



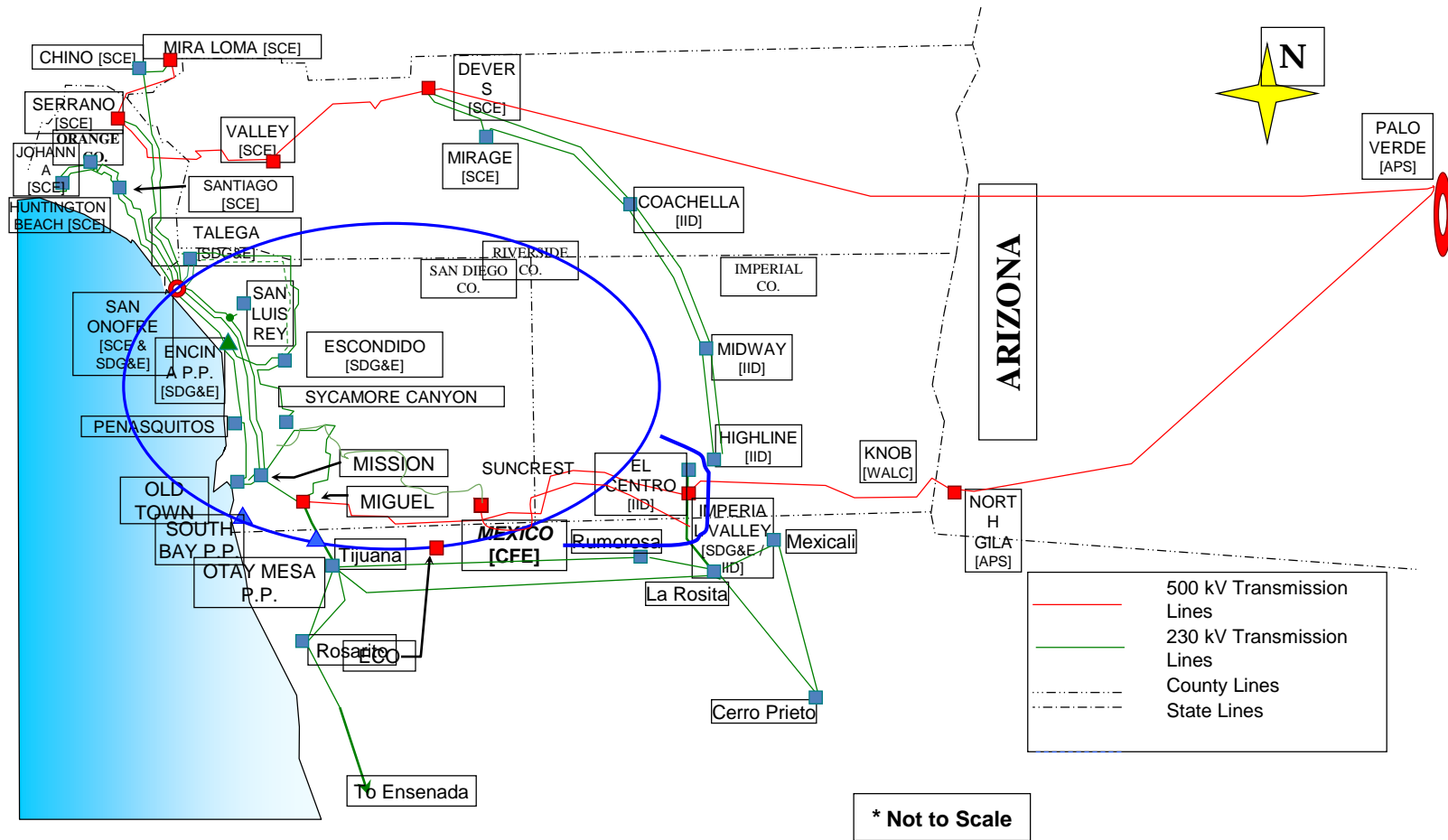
# 2020 & 2024 Final LCR Study Results SDG&E Non-Bulk System

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Stakeholder Call

April 10, 2019

# San Diego Non-Bulk LCR Area



# Major Network Upgrades Modeled by 2020

1. Ocean Ranch 69 kV substation
3. Mesa Height TL600 Loop-in
4. Re-conductor of Mission-Mesa Heights 69 kV
4. Re-conductor of Kearny-Mission 69 kV line
5. TL6906 Mesa Rim loop-in
6. Upgrade Bernardo - Rancho Carmel 69kV line
7. 2nd Miguel–Bay Boulevard 230 kV line
8. Suncrest SVC project
9. TL632 Granite loop-in and TL6914 reconfiguration
10. 2nd Poway–Pomerado 69 kV line
11. IV Bank 80 Replacement
12. Generation retirements at Encina, North Island, and Division Naval Station
13. Carlsbad Energy Center (Encina repower) (5x100 MW)
14. Storage projects at Melrose (40 MW)

# Additional Network Upgrades by 2024

1. 2nd San Marcos–Escondido 69kV line
2. Reconductor of Stuart Tap–Las Pulgas 69 kV line (TL690E)
3. Artesian 230 kV expansion with 69kV upgrade
4. IID's S-Line Upgrade
5. South Orange County Reliability Enhancement
6. Storage projects at Avocado (70 MW)

