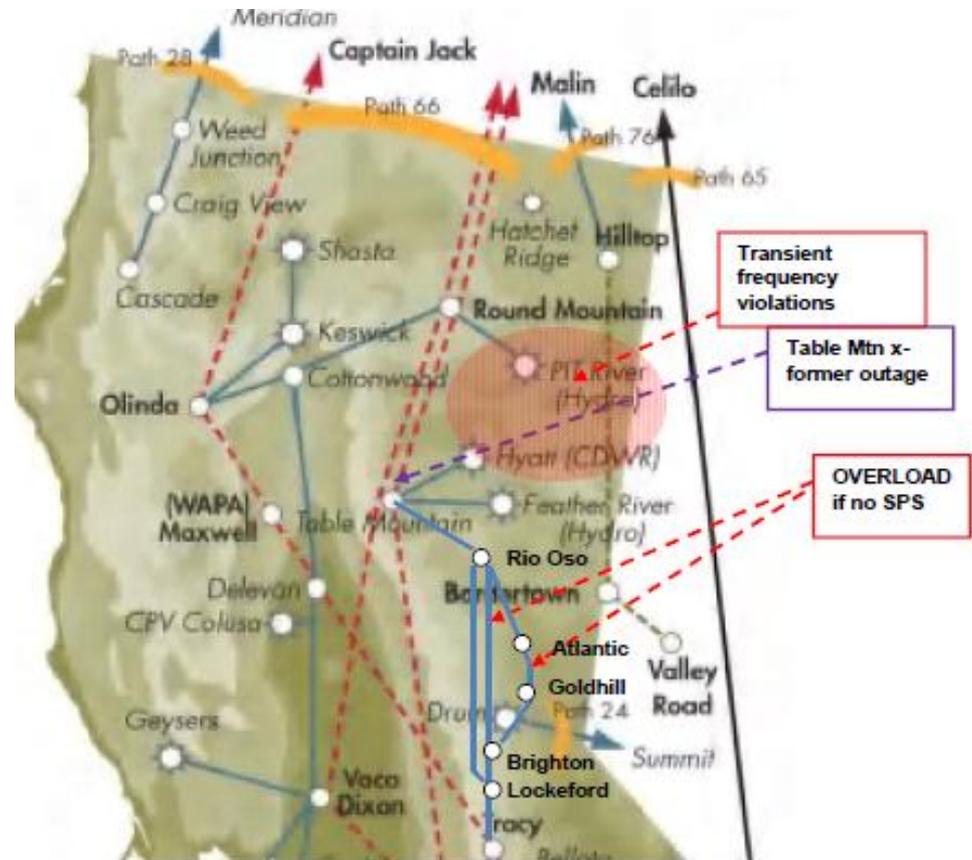
Table Mountain 500/230 kV Transformer Outage Off-Peak

Concerns

- Existing SPS trips Hyatt and Thermalito generation
- Overload if SPS not applied, slightly higher without DCPD due to higher generation in Northwest
- Large transient frequency dip with SPS both with and without DCPD

Mitigation

- Modify SPS - trip Colgate, Poe, Butte Vly, Honey Lake, Win&AMD gen instead of Hyatt and Thermalito



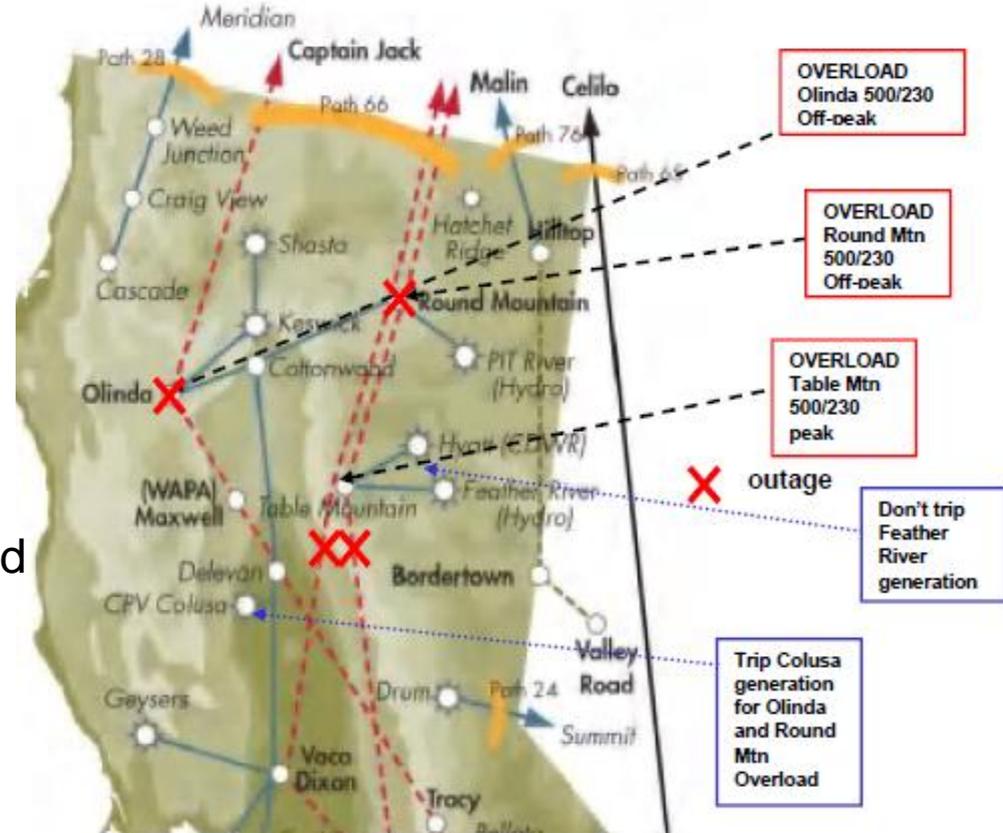
500/230 kV Transformer Overloads in North PG&E

Concerns

- Olinda and Round Mtn 500/230 kV off-peak overload with outages of parallel transformers
- Loading 7% higher without DCPD because of higher generation in Northwest
- Table Mtn 500/230 kV heavily loaded on peak with Cat C contingency – same with DCPD and higher COI

Mitigation

- Modify existing Colusa SPS to monitor transformer outages and to also trip Colusa units for Round Mtn transformer overload



- Modify South of Table Mtn 500kV DLO RAS not to trip Feather River

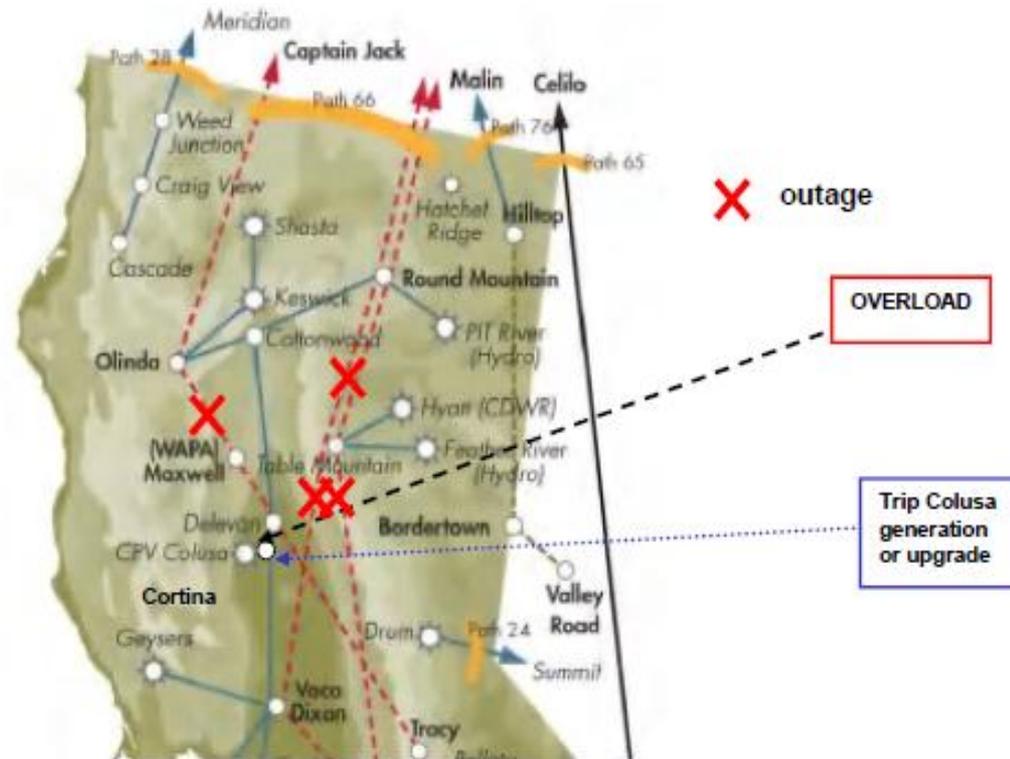
Delevan-Cortina 230 kV Line Overload, Peak Conditions

Concerns

- Overload with Olinda-Tracy outage, slightly higher without DCPP
- Category C overloads, slightly higher without DCPP for some outages

Mitigation

- Trip Colusa generation or upgrade the line
- Loading is higher without DCPP because of higher generation in Northwest



Study Conclusions for the Mid and Long Term Studies – Diablo Canyon Power Plant

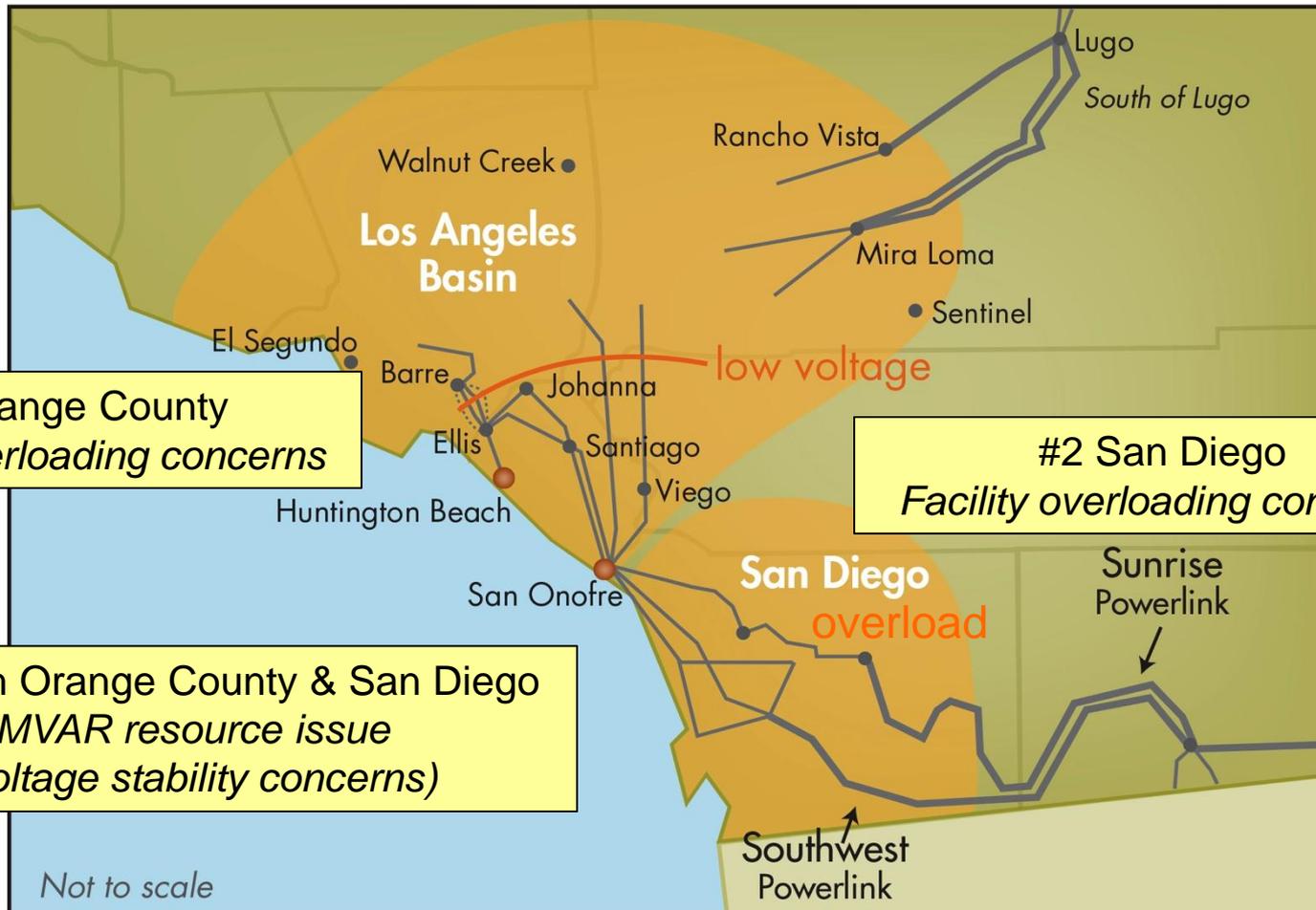
- No material mid or long term transmission system impacts associated with DCPD absence in the assumption that renewable generation projects develop according to the CPUC plan
- Absence of DCPD allowed to avoid several overloads on the PG&E bulk system during off-peak load conditions (Westley-Los Banos 230 kV, Gates-Midway 230 kV)
- Category D contingencies will require more load tripping if DCPD is absent
- Additional studies are required to determine if the system has sufficient reactive margin with higher load
- Additional sensitivity studies with lower level of renewable generation may be required to confirm these conclusions

Study Conclusions for the Mid and Long Term Studies – San Onofre Nuclear Generating Station

- Preliminary conclusions:
 - Loss of SONGS creates transmission impacts (thermal overloading, voltage instability) in LA Basin and San Diego LCR areas
- Possible mitigations for SONGS have been explored, and are presented on the following slides.

Recap of Mid and Long-Term Studies

Focus is on various alternatives to mitigate load shed risk for multiple-contingency events



Mid term mitigation alternatives for extended outage of SONGS:

Continue use synchronous condensers

Construct an 11-mile 230 kV line from Sycamore to Penasquitos

820 MW new or replaced

+

300 MW new generation

+

650 MVAR SVC support

• SONGS and San Luis Rey/Talega

965 MW new or replaced in northwest San Diego, and 1460 MVAR SVC support

- SONGS, Talega, Penasquitos, San Luis Rey, Mission

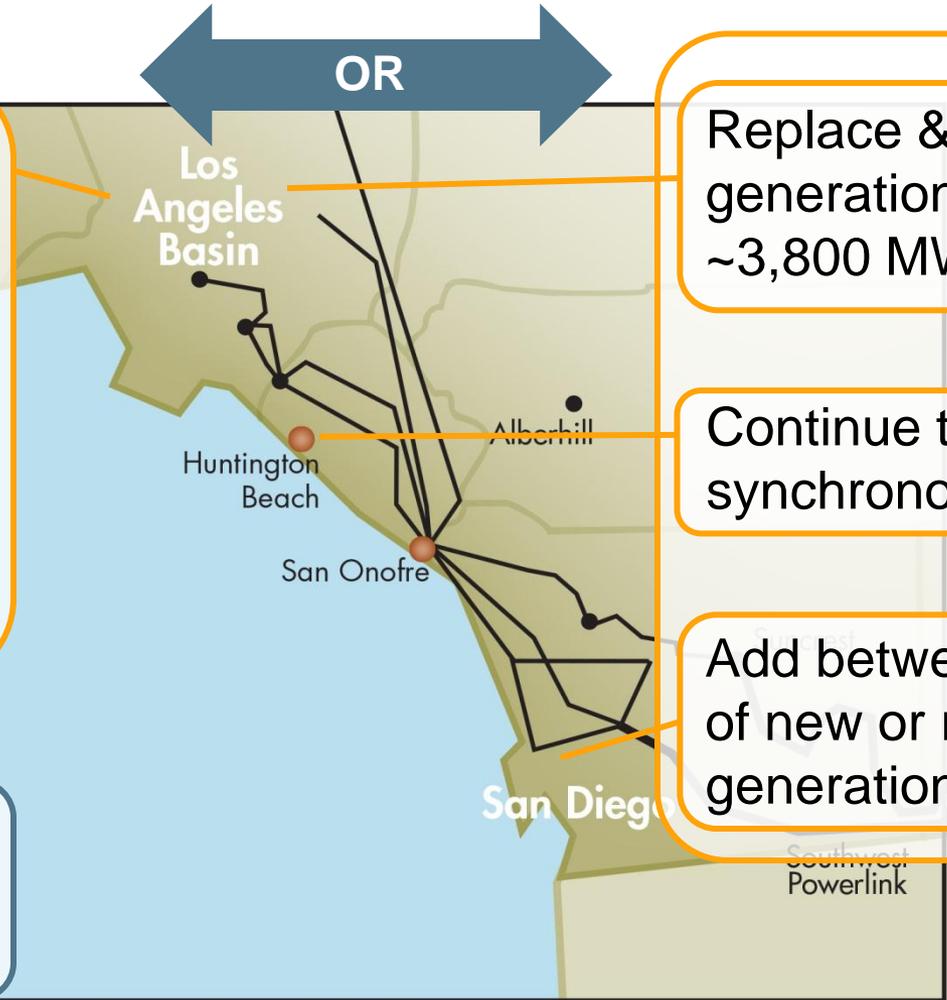
OR

Long term generation mitigation alternatives – no added transmission lines (in addition to mid term plan)

Replace & add new generation totaling ~4,300 - 4,600* MW

*May be reduced by adding another 550 MVAR SVC at San Onofre and shifting the locations of the new generation.

More detailed information is available in Table 3.5-10 of the Draft ISO Transmission Plan



Replace & add new generation totaling ~3,800 MW

+

Continue to rely on synchronous condensers.

+

Add between 765-920 MW of new or replaced generation

Long term transmission and generation alternative (in addition to mid term plan)

Replace
~3,000 MW
of existing
generation

Construct a 65-mile
500 kV line (70%
compensation)

Add up to 620 MW for a
total of 1600 MW

- Spread between northwest and southwest San Diego depending on location of mid term plan generation*

Add up to 850
MVAR to bring
new reactive
support up to at
least 1,500 MVAR

- LA Basin & San Diego

More detailed information is
available in Table 3.5-11 of the
Draft ISO Transmission Plan

***Approximately 700 MW of generation in San Diego can be displaced by additional reactive support, transformer upgrades and 66 kV transmission upgrades in the LA Basin and upgrading line series capacitors and additional transformer upgrades.**

Sensitivity analyses with CPUC High D.G. portfolio for 2022 summer peak load conditions (LA Basin and San Diego areas)

- The sensitivity analyses were performed to compare with the long-term generation alternative to determine the impact of D.G. in reducing incremental thermal generation requirements in LA Basin

	Commercial Interest			High D.G.		
Area	Production Capacity (MW)	Installed Capacity (MW)	Generation Replacement or New Generation Need (MW)	Production Capacity (MW)	Installed Capacity (MW)	Generation Replacement or New Generation Need (MW)
LA Basin	243	486	4,600	769*	1,538	4,112
San Diego Sub-LCR	202*	404	920	245*	490	920

- Observations
 - For an increase of 569 MW of D.G. production (or an increase of 1,138 MW of installed D.G. capacity) for both areas, it results in a reduction of 488 MW of generation replacement (or new) in the LA Basin

Uncertainty drives preliminary least-regrets conclusions:

- Significant uncertainty is inherent in the studies and conclusions:
 - Future of SONGS
 - Status of converting Huntington Beach Units 3 and 4 to synchronous condensers
 - Status of pending and future SCE and SDG&E procurement
 - Status of meeting flexible generation requirements
 - Further levels of energy efficiency that can be counted as committed in the future
 - Successful deployment of improved and responsive demand response
- ISO Management's preliminary conclusions reflect least-regret considerations for the Mid-Term needs:
 - The Sycamore – Penasquitos 230kV line provides mitigation for the absence of SONGS, as well as mitigation of policy driven needs as identified in the Draft ISO 2012/2013 Transmission Plan; and
 - A total of approximately 650 MVAR of dynamic reactive support in both LA Basin and San Diego areas in a wide range of conditions, and
 - An SVC at SONGS in particular can also provide a backup plan in the near term if the Huntington Beach synchronous condensers do not materialize

Next Steps

- Huntington Beach synchronous condensers
 - Continue to press forward for Huntington Beach Synchronous Condensers
 - Consider seeking approval for SONGS Static VAR Compensator (400 to 500 MVAR) at March Board of Governors Meeting pending the status of Huntington Beach synchronous condensers
- Transmission improvements (Capacitors and Barre-Ellis Reconfiguration)
 - Continue to monitor progress
- Talega (or San Luis Rey) synchronous condensers (+240/-120 MVAR)
 - The ISO will continue to follow further policy discussions supporting the need for immediate action to prepare for long-term outages of SONSG and give additional considerations to approve this upgrade.
- Sycamore – Penasquitos 230kV line
 - Given long lead time for this line and other potential benefits this may provide, the ISO is giving additional consideration to this mitigation option for potential approval in this year's plan.

