



GENERATION UTILIZATION UPDATE

PRESENTED BY:

Kevin Pollo

Vice President, Energy Supply & Market Operations

May 26, 2022

Informational Update

AGENDA

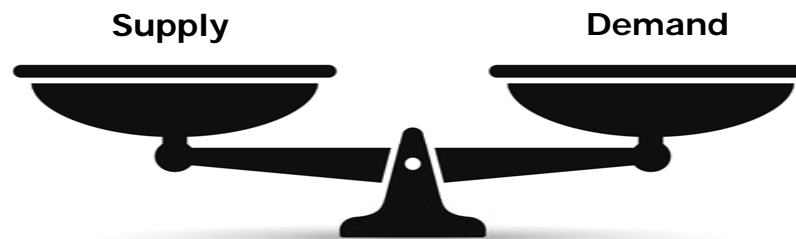


- PEAK PLANNING
- RESERVE MARGIN
- UTILIZATION UPDATE: ENERGY & ANCILLARY SERVICES

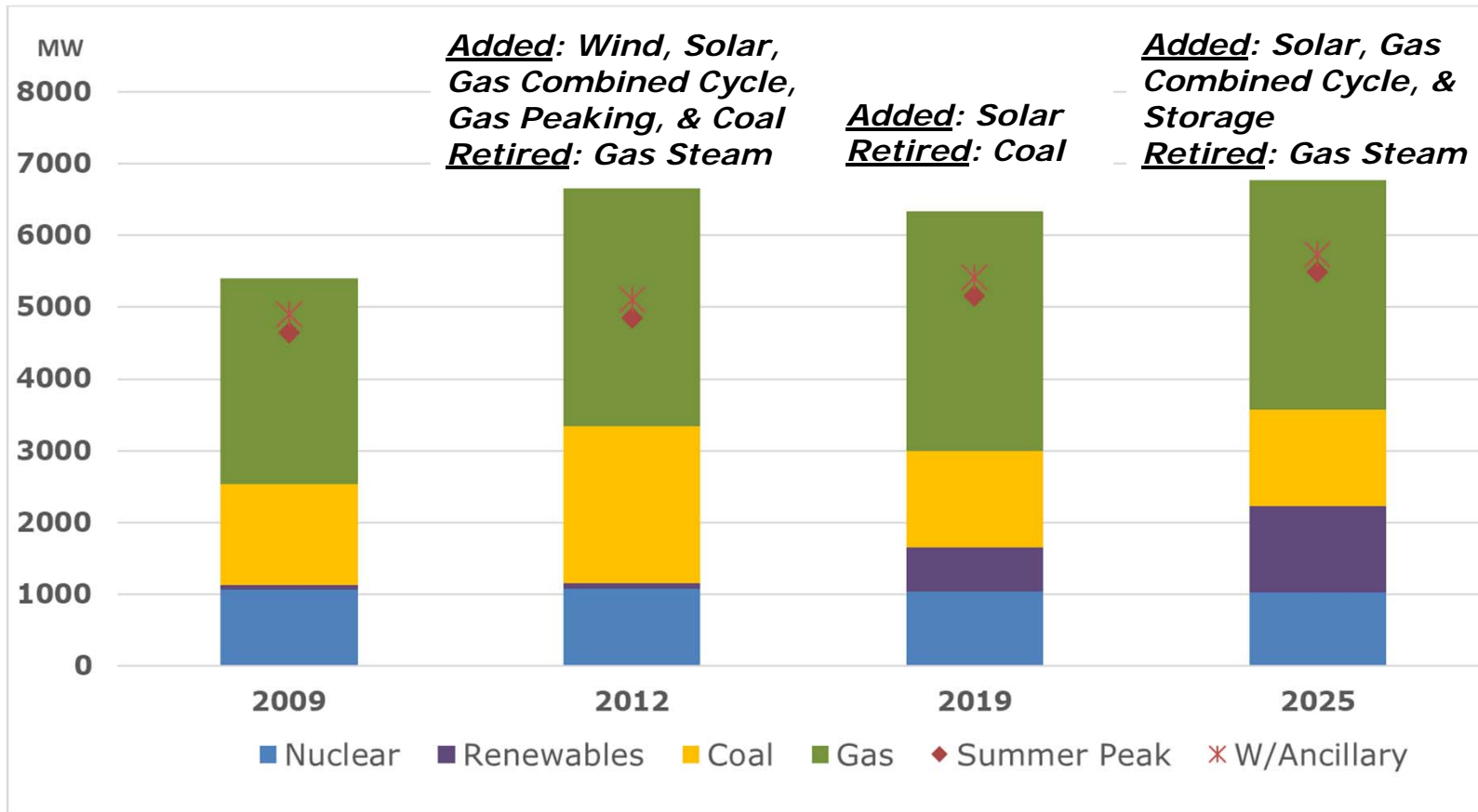
UNIQUE ASPECTS OF ELECTRICITY



- Electric supply must be produced & delivered in “real time” to meet demand
 - Electricity cannot be stored in large enough quantities
- Depending on the magnitude of the shortfall, there can be severe financial and/or reliability consequences if electric supply falls short of demand