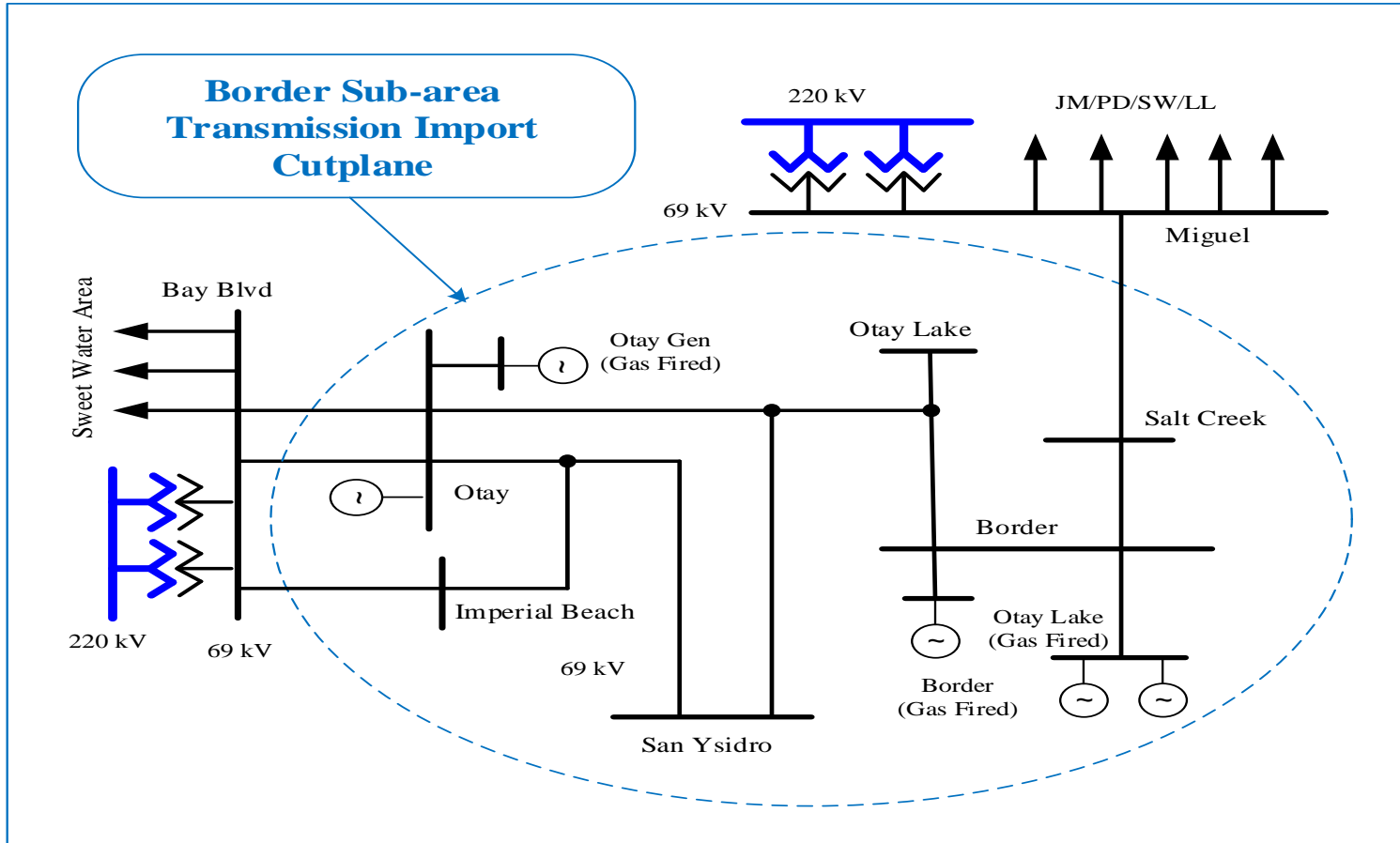
## Areas and sub-areas studied:

- Border sub-area
- El Cajon sub-area
- Esco sub-area
- Pala sub-area
- Mission sub-area
- Miramar sub-area

# Border Subarea: Load and Resources

		2020	2024
<b>Load (MW)</b>	Gross Load	165	173
	AAEE	-8	-8
	Behind-The-Meter PV	0	0
	Net Load	157	164
	Transmission Loss	2	3
	<b>Net Load + Loss</b>	<b>159</b>	<b>167</b>
<b>Resources (MW)</b>	Gas-Fired	176	176
	Solar PV	0	0
	Wind	0	0
	QF/Other	2	2
	Demand Response	0	0
	Energy Storage	0	0