Next Steps (cont'd)

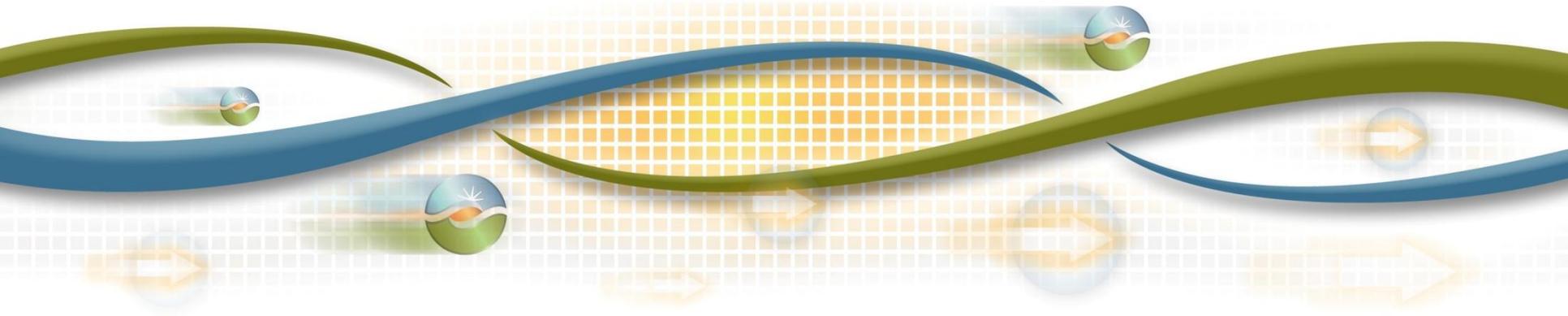
- In 2013/2014 transmission planning cycle:
 - Continue analysis and support regarding demand side management
 - Consider the need for additional mitigation in the event of further changes in generation and transmission input assumptions (i.e., changes in RPS portfolio assumptions, or certain approved transmission projects not materialized as planned)
 - Resource requirements, such as planning reserve criteria and flexible resource needs, require further study



Reliability Projects Recommended for Approval *SDG&E Area*

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Sushant Barave
Senior Regional Transmission Engineer
February 11, 2013

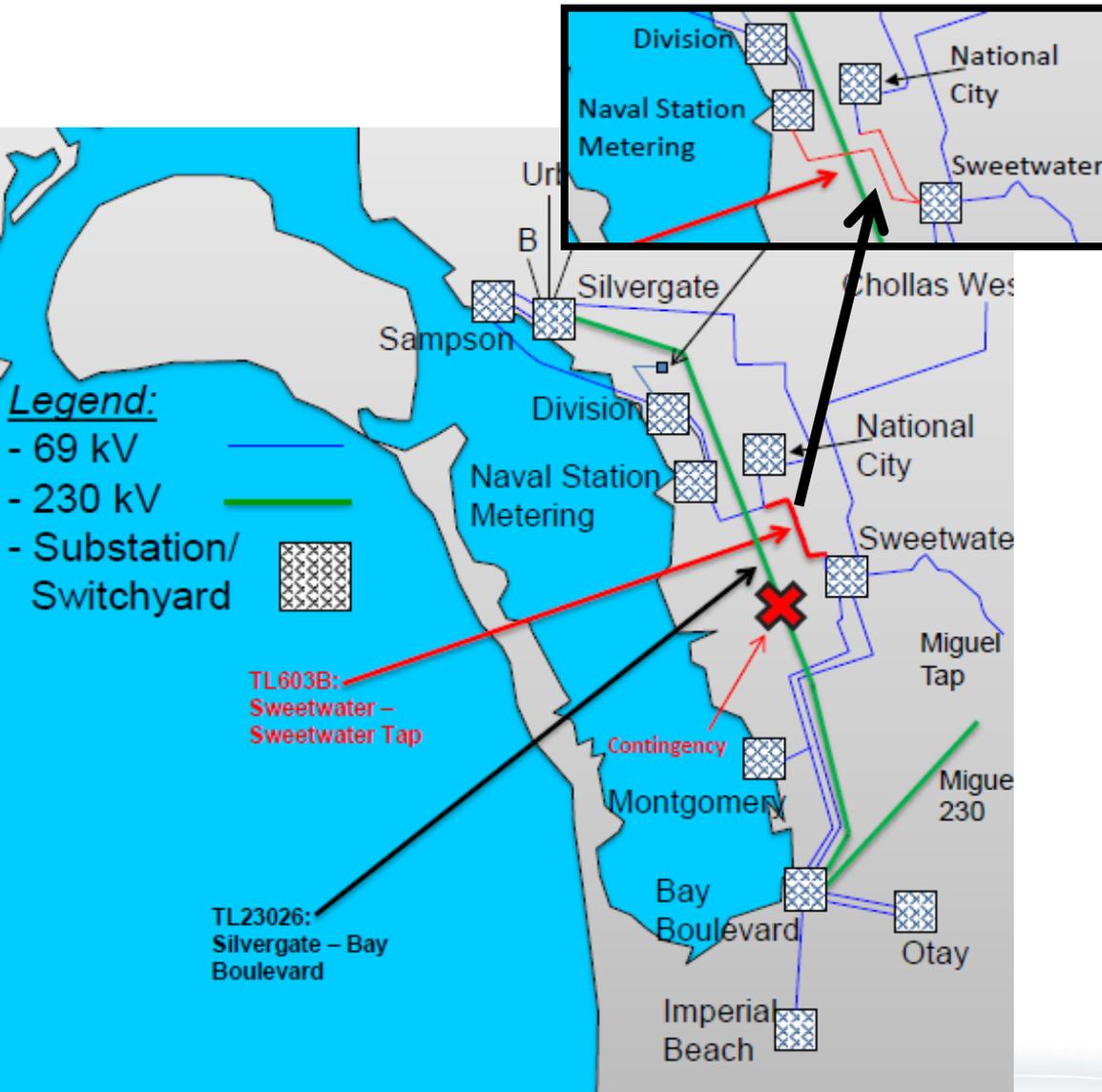


ISO Recommendations - Projects Determined as Needed in the San Diego Area

Project Name	Cost of Project
Sweetwater Reliability Enhancement	\$11M - \$14M
TL13820, Sycamore – Chicarita Reconductor	\$0.5 - \$1M
TL674A Loop-in and Removal of TL666D	\$12M - \$15M

3 Projects Recommended for Approval (under \$50 Million)

Sweetwater Reliability Enhancement



Needs: NERC Category B overloads (2017 G-1/N-1 overload in CAISO studies)

Project Scope: Remove Sweetwater Tap from service. Create 2 lines – Sweetwater – Naval Station Metering (180 MVA) and Sweetwater – National City (102 MVA)

Cost: \$11 - \$14 million

Other Considered Alternatives:

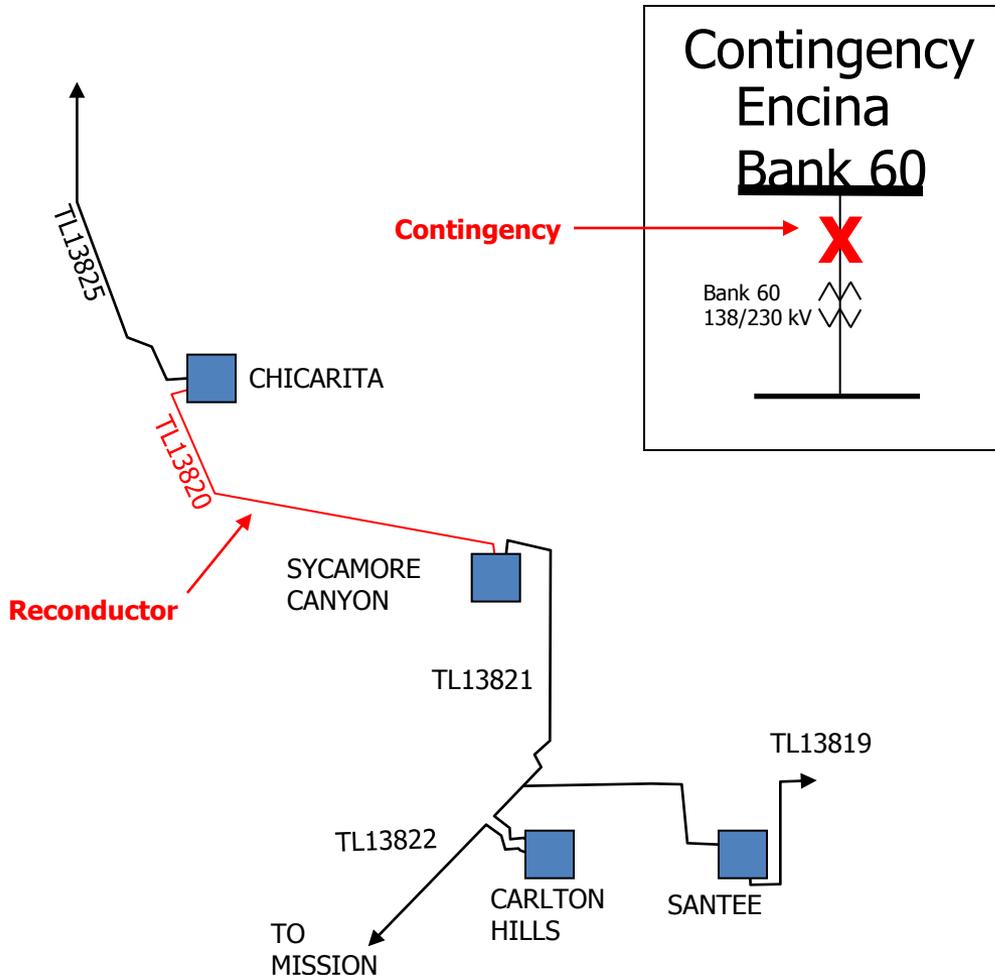
- Reconductor Sweetwater – Sweetwater Tap 69kV section (\$10 - \$12 million)

Expected In-Service: 2017

Interim Plan: NA

ISO Determination: This project has been determined to be needed.

TL13820, Sycamore – Chicarita Reconductor



Needs: NERC Category B overload (2019)

Project Scope: The overhead conductor will be replaced by 900 ACSS as part of an existing project TL6961. The remaining limiting elements to be replaced are underground getaways, relays, jumpers and terminal equipment. The new rating will be 274 MVA.

Cost: \$0.5 - \$1 million

Other Considered Alternatives:

- Add a second Encina Bank (\$30 - \$40 million)
- No generation mitigation available beyond 2017
- Carlsbad Energy Center

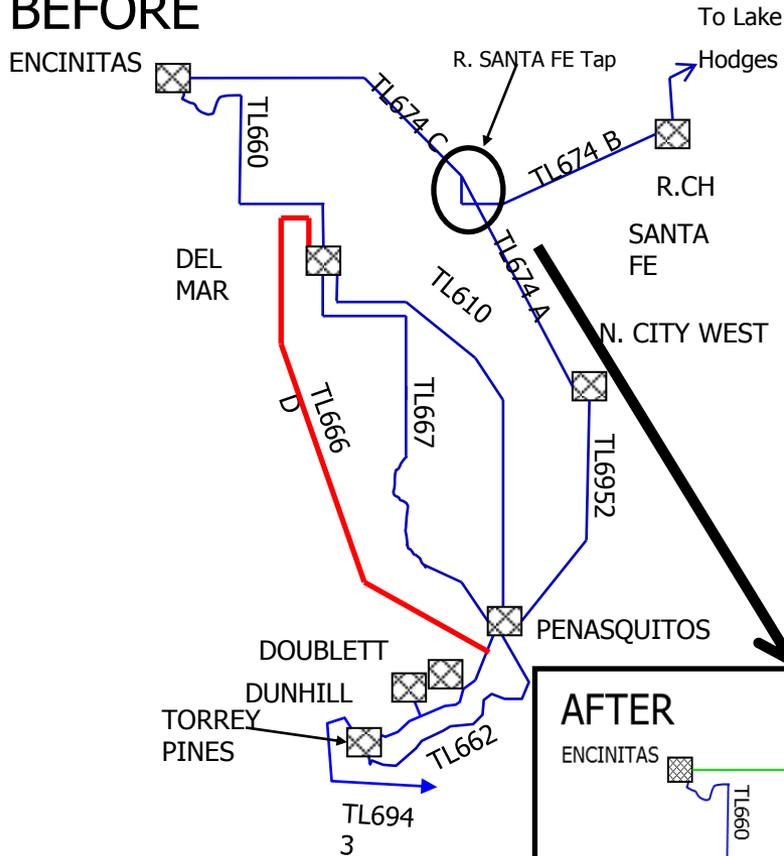
Expected In-Service: 2014

Interim Plan: NA

ISO Determination: This project has been determined to be needed.

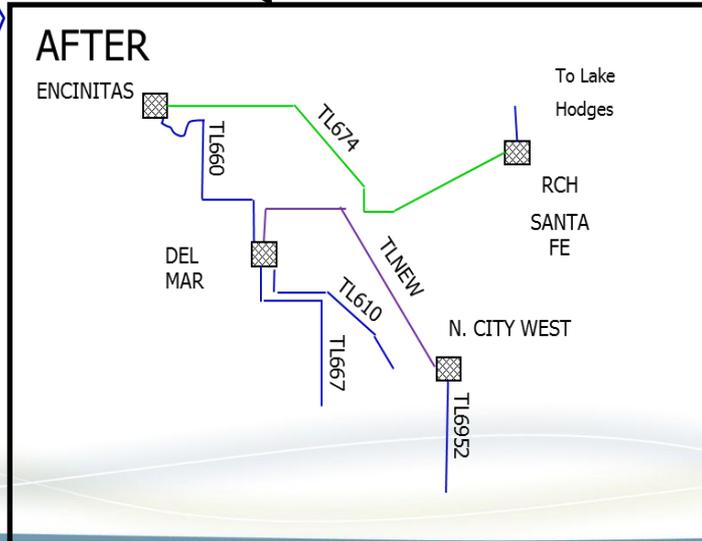
TL674A Loop-in and Removal of TL666D

BEFORE



— RFS TL666D
— 69 kV Line

AFTER



Needs: Challenges in outage restoration and maintenance of aging infrastructure due to environmental concerns. Category B and C voltage deviation issues after the removal of TL666D.

Project Scope: Remove from service TL666D. Loop-in TL664A into Del Mar.

Cost: \$12 to \$15 million

Other Considered Alternatives:

- Relocate and underground TL666D (\$25 - \$30 million)

Expected In-Service: 2015

Interim Plan: NA

ISO Determination: This project has been determined to be needed.

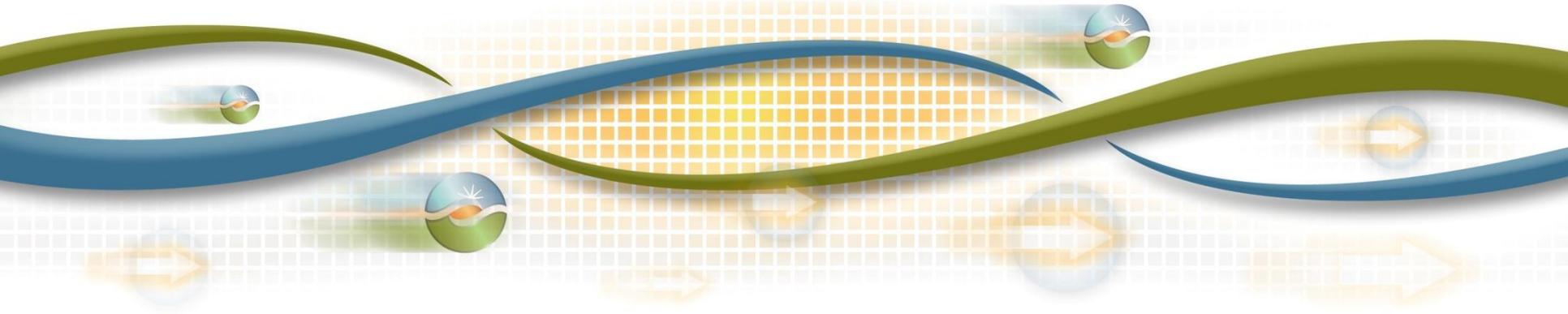


Reliability Projects Recommended for Approval

PG&E Central Valley Area

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Binaya Shrestha
Senior Regional Transmission Engineer
February 11, 2013

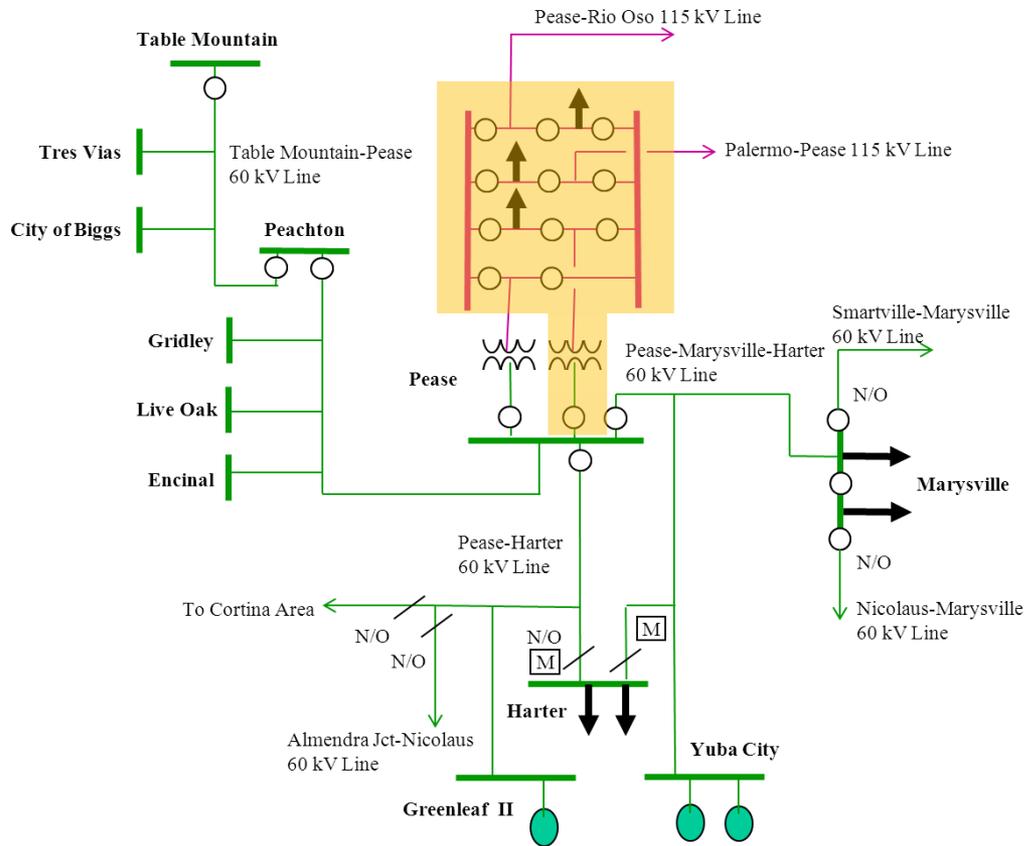


ISO Recommendations - Projects Determined as Needed in the Central Valley Area

Project Name	Cost of Project
Pease 115/60 kV Transformer Addition and 115 kV Bus Upgrade	\$25M - \$35M
Ripon 115 kV New Line	\$10M - \$15M
Salado 115/60 kV Transformer Addition	\$15M - \$20M
Atlantic-Placer 115 kV Line	\$55M - \$85M
Lockeford-Lodi Area 230 kV Development	\$80M - \$105M

3 Projects Recommended for Approval (under \$50 Million)

Pease 115/60 kV Transformer Addition and 115 kV Bus Upgrade



Need: NERC Category B overloads (2019) & Category C low voltage and overloads (2014)

Project Scope:

- Add a new 115/60 kV transformer rated at 200 MVA at Pease Substation
- Reconfiguring the Pease 115 kV Bus to BAAH
- Replacing any limiting equipment on the existing Pease 115/60 kV Transformer in order to achieve the transformer's normal and emergency ratings
- Install a UVLS to drop load at Harter Substation when detecting low voltages there. This should be completed earlier as an interim solution until the new Pease 115/60 kV Transformer is installed.

Cost: \$25M - \$35M

Other Considered Alternatives:

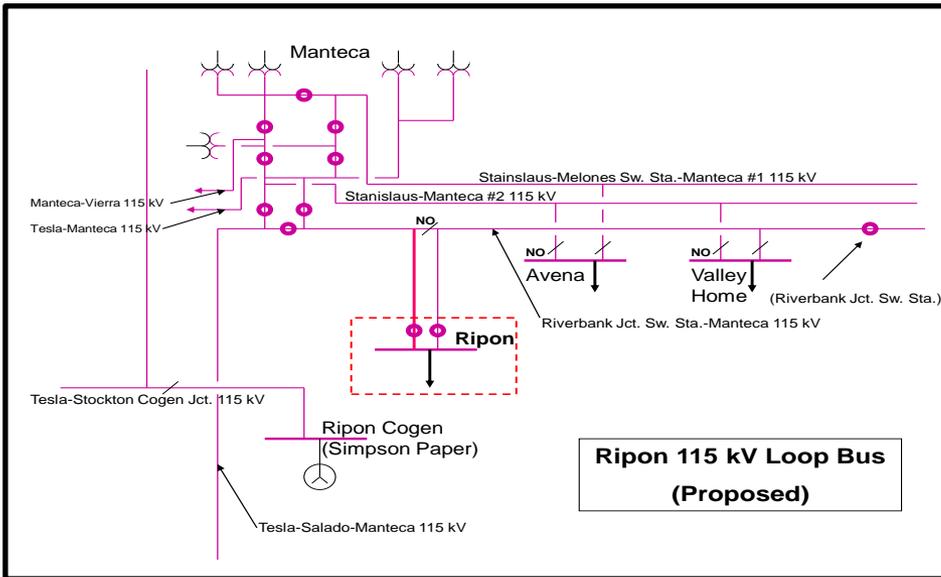
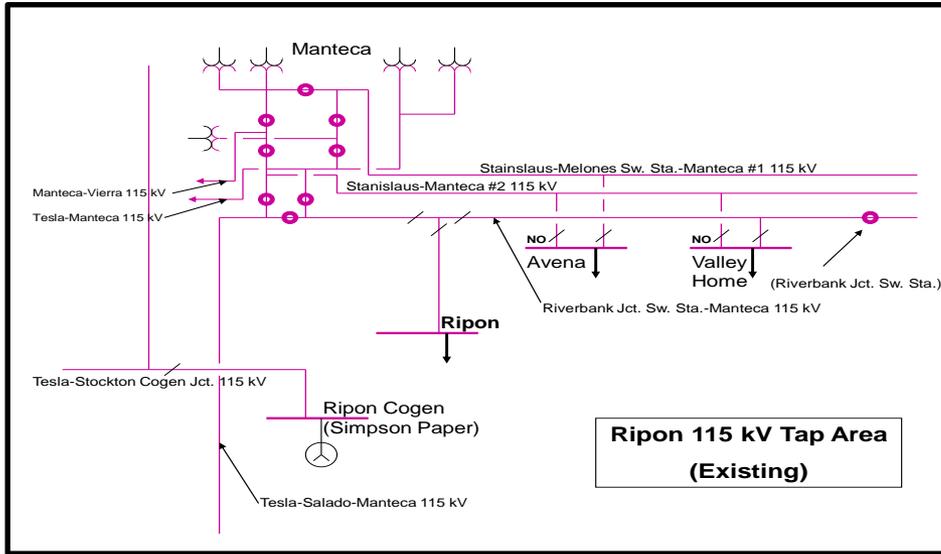
- *Plumas-Marysville Connection. Doesn't address voltage issue. (\$20M-\$35M)*
- *Reconductor Colgate 60 kV System. (\$40M-\$70M)*

Expected In-Service: May 2016 or earlier

Interim Plan: Radialize system

ISO Determination: This project has been determined to be needed.

Ripon 115 kV New Line



Need: ISO Planning Standards - Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0).

- BCR 3.66.

Project Scope:

- Construct a second 115 kV tap line (5 miles long) from Riverbank Junction Switching Station - Manteca 115 kV Line to Ripon Substation. This new tap line will be sized to handle at least 440 Amps and 514 Amps under normal and emergency conditions, respectively.
- Install two line circuit breakers to loop Ripon Substation.

Cost: \$10M - \$15M

Other Considered Alternatives:

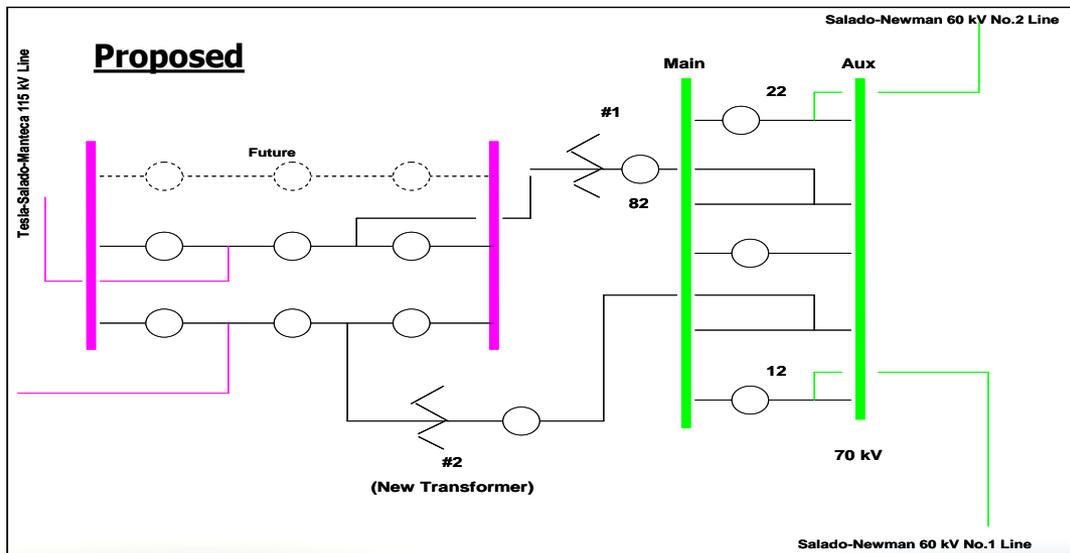
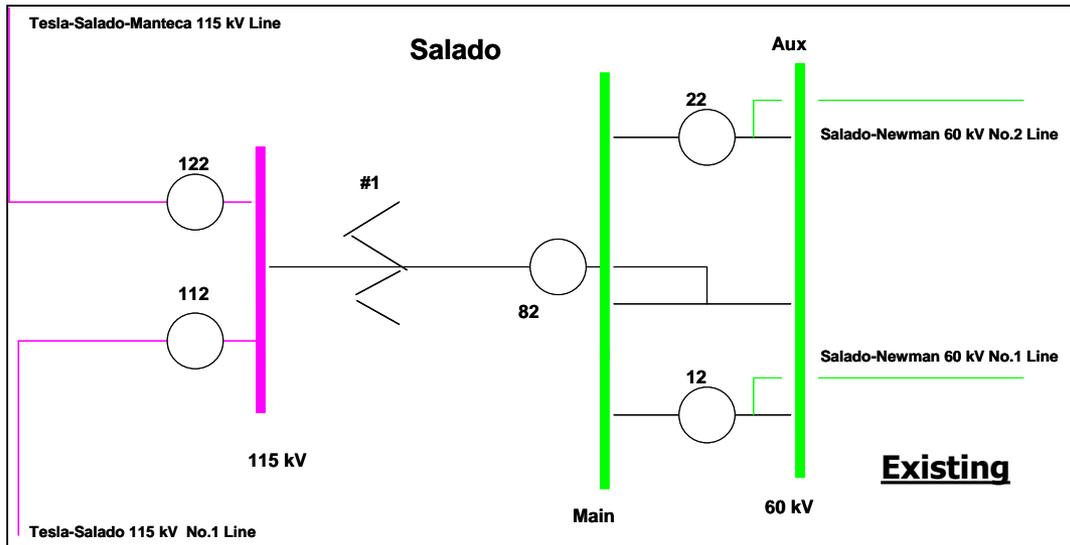
- *New 115 kV Tap Line from Tesla-Salado-Manteca 115 kV Line (\$12M-\$17M)*

Expected In-Service: May 2015

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Salado 115/60 kV Transformer Addition



Need: ISO Planning Standards - Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0).

