

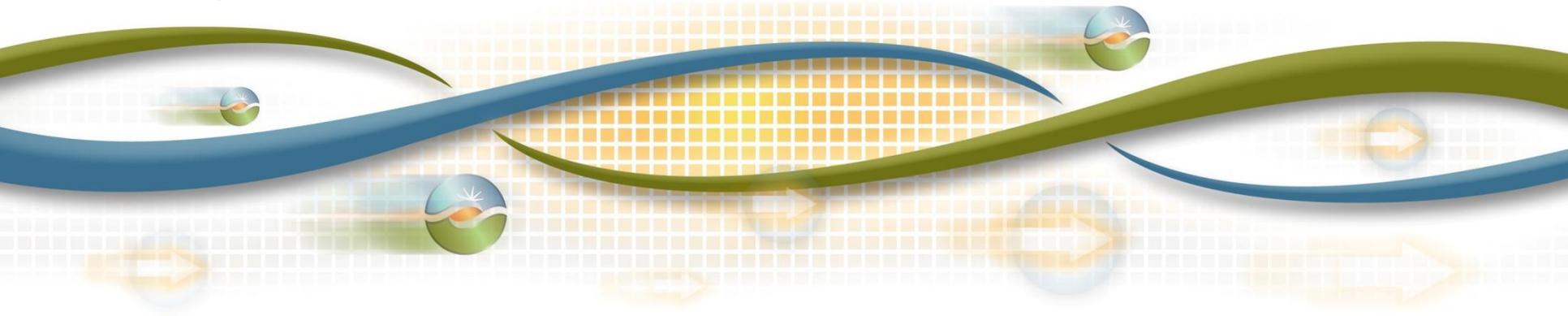
2015 and 2019 Final LCR Study Results San Diego-Imperial Valley

