



California ISO
Shaping a Renewed Future

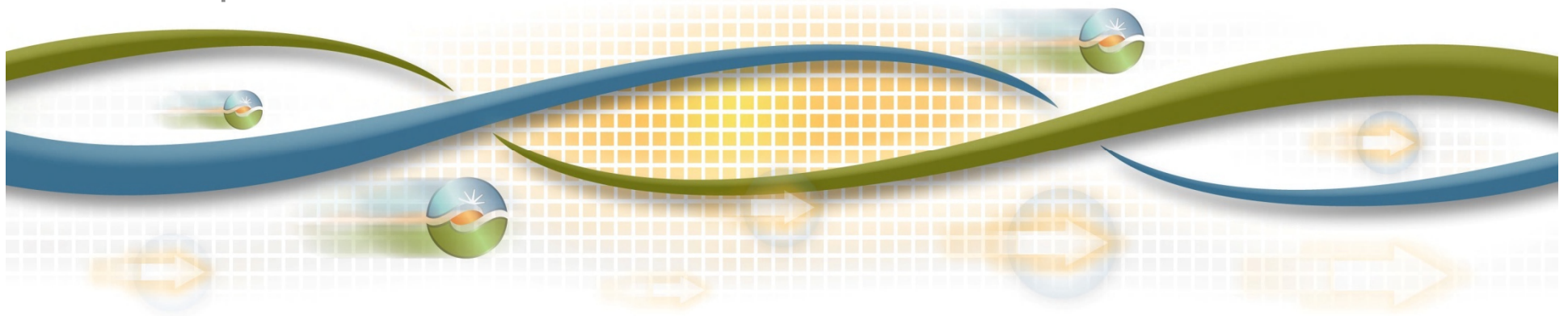
2014 and 2018 Final LCR Study Results - San Diego-Imperial Valley

Frank Chen

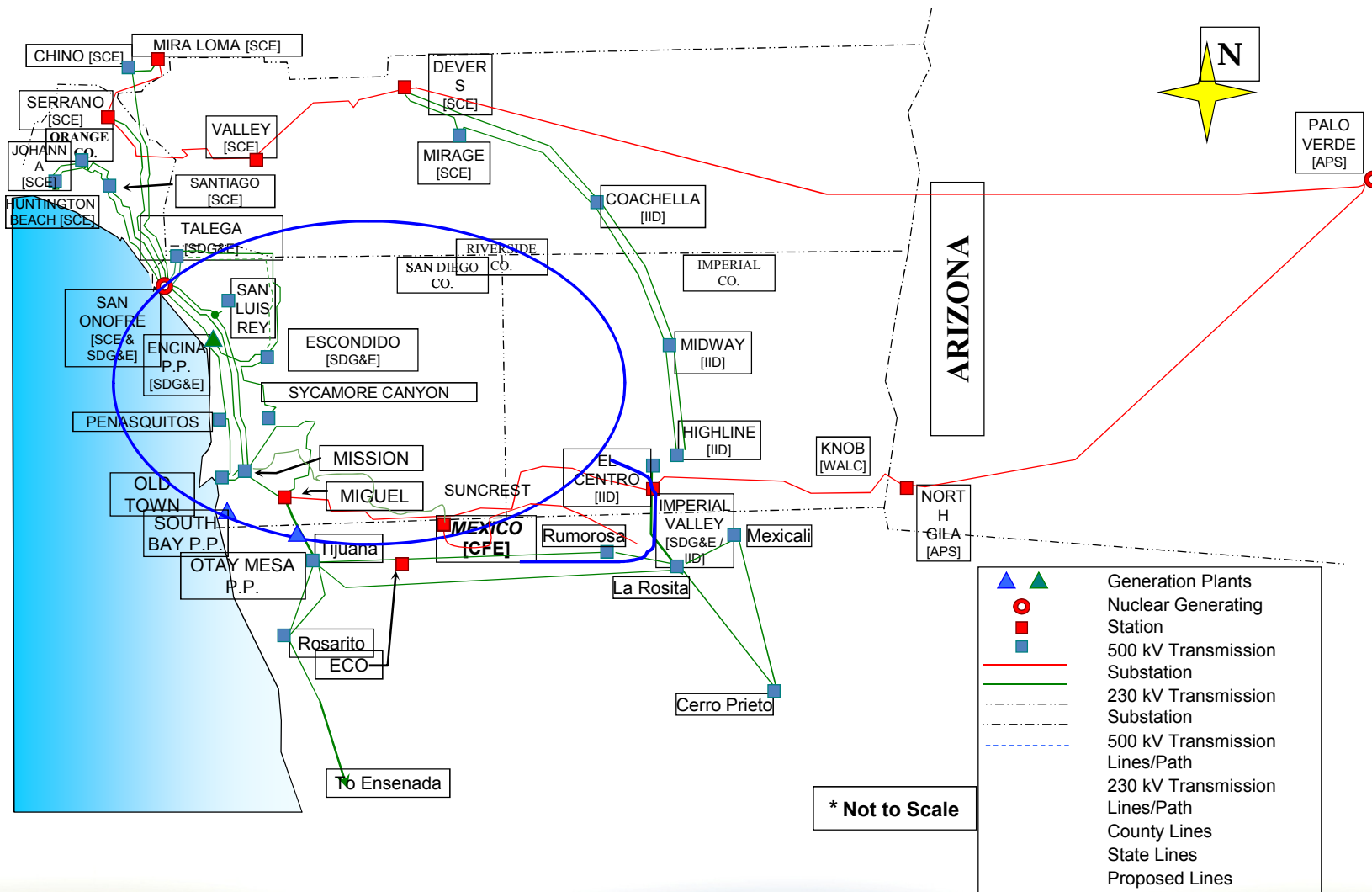
Senior Regional Transmission Engineer

Stakeholder Conference Call

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San Diego-Imperial Valley LCR Area



San Diego-Imperial Valley Area Load and Resources

		2014	2018
Load	=	5,073	5,497
Transmission Losses	=	127	166
Total Area Load	=	5,200	5,663
Market Generation	=	4,506	5,914
Muni Generation	=	0	0
Wind Generation	=	38	100
QF Generation	=	162	162
Total Qualifying Capacity	=	4,706	6,176



Major New Transmission Upgrades Modeled

2014 Base Case

1. New Imperial Valley – Dixieland 230kV line
2. East County 500kV Substation (ECO)



Major New Transmission Upgrades Modeled

2018 Base Case

1. Reconductor of El Cajon – Los Coches 69 kV line
2. Reconductor of Mission – Clairmont 69 kV line
3. Reconductor of Mission – Kearny 69 kV line
4. Reconductor of Mission – Mesa Heights 69 kV line
5. A new Sycamore – Bernardo 69 kV line
6. Reconductor Bernardo-Rancho Carmel 69 kV line
7. Reconductor of Sycamore – Chicarita 138 kV line



Areas and sub-areas studied

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

El Cajon Sub-area Critical Contingencies

Category B:

Contingency: loss of Miguel-Granite-Los Coches 69 kV (TL632) with one El Cajon unit out of service.

Limiting component: El Cajon-Los Coches 69 kV (TL631) overloaded

2014 LCR need: 54 MW (includes 0 MW of QF generation)

2018: no requirement due to El Cajon-Los Coches 69 kV (TL631) Rewiring

Category C:

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

Limiting component: El Cajon-Los Coches 69 kV (TL631) overloaded

2014 LCR need: 85 MW (includes 0 MW of QF generation)

2018: no requirement due to El Cajon-Los Coches 69 kV (TL631) Rewiring



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: Mission-Clairmont 69kV (TL670) overloaded

2014 LCR need: 219 MW (includes 3 MW of QF and 120 MW of deficiency)

2018: no requirement due to Mission-Clairmont 69 kV (TL670) Rewiring

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
2014 LCR need: 120 MW (includes 0 MW of QF and 80 MW of deficiency)

2018: no requirement due to Felicita Tap-Bernardo 69 kV (TL689)
Rewiring

Category B:

No requirement.

Esco Sub-area Critical Contingency

Category C:

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

Limiting component: Bernardo-Rancho Carmel 69kV (TL633) overloaded
2014 LCR need: 110 MW (includes 37 MW of QF generation and 73 MW of deficiency)

2018 LCR need: 65 MW (includes 37 MW of QF generation and 28 MW of deficiency)

Category B:

No requirement.

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

2014 LCR need: 35 MW (includes 0 MW of QF generation)

2018 LCR need: 58 MW (includes 0 MW of QF generation)

Category B:

No requirement.

Encinitas Sub-area Critical Contingency

Category C:

Contingency: loss of Escondido-OMWD 69 kV (TL6930) followed by loss of North City-Penasquitos 69kV (TL6952)

Limiting component: Penasquitos-Del Mar 69 kV (TL666) overloaded

2014 LCR need: no requirement due to lower load

2018 LCR need: 20 MW (includes 0 MW of QF generation)

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

2014 LCR need: 60 MW (includes 5 MW of QF generation)

2018 LCR need: 55 MW (includes 5 MW of QF generation)

Category B:

No requirement.

Miramar Sub-area Critical Contingencies

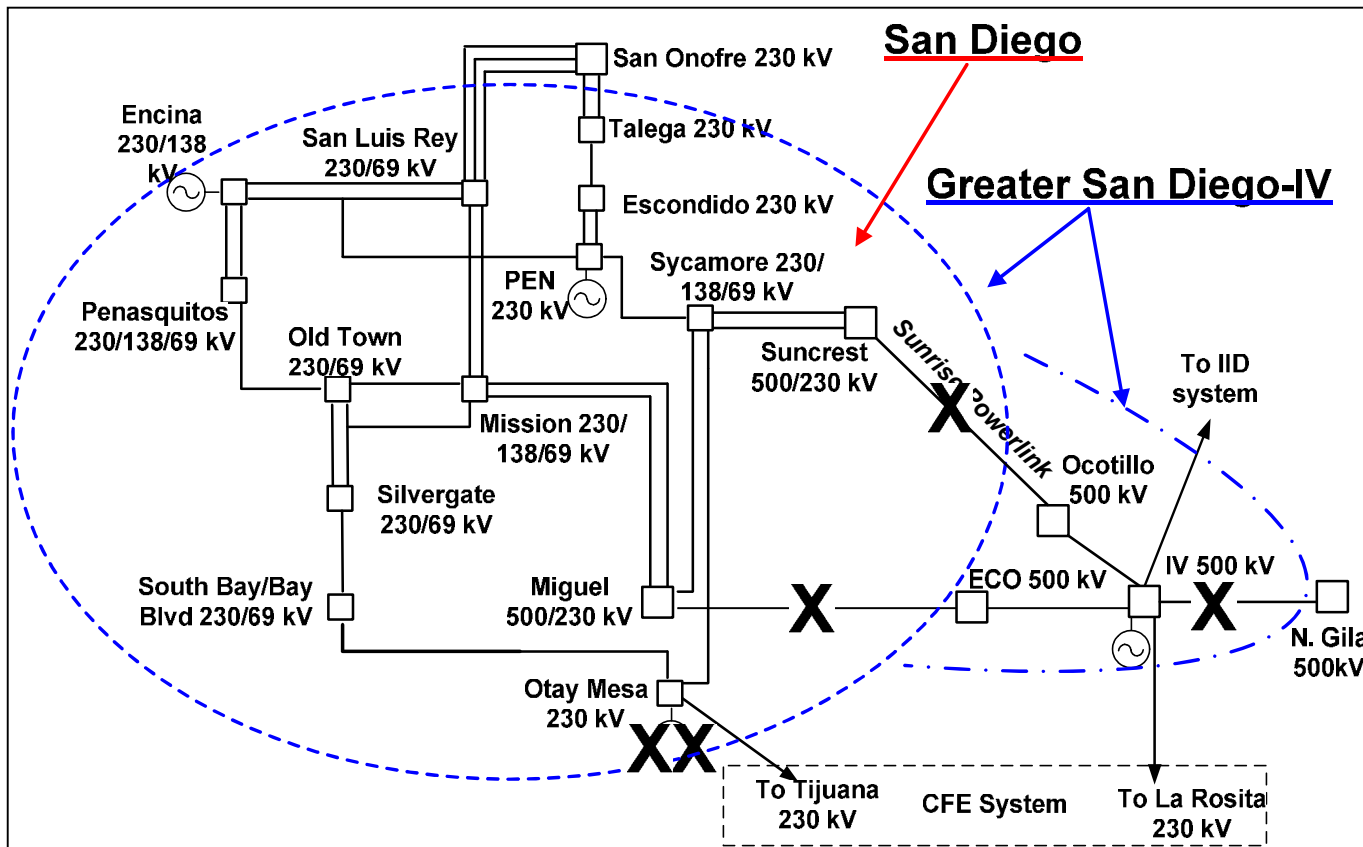
Category B:

Contingency: loss of OtayMesa-MiguelTap-Silvergate (Miguel-South Bay) 230 kV (TL23042) overlapping with Miramar Energy Facility unit #1 or #2
Limiting component: Sycamore-Scripps 69 kV (TL6916) overloaded
2014: 96 MW (includes 0 MW of QF and 0 MW of deficiency)
2018: 98 MW (includes 0 MW of QF and 2 MW of deficiency)

Category C:

Contingency: loss of OtayMesa-MiguelTap-Silvergate (Miguel-South Bay) 230 kV (TL23042) followed by loss of Sycamore 230/138kV Bank
Limiting component: Sycamore-Scripps 69kV (TL6916) overloaded
2014: 128 MW (includes 0 MW of QF and 32 MW of deficiency)
2018: 120 MW (includes 0 MW of QF and 24 MW of deficiency)

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



San Diego Sub-area Critical Contingencies

Category B:

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

Limiting component: Reactive Margin

2014:

- 2 SONGS: 2,370 MW (includes 170 MW of QF/Wind)
- 1 SONGS: 2,885 MW (includes 170 MW of QF/Wind)
- 0 SONGS: 3,103 MW (includes 170 MW of QF/Wind, and 167 MW of deficiency)

2018:

- 2 SONGS: 2,790 MW (includes 170 MW of QF/Wind)

San Diego Sub-area Critical Contingencies (contd.)

Category C:

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

Limiting component: Reactive Margin

2014: - 2 SONGS: Non binding

- 1 SONGS: Non binding

- 0 SONGS: 3,394 MW (includes 170 MW of QF/Wind, and
458 MW of deficiency)

2018: - 2 SONGS: 2,893 MW (includes 170 MW of QF/Wind)

San Diego-Imperial Valley Area Critical Contingencies

Category B:

Contingency: Loss of Imperial Valley-North Gila 500 kV line (TL50002) overlapping with Otay Mesa plant already out of service (or vice versa)

Limiting component:

- 2 SONGS: 2500 MW Limit @ Path 44 (N to S)
- 1 SONGS: Reactive Margin
- 0 SONGS: Reactive Margin

2014:

- 2 SONGS: 2,945 MW (includes 200 MW of QF/Wind)
- 1 SONGS: 3,120 MW (includes 200 MW of QF/Wind)
- 0 SONGS: 3,605 MW (includes 200 MW of QF/Wind)

2018:

- 2 SONGS: 3,310 MW (includes 158 MW of QF/Wind)

San Diego-Imperial Valley Area Critical Contingencies (contd.)

Category C – Non binding:

Contingency: Loss of Imperial Valley-North Gila 500 kV line (TL50002)
followed by Otay Mesa plant out of service

Limiting component:

- 2 SONGS: 2500 MW Limit @ Path 44 (N to S)
- 1 SONGS: 2500 MW Limit @ Path 44 (N to S)
- 0 SONGS: Reactive Margin

2014:

- 2 SONGS: 2,945 MW (includes 200 MW of QF/Wind)
- 1 SONGS: 2,820 MW (includes 200 MW of QF/Wind)
- 0 SONGS: 3,403 MW (includes 200 MW of QF/Wind)

2018:

- 2 SONGS: 3,310 MW (includes 158 MW of QF/Wind)

San Diego – Imperial Valley Area LCR

Available Generation	Qualifying Capacity	Wind	Market	Max Qualified Capacity
	MW	MW	MW	MW
2014	162	38	4506	4706
2018	162	100	5914	6176

Study Year	Contingency Type	Generation Capacity Needed	Deficiency	Total LCR
		MW	MW	MW
2014	Category B (Single)	3605	167	3772
	Category C (Multiple)	3605	458	4063
2018	Category B (Single)	3310	2	3312
	Category C (Multiple)	3310	52	3362

Changes

2014 LCR compared to 2013:

- Load forecast went up by 86 MW.
- Overall LCR need has increased by 168 MW mainly due to deficiency increase in Mission sub-area.
- Includes LCR sensitive studies with three SONGS scenarios.

2018 LCR compared to 2017:

- Load forecast went up by 157 MW.
- Overall LCR need has increased by 185 MW.

Since our last stakeholder meeting:

- Updated NQC.
- Updated results based on additional analysis.

Your comments and questions are welcome.

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