# Border Subarea: One-line diagram

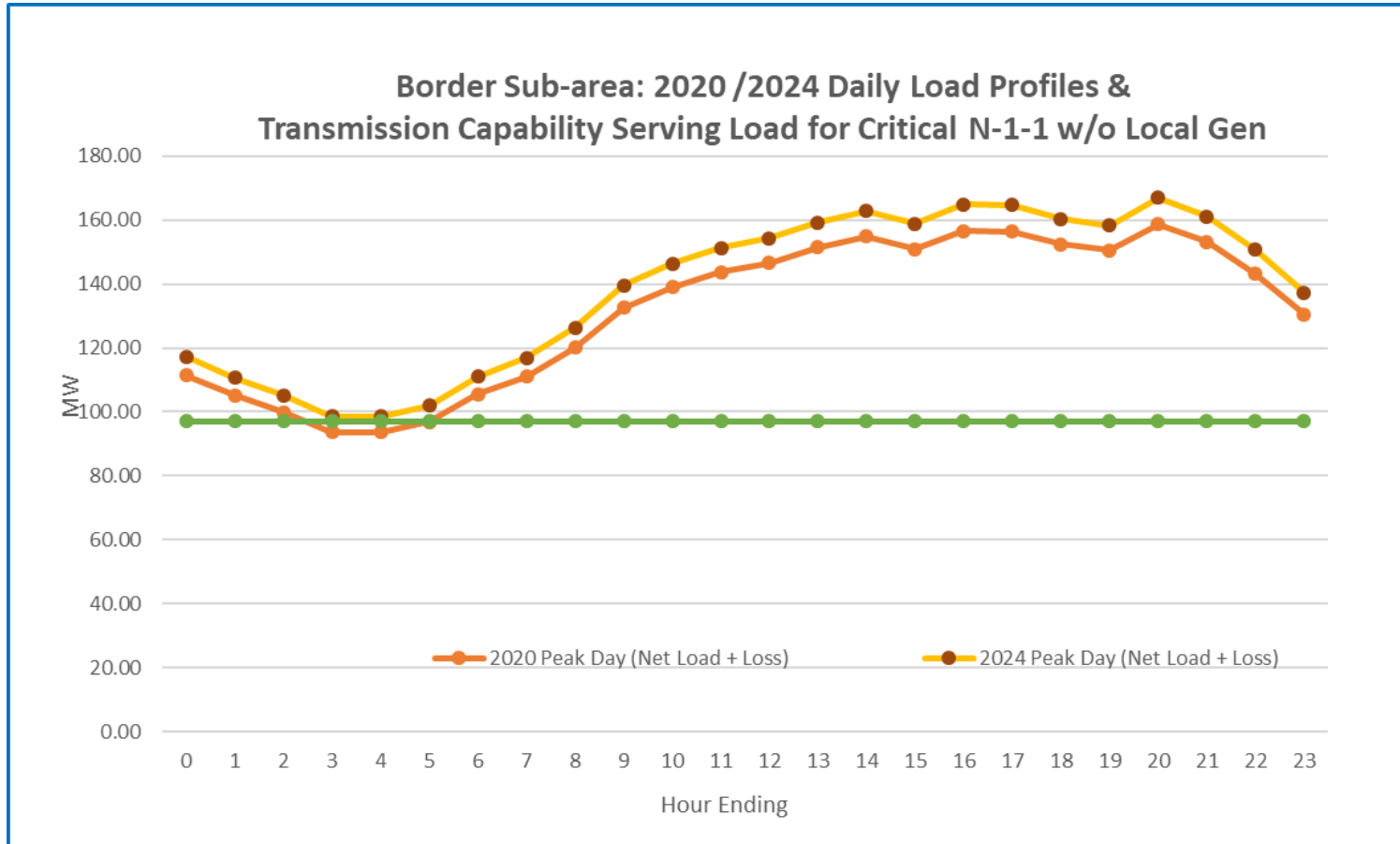


# Border Sub-area: LCR Requirement

Year	Category	Contingency	Limiting Facility	LCR (MW)
2020	B	Miguel-Salt Creek 69 kV #1 (TL6910)	Otay-Otay Lake Tap 69 kV (TL649) with the Border unit out of service	61
	C	Bay Boulevard-Otay 69 kV #1 & #1 (TL645 & TL646)	Imperial Beach-Bay Boulevard 69 kV (TL647)	65
2024	B	Miguel-Salt Creek 69 kV #1 (TL6910)	Otay-Otay Lake Tap 69 kV (TL649) with the Border unit out of service	66
	C	Bay Boulevard-Otay 69 kV #1 & #1 (TL645 & TL646)	Imperial Beach-Bay Boulevard 69 kV (TL647)	76



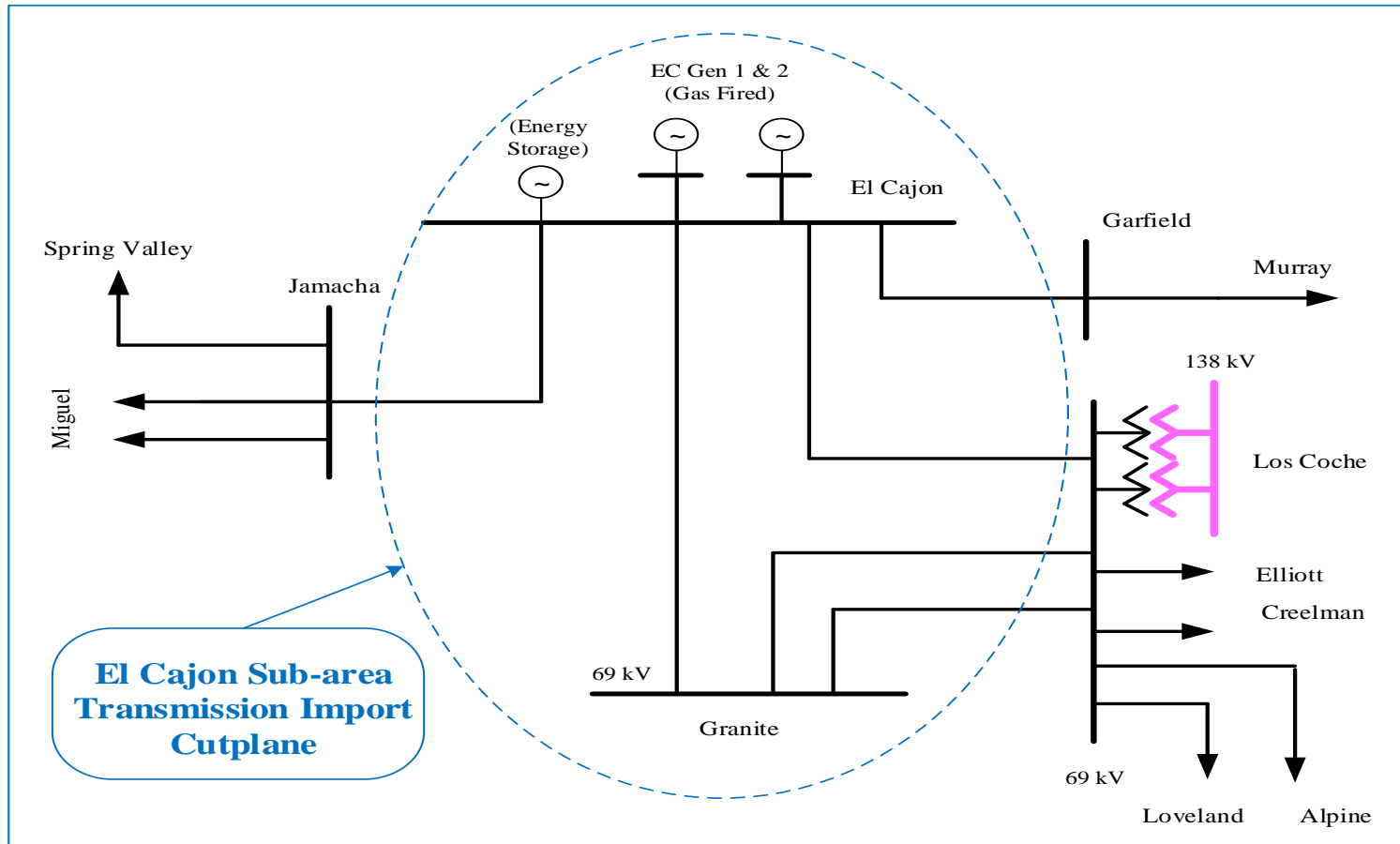
# Border Sub-area: Load Profiles & Transmission Capability