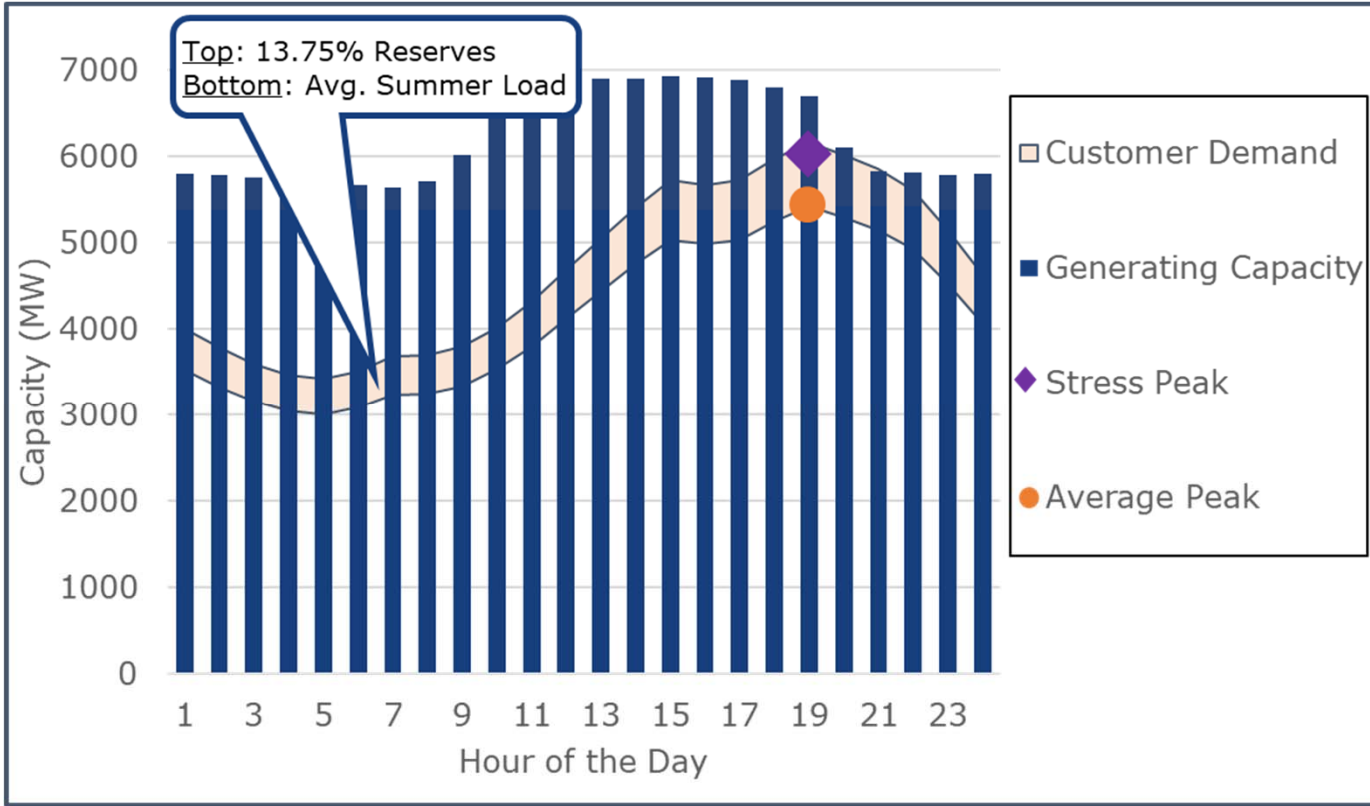
SUPPLY & DEMAND AT SUMMER PEAK



Our generation planning strategy is to provide sufficient capacity to protect our customers from exposure to high market prices.