- BCR 1.12.

Project Scope:

- Install a new 115/60 kV transformer.
- Upgrade the existing 115 kV loop bus to a two-bay BAAH bus at Salado Substation and install a MPAC building at Salado Substation.

Cost: \$15M - \$20M

Other Considered Alternatives:

- Close tie to Manteca 60 kV system (\$30M-\$45M)

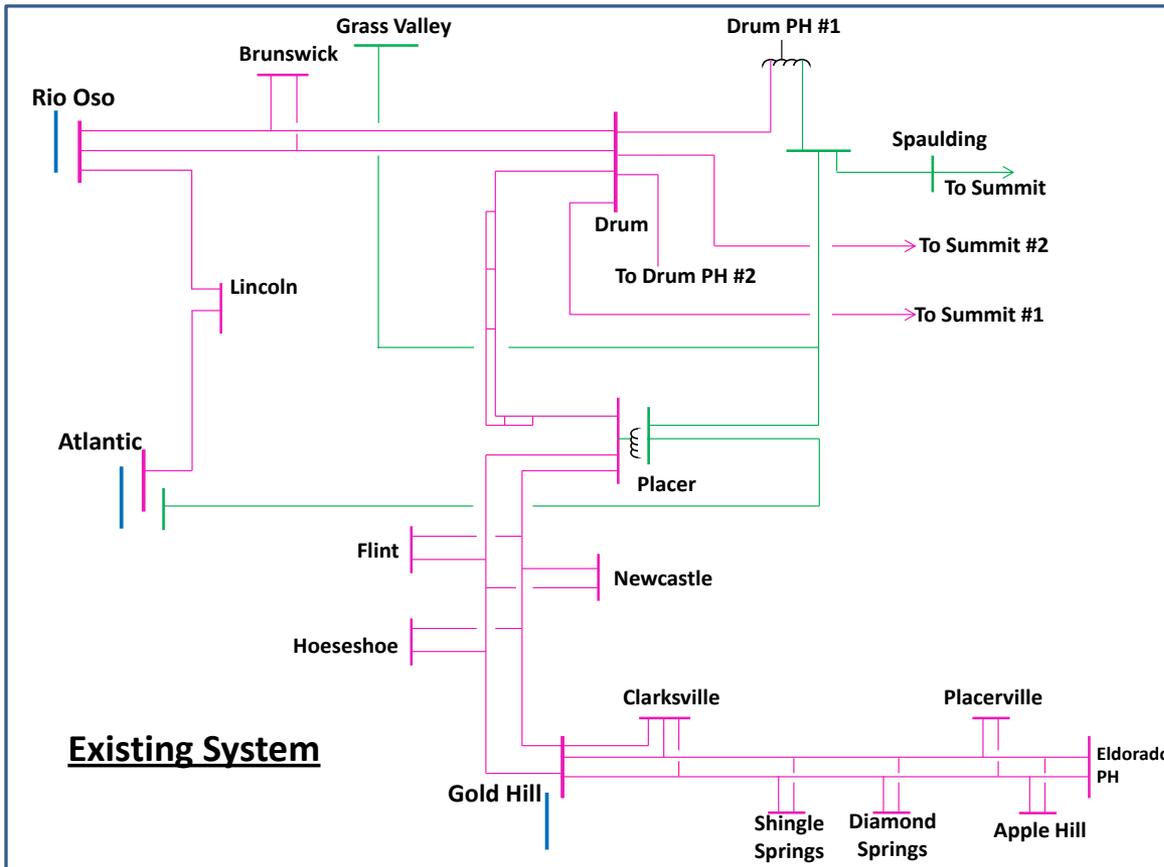
Expected In-Service: December 2014

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

2 Projects Recommended for Approval (over \$50M)

Atlantic-Placer 115 kV Line



Need: NERC Category A overload (2022) & Category B voltage deviation, Category C low voltage (voltage collapse) and overloads (2014)

Project Scope:

- New Atlantic-Placer 115 kV line (~14 miles)
- Add second Placer 115/60 kV Transformer
- SPS to drop load following two Gold Hill 230/115 kV transformers outage.

Cost: \$55M - \$85M

Other Considered Alternatives:

- *Atlantic-Placer Voltage Conversion Project (\$90M-\$100M)*
- *New Lincoln-Placer 115 kV Line, Second Placer 115/60 kV Transformer and SPS for loss of two Gold Hill 230/115 kV transformers (\$65M-\$90M).*
- *Placer 115/60 kV transformer replacement and SPS. (\$15M-\$20M). Doesn't address all reliability concerns.*

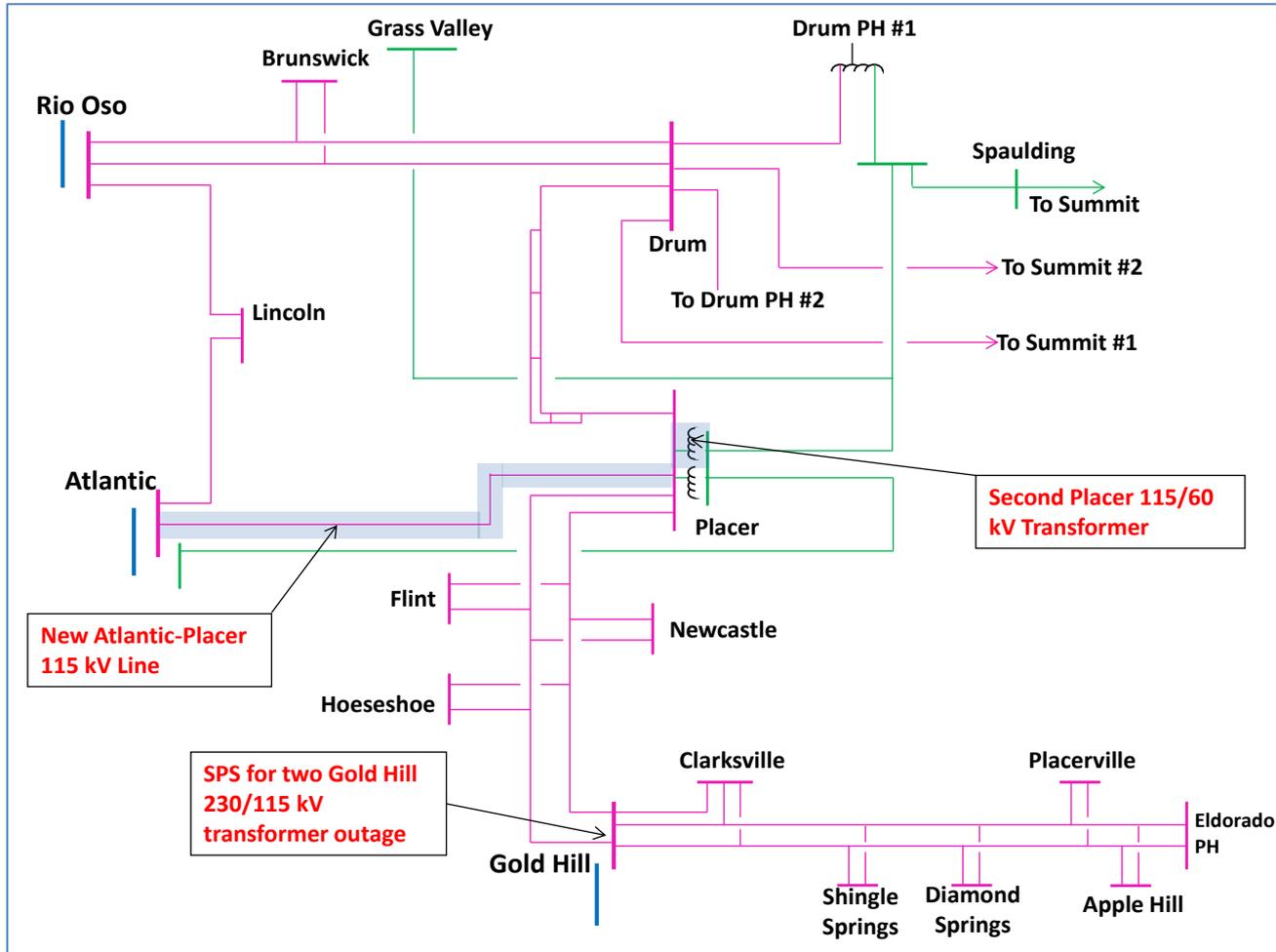
Expected In-Service: May 2016

Interim Plan: Operating action plan.

ISO Determination: This project has been determined to be needed.

Atlantic-Placer 115 kV Line (cont'd)

Proposed

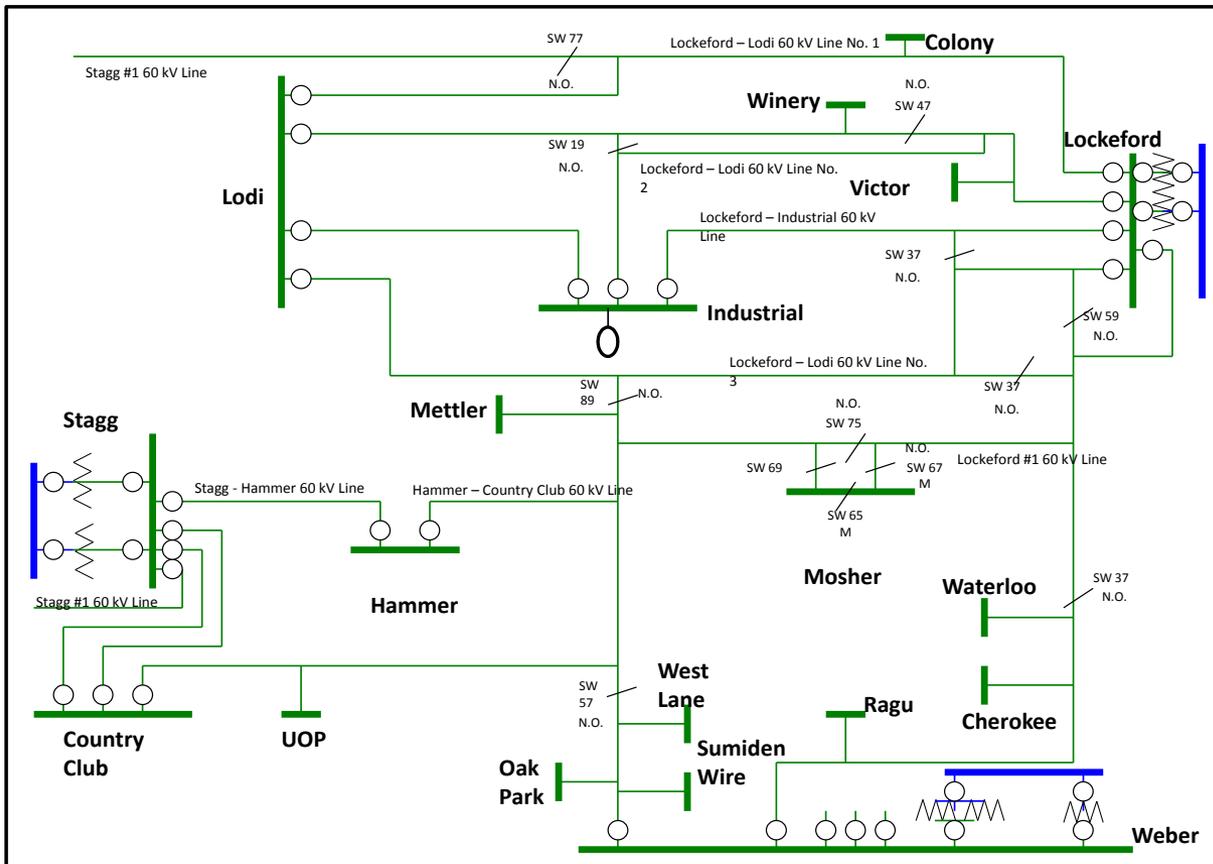


Project Scope:

- New Atlantic-Placer 115 kV line (~14 miles)
- Add second Placer 115/60 kV Transformer
- SPS to drop load following two Gold Hill 230/115 kV transformers outage.

Lockeford-Lodi Area 230 kV Development

Existing System



Need: NERC Category B & C overloads (2014), Category B voltage deviations (2014) & Category C low voltages (2014)

Project Scope:

- 230 kV DCTL from Eight Miles substation to Lockeford substation.
- New 230 kV bus at Industrial substation and loop-in one of the new Eight Miles-Lockeford 230 kV line.

Cost: \$80M - \$105M

Other Considered Alternatives:

- *Lockeford-Mettler-Industrial 230 kV Loop (\$105M-\$140M). Relies on SPS.*
- *Lockeford-Moshier-Mettler 115 kV Loop (\$115M-\$165M).*
- *Category B Fixes & SPS. (\$25M-\$35M). Complicated SPS and violates SPS Guideline .*

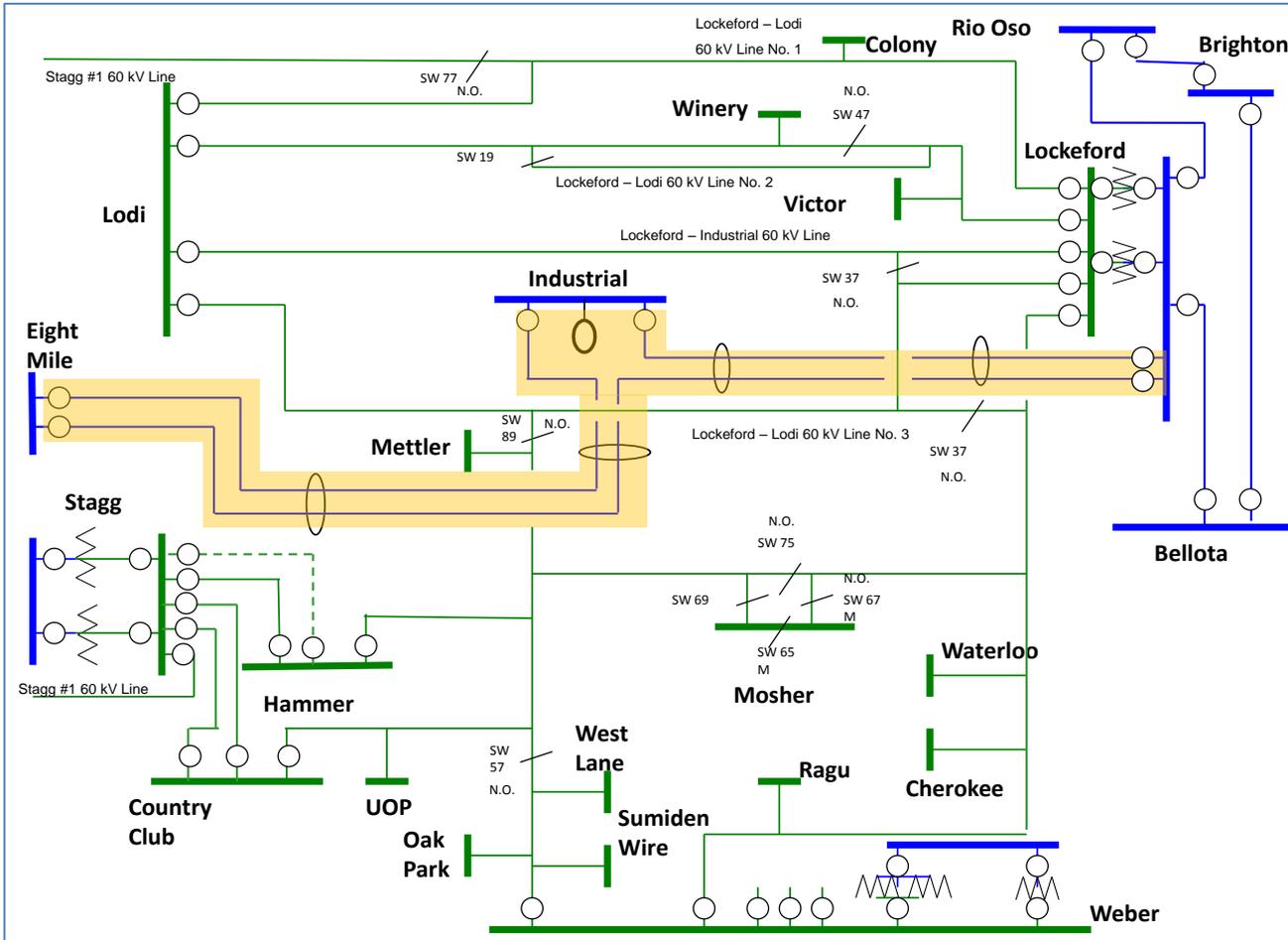
Expected In-Service: 2015

Interim Plan: Operating action plan.

ISO Determination: This project has been determined to be needed.

Lockeford-Lodi Area 230 kV Development (cont'd)

Proposed



Project Scope:

- 230 kV DCTL from Eight Miles substation to Lockeford substation.
- New 230 kV bus at Industrial substation and loop-in one of the new Eight Miles-Lockeford 230 kV line.

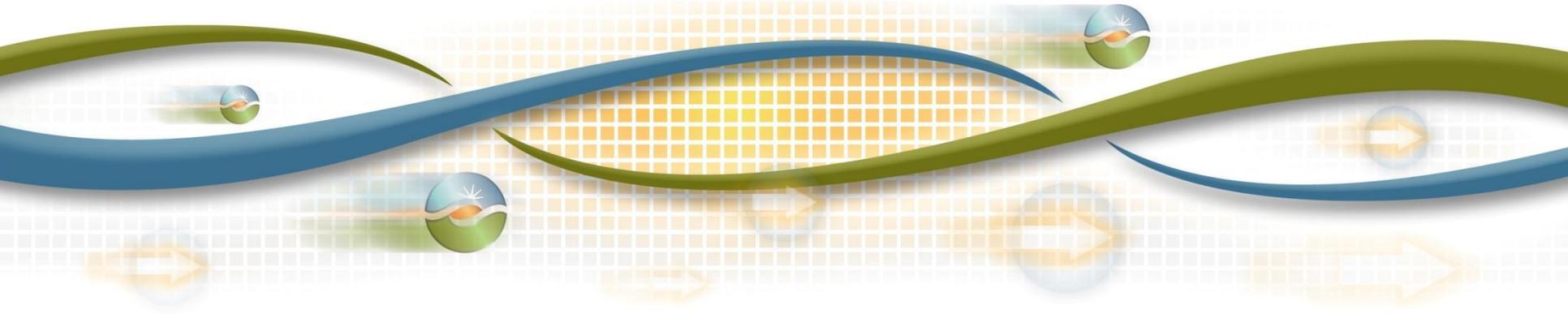


Reliability Projects Recommended for Approval

PG&E Greater Bay Area

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Bryan Fong
Senior Regional Transmission Engineer
February 11, 2013

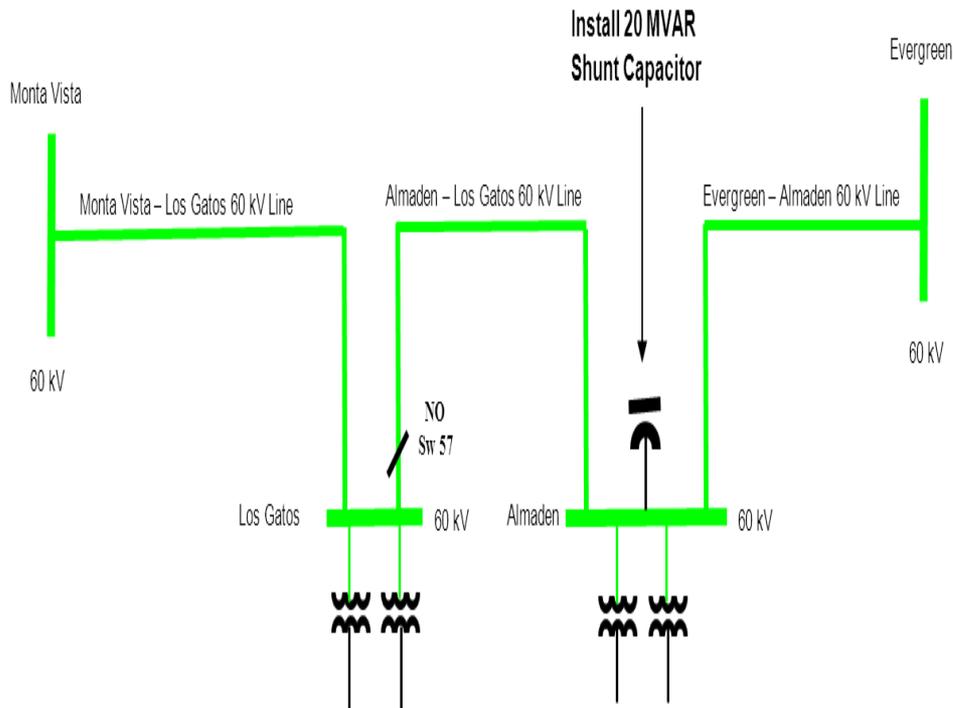


ISO Recommendations - Projects Determined as Needed in the Greater Bay Area

Project Name	Cost of Project
Almaden 60 kV Shunt Capacitor	\$5M - \$10M
Christie 115/60 kV Transformer No. 2	\$12M - \$17M
Contra Costa Sub 230 kV Switch Replacement	Less than \$1M
Lockheed No. 1 115 kV Tap Reconductor	\$2M - \$3M
Los Esteros-Montague 115 kV Substation Equipment Upgrade	\$0.5M - \$1M
Monta Vista 230 kV Bus Upgrade	\$10M - \$15M
Monta Vista-Wolfe 115 kV Substation Equipment Upgrade	\$0.5M - \$1M
Newark-Applied Materials 115 kV Substation Equipment Upgrade	\$0.5M - \$1M
NRS - Scott No. 1 115 kV Line Reconductor	\$2M - \$4M
Potrero 115 kV Bus Upgrade	\$10M - \$15M
Stone 115 kV Back-tie Reconductor	\$3M - \$6M
Trans Bay Cable Dead Bus Energization Project	\$20M - \$30M

12 Projects Recommended for Approval (under \$50 Million)

Almaden 60 kV Shunt Capacitor



Need: ISO Planning Standards Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0)

- BCR = 2.99

Project Scope: To install a 20 MVAR Mechanically Switched Shunt Capacitor with automatic voltage regulator at Almaden 60 kV Substation

Cost: \$5M - \$10M

Other Considered Alternatives:

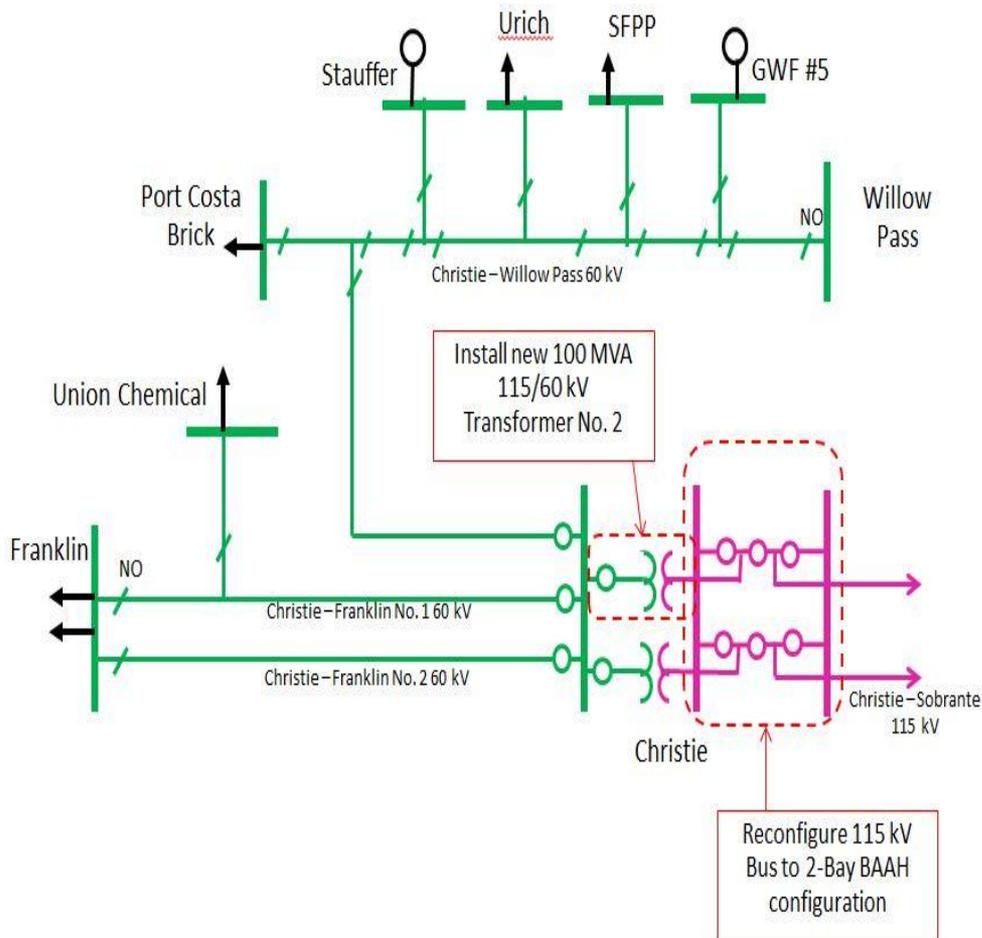
Status Quo
Installing SVC at Almaden

Expected In-Service: 2015

Interim Plan: Disable flop-flop

ISO Determination: This project has been determined to be needed.