## El Cajon Sub-area: Load and Resources

		2020	2024
<b>Load (MW)</b>	Gross Load	172	180
	AAEE	-5	-5
	Behind-The-Meter PV	0	0
	Net Load	167	175
	Transmission Loss	3	3
	Net Load + Loss	170	178
<b>Resources (MW)</b>	Gas-Fired	93	93
	Solar PV	0	0
	Wind	0	0
	QF/Other	0	0
	Demand Response	0	0
	Energy Storage	8	8

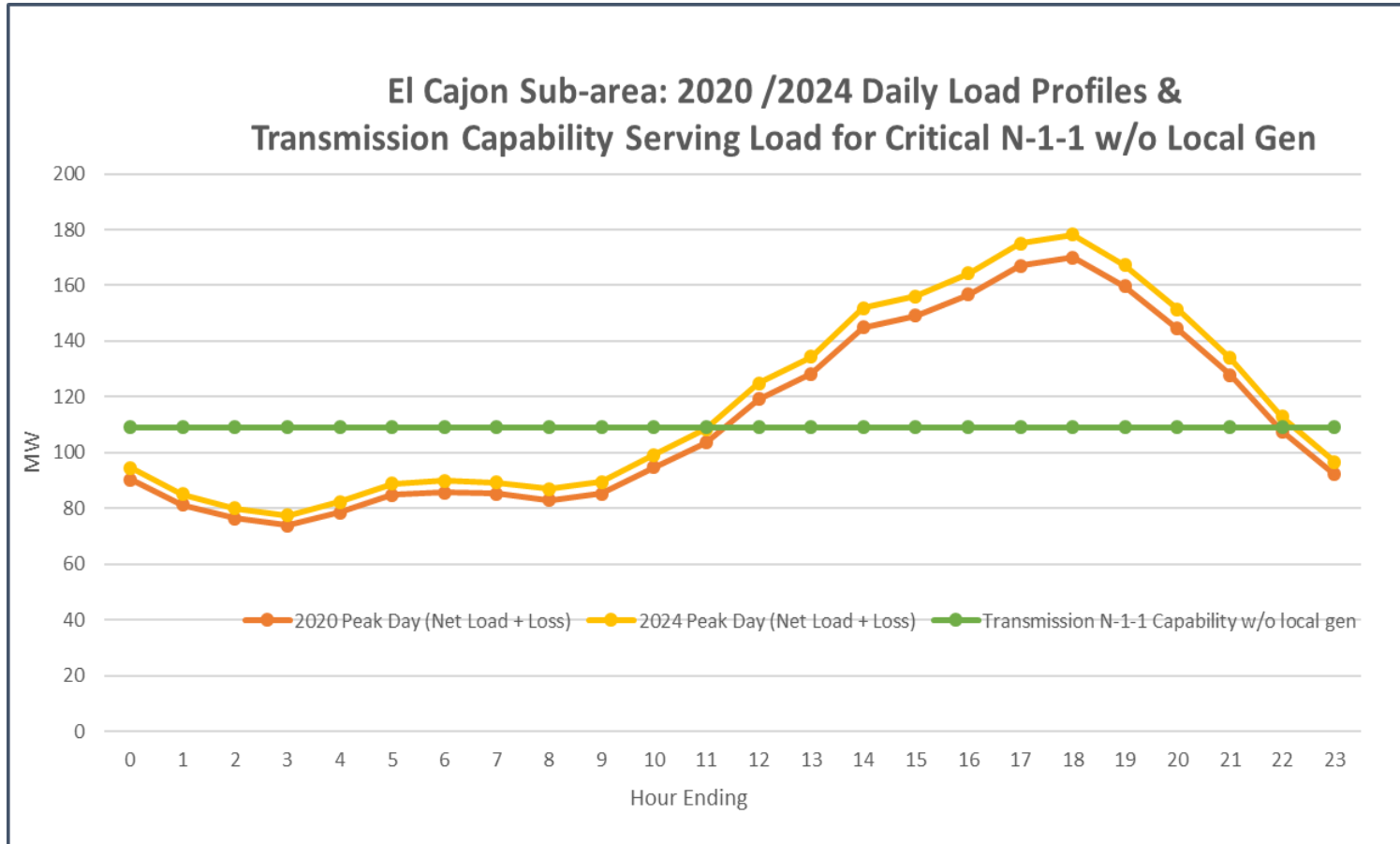
# El Cajon Subarea: One-line diagram



# El Cajon Sub-area: LCR Requirement

Year	Category	Contingency	Limiting Facility	LCR (MW)
2020	B	None	None	0
	C	Granite – Los Coches 69 kV lines #1 & #2	El Cajon-Los Coches 69 kV (TL631)	78
2024	B	None	None	0
	C	Granite – Los Coches 69 kV lines #1 & #2	El Cajon-Los Coches 69 kV (TL631)	76