SUMMER DAY

2025 PROJECTION – DEMAND & SUPPLY



2025 Summer Forecast:

Demand:

- Avg. Peak: 5,424MW
- Stress Peak: 6,028MW

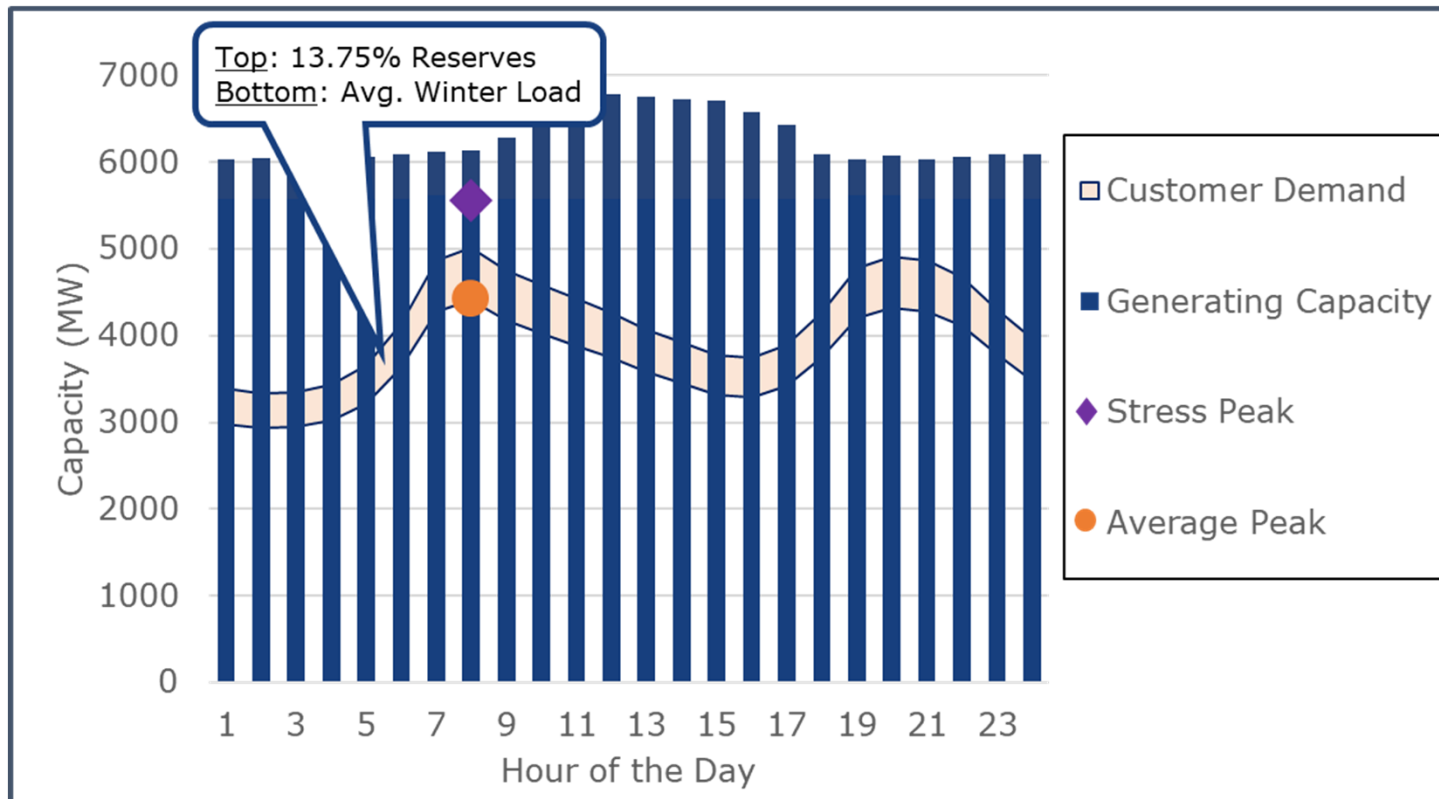
Supply:

- Nuclear, Coal, Gas, & Storage: 100%
- Coastal Wind: 57%
- West Wind: 20%
- Solar: 50%

All resources are utilized to meet summer peak demand.