Frank Chen

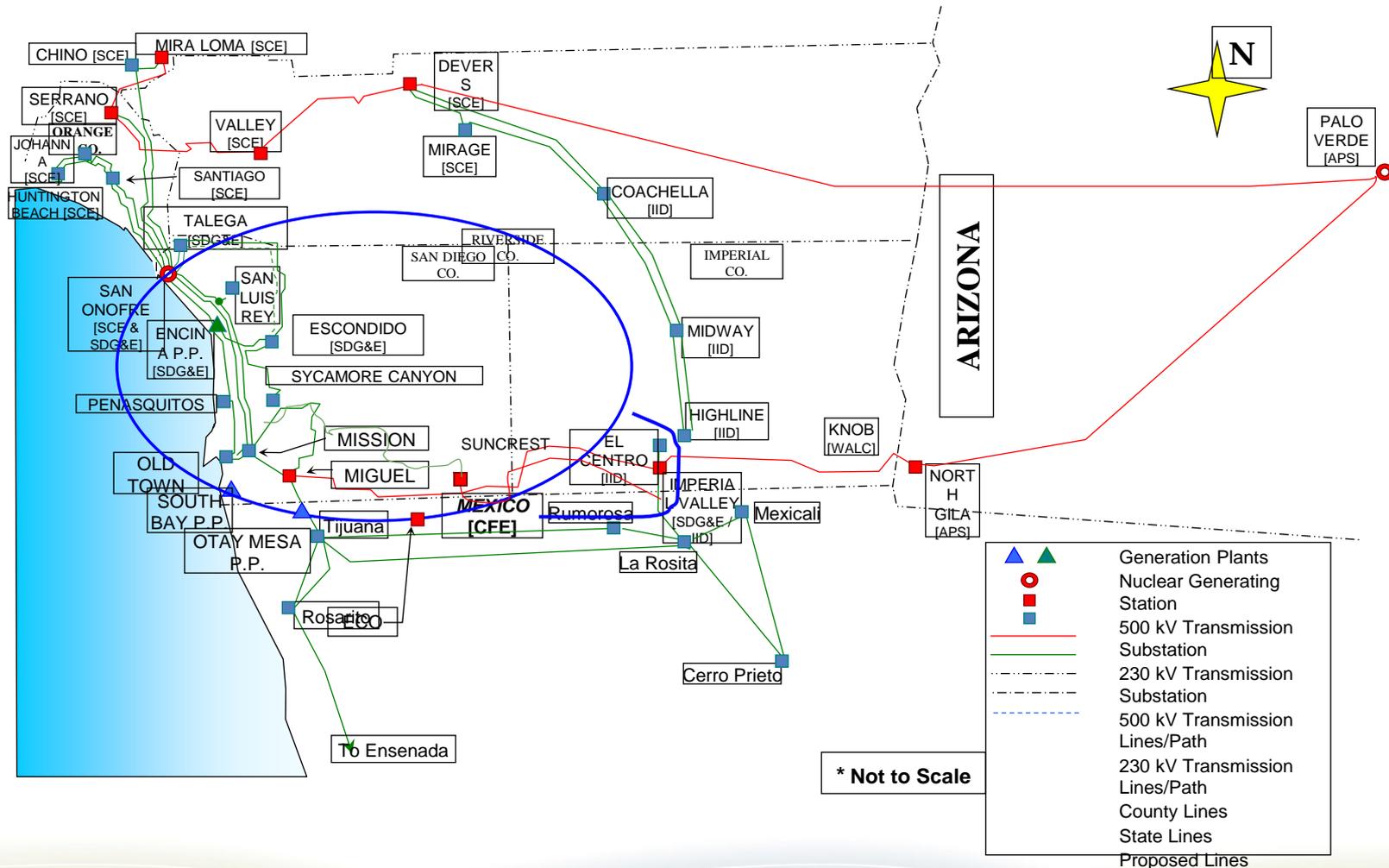
Senior Regional Transmission Engineer

Stakeholder Web Conference

April 10, 2014



San Diego-Imperial Valley LCR Area



San Diego-Imperial Valley Area Load and Resources

		2015	2019
Load	=	5,244	5,331
Transmission Losses	=	163	207
Total Area Load	=	5,407	5,538
Market Generation	=	4,328	4,004
Muni Generation	=	0	0
Wind Generation	=	55	55
QF Generation	=	164	164
Total Qualifying Capacity	=	4,547	4,223

Major New Transmission Upgrades Modeled

2015 Base Case

1. SONGS Retirement
2. East County 500kV Substation (ECO)
3. Talega Synchronous Condenser (2x225 Mvar)
4. Reconductor of El Cajon – Los Coches 69 kV line
5. Reconductor of Mission – Clairmont 69 kV line
6. Reconductor of Mission – Kearny 69 kV line
7. Reconductor of Mission – Mesa Heights 69 kV line

Major New Transmission Upgrades Modeled

2019 Base Case

1. A new Sycamore – Bernardo 69 kV line
2. Reconductor Bernardo-Rancho Carmel 69 kV line
3. Reconductor of Sycamore – Chicarita 138 kV line
4. Sycamore-Penasquitos 230 kV line
5. Miguel-Otay Mesa-South Bay-Sycamore 230 kV re-configuration
6. Artesian 230/69 kV Sub and loop-in
7. Imperial Valley – Dixieland 230 kV tie with IID
8. Imperial Valley Flow Controller on path to CFE
9. New Hassayampa – North Gila 500 kV line
10. Encina Plant retirement
11. Kearny retirement
12. El Cajon GT retirement
13. Miramar GT retirement
14. Pio Pico Power Plant
15. Encina Repower Project

Areas and sub-areas studied

- El Cajon sub-area
- Mission sub-area
- Bernardo sub-area
- Esco sub-area
- Pala sub-area
- Miramar sub-area
- Border sub-area
- San Diego sub-area
- San Diego-Imperial Valley area

El Cajon Sub-area Critical Contingencies

Category C:

Contingency: loss of El Cajon-Jamacha 69 kV (TL624) followed by loss of Miguel–Granite–Los Coches 69 kV (TL632) or vice versa

Limiting component: Garfield-Murray 69 kV (TL631) overloaded

2015 LCR: 43 MW (includes 0 MW of QF generation)

2019 LCR: 25 MW (includes 0 MW of QF generation)

Effectiveness factors:

All units within this sub-area (El Cajon Calpeak, El Cajon GT and El Cajon Energy Center) have the same effectiveness factor.