Christie 115/60 kV Transformer No. 2



Need: ISO Planning Standards Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0)

- BCR = 2.99

Project Scope: Install a new 115/60 kV three-phase, 100 MVA Transformer No. 2 at Christie Substation. Reconfigure the 115 kV bus to a 2-bay breaker and a half configuration. Install a new control building to house all 115/60 kV protection and controls.

Cost: \$12M - \$17M

Other Considered Alternatives:

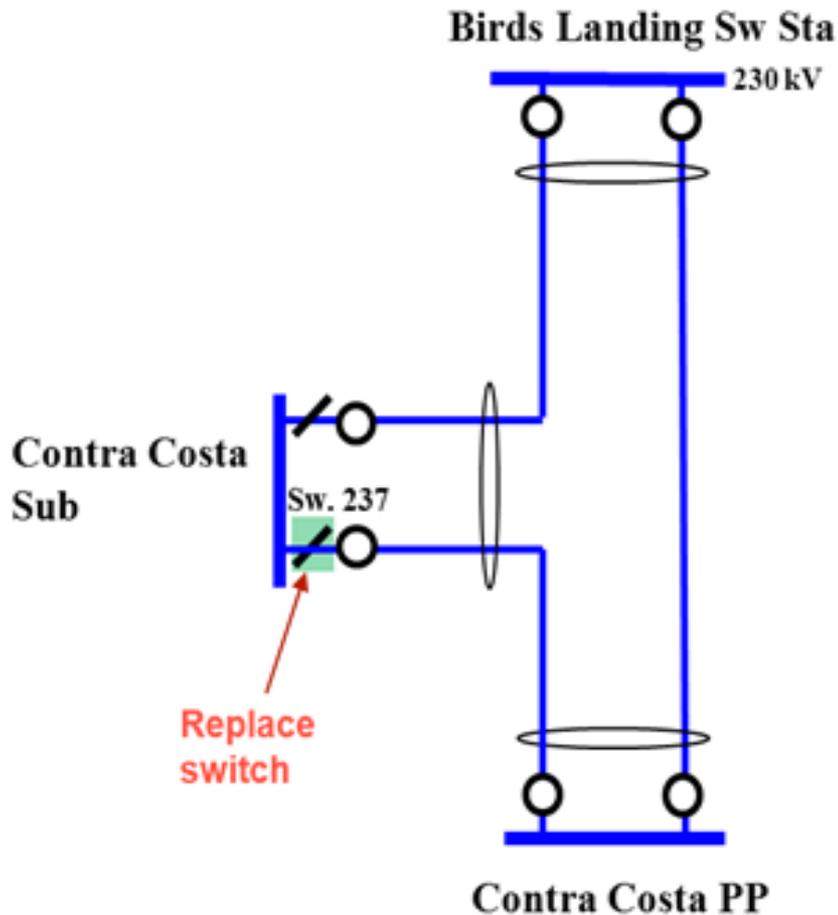
- Status Quo
- Network the 60 kV system

Expected In-Service: 2014

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Contra Costa Sub 230 kV Switch Replacement



Need: NERC Category B (L-1/G-1) overloads (2014)

Project Scope: To replace Contra Costa Sub 230 kV Switch No. 237 and any other associated limiting equipment. This project will increase the Contra Costa PP-Contra Costa Sub 230 kV Line summer emergency rating to 1893A (from 1600A).

Cost: Less than \$1M

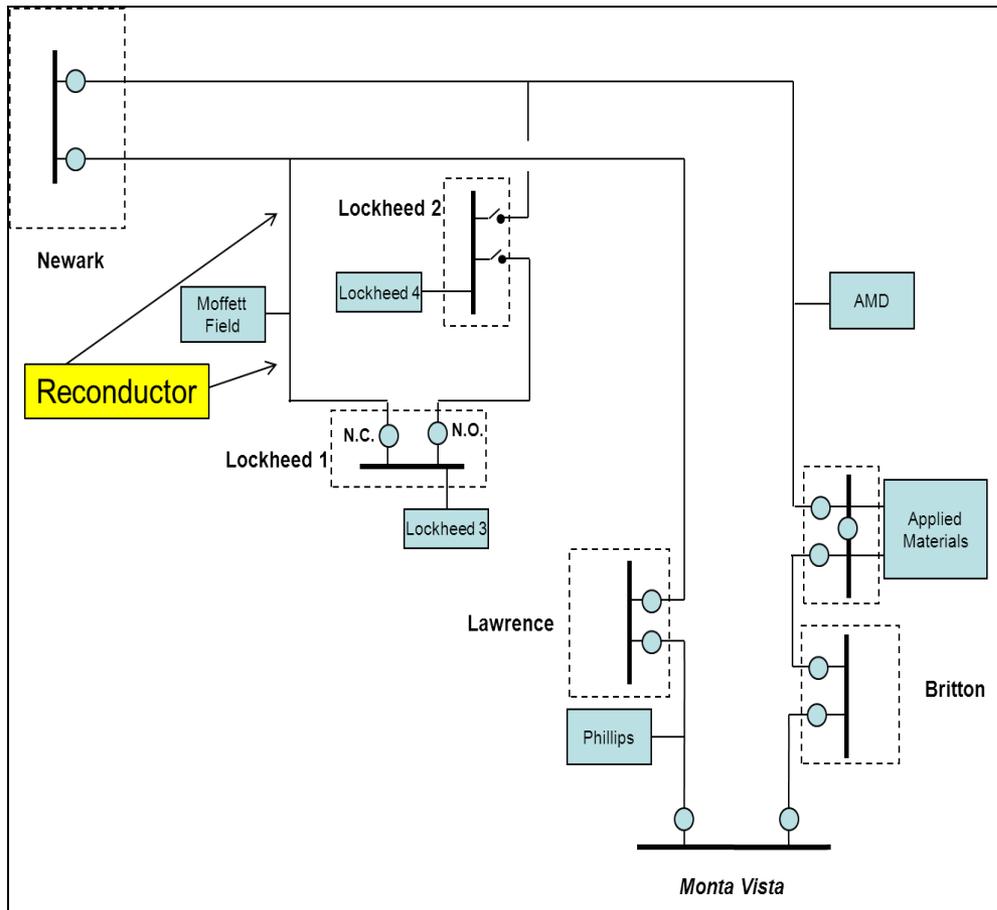
Other Considered Alternatives:
Status Quo

Expected In-Service: 2015

Interim Plan: Reduce Marsh Landing Generation

ISO Determination: This project has been determined to be needed

Lockheed No. 1 115 kV Tap Reconductor



Need: ISO Planning Standards Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0)

- BCR = 1.79

Project Scope: To reconductor the 1.7 mile long Lockheed No. 1 115 kV Tap with a conductor which has a summer emergency rating of at least 700 amps.

Cost: \$2M - \$3M

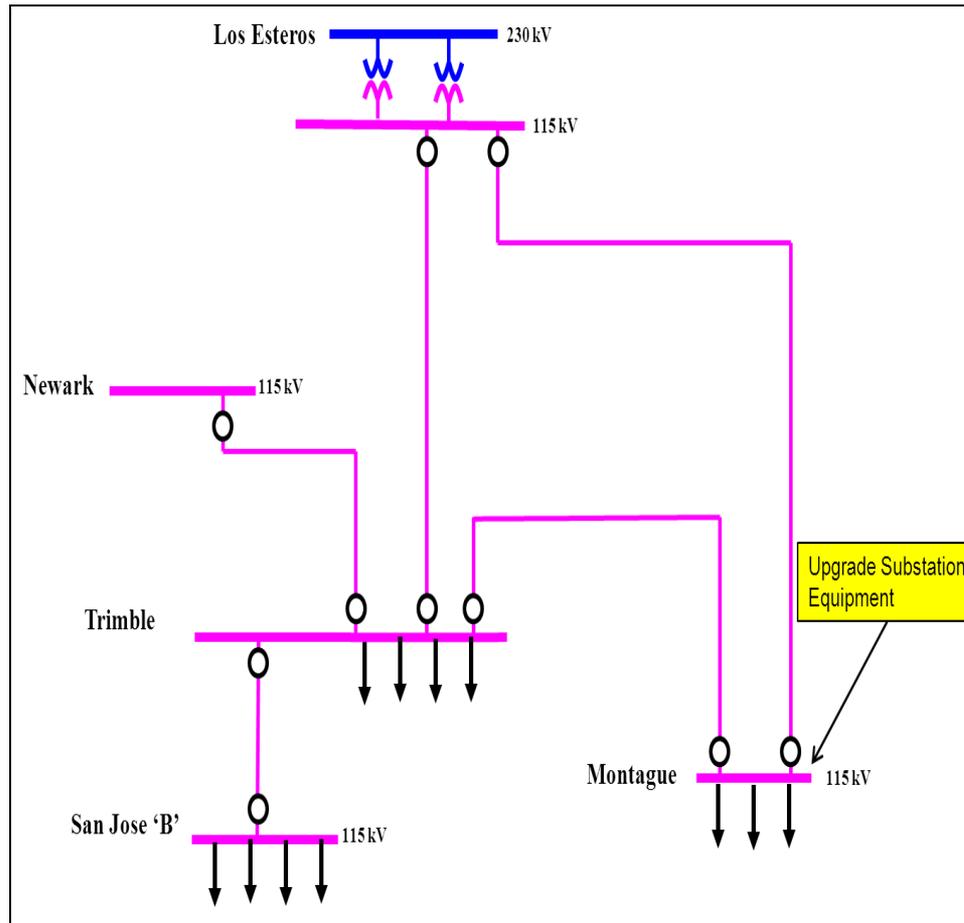
Other Considered Alternatives:
Status Quo

Expected In-Service: 2016

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Los Esteros-Montague 115 kV Substation Equipment Upgrade



Need: NERC Category B overloads (2016)

Project Scope: To upgrade limiting substation equipment at Montague Substation to fully utilize the Los Esteros-Montague 115 kV Line.

Cost: \$0.5M - \$1M

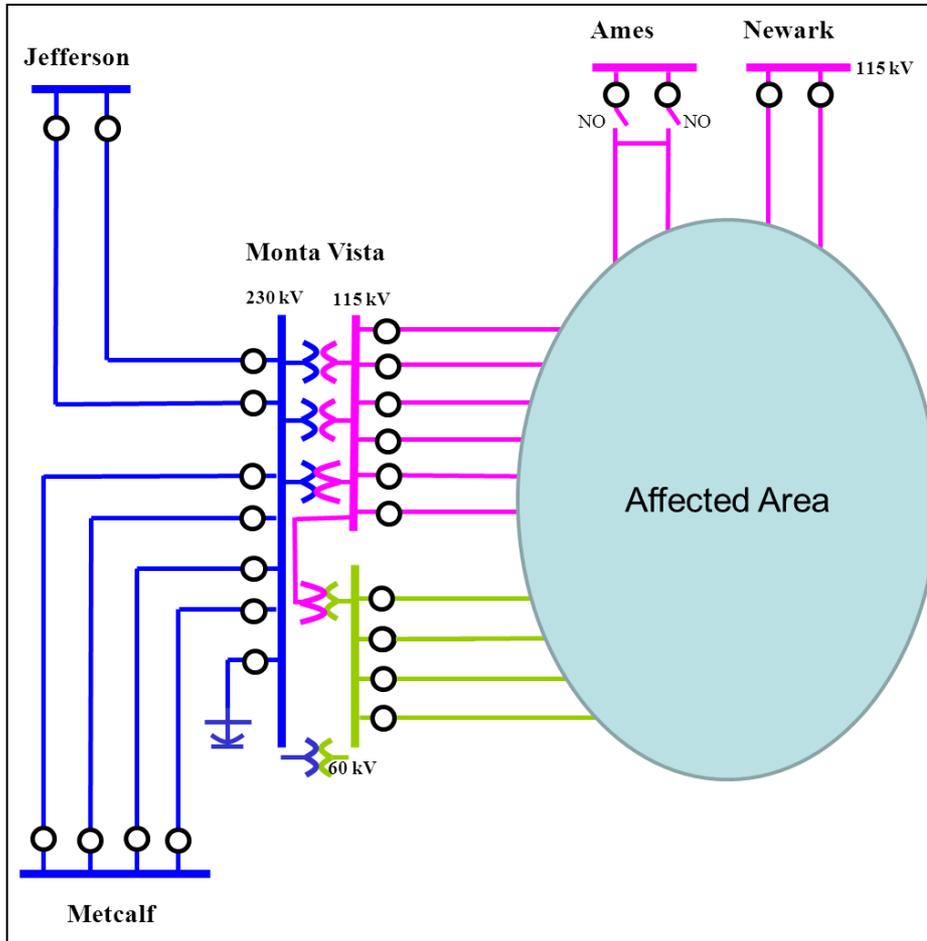
Other Considered Alternatives:
Status Quo

Expected In-Service: 2016

Interim Plan: N/A

ISO Determination: This project has been determined to be needed

Monta Vista 230 kV Bus Upgrade



Need: NERC Category C Low Voltage (2017) - a stuck breaker outage in Monta Vista 230 kV substation will cause low voltage and thermal overloads throughout the De Anza Division. The substation upgrade project consists of installing 2 bus tie breakers and 1 bus sectionalizing breaker, it will mitigate the voltage drop by maintaining 2 out of 4 Metcalf-Monta Vista 230 kV Lines being in service at the onset of the Category C contingency.

Project Scope: To upgrade the Monta Vista 230 kV bus by installing bus sectionalizing breakers.

Cost: \$10M - \$15M

Other Considered Alternatives:

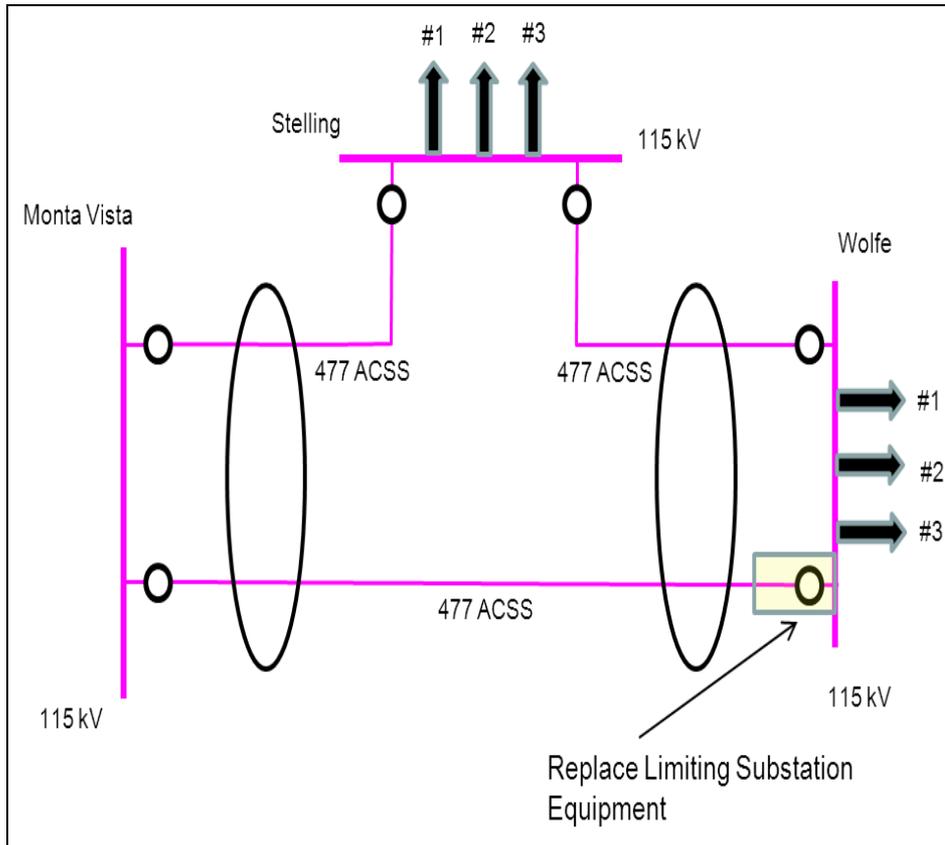
- Status Quo
- Special Protection Scheme (SPS)

Expected In-Service: 2016

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Monta Vista-Wolfe 115 kV Substation Equipment Upgrade



Need: NERC Category B overloads (2015)

Project Scope: To upgrade limiting substation equipment at Wolfe Substation to fully utilize the Monta Vista-Wolfe 115 kV Lines installed conductor capacity.

Cost: \$0.5M - \$1M

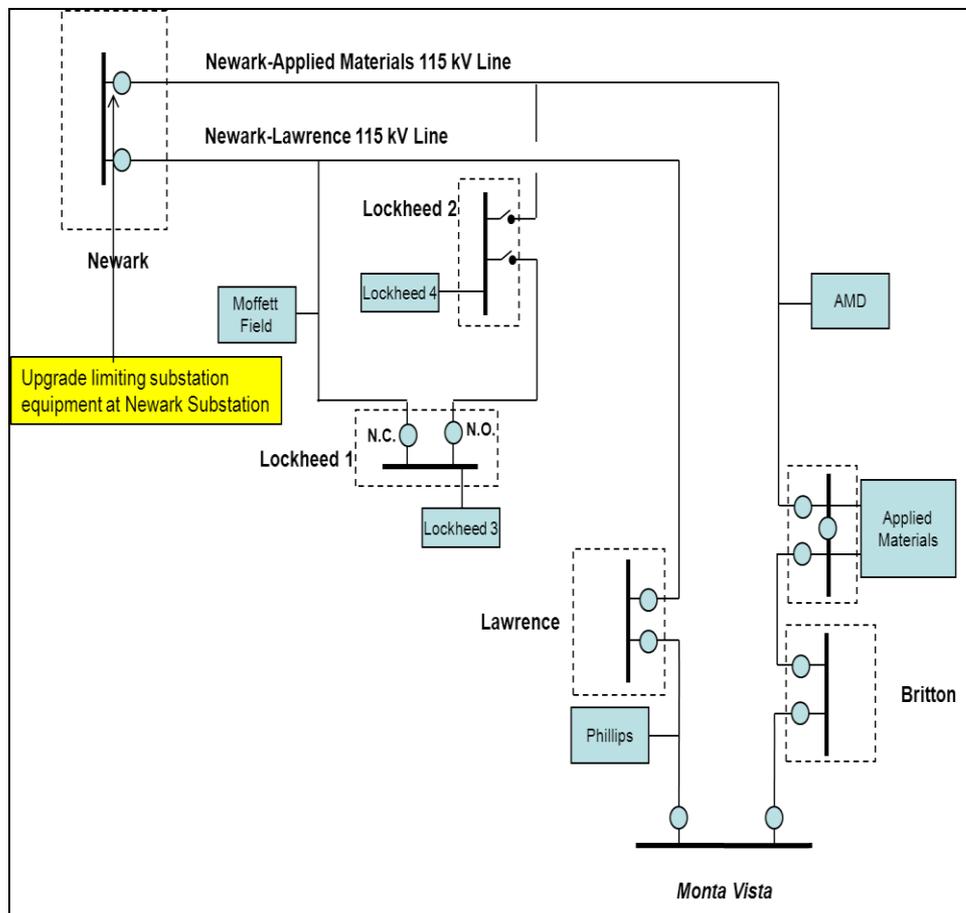
Other Considered Alternatives:
Status Quo

Expected In-Service: 2015

Interim Plan: N/A

ISO Determination: This project has been determined to be needed

Newark-Applied Materials 115 kV Substation Upgrade



Need: NERC Category B overloads (2016)

Project Scope: To upgrade limiting substation equipment at Newark Substation to fully utilize the installed conductor capacity installed on the Newark-Applied Materials 115 kV Line.

Cost: \$0.5M - \$1M

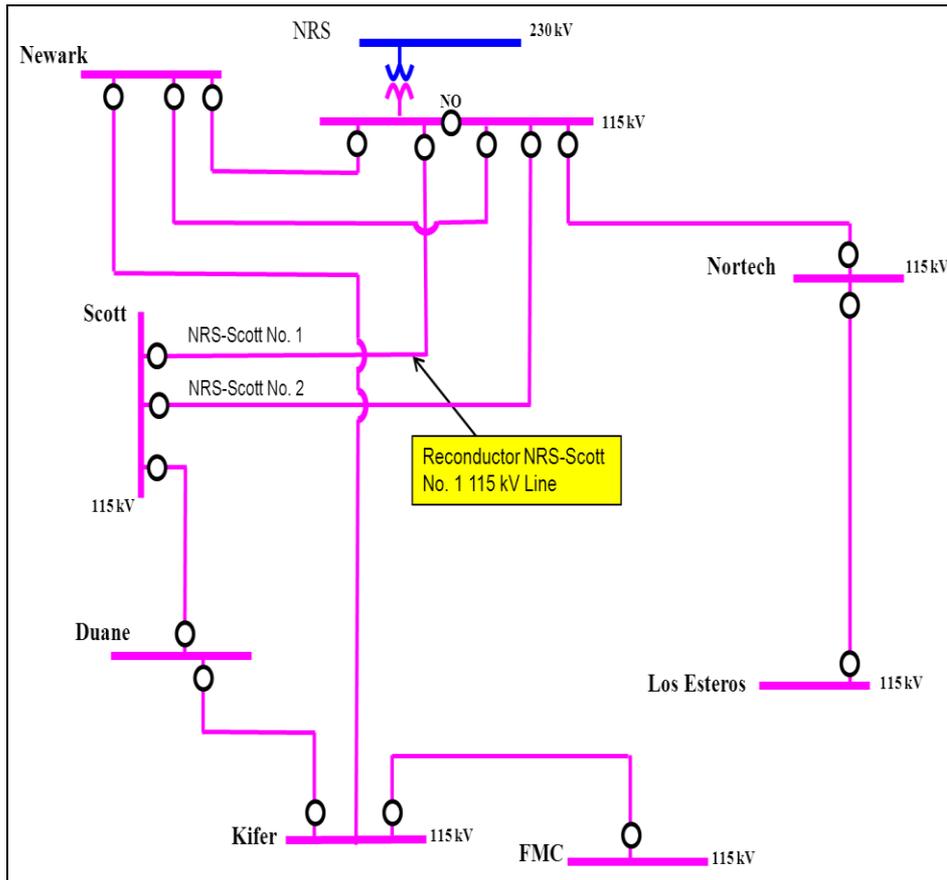
Other Considered Alternatives:
Status Quo

Expected In-Service: 2016

Interim Plan: N/A

ISO Determination: This project has been determined to be needed

NRS - Scott No. 1 115 kV Line Reconductor



Need: NERC Category B (L-1/G-1) overloads (2016)

Project Scope: To reconductor the NRS-Scott No.1 115 kV Line with conductor which has a summer emergency rating of at least 1500 amps.

Cost: \$2M - \$4M

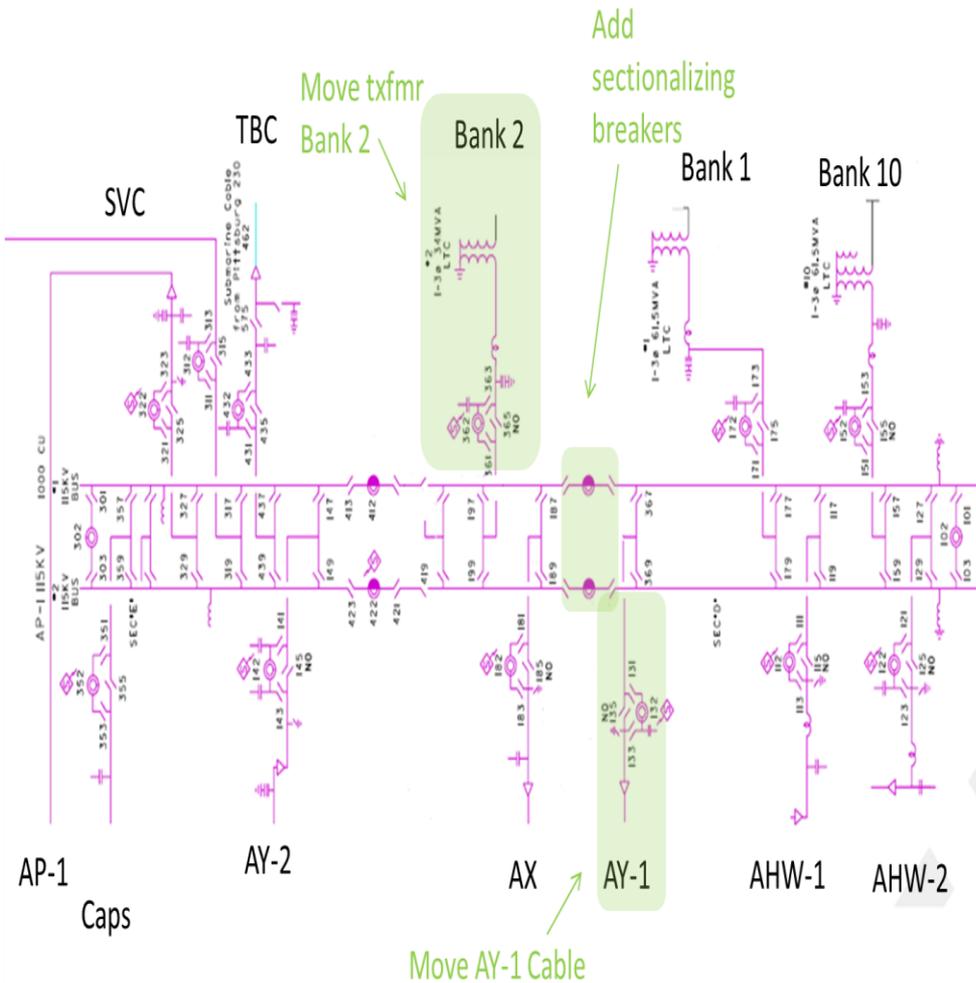
Other Considered Alternatives:
Status Quo

Expected In-Service: 2016

Interim Plan: N/A

ISO Determination: This project has been determined to be needed

Potrero 115 kV Bus Upgrade



Need: NERC Category C2 (breaker) overloads (2014)

Project Scope: To upgrade the Potrero 115 kV bus by removing the tie-lines to the retired Potrero Power Plant, moving the location of two elements, and adding two sectionalizing breakers

Cost: \$10M - \$15M

Other Considered Alternatives:

Status Quo

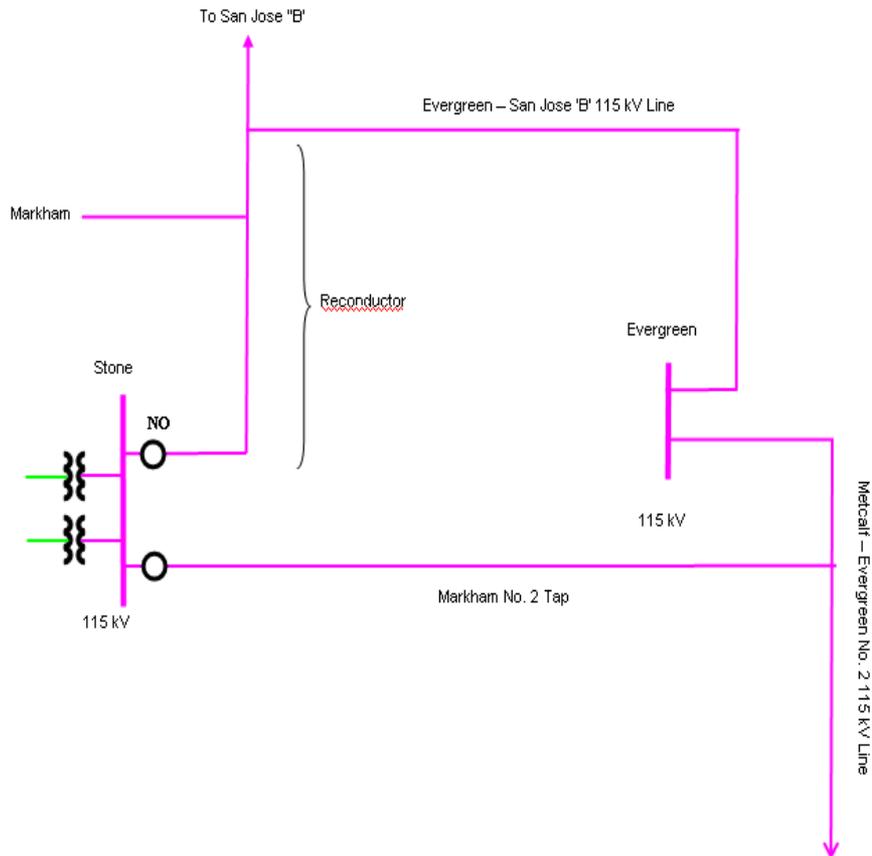
Breaker-and-a-Half (BAAH) bus conversion

Expected In-Service: 2017

Interim Plan: Action Plan

ISO Determination: This project has been determined to be needed

Stone 115 kV Back-tie Reconductor



Need: ISO Planning Standards Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0)

- BCR = 3.39

Project Scope: To reconductor the Markham No.1 Tap of the San Jose 'B' – Stone – Evergreen 115 kV Line

Cost: \$3M - \$6M

Other Considered Alternatives:

Status Quo

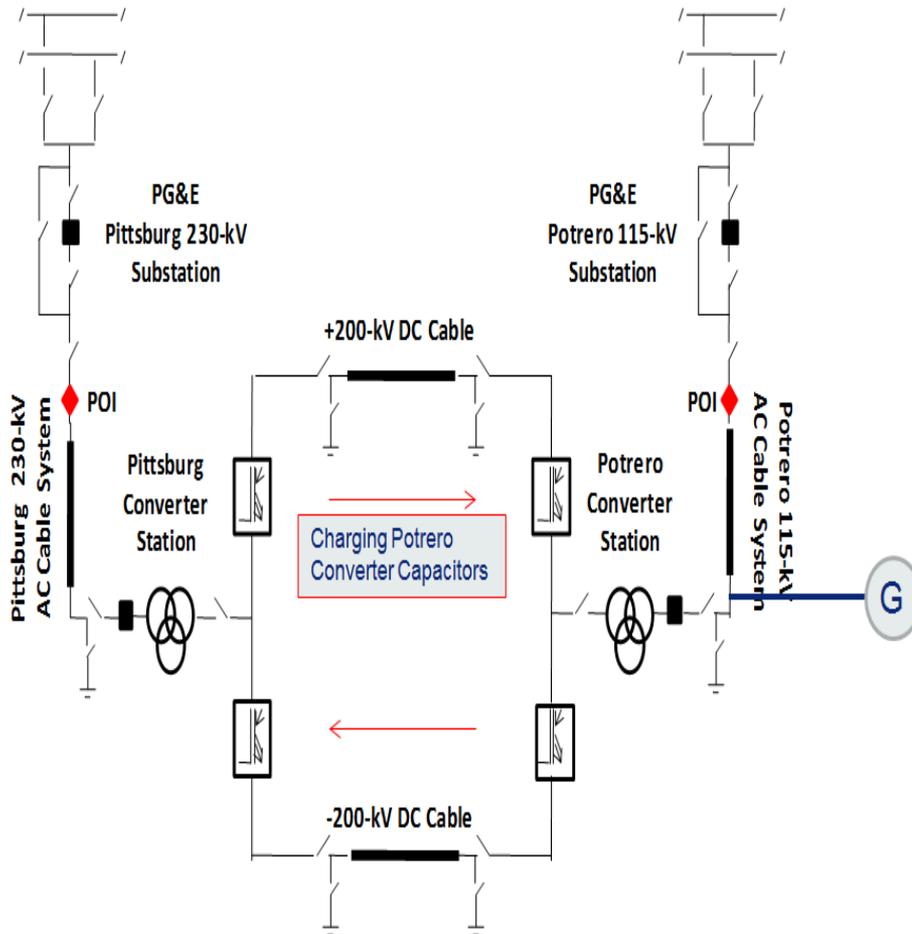
Build New San Jose 'B'-Stone 115 kV Line

Expected In-Service: 2016

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Trans Bay Cable Dead Bus Energization Project



Need: NERC Category D

Project Scope: To install 1.5 MW of new, fast ramping generation (or its equivalent) with redundancy, such that the total installation would consist of 3 MW of rapid response capability. This generation (or equivalent) would also provide power to station service loads, including the pumps and fans.

Cost: \$20M to \$30M

Other Considered Alternatives:
Status Quo

Expected In-Service: 2014

Interim Plan: Restoration Plan

ISO Determination: This project has been determined to be needed.

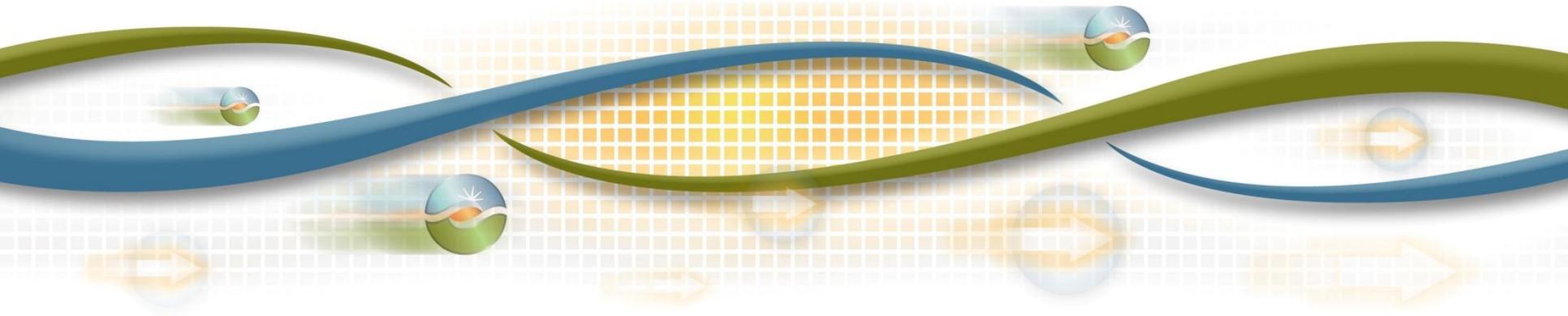


Reliability Projects Recommended for Approval

PG&E Fresno and Kern Areas

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Joseph E Meier
Senior Regional Transmission Engineer
February 11, 2013

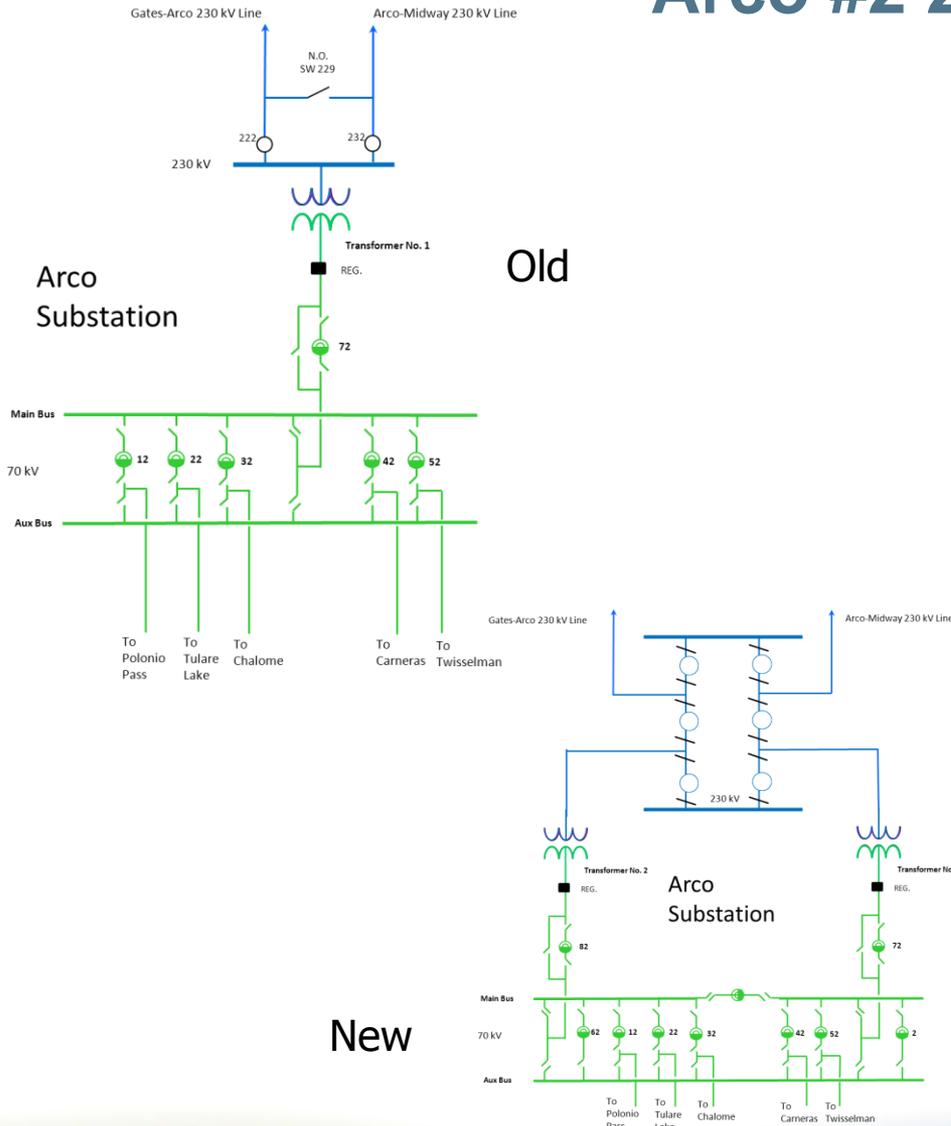


ISO Recommendations - Projects Determined as Needed in the Fresno & Kern Area

Project Name	Cost of Project
Arco #2 230/70kV	\$15M - \$19M
Cressey-Gallo 115kV	\$15M - \$20M
Gregg-Herndon #2 230kV Circuit Breaker Upgrade	\$1M - \$2M
Kearney #2 230/70kV	\$32M - \$37M
Kearney-Caruthers 70kV Reconductor	\$13M - \$20M
Los Banos-Livingston Jct-Canal 70kV switch replacement	\$0.5M - \$1M
Midway-Temblor 115kV line reconductor & voltage support	\$25M - \$35M
Northern Fresno 115kV Reinforcement	\$110M - \$190M

7 Projects Recommended for Approval (under \$50 Million)

Arco #2 230/70kV



Need: Planning Standards - Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0)

- BCR 1.50

Project Scope: Add second 230/70kV transformer at Arco substation

Cost: \$15M - \$19M

Other Considered Alternatives:

- Status quo
- Network the 70kV system (not recommended)

Expected In-Service: 2013

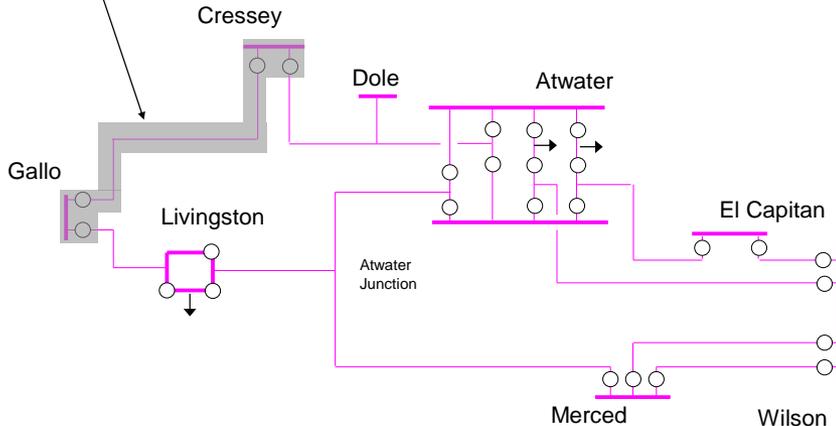
Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Cressey-Gallo 115kV

Cressey – Gallo 115 kV Reliability Project Scope of Work:

1. Construct 14.4 mile 115 kV transmission line from Cressey to Gallo
2. Install two circuit breakers and upgrade Cressey to a loop substation (expandable to 6 breaker ring bus)
3. Install two circuit breakers and upgrade Gallo to a loop substation



Need: ISO Planning Standards - Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0)

- BCR 2.09

Project Scope: Construct new 14.4 mile 115kV line between Cressey and Gallo substations.

Cost: \$15M - \$20M

Other Considered Alternatives:

- Status quo
- Build new line from Atwater to Gallo substation

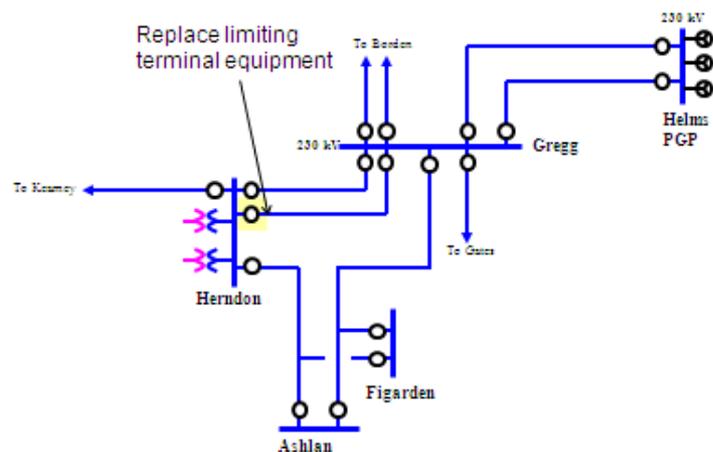
Expected In-Service: 2013

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Gregg-Herndon #2 230kV Circuit Breaker Upgrade

Herndon-Gregg #2 230 kV
Line Circuit Breaker Upgrade
(Proposal)



Need: NERC Category C3 2014

Project Scope: Upgrade Herndon terminal equipment to utilize full rating of line.

Cost: \$1M - \$2M

Other Considered Alternatives:

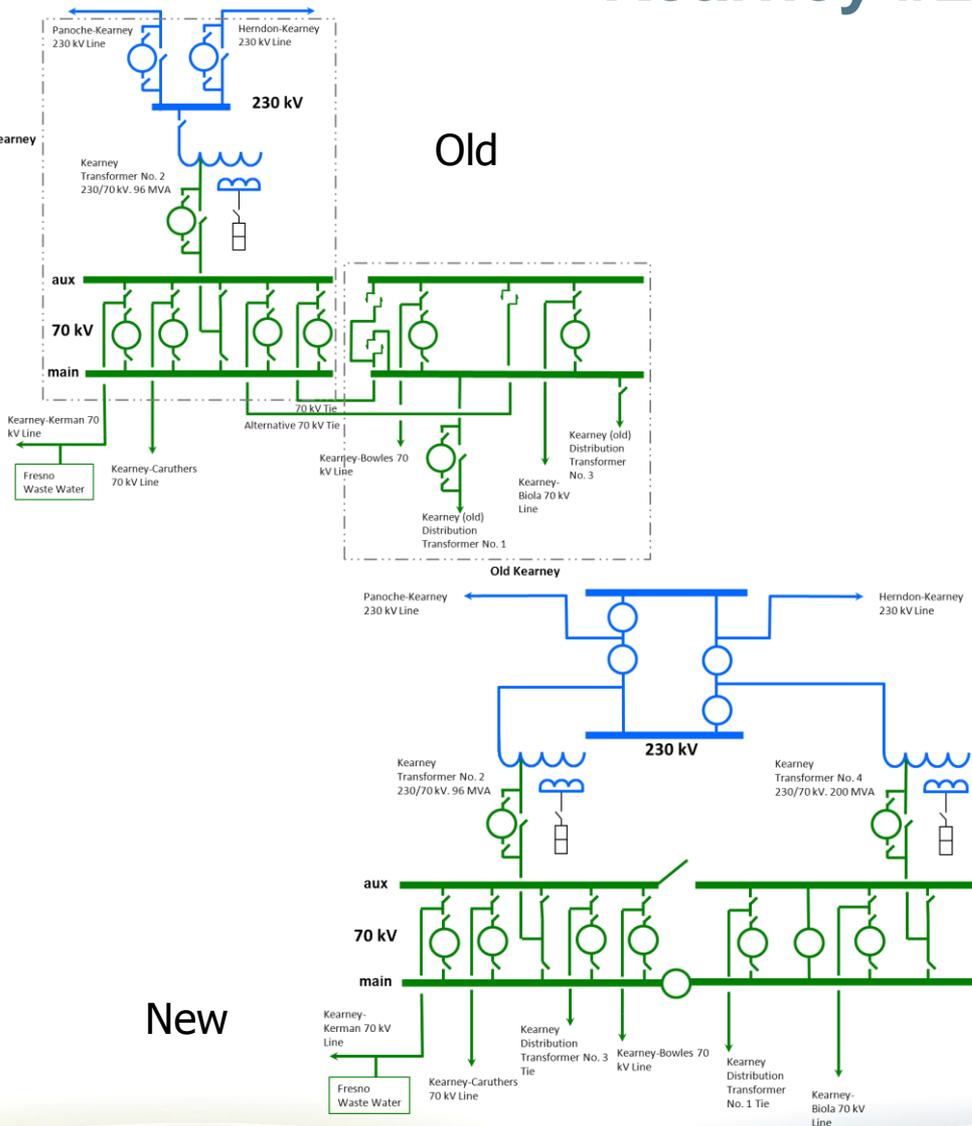
- None specified

Expected In-Service: 2015

Interim Plan: Operational solution, DEC Helms PSP after first contingency

ISO Determination: This project has been determined to be needed

Kearney #2 230/70kV



Need: ISO Planning Standards - Planning for New Transmission vs. Involuntary Load Interruption Standard (Section VI - 4 reducing load outage exposure through a BCR above 1.0)

- BCR 1.82

Project Scope: Add #2 230/70kV transformer and four element ring bus.

Cost: \$32M - \$37M

Other Considered Alternatives:

- Status quo
- Network the 70kV system (not recommended)

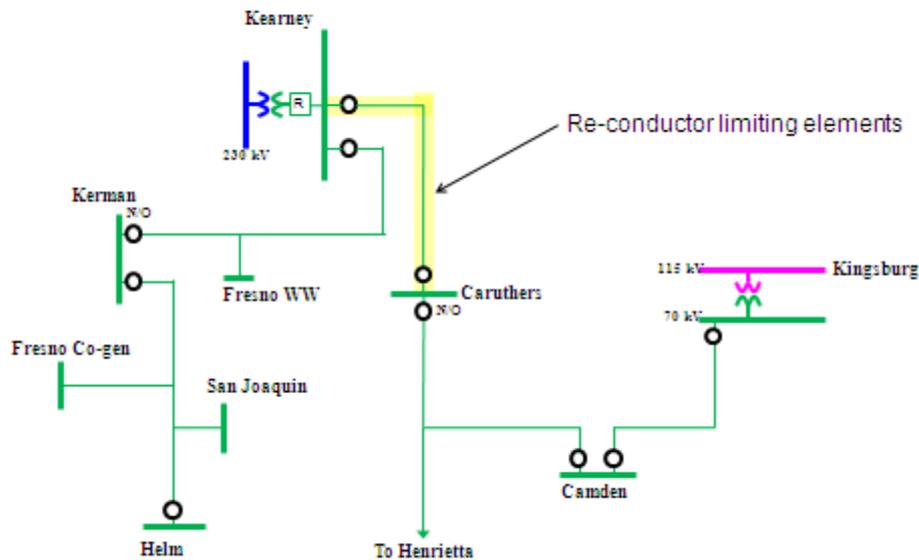
Expected In-Service: 2015

Interim Plan: N/A

ISO Determination: This project has been determined to be needed

Kearney-Caruthers 70kV Reconductor

Kearney-Caruthers 70 kV Line Re-conductor



Need: NERC Category A ~2018

Project Scope: Reconductor 12 miles of Kearney-Caruthers 70kV line

Cost: \$13M - \$20M

Other Considered Alternatives:

- Henrietta source

Expected In-Service: 2016

Interim Plan: N/A

ISO Determination: This project has been determined to be needed

Los Banos-Livingston Jct-Canal 70 kV switch upgrade

Need: NERC Category B 2014

Project Scope: Replace two limiting line switches on Los Banos-Livingston Jct-Canal 70kV line.

Cost: \$0.5M - \$1M

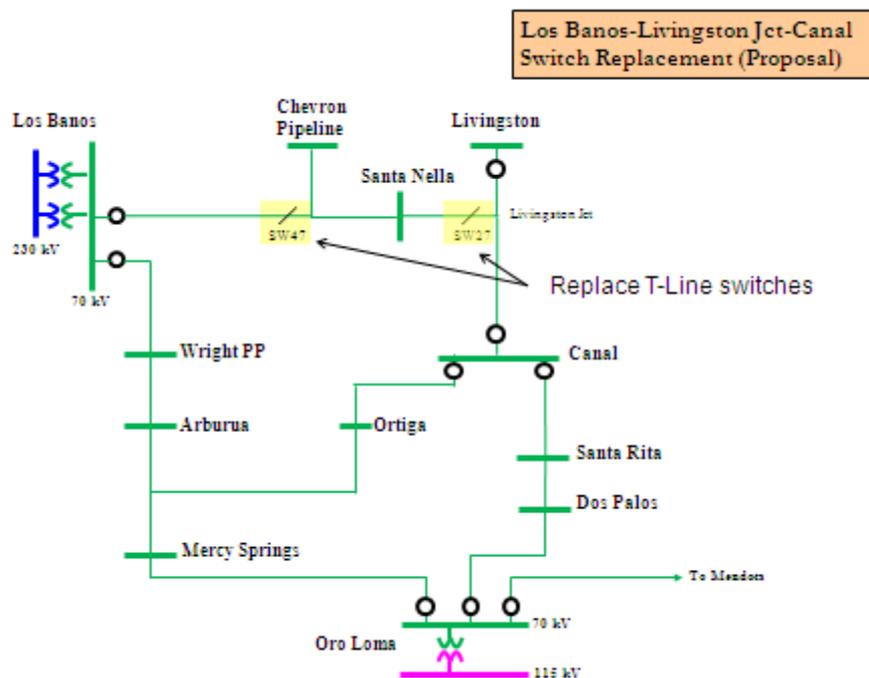
Other Considered Alternatives:

- Temporary Operational Solution

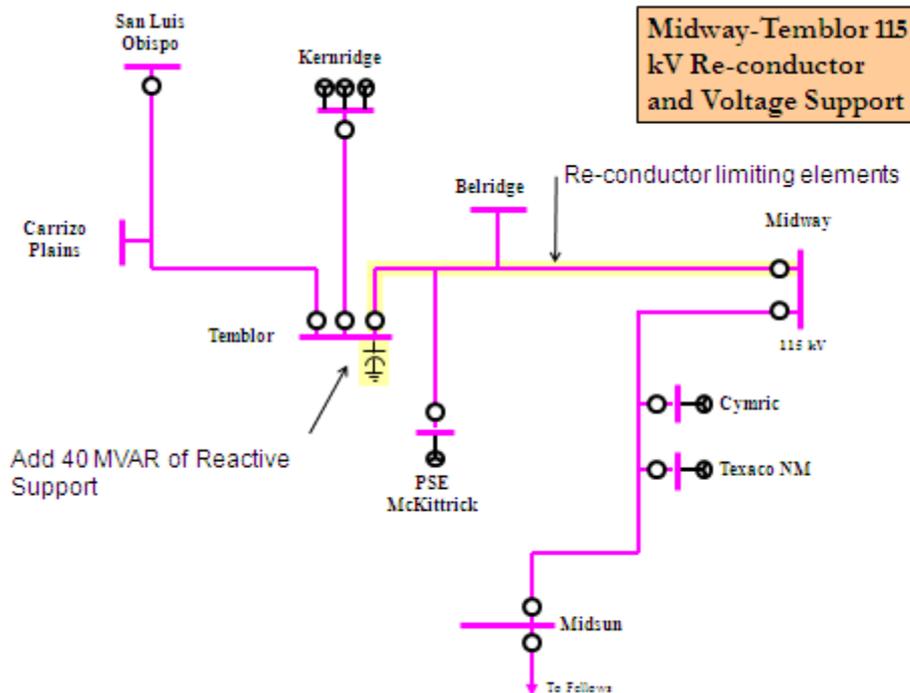
Expected In-Service: 2015

Interim Plan: Operational plan

ISO Determination: This project has been determined to be needed



Midway-Temblor 115kV reconductor and Voltage support



Need: NERC Category B 2014

Project Scope: Reconductor 15 miles of Midway-Temblor 115kV and install 40MVAR of shunt capacitors at Temblor

Cost: \$25M - \$35M

Other Considered Alternatives:

- McKittrick 115/70kV switching station, looping Midway-Midsun

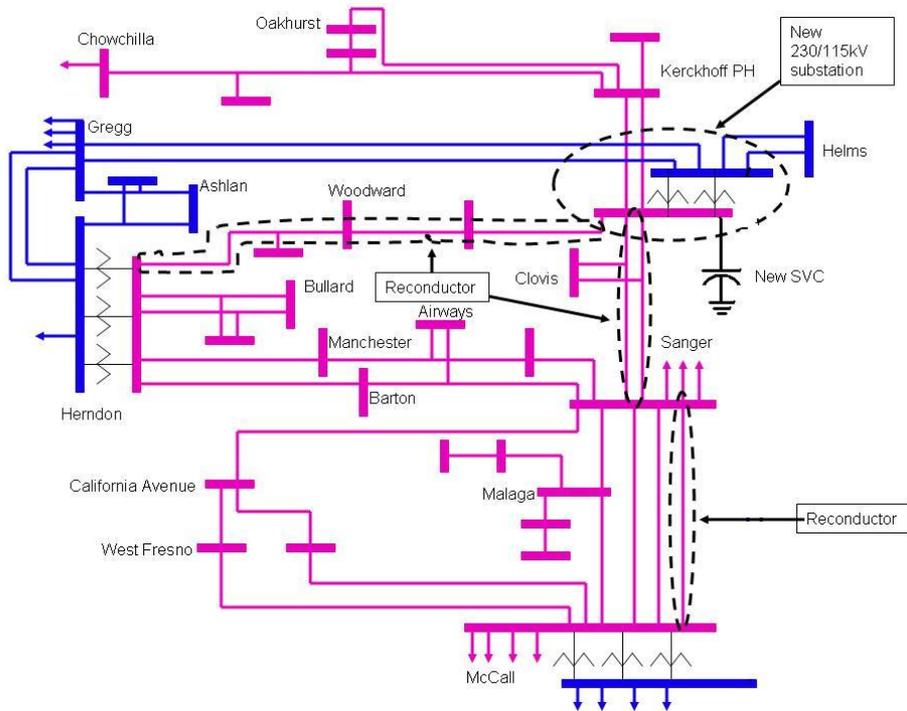
Expected In-Service: 2018

Interim Plan: Operational plan. Reconfigure Temblor 115kV to avoid drop of PSE McKittrick for loss of Midway-Temblor 115kV (CAISO)

ISO Determination: This project has been determined to be needed

1 Project Recommended for Approval (over \$50M)

Northern Fresno 115kV Reinforcement



Need: NERC Category C1, C2, C3, & C5 (All years)

Project Scope: Build new 230/115kV substation northeast of Fresno and reconductor 115kV facilities using existing ROWs. Sectionalizes Herndon 230kV and McCall 230kV buses

Cost: \$110M - \$190M

Other Considered Alternatives:

- Substation upgrades and reconductoring lines

Expected In-Service: 2018

Interim Plan: Operational plan

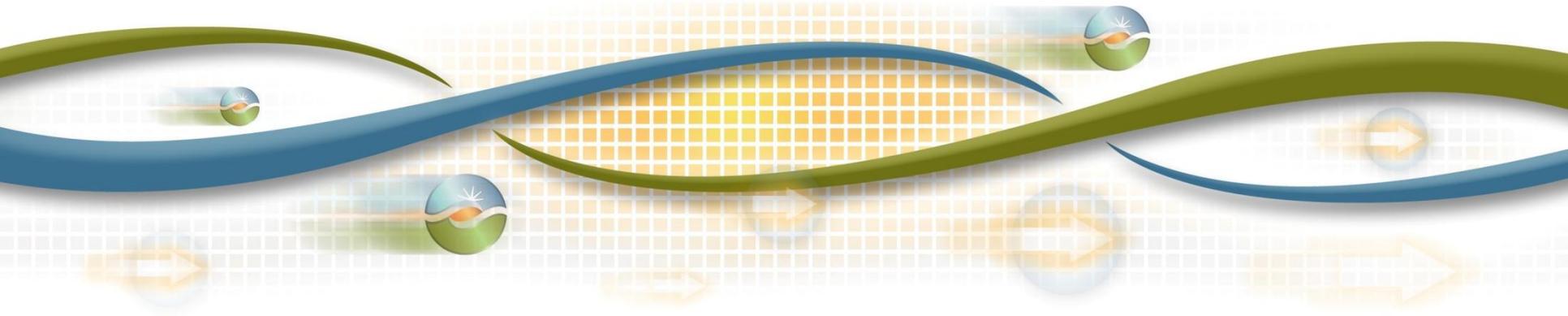
ISO Determination: This project has been determined to be needed



Reliability Projects Recommended for Approval *Central California Study*

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

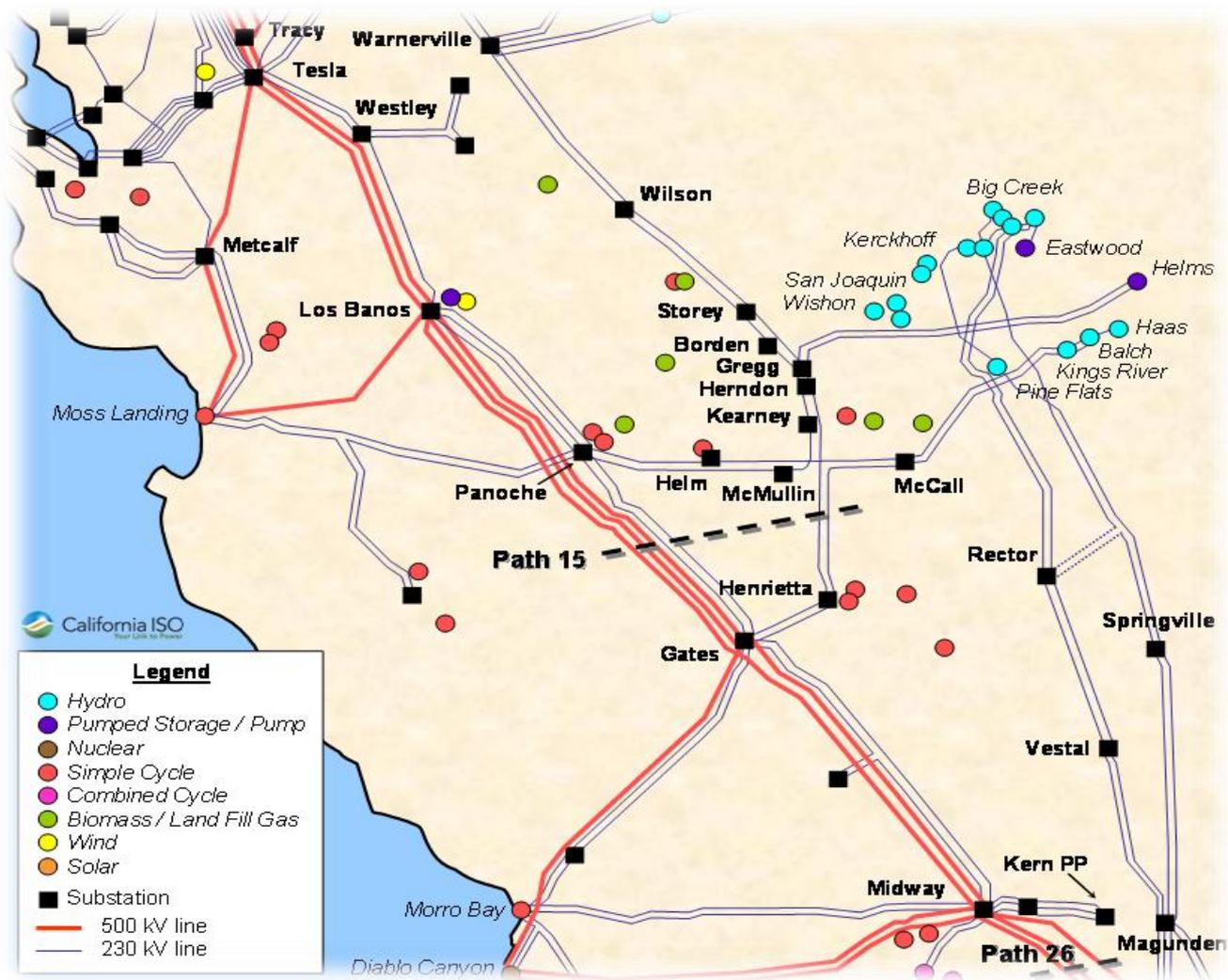
Jeff Billinton
Manager, Regional Transmission North
February 11, 2013



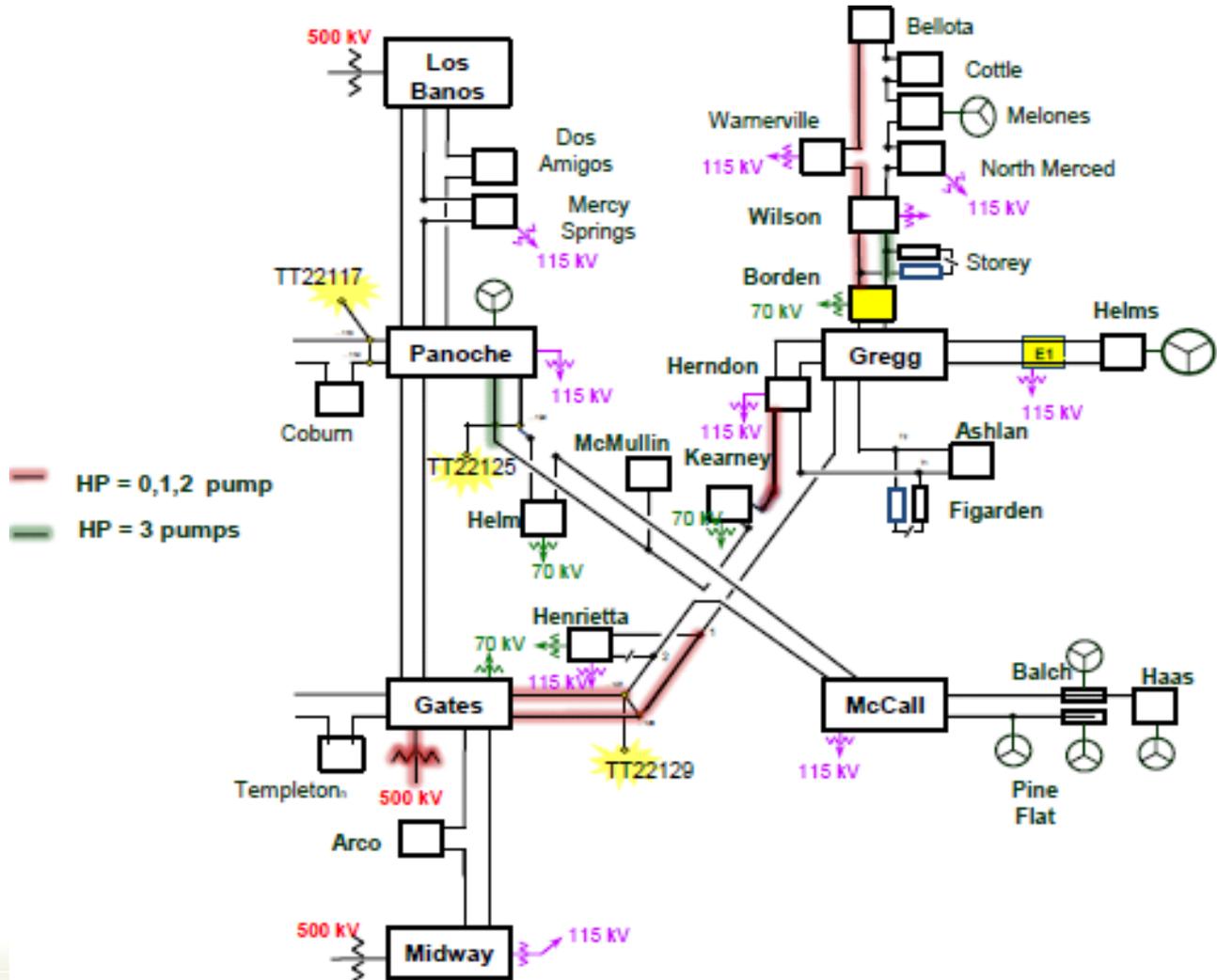
ISO Recommendations - Projects Determined as Needed in the Central CA Study

Project Name	Cost of Project
Series Reactor on Warnerville-Wilson 230 kV Line	\$20M - \$30M
Gates #2 500/230 kV Transformer Addition	\$75M - \$85M
Kearney - Hearndon 230 kV Line Reconductoring	\$15M - \$25M
Gates-Gregg 230 kV Line	\$115M - \$145M

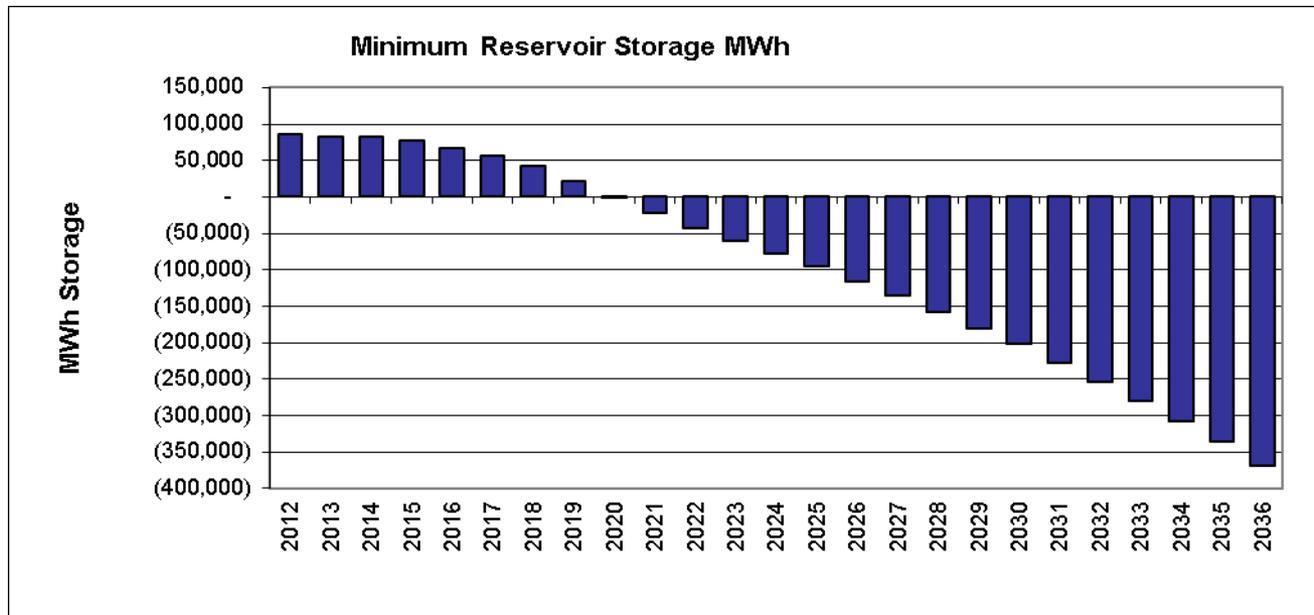
Central Valley Study Area



Central California Overloads, Partial Peak



HELMS Water Availability Existing System



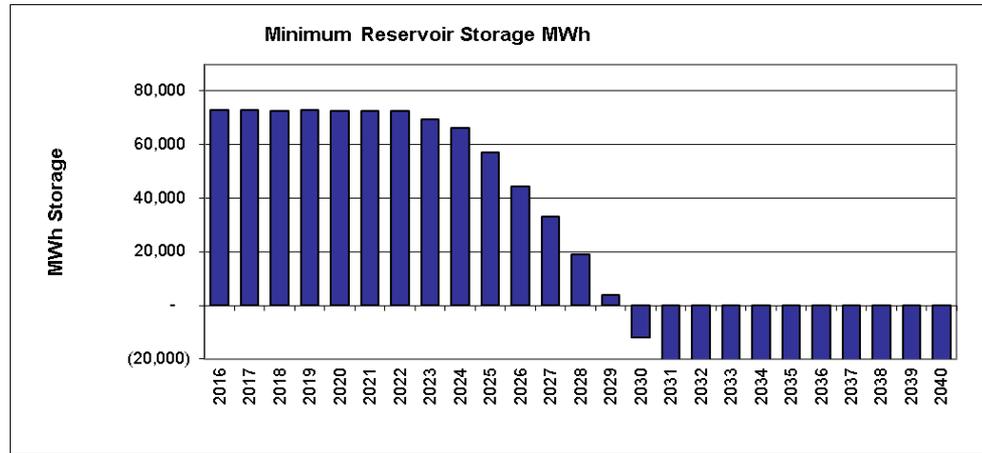
Transmission Development Alternative Configurations

Configuration	Description of Configuration
0	Base Case (No Upgrades)
1a/1b/1c	a) 50.5 Ohm Series Reactor at Wilson on W-W 230 kV Line; b) Reconductor overloaded Bellota-Gregg lines (136 mi); or c) Warnerville loop and 2-25 ohm reactors at Wilson
2	Configuration 1 plus: - 1122 MVA Gates 500/230/13.8 kV Transformer Bank Addition
3x	Configuration 2 plus: - Northern Fresno Area Reinforcements including North Fresno Substation (plus 200 MVAR SVD) ¹
4	Configuration 3 plus: a) one Gates-Gregg 230 kV Line; b) one Panoche-Gregg 230 kV Line; or c) one Los Banos-Gregg 230 kV Line
5	Configuration 4 plus: - one Gates-North Fresno 230 kV Line
6	Configuration 4 plus: - Raisin City Junction Switching Station with looping of all existing and planned 230 kV transmission (6 circuits total) in the vicinity of RCJ and SVC (plus 200 MVAR SVD)

HELMS Water Availability with Transmission Development

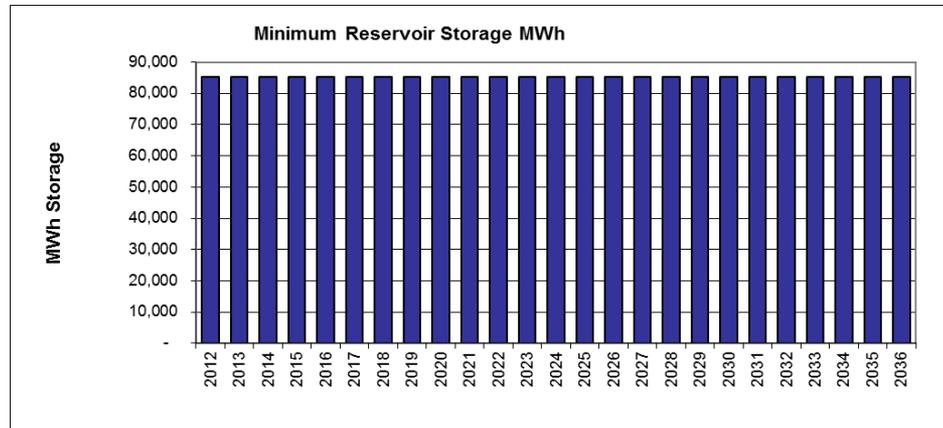
- Development Configuration 3

- Series Reactor at Wilson
- Gates 500/230 kV Transformer
- Plus
- Kearney-Herndon 230 kV Line Reconductoring



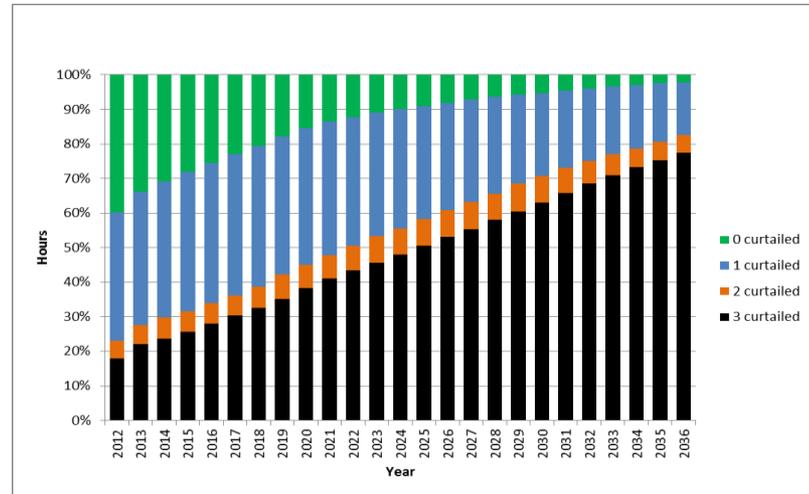
- Development Configuration 4

- Configuration 3 plus;
- Gates-Gregg 230 kV Line

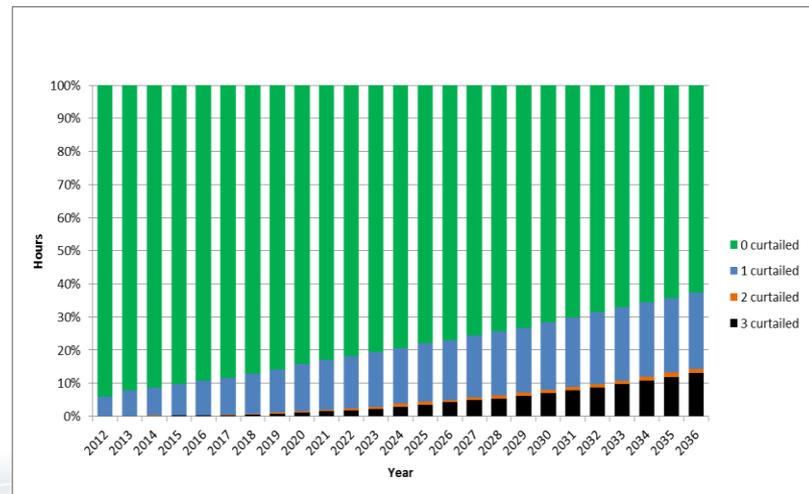


HELMS Pumping Constraint with Transmission Development

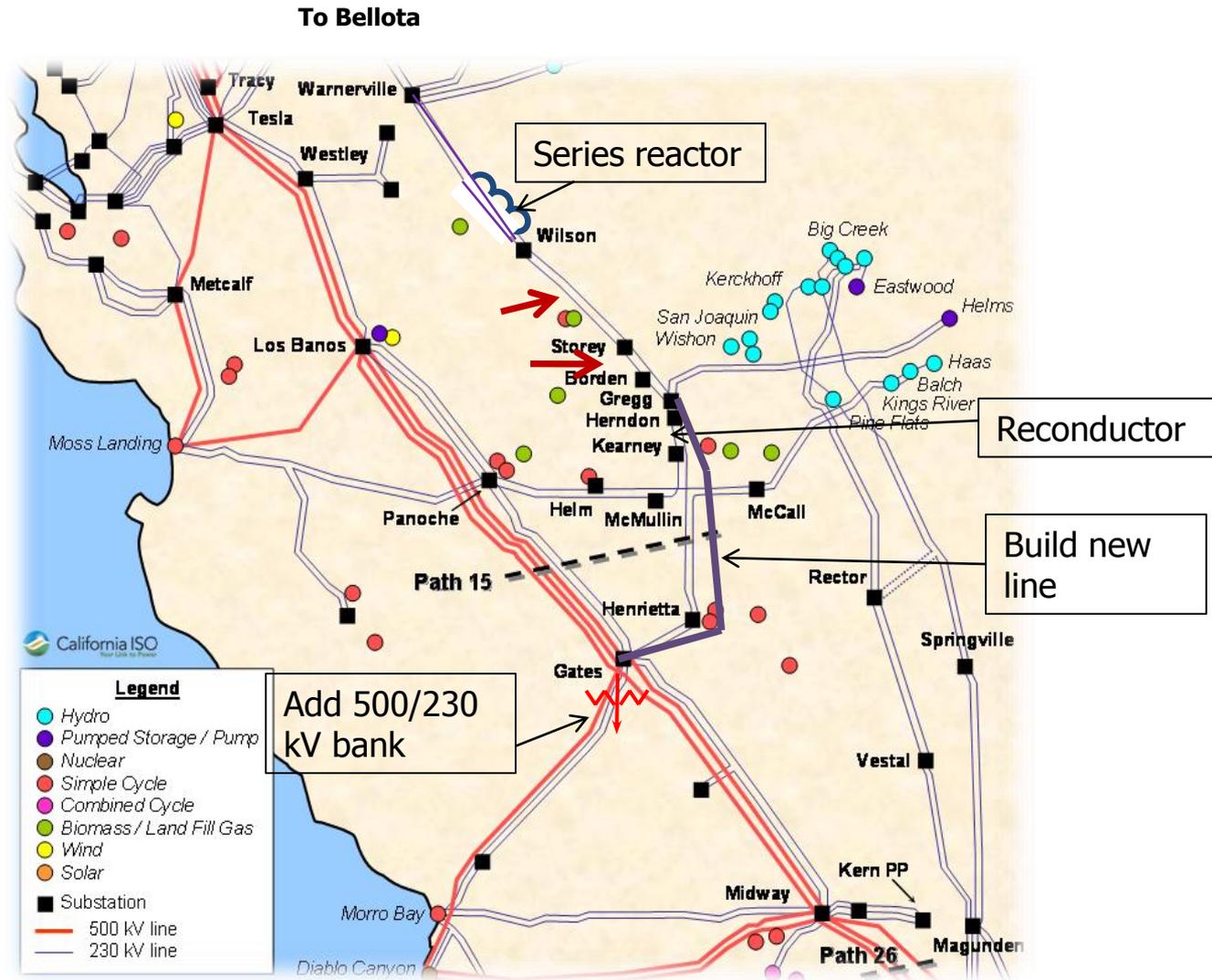
- Development Configuration 3
 - Series Reactor at Wilson
 - Gates 500/230 kV Transformer
- Plus
 - Kearney-Hearndon 230 kV Line Reconductoring



- Development Configuration 4
 - Configuration 3 plus;
 - Gates-Gregg 230 kV Line



Central California Proposed Development

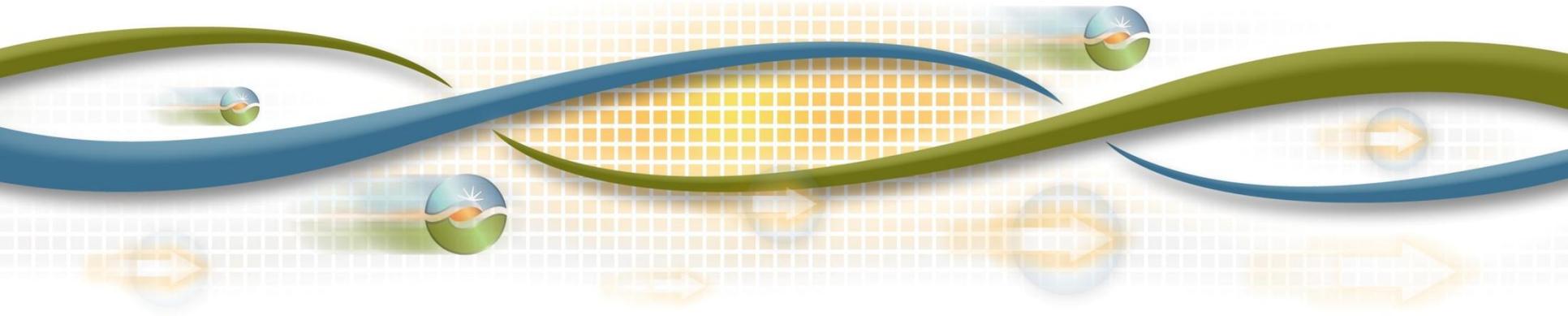




Reliability Projects Recommended for Approval *PG&E Central Coast and Los Padres Area*

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Chris Mensah-Bonsu
Senior Regional Transmission Engineer
February 11, 2013

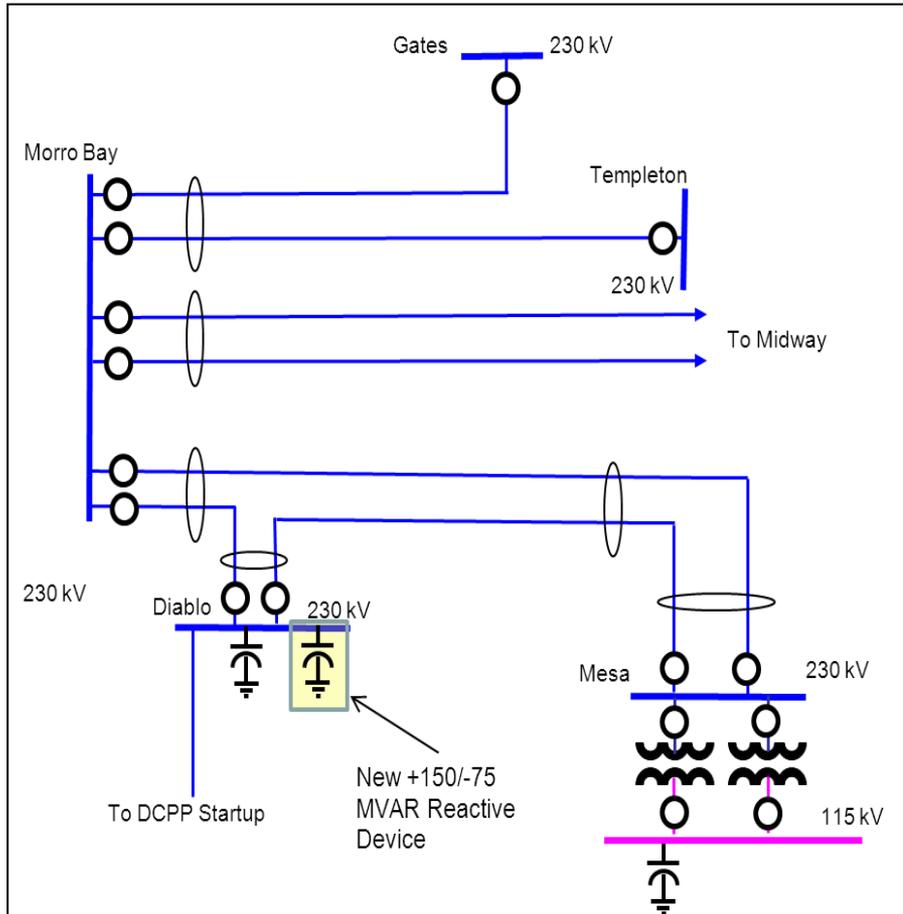


ISO Recommendations - Projects Determined as Needed in the Central Coast and Los Padres Area

Project Name	Cost of Project
Diablo Canyon Voltage Support Project	\$35M - \$45M
Midway-Andrew 230 kV Project	\$120M - \$150M

1 Projects Recommended for Approval (under \$50 Million)

Diablo Canyon Voltage Support Project



Need: NERC NUC-001-2, NERC TPL Standards and CAISO Category B (L-1/G-1) resulting in low voltages below 0.90pu. Outage: Morro Bay-Diablo 230 and Morro Bay-Mesa 230 kV Lines; Also one DCPD Unit plus Morro Bay-Diablo 230 kV Line (2017).

Project Scope: Installs a new SVC or thyristor-controlled switched capacitor bank rated at +150 MVAR at the Diablo Canyon 230 kV Substation. Constructs the associated bus to provide voltage control and support for the Diablo Canyon Power Plant (DCPP)

Cost: \$35 - \$45 Million

Other Considered Alternatives: Status Quo

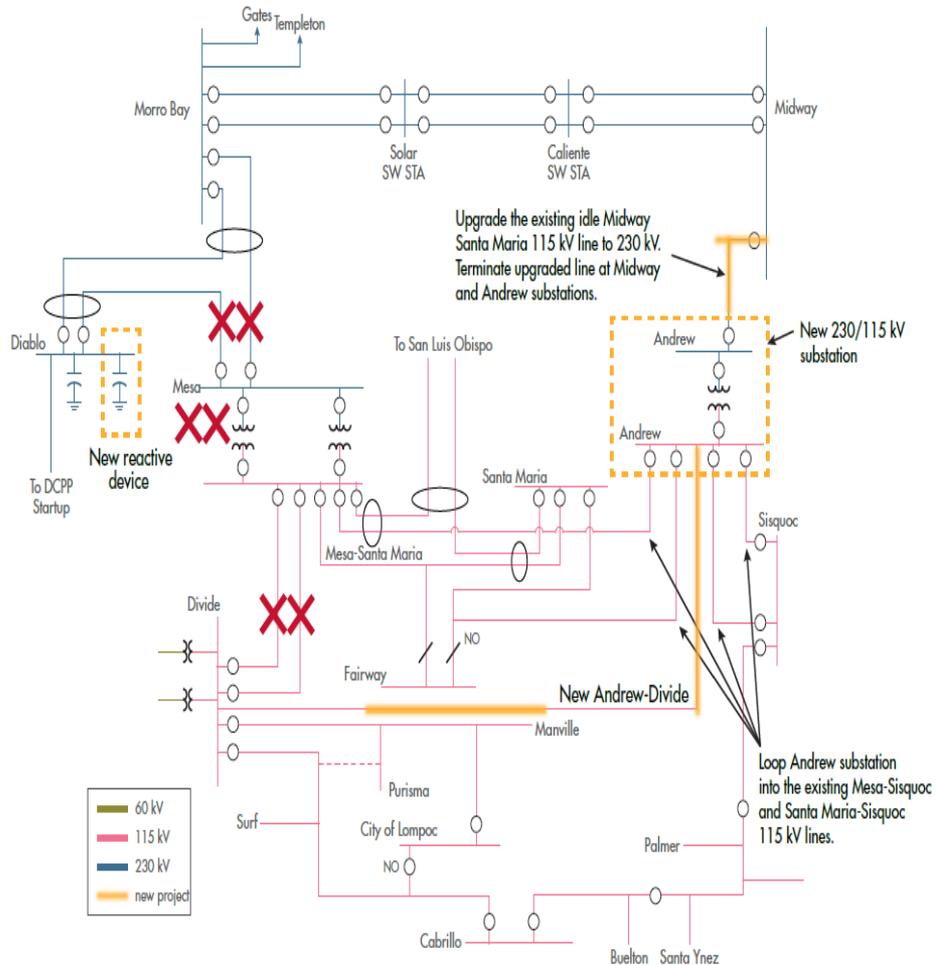
Expected In-Service: May 2016

Interim Plan: Action Plan

ISO Determination: This project has been determined to be needed.

1 Project Recommended for Approval (over \$50M)

Midway-Andrew 230 kV Project



Need: NERC Categories C5, C2 and C3 outages causing voltage collapse due to severe low voltages below 0.8 pu and thermal overloads in the San Luis Obispo 115 kV system. Also enhances maintenance and clearance options.

Project Scope: Converts existing idle Midway-Santa Maria 115 kV Line to a new Midway-Andrew 230 kV Line. Installs one 3-phase 420 MVA 230/115 kV Bank at the new Andrew Sub and loops Andrew 115 kV bus into Santa Maria-Sisquoc and Mesa-Sisquoc 115 kV Lines. Also it installs a new 10-mile Andrew-Divide #1 115 kV Line.

Cost: \$120 - \$150 Million

Other Considered Alternatives: Midway-Mesa 230 kV Project (\$90-\$120M)

Expected In-Service: May 2019

Interim Plan: SPS to drop ~270 MW Load (Operational since May 2012)

ISO Determination: This project has been determined to be needed.

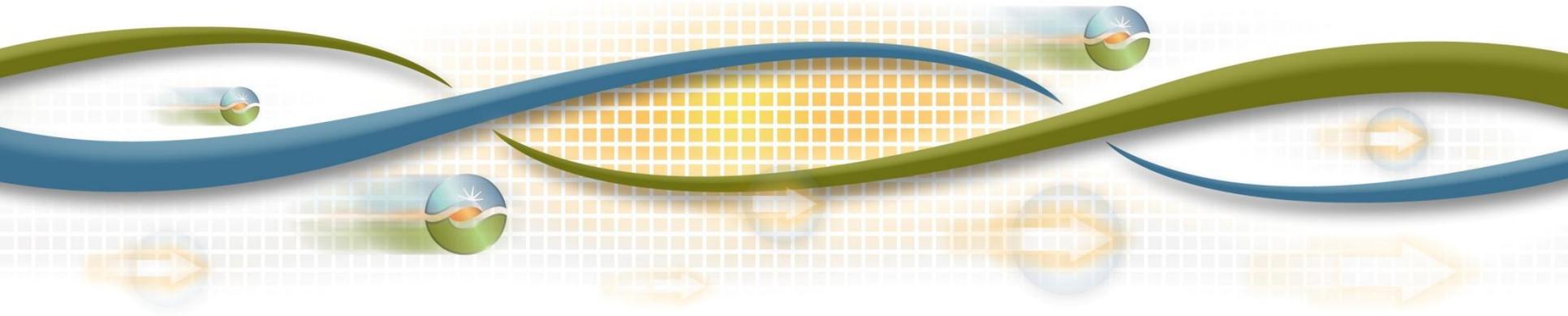


Policy Driven Project Recommendations

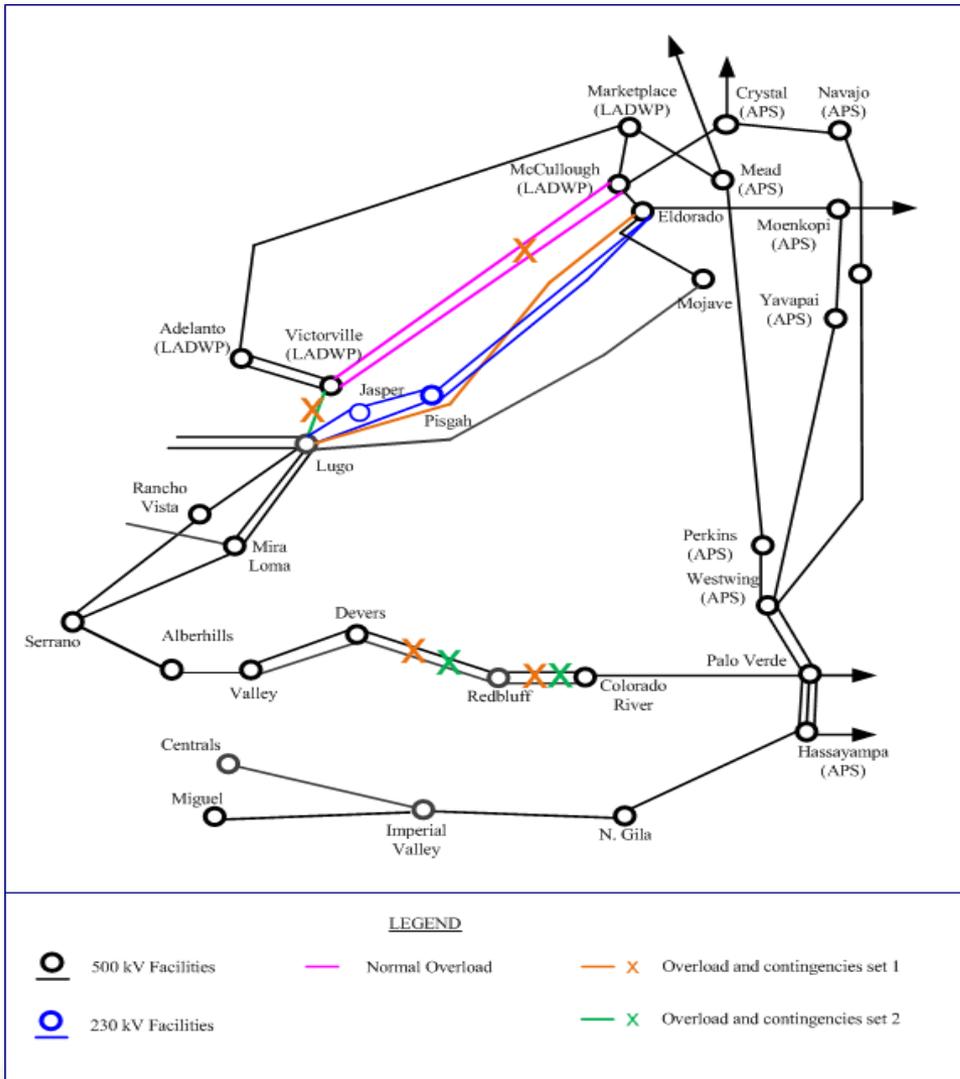
SCE Area

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Songzhe Zhu
Lead Regional Transmission Engineer
February 11, 2013



Lugo – Eldorado Series Cap and Terminal Equipment Upgrade



Needs:

- Support deliverability of renewable generation in multiple renewable zones, including Mountain Pass, Eldorado, Riverside East, Tehachapi, Nevada C, Kramer and Imperial Valley.
- Needed for the 33% renewable Commercial Interest Portfolio (base portfolio) and Cost Constrained Portfolio; estimated being needed in 2015

Project Scope: Upgrade the two existing 500kV series capacitors and terminal equipment on the Eldorado - Lugo 500kV line to 3800 Amp continuous rating.

Cost: \$120 - \$130 million

Other Considered Alternatives:

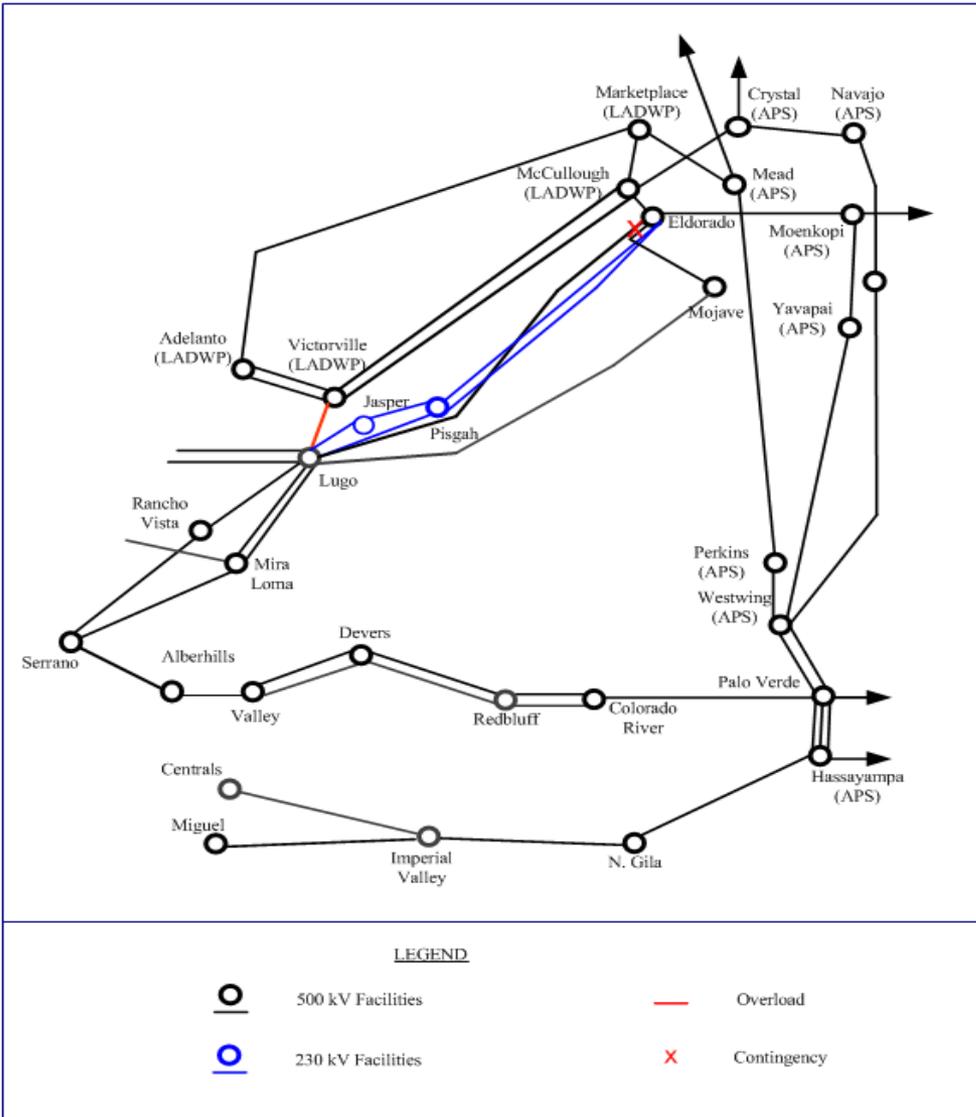
- New 500kV line from Eldorado area to Lugo area (> \$500 million)
- New Colorado River – Red Bluff – Devers 500kV line (>\$1 billion)

Expected In-Service: 2016

Interim Plan: NQC reduction, SPS and congestion management

ISO Determination: This project has been determined to be needed.

Reroute Lugo – Eldorado 500kV Line



Needs:

- Support deliverability of renewable generation in multiple renewable zones, including Eldorado, Tehachapi, Nevada C, and Imperial Valley.
- Needed for all the 33% renewable portfolios; estimated being needed in 2015

Project Scope: Dismantle and rebuild approximately 6 miles of line to increase line separation to the Eldorado - Mohave 500kV line.

Cost: \$30 - \$40 million

Other Considered Alternatives:

New Nipton 500kV substation looping into Lugo – Eldorado 500kV line and a new Eldorado – Nipton 500kV line (>\$100 million)

Expected In-Service: 2020

Interim Plan: NQC reduction, SPS and congestion management; pursuing temporary waiver from WECC for Lugo – Eldorado and Mohave – Eldorado simultaneous outage as Category D

ISO Determination: This project has been determined to be needed.

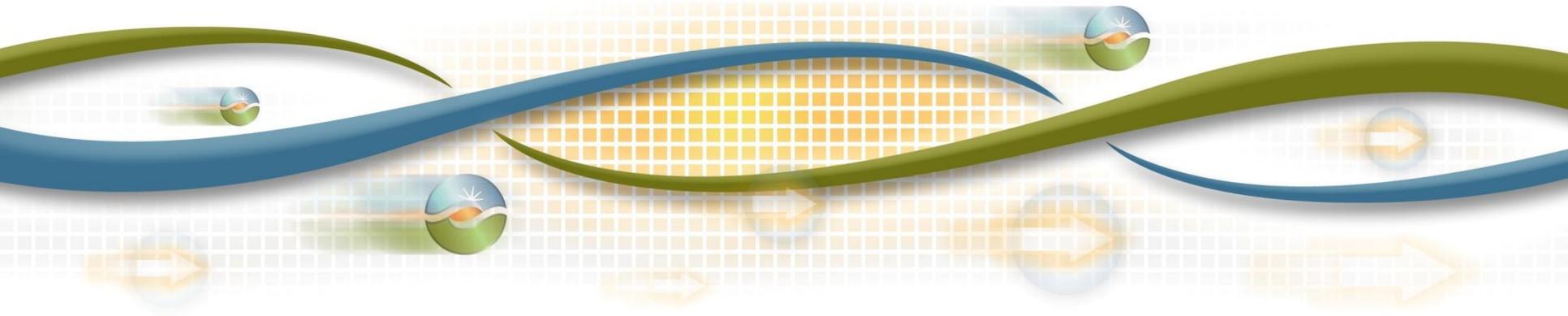


Policy Driven Project Recommendations

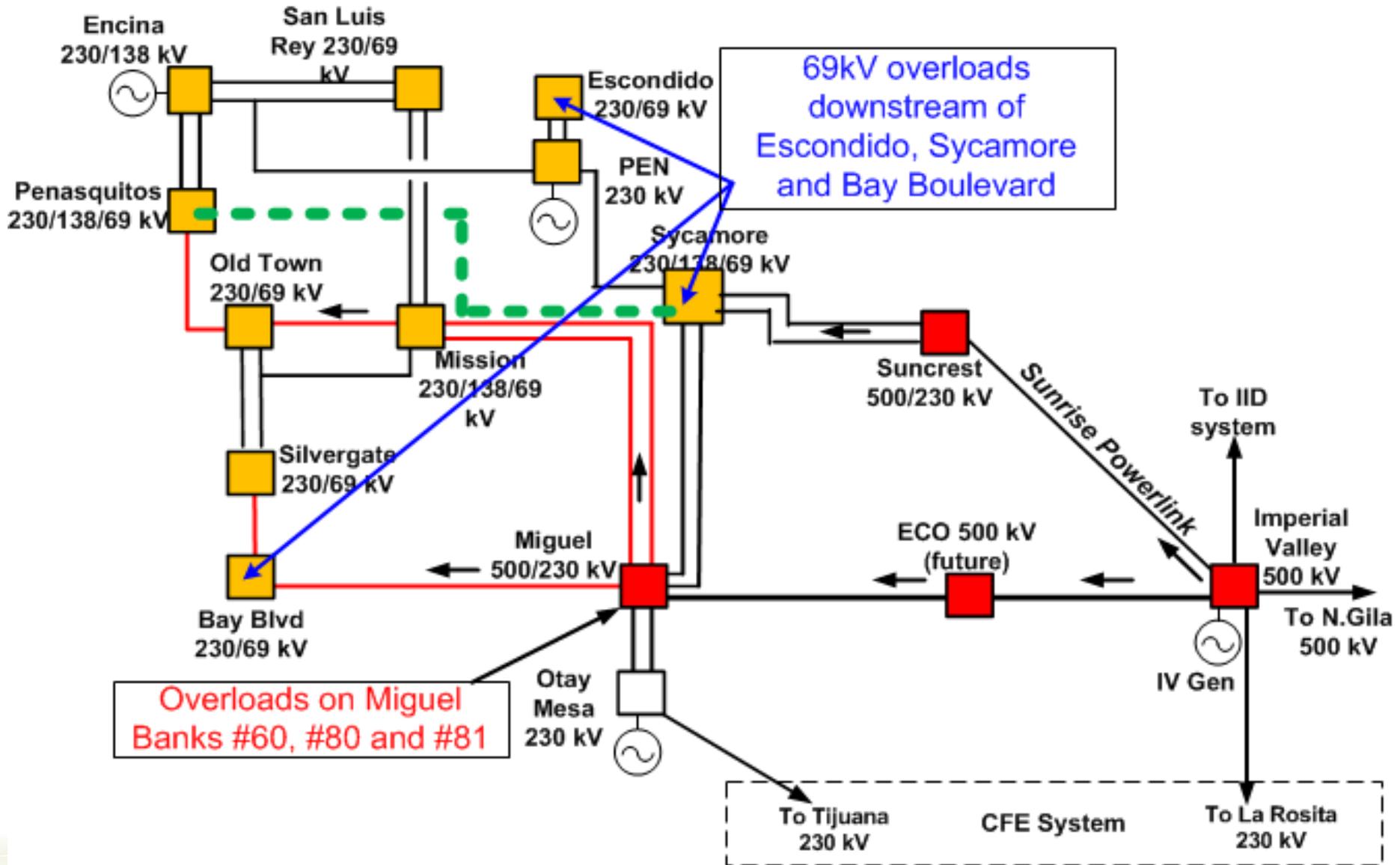
SDG&E Area

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Sushant Barave
Senior Regional Transmission Engineer
February 11, 2013



TL230xx, Sycamore – Penasquitos 230kV Line



TL230xx, Sycamore – Penasquitos 230kV Line

Needs: (estimated need date: 2018)

- Thermal overload issues in Commercial Interest and Environmental portfolios → (1) Old Town – Penasquitos 230kV line, (2) Miguel – Mission #1 and #2 230kV lines, (3) Mission – Old Town 230kV line, (4) Silvergate – Bay Boulevard 230kV line, (5) Sweetwater – Sweetwater Tap 69kV line, (6) Escondido – San Marcos 69kV line, (7) Miguel 500/230 kV #1 and #2 transformers (SPS to trip generation needed in addition to proposed upgrade) and (8) Sycamore – Scripps 69kV line
- To support the delivery of renewable generation in Arizona, Imperial, San Diego South and Baja CREZs.
- Mid-term as well as long-term mitigation plans for the outage of SONGS units

Project Scope: Construct a new 230kV line between Sycamore and Penasquitos 230kV substations.

Cost: \$111 - \$221 million

Other Considered Alternatives:

- Individual upgrades of all the overloaded elements
- A combination of individual upgrades and SPS to mitigate all the overload issues

Expected In-Service: June 1, 2017

Interim Plan: NA

ISO Determination: Continue the policy discussions to coordinate between RPS needs and nuclear back-up mitigation needs before the March Board of Governors meeting.

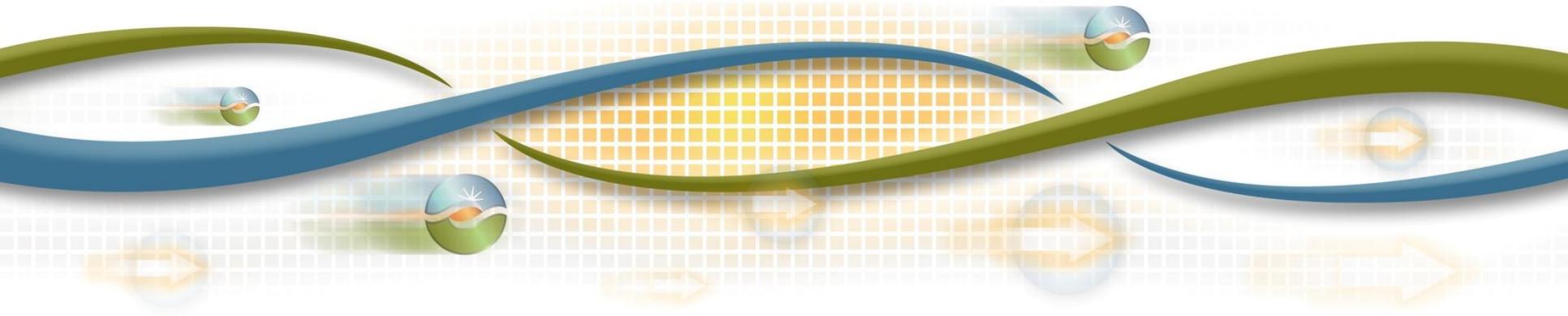


Policy Driven Project Recommendations

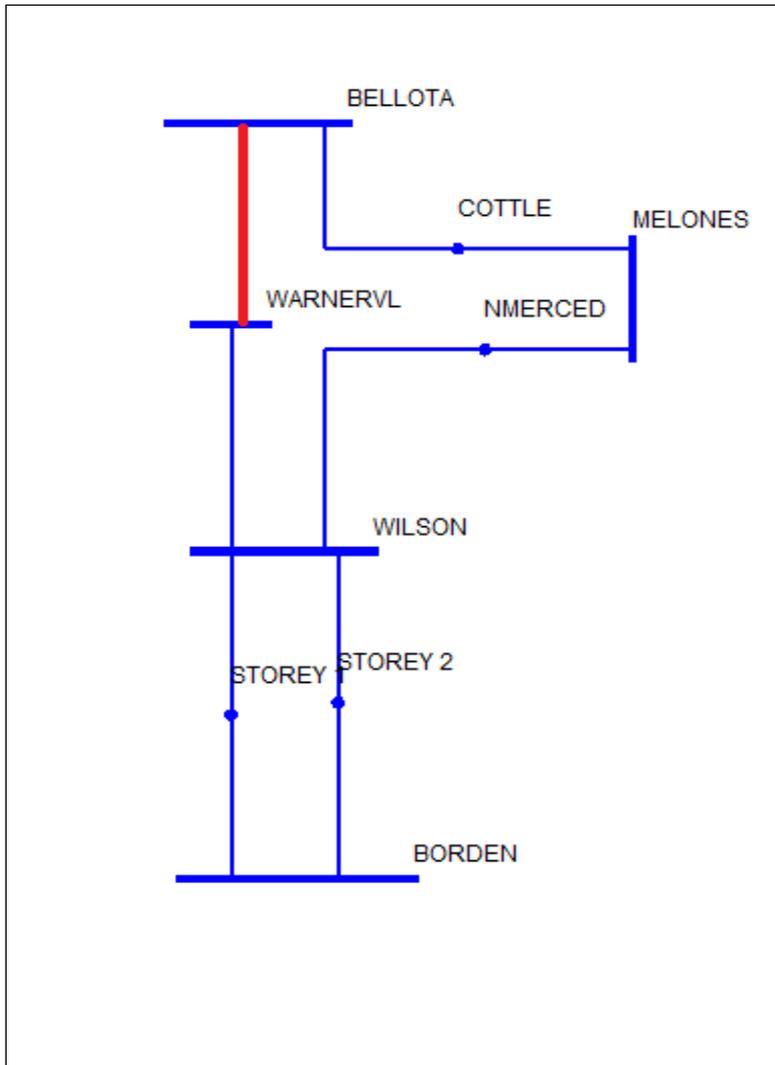
PG&E Area

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Abhishek Singh
Senior Regional Transmission Engineer
February 11, 2013



Warnerville – Bellota 230kV Line Reconductoring



Need: NERC Category A overload (120%). Results in undeliverable renewable generation in Zones: Greater Fresno DG, Central Valley North, Merced, Westlands.

Project Scope:

- Reconductor Warnerville – Bellota 230kV line .

Cost: \$28 M

Other Considered Alternatives:

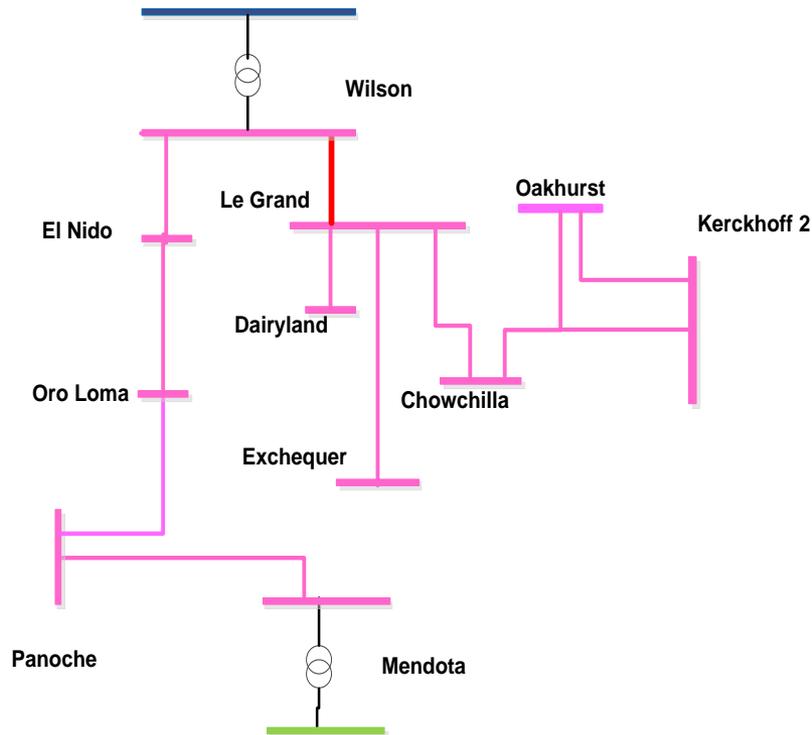
- *Alternatives assessed in conjunction with Central California Study*

Expected In-Service: 2017

Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Wilson – Le Grand 115kV Line Reconductoring



Need: NERC Category A overload (103%). Results in undeliverable renewable generation in Zones: Greater Fresno DG, Merced, Westlands.

Project Scope:

- Reconductor Wilson – Le Grand 115kV line.

Cost: \$15M

Other Considered Alternatives:

- *Alternatives assessed in conjunction with Central California Study*

Expected In-Service: 2020

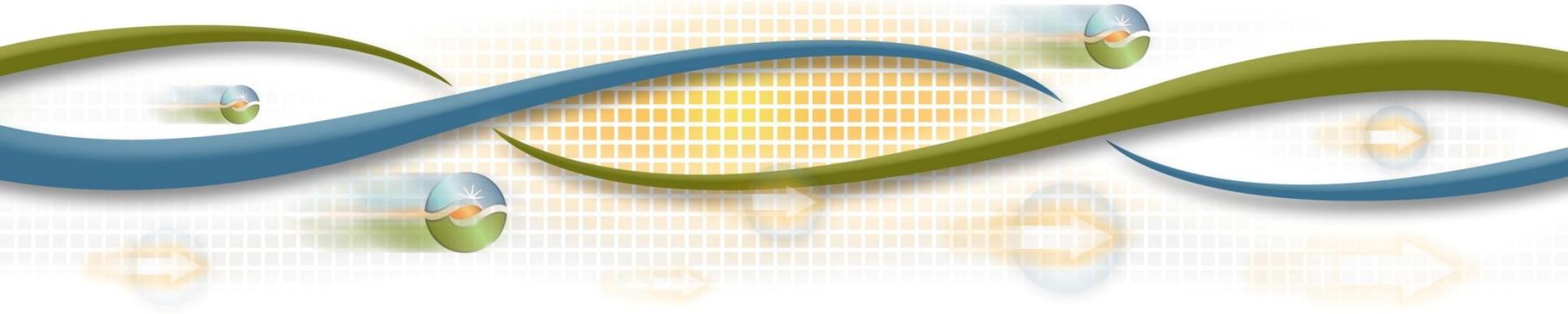
Interim Plan: N/A

ISO Determination: This project has been determined to be needed.

Eligibility for Competitive Solicitation

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Neil Millar
Executive Director - Infrastructure Development
February 11, 2003



Tariff criteria for eligibility for competitive solicitation:

- Policy and Economically Driven Elements:
 - unless the project involves an upgrade to or addition on an existing facility of a participating transmission owner, the construction of facilities on a participating transmission owner's right-of-way, or the construction or ownership of facilities within a participating transmission owner's substation, then the participating transmission owner will construct and own such upgrade or addition.
- Reliability Project elements that provide additional benefits:
 - if it also serves to meet state or federal policy requirements or directives as specified in the Study Plan for the current planning cycle, or
 - if its economic benefits exceed ten (10) percents of its costs; and
 - unless the project involves an upgrade to or addition on an existing facility of a participating transmission owner, the construction of facilities on a participating transmission owner's right-of-way, or the construction or ownership of facilities within a participating transmission owner's substation, then the participating transmission owner will construct and own such upgrade or addition.

Economic Benefit Methodology

- The assessment of economic benefit takes in to account:
 - congestion benefits
 - transmission line loss benefits
 - any other identified financial benefits
 - annual benefits compared to the leveled annual revenue requirement necessary to support the cost of the project.

Eligibility of Policy and Economic driven elements for competitive solicitation:

- All five Category 1 policy driven elements were reviewed:
 - Lugo-Eldorado 500 kV line re-route
 - Lugo-Eldorado series capacitor and terminal equipment upgrade
 - Warnerville-Bellota 230 kV line reconductoring
 - Wilson-Le Grand 115 kV line reconductoring
 - Sycamore-Penasquitos 230 kV transmission line *
- One economically driven element was reviewed:
 - Delaney-Colorado River 500 kV transmission line

* The ISO's recommendation for this project is receiving further consideration before the March Board of Governors meeting.

Reliability driven project elements:

- All reliability project elements were reviewed for potentially eligible elements that are not upgrades to existing facility of a PTO, the construction of facilities on a PTO's right-of-way, or the construction or ownership of facilities within a PTO's substation:
 - Gregg-Gates 230 kV transmission line – **Policy related benefits**
 - Lockford-Lodi Area 230 kV development
 - Altantic Placer 115 kV transmission line
 - Rippon 115 kV transmission line
 - Midway-Andrew 230 kV project
 - North Fresno 115 kV upgrade
 - Cressey-Gallo 115 kV transmission line
 - South Orange County (SONGS vicinity) SVC
 - Talega area SVC or similar reactive support

Detailed evaluation necessary.

Operational requirements negate economic benefits.

Detailed economic benefits assessment:

No.	Project	Capital Cost \$ millions	Total Cost (1)	Congesti on Benefit	Year 1 Loss Saving MWh	Loss Savings \$ Millions (2)	Cost Benefit Ratio (3)
1	Lockeford-Lodi Area 230 kV Development	\$80 - 105	\$116 - 152	0	12,557	\$11.71	8.7%
2	Atlantic Placer 115 kV Line	\$55 - 85	\$80 - 123	0	3,000	\$2.63	2.6%
3	Rippon 115 kV Line	\$10 - 15	\$15 - 22	0	841	\$0.78	4.3%
4	Midway-Andrew 230 kV Project	\$120 - \$150	\$174 – 217.5	0	20,140.33	\$18.78	9.6%
5	Cressey-Gallo 115kV	\$15 - 20	\$22 - 29	0	399	\$0.32	1.27%
6	North Fresno 115kV Reinforcement	\$110 - 190	\$160 - 275	0	23,654	\$19.12	8.79%
7	<i>New Gates-Gregg 230 kV line</i>	\$115 - 145	\$167 - 210	0	113,816	\$103.73	55%

- Notes:
- 1 RR/CC ratio of 1.45 consistent with Section 5
 - 2 Losses are valued at \$58.05/MWh
 - 3 Cost benefit ratio is based upon average Total Cost.

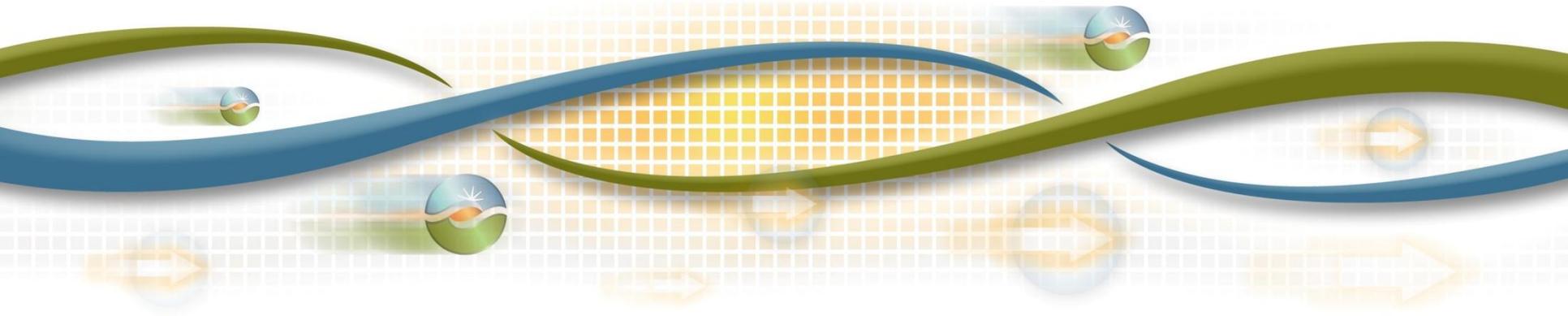
Eligibility for competitive solicitation:

- Reliability project element with additional policy benefits:
 - Gregg-Gates 230 kV transmission line
- Policy driven element:
 - Sycamore-Penasquitos 230 kV transmission line *
 - The ISO's recommendation for this project is receiving further consideration before the March Board of Governors meeting.
- Economically driven element:
 - Delaney-Colorado River 500 kV transmission line

Next Steps

Draft 2012/2013 ISO Transmission Plan Stakeholder Meeting

Neil Millar
Executive Director - Infrastructure Development
February 11, 2013



Next Steps

Date	Milestone
February 25	Stakeholder comments to be submitted to regionaltransmission@caiso.com
No later than March 13	Post Revised Draft 2012-2013 Transmission Plan
March 20-21	Present Revised Draft Plan to ISO Board of Governors
March 22	Post Final 2012-2013 Transmission Plan
April 1– June 1	Phase 3 Competitive Solicitation Period Opens *

* Refer to the [Transmission Planning Process Business Practice Manual](#) for the rest of the steps for Phase 3 of the ISO transmission planning process.