WINTER DAY

2025 PROJECTION – DEMAND & SUPPLY



2025 Winter Forecast:

Demand:

- Avg. Peak: 4,411MW
- Stress Peak: 5,555MW

Supply:

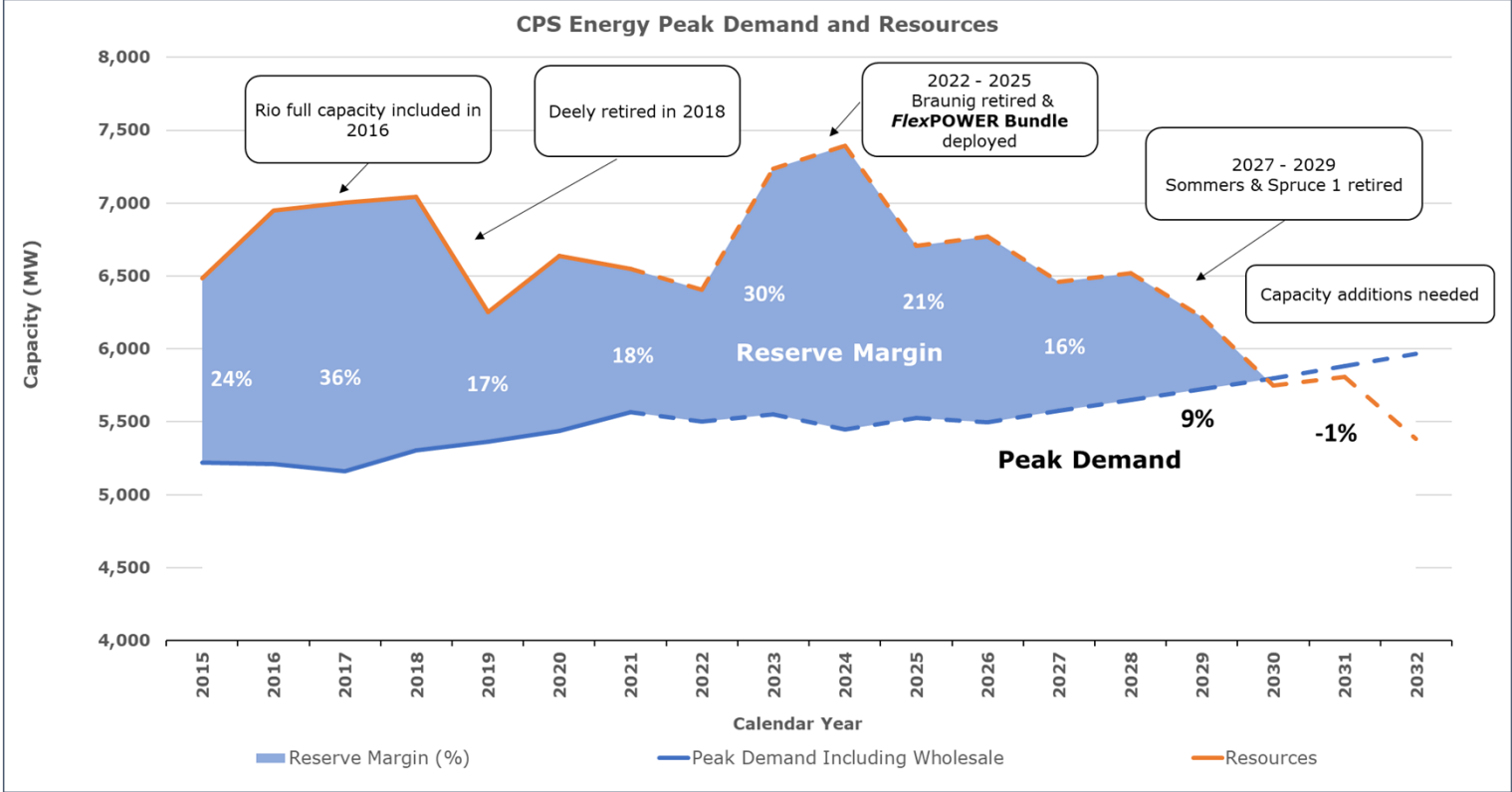
- Nuclear, Coal, Gas, & Storage: 100%
- Coastal Wind: 43%
- West Wind: 19%
- Solar: 0.9%

All resources are utilized to meet extreme winter peak demand while average winter peak is less challenging.



OUR RESERVE MARGIN*

VIEW WITH NO ADDITIONS AFTER *FLEXPOWER BUNDLE*SM



Reserve margin is the capacity needed to:

- Provide ancillary services.
- Meet customer demand if power plants generate less than expected, or customer demand increases more than expected.

* At summer peak, hour ending 7 p.m.

Our planning reserve margin floor is 13.75%.