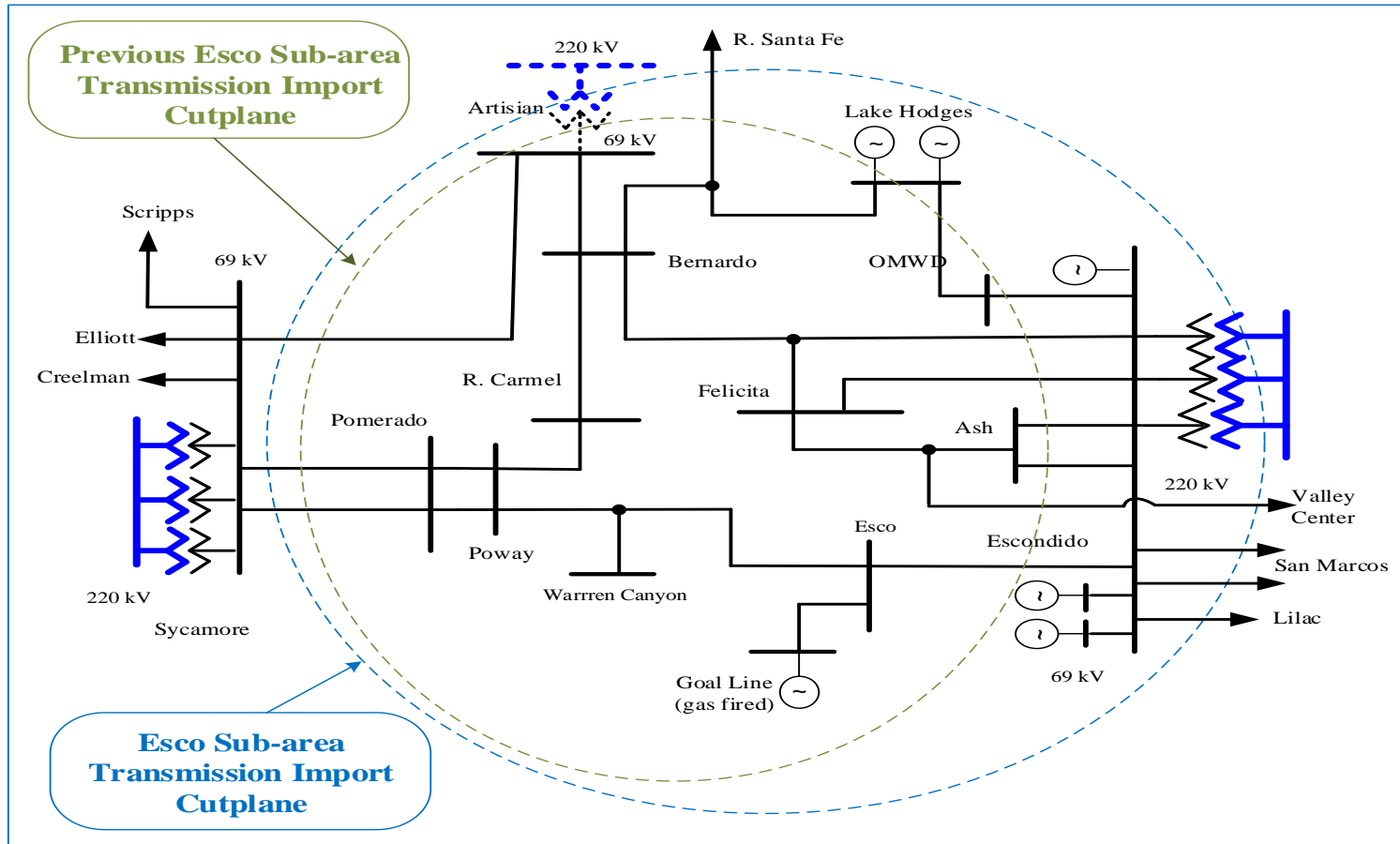
# El Cajon Sub-area: Load Profiles & Transmission Capability



# Esco Sub-area: Load and Resources

		2020	2024
<b>Load (MW)</b>	Gross Load	529	553
	AAEE	-17	-17
	Behind-The-Meter PV	0	0
	Net Load	512	536
	Transmission Loss	5	5
	Net Load + Loss	517	541
<b>Resources (MW)</b>	Gas-Fired	133	133
	Solar PV	4	4
	Wind	0	0
	Hydro	40	40
	QF/Other	0	0
	Demand Response	0	0
	Energy Storage	30	30

# Esco Subarea: One-line diagram

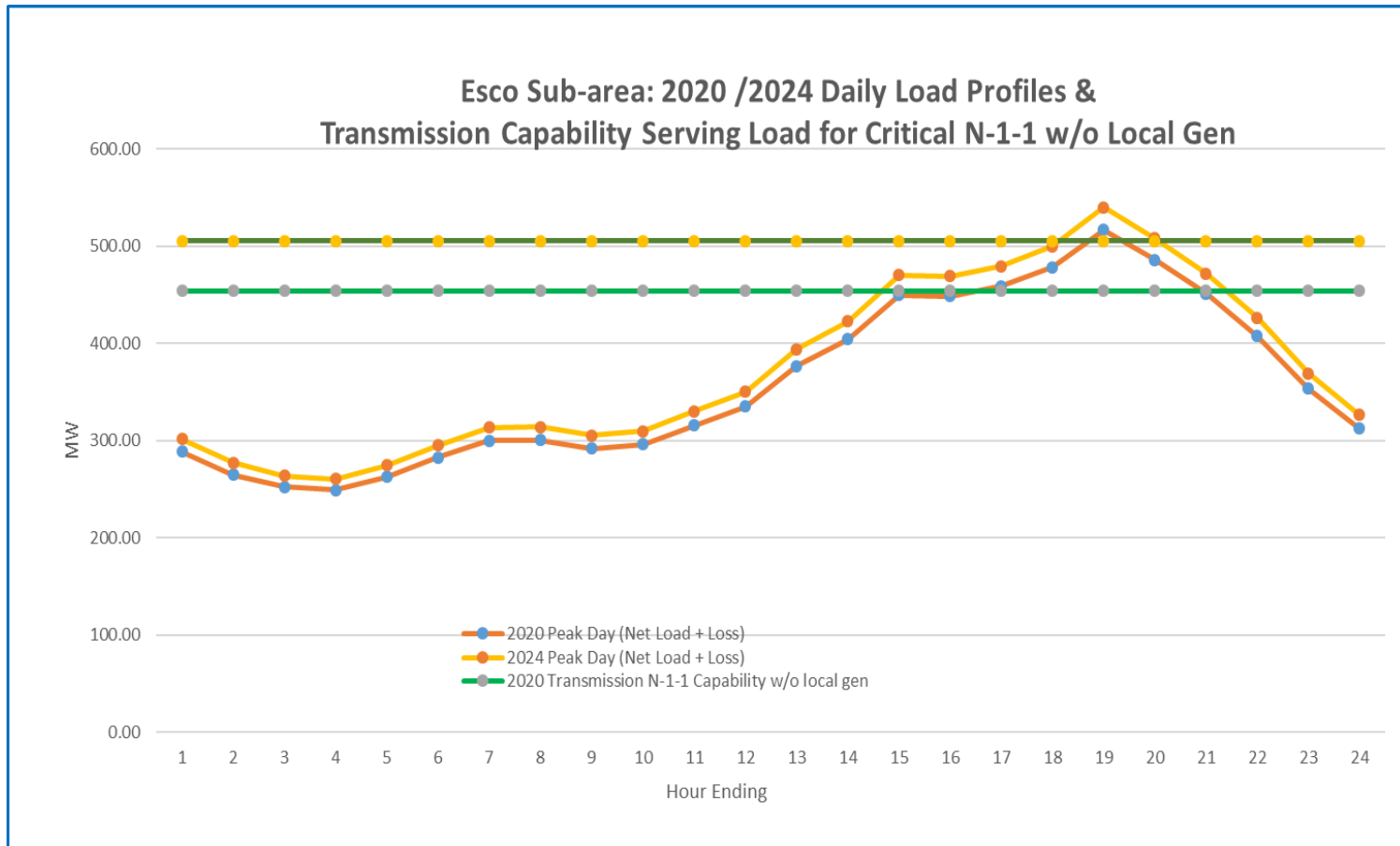


# Esco Sub-area: LCR Requirement

Year	Category	Contingency	Limiting Facility	LCR (MW)
2020	B	None	None	0
	C	One of Sycamore-Pomerado 69 kV (TL6915 or TL6924) and Sycamore-Artesian 69 kV (TL6920) lines	remaining Sycamore-Pomerado 69 kV line	140
2024	B	None	None	0
	C	One of Sycamore-Pomerado 69 kV (TL6915 or TL6924) lines and Artesian 230/69kV bank	remaining Sycamore-Pomerado 69 kV line	77



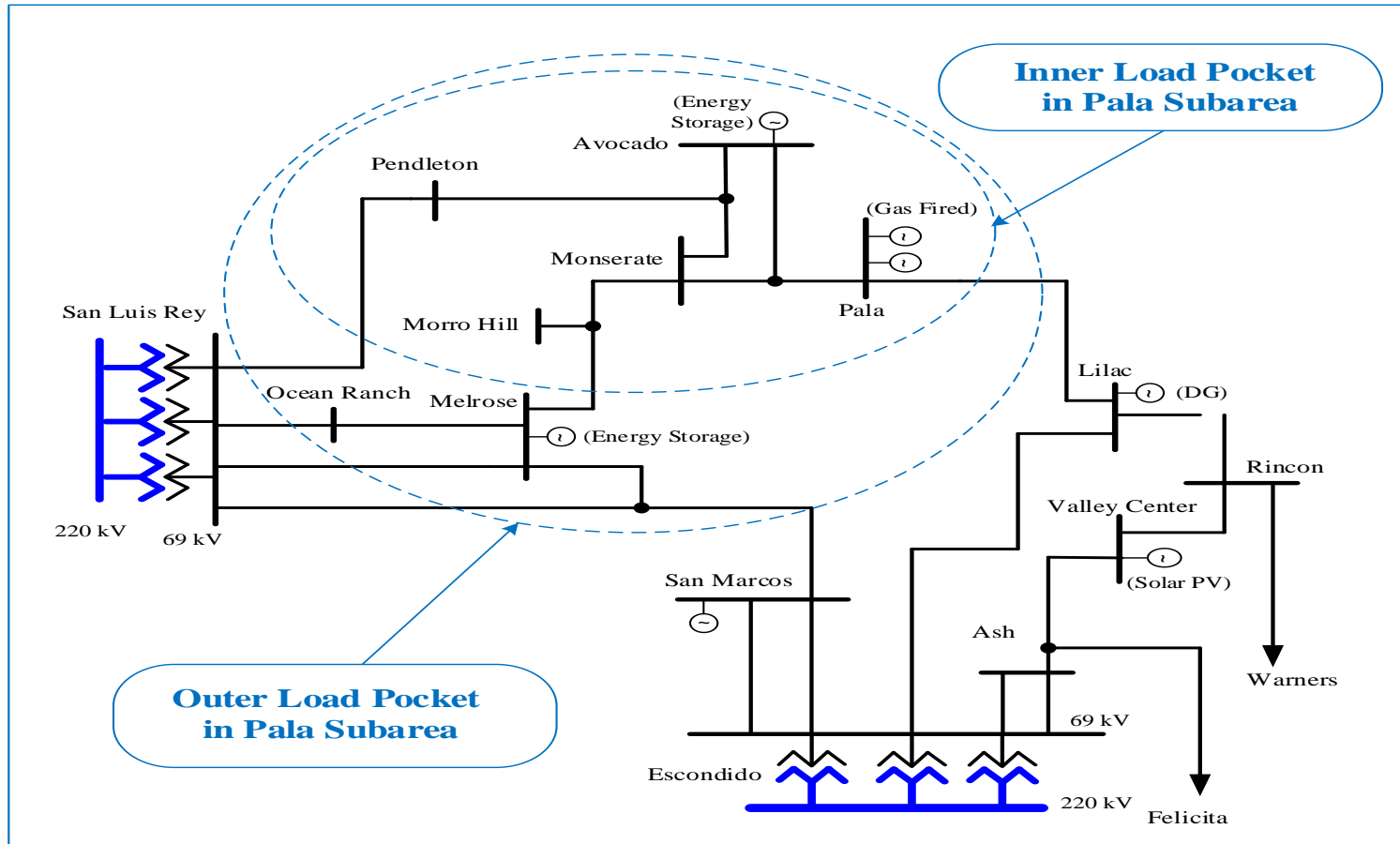
# Esco Sub-area: Load Profiles & Transmission Capability



# Pala Sub-area (Outer Load Pocket): Load and Resources

		2020	2024
<b>Load (MW)</b>	Gross Load	262	273
	AAEE	-10	-10
	Behand-The-Meter PV	0	0
	Net Load	252	263
	Transmission Loss	7	7
	Net Load + Loss	259	270
<b>Resources (MW)</b>	Gas-Fired	96	96
	Solar PV	0	0
	Wind	0	0
	QF/Other	2	2
	Demand Response	0	0
	Energy Storage	11	81

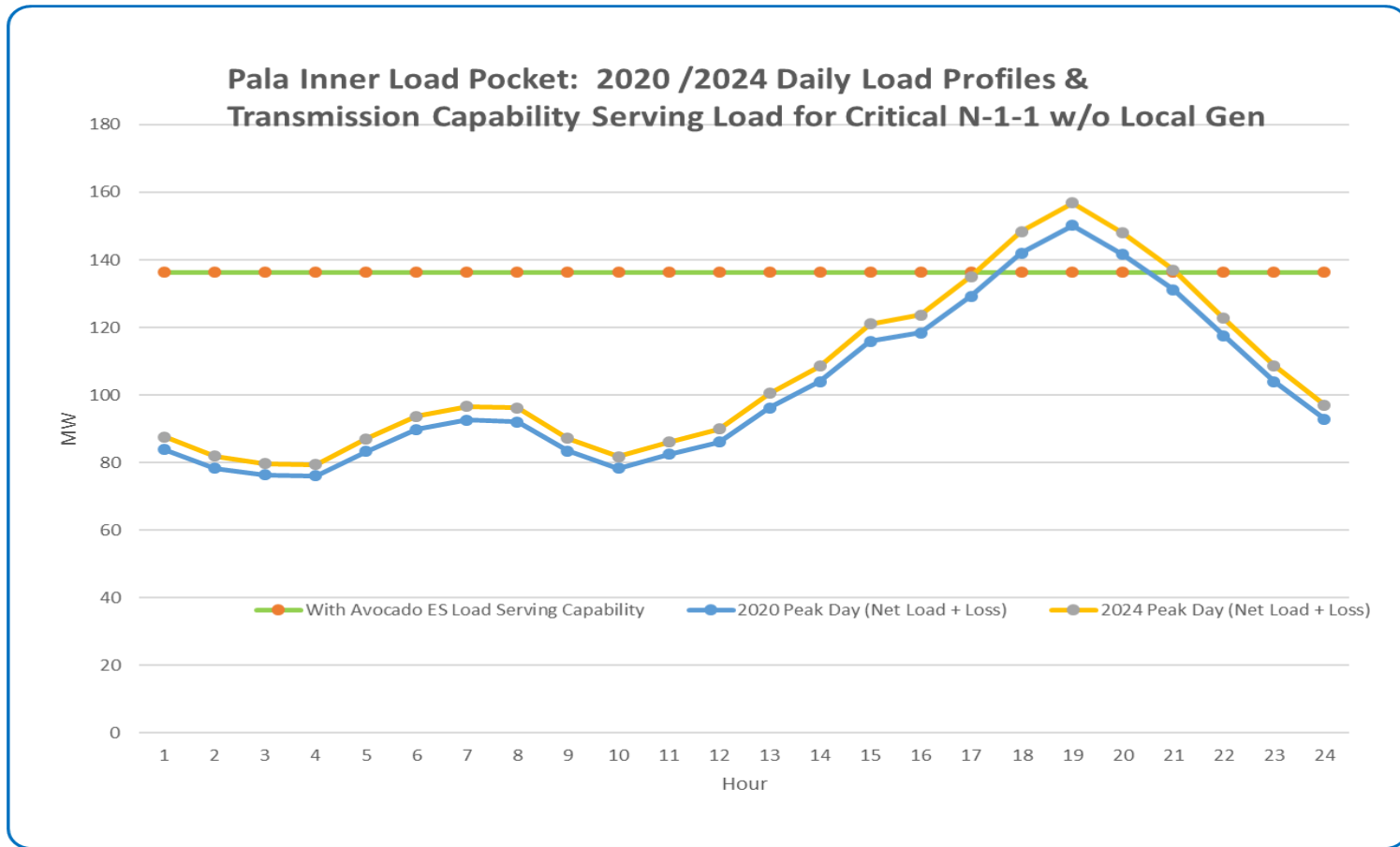
# Pala Subarea: One-line diagram



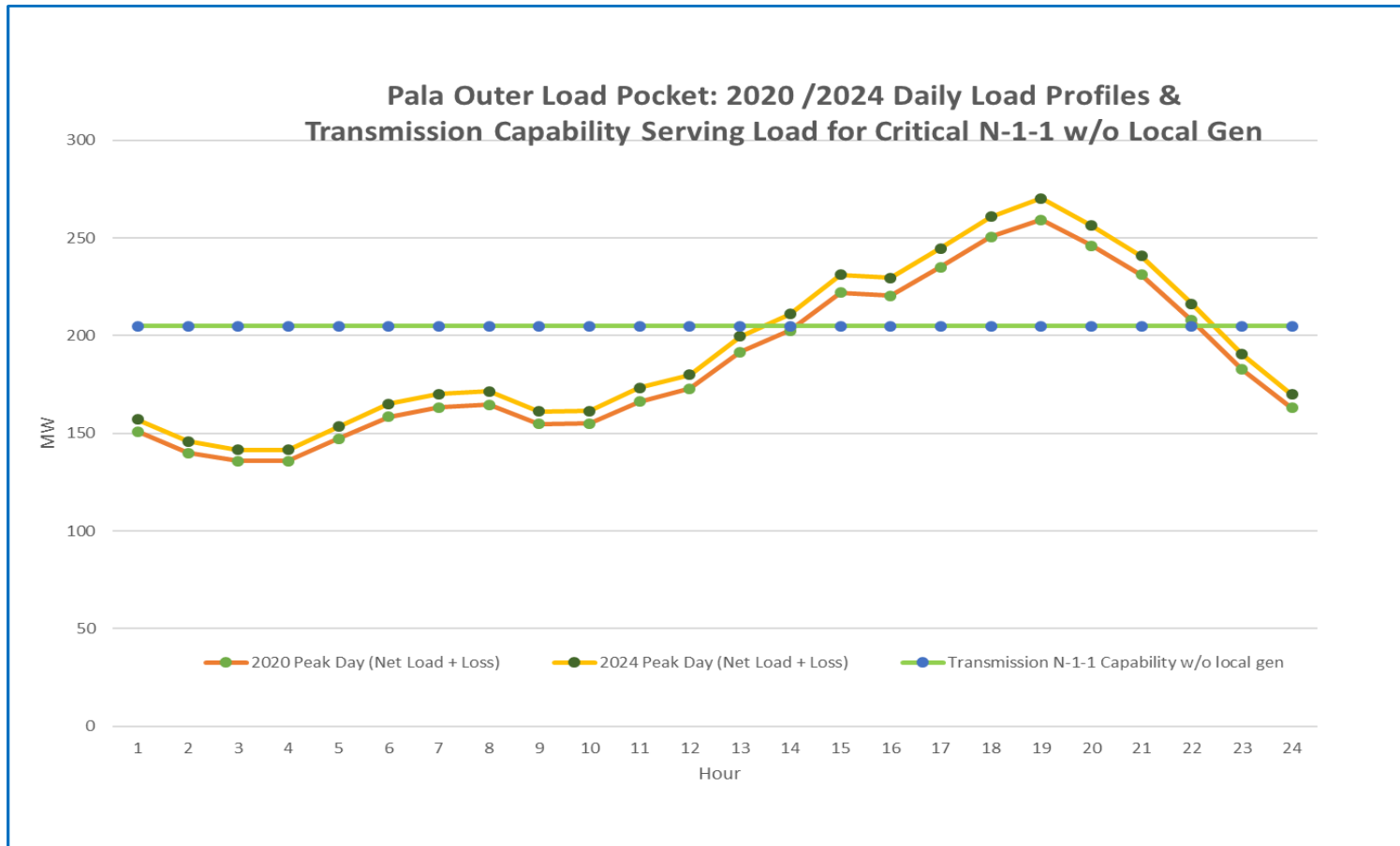
# Pala Sub-area: LCR Requirement

Sub-area	Year	Category	Contingency	Limiting Facility	LCR (MW)
Pala Inner Load Pocket	2020	B	none	none	0
		C	Pendleton-San Luis Rey 69 kV line (TL6912) and Lilac-Pala 69kV (TL6908)	Melrose-Morro Hill Tap 69kV (TL694)	19
	2024	B	none	none	0
		C	Pendleton-San Luis Rey 69 kV line (TL6912) and Lilac-Pala 69kV (TL6908)	Melrose-Morro Hill Tap 69kV (TL694)	25
Pala Outer Load Pocket	2020	B	none	none	0
		C	San Luis Rey-Melrose (TL693) and San Luis Rey-Melrose-San Marcos 3-terminal (TL680) 69 kV lines	San Luis Rey-Ocean Ranch 69kV overloaded	65
	2024	B	none	none	0
		C	San Luis Rey-Melrose (TL693) and San Luis Rey-Melrose-San Marcos 3-terminal (TL680) 69 kV lines	San Luis Rey-Ocean Ranch 69kV overloaded	90