Category B:

No requirement.

Mission Sub-area Critical Contingency

Category C:

Contingency: Loss of Mission-Kearny 69 kV (TL663) followed by the loss of Mission-Mesa Heights 69kV (TL676)

Limiting component: Kearny-Clairmont 69kV line (TL670) and Clairmont-Clairmont Tap 69 kV section overloads

2015 LCR: 43 MW (includes 4 MW of QF)

2019 LCR: 43 MW (includes 4 MW of QF and 39 MW of deficiency)

Effectiveness factors:

All units within this sub-area (Kearny and Mesa Hights) have the same effectiveness factor.

Category B:

No requirement.

Bernardo Sub-area Critical Contingency

Category C:

Contingency: Loss of Artesian-Sycamore 69 kV (TL6920) followed by loss of Poway-Rancho Carmel 69 kV (TL648)

Limiting component: Felicita Tap-Bernardo 69 kV (TL689) overloaded

2015 LCR: 160 MW (includes 0 MW of QF and 120 MW of deficiency)

2019 LCR: 0 MW due to the Artesian 230 kV substation upgrade

Effectiveness factors:

Two units in this sub-area (Lake Hodges) have same effectiveness factor.

Category B:

No requirement.

Esco Sub-area Critical Contingency

Category C:

2015 LCR:

Contingency: loss of Poway-Pomerado 69 kV (TL6913) followed by loss of Esco-Escondido 69kV (TL6908)

Limiting component: Bernardo-Rancho Carmel 69kV (TL633) overloaded

LCR need: 120 MW (includes 38 MW of QF generation and 82 MW deficiency)

2019 LCR :

Contingency: loss of Poway-Pomerado 69 kV (TL6913) followed by loss of Bernardo-Rancho Carmel 69kV (TL633)

Limiting component: Esco-Escondido 69kV (TL6908) overloaded

LCR need: 85 MW (includes 38 MW of QF generation and 47 MW of deficiency) after completion of the Bernardo-Rancho Carmel 69kV upgrade

Effectiveness factors:

All units in this sub-area (Goal line) have same effectiveness factor.

Pala Sub-area Critical Contingency

Category C:

Contingency: loss of Pendleton-San Luis Rey 69 kV line (TL6912) followed by loss of Lilac-Pala 69kV (TL6908)

Limiting component: Melrose-Morro Hill Tap 69kV (TL694) overloaded

2015 LCR: 38 MW (includes 0 MW of QF generation)

2019 LCR: 45 MW (includes 0 MW of QF generation)

Effectiveness factors:

All units in this sub-area (Pala) have same effectiveness factor.

Category B:

No requirement.

Border Sub-area Critical Contingency

Category C:

Contingency: loss of Bay Boulevard-Otay 69 kV #1 (TL645) followed by loss of Bay Boulevard-Otay 69 kV #2 (TL646)

Limiting component: Imperial Beach-Bay Boulevard 69 kV (TL647) overloaded

2015 LCR: 65 MW (includes 5 MW of QF generation)

2019 LCR: 60 MW (includes 5 MW of QF generation)

Effectiveness factors:

All units in this sub-area have same effectiveness factor.

Category B:

No requirement.

Miramar Sub-area Critical Contingencies

Category C:

Contingency: loss of OtayMesa-MiguelTap-South Bay 230 kV (TL23042) followed by outage of Sycamore-Palomar 230 kV Line(2015)

loss of Miguel-South Bay 230 kV (TL23042) followed by outage of Sycamore-Penasquitos 230 kV Line (2019)

2015 LCR: 131 MW (includes 0 MW of QF)

2019 LCR: 140 MW (includes 0 MW of QF and 44 MW of deficiency)

Category B:

Contingency: loss of OtayMesa-MiguelTap-South Bay(Miguel-South Bay) 230 kV (TL23042) overlapping with Miramar Energy Facility unit #1 or #2

Limiting component: Sycamore-Scripps 69 kV (TL6916) overloaded

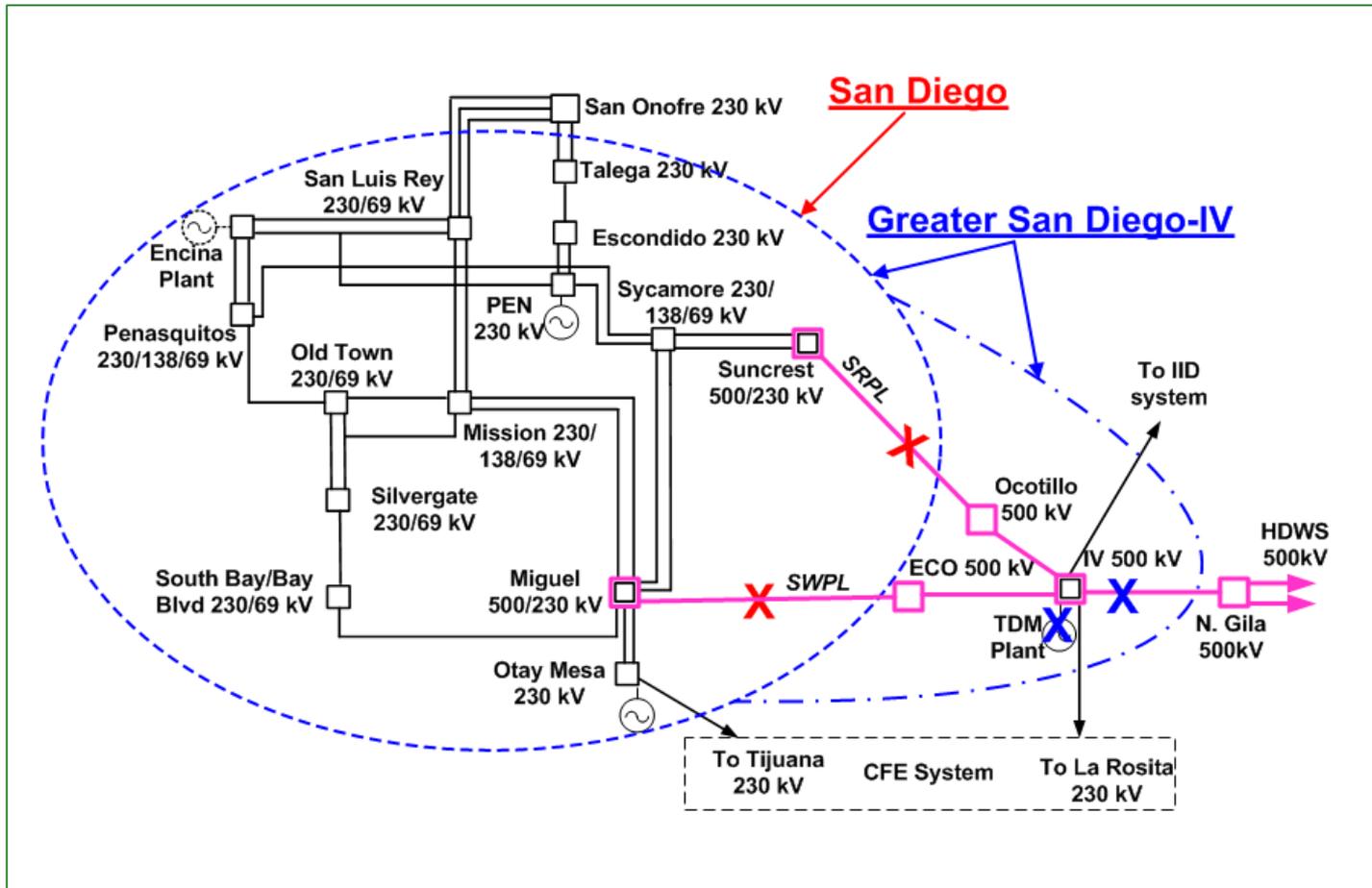
2015 LCR: 95 MW (includes 0 MW of QF and 0 MW of deficiency)

2019 LCR: 98 MW (includes 0 MW of QF and 3 MW of deficiency)

Effectiveness factors:

All units in this sub-area have same effectiveness factor.

San Diego Sub-area and San Diego-Imperial Valley Area



San Diego Sub-area Critical Contingency

Category C:

Contingency: Loss of Ocotillo–Suncrest 500kV line followed by loss of ECO-Miguel 500kV line

Limiting component: post-voltage Instability in SDG&E and SCE's LA Basin

2015 LCR: 3,103 MW (includes 164 MW of QF and 9 MW of wind generation, and no deficiency/surplus)

2019 LCR: 2,508 MW with the Phase Shifter at IV (includes 164 MW of QF and 9 MW of wind generation)

Effectiveness factors:

Units in this sub-area have higher effectiveness factors than units in LA Basin.

San Diego Sub-area Critical Contingency - Cont'd

Category B:

Contingency: Loss of ECO-Miguel 500kV line with Otay Mesa Plant already out of service

Limiting component: Suncrest-Sycamore 230 kV lines (TL23054/TL23055 rated at 1138 MVA) overloaded

2015 LCR: 2,810 MW (includes 164 MW of QF and 9 MW of wind)

2019 LCR: No requirement due to the Phase Shifter at IV

Effectiveness factors:

Units in this sub-area have same effectiveness factors.

San Diego-Imperial Valley Area Critical Contingencies

2015 LCR Results

Category C

Contingency: Loss of IV-N.Gila 500 kV line (TL50002) followed by TDM plant out of service

Limiting component: IV-EI Centro 230 kV tie with IID (S-Line) overload

LCR need: 3,910 MW with 0 MW export from IID (includes 164 MW of QF and 55 MW of Wind)

Category B:

Contingency: TDM Plant out of service followed by loss of IV-N.Gila 500 kV line (TL50002)

Limiting component: IV-EI Centro 230 kV tie with IID (S-Line) overload

LCR need: 3,910 MW with 0 MW export from IID (includes 164 MW of QF and 55 MW of Wind)

San Diego-Imperial Valley Area Critical Contingencies - Cont'd

2019 LCR Results

Category C

Contingency: Loss of IV-N.Gila 500 kV line (TL50002) followed by TDM plant out of service

Limiting component: post-voltage Instability

LCR need: 3,160 MW (includes 164 MW of QF and 55 MW of Wind)

Category B:

Contingency: TDM Plant out of service followed by loss of IV-N.Gila 500 kV line (TL50002)

Limiting component: post-voltage Instability

LCR need: 3,160 MW (includes 164 MW of QF and 55 MW of Wind)

San Diego – Imperial Valley Area LCR

Available Generation	Qualifying Capacity	Wind	Market	Max Qualified Capacity
	MW	MW	MW	MW
2015	164	55	4328	4547
2019	164	55	4004	4223

Study Year	Contingency Type	Generation Capacity Needed	Deficiency	Total LCR
		MW	MW	MW
2015	Category B (Single)	3910	0	3910
	Category C (Multiple)	3910	202	4112
2019	Category B (Single)	3160	3	3163
	Category C (Multiple)	3160	130	3290

Changes

2015 LCR compared to 2014:

- SONGS Retirement
- Load forecast went up by 171 MW
- Overall LCR need increased only by 49 MW in 2015 due to the Talega SC project, IV-Dixieland 230 kV project postponed, and the new approach to fully use generating units in the San Diego sub-area in order to minimize over whole LCR need in the SDGE and SCE's LA Basin sub-areas.

2019 LCR compared to 2018:

- Load forecast decreased by 166 MW
- Overall LCR need reduced by 73 MW

From last stakeholder call:

- Updated NQC
- Small changes to sub-area needs
- Overall decrease of 2019 LCR needs by 490 MW

Your comments and questions are welcome

For written comments, please send to: RegionalTransmission@caiso.com