UTILIZATION – KEY FACTORS



- Energy Utilization

- Energy utilization was presented to the RAC at Jan 2022 meeting
- Competitive wholesale market prices determine power plant energy utilization
 - Generally, generators bid variable costs (fuel¹ & variable O&M)
- Market prices vary by hour, day, night, & season
- Generation units are primarily dispatched (started and run) based on variable cost
 - The least expensive plants run the most, minimizing cost to customers
 - To “manually” increase utilization would result in higher cost to customers

- Ancillary Service Utilization

- Generation resources are needed for “capacity” for responding quickly to changing conditions, i.e. the units usually do not run

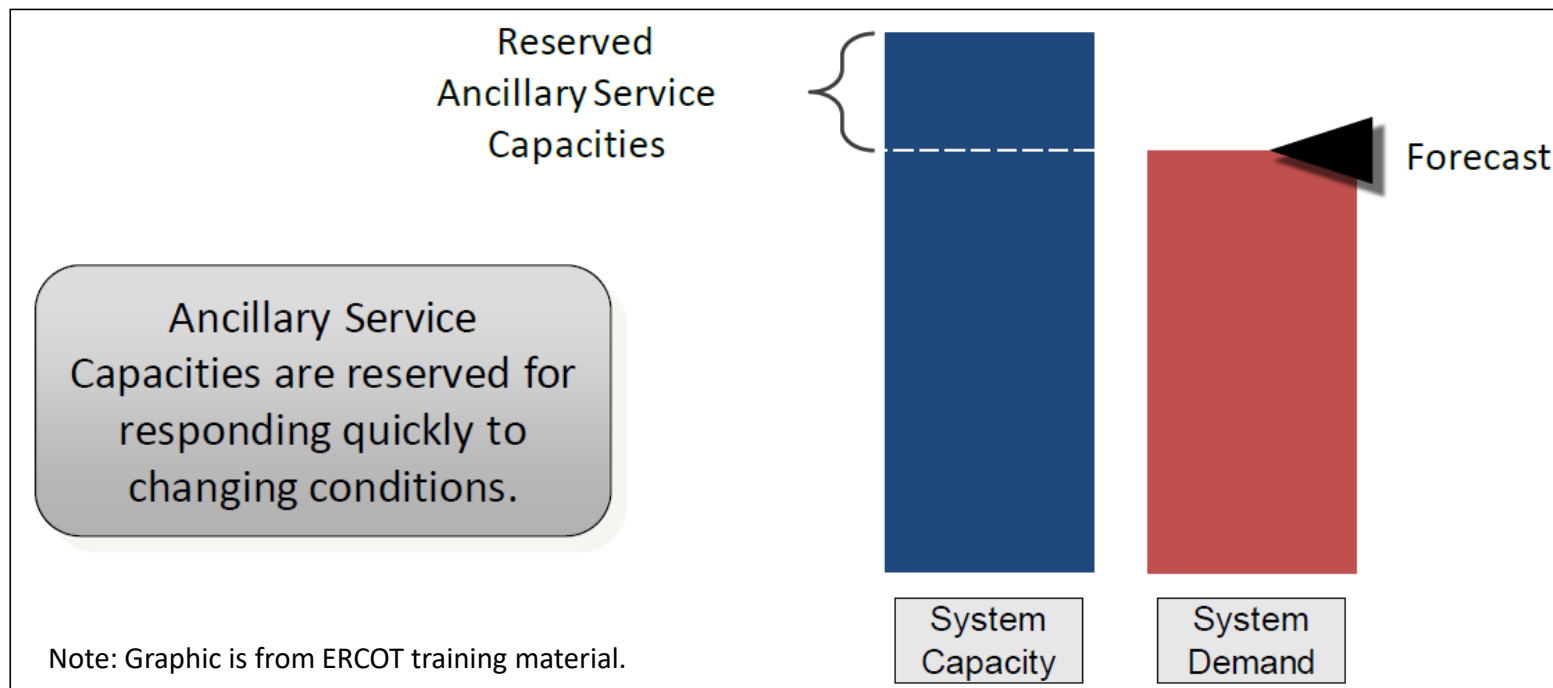
- Energy + Ancillary Service = Total Utilization