# Pala Sub-area Inner Load Pocket: Load Profiles & Transmission Capability



# Pala Sub-area Outer Load Pocket: Load Profiles & Transmission Capability



## Mission Sub-area

**No LCR requirement in 2020 and 2024 due to completions of the T600 Loop-in to Mesa Heights 69 kV and TL676 Mission – Mesa Heights 69 kV re-conductor projects.**

## Miramar Sub-area

**No LCR requirement in 2020 and 2024 due to addition of the Sycamore-Penasquitos 230 kV project.**



# LCR Changes Compared to Previous Results

Sub-Area	2019 LCR	2020 LCR	2023 LCR	2024 LCR	Major Reason for Change
	(MW)	(MW)	(MW)	(MW)	
Border	100	65	108	76	load forecast variation
El Cajon	88	78	35	76	network upgrade and load increase
Esco	0	140	20	77	expanded sub-area and load increase
Pala Inner Pocket	10	19	10	25	load increase
Pala Outer Pocket	N/A	65	N/A	90	new Ocean Ranch substation
Mission	0	0	0	0	N/A
Miramar	0	0	0	0	N/A

# Changes Compared to Draft LCR Results

Sub-Area	Draft LCR		Final LCR		Reason for LCR Change
	2020 (MW)	2024 (MW)	2020 (MW)	2024 (MW)	
Border	65	76	65	76	none
El Cajon	78	76	78	76	
Esco	140	77	140	77	
Pala Inner Pocket	19	25	19	25	
Pala Outer Pocket	65	90	65	90	
Mission	0	0	0	0	
Miramar	0	0	0	0	