¹ Fuel cost is a function of fuel price & plant fuel efficiency

ANCILLARY SERVICES



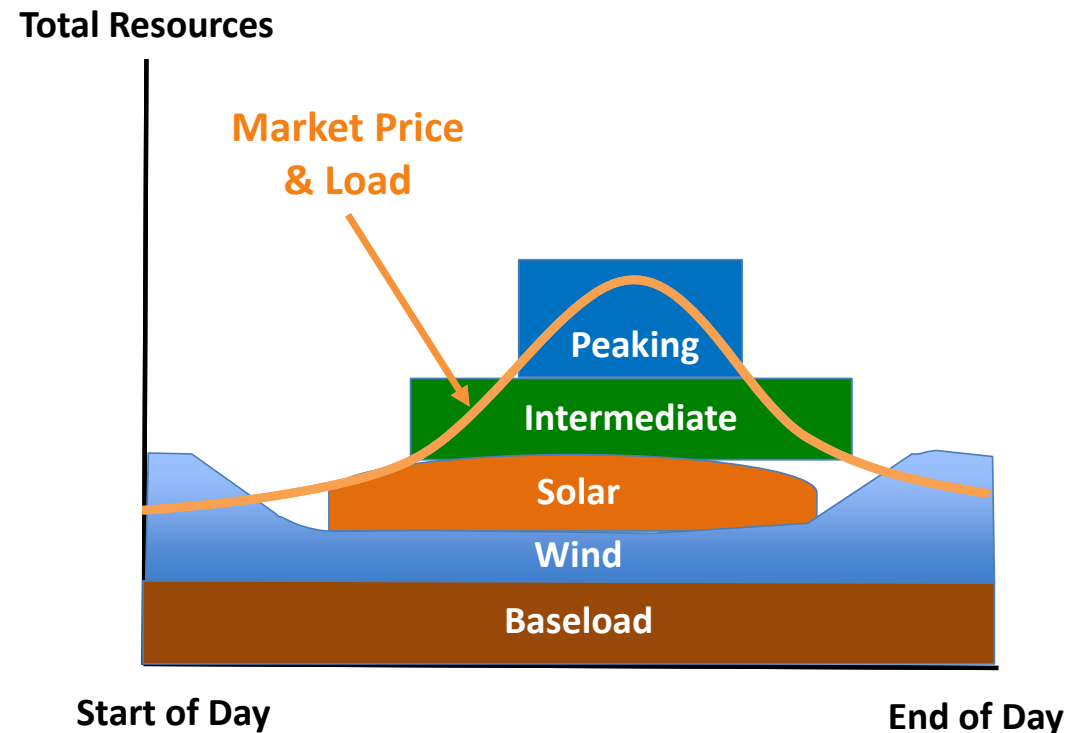
- Capacity used by ERCOT to maintain grid reliability minute-by-minute, 365 days per year



Ancillary services create a financial obligation for our customers.

GENERATION TYPES

- **Peaking Generation:** To minimize capacity shortages and costs over short periods of time
- **Intermediate Generation:** To balance the resource needs of the system between peak and baseload on a daily basis.
- **Renewable Generation:** To minimize emissions & energy costs over long periods of time
- **Baseload Generation:** To minimize fuel & energy costs over long periods of time



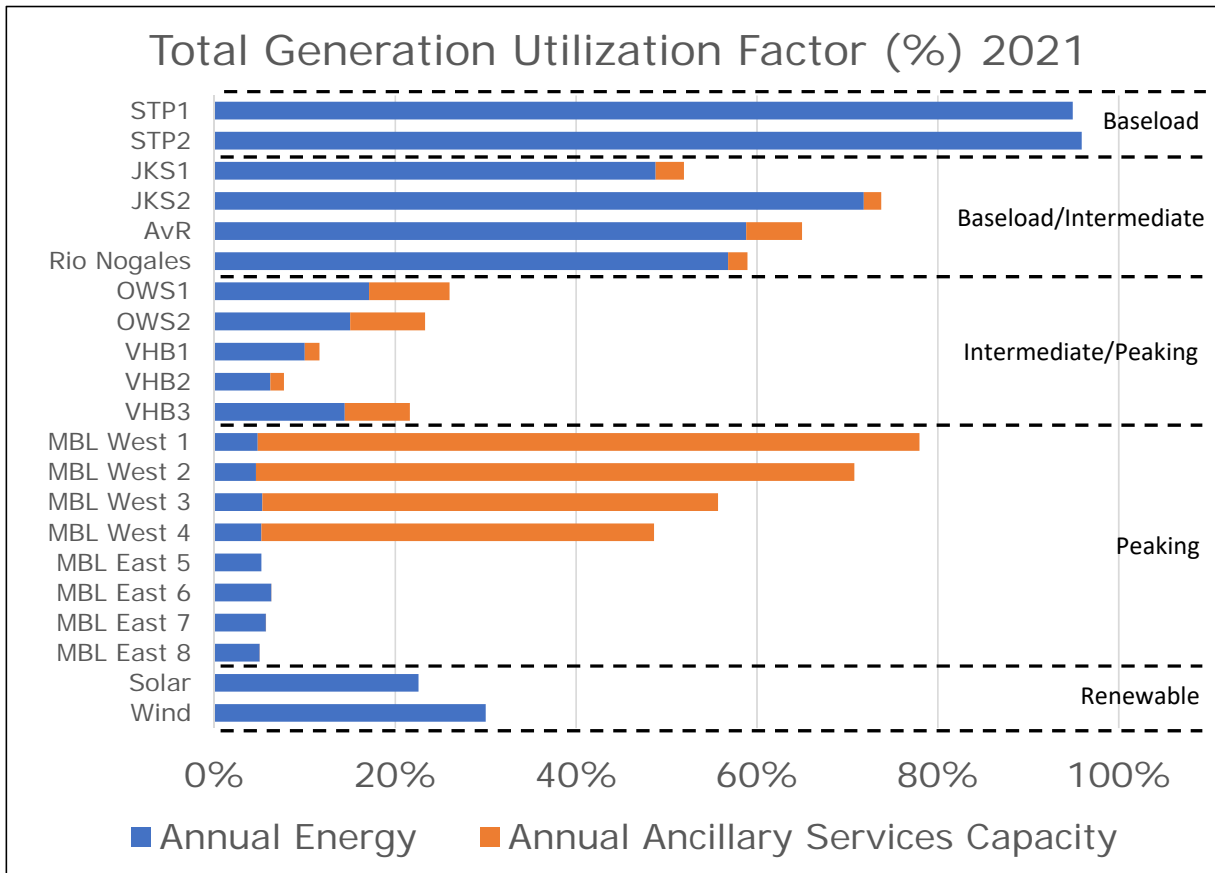
A array of generation types, that balance cost & performance, is used to reliably meet customer demand.

UTILIZATION BY GENERATION TYPE

Generation Type	Utilization	
	Energy	Ancillary Services
Peaking	5% to 25%	Frequently used
Intermediate	25% to 75%	Frequently used
Renewable (Solar & Wind)	25% to 45%	Not used due to intermittent output
Baseload	75% to 100%	Can be limited (resource dependent)

Generation resources are constantly optimized considering many variables.

TOTAL GENERATION UTILIZATION 2021



Total Generation Utilization Factor:
Percentage of total capacity used for energy and ancillary services

Adding Energy & Ancillary Services provides the total utilization picture.

KEY TAKEAWAYS



- Our generation planning strategy is to provide sufficient capacity to protect our customers from exposure to high market prices.
- A diverse mix of generating capacity is needed, even if utilization may be low for certain resources
- Utilizing capacity for ancillary services is vital to the reliability of CPS Energy supply and the ERCOT grid
- Energy & ancillary services are a financial obligation for our customers
- Reserve margin helps protect against market exposure

Questions?

APPENDIX

RESOURCE NAME & TYPE

CONVENTIONAL TECHNOLOGIES



Resource Name	Short Name	Capacity (MW)	Type/Fuel
SOUTH TEXAS 1	STP1	517	Baseload/Nuclear
SOUTH TEXAS 2	STP2	512	Baseload/Nuclear
J K SPRUCE 1	JKS1	560	Baseload/Intermediate/Coal
J K SPRUCE 2	JKS2	785	Baseload/Intermediate/Coal
A VON ROSENBERG 1	AvR	518	Baseload/Intermediate/Gas Combined Cycle (CC)/Gas
RIO NOGALES	Rio Nogales	777	Baseload/Intermediate/Gas Combined Cycle (CC)/Gas
O W SOMMERS 1	OWS1	420	Intermediate/Peaking/Gas Steam
O W SOMMERS 2	OWS2	410	Intermediate/Peaking/Gas Steam
V H BRAUNIG 1	VHB1	217	Intermediate/Peaking/Gas Steam
V H BRAUNIG 2	VHB2	230	Intermediate/Peaking/Gas Steam
V H BRAUNIG 3	VHB3	412	Intermediate/Peaking/Gas Steam
MILTON LEE PEAKING 5	MBL East 5	48	Peaking/Gas Combustion Turbine (CT)/Gas
MILTON LEE PEAKING 6	MBL East 6	48	Peaking/Gas Combustion Turbine (CT)/Gas
MILTON LEE PEAKING 7	MBL East 7	48	Peaking/Gas Combustion Turbine (CT)/Gas
MILTON LEE PEAKING 8	MBL East 8	47	Peaking/Gas Combustion Turbine (CT)/Gas
MILTON LEE PEAKING 1	MBL West 1	46	Peaking/Gas Combustion Turbine (CT)/Gas
MILTON LEE PEAKING 2	MBL West 2	46	Peaking/Gas Combustion Turbine (CT)/Gas
MILTON LEE PEAKING 3	MBL West 3	46	Peaking/Gas Combustion Turbine (CT)/Gas
MILTON LEE PEAKING 4	MBL West 4	46	Peaking/Gas Combustion Turbine (CT)/Gas
	Total	5,733	



RESOURCE NAME & TYPE

RENEWABLE TECHNOLOGIES

Resource Name	Capacity Maximum Capability (MW)	Capacity at Summer Peak (MW)	Type
Desert Sky Wind Farm	63.4	12.7	Wind
Cottonwood Creek Wind Farm	82.6	16.5	Wind
Sweetwater 4	240.8	48.2	Wind
Penascal	76.8	43.8	Wind
Papalote Creek	130.4	74.3	Wind
Cedro Hill	150.0	30	Wind
Los Vientos	200.1	114.1	Wind
Blue Wing	13.9	7	Solar
Sinkin 1	9.9	5	Solar
Sinkin 2	9.9	5	Solar
Somerset	10.6	5.3	Solar
CEC_Beck (Community Solar)	1.0	0.5	Solar
Alamo 1	39.2	19.6	Solar
St. Hedwig (Alamo 2)	4.4	2.2	Solar
Eclipse (Alamo 4)	39.6	19.8	Solar
Walzem (Alamo 3)	5.5	2.8	Solar
Helios (Alamo 5)	95.0	47.5	Solar
Solara (Alamo 7)	106.4	53.2	Solar
Sirius 1 (Alamo 6)	110.2	55.1	Solar
Sirius 2 (Pearl)	50.0	25	Solar
Lamesa 2 (Ivory)	50.0	25	Solar
Commerce PV	5.0	2.5	Solar
Commerce BESS	10.0	10.0	Storage
Covel Gardens	9.6	7.3	Landfill Gas
Nelson Gardens	4.2	3.2	Landfill Gas

Type	Summer Peak Contribution (% of Max. Capacity)
Nuclear, Coal, Gas, & Storage	100%
West Wind	20%
Coastal Wind	57%
Solar	50%
Landfill Gas	76%

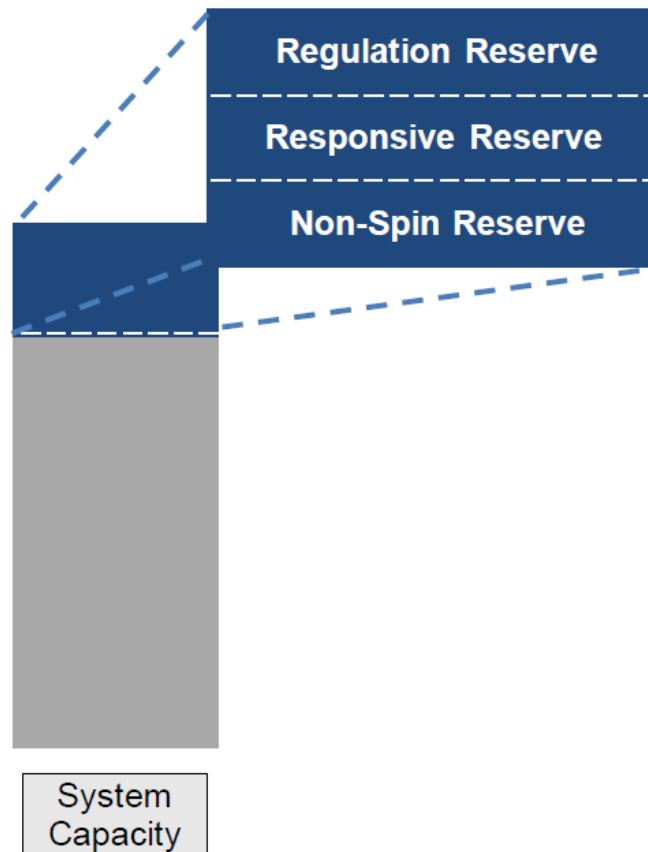
Type	Total (MW)	Total Summer (MW)
Wind	944.1	339.6
Solar	550.6	275.5
Storage	10.0	10.0
Landfill Gas	13.8	10.5
	1519	635.6

ANCIllARY SERVICE TYPES



Ancillary Service Capacity

- Three types of Ancillary Service Capacities
- Different purposes and response times



Note: Graphic is from ERCOT training material.

ANCILLARY SERVICE DEFINITIONS



Ancillary Service Type	Definition
Regulation Down Service	An Ancillary Service that provides capacity that can respond to signals from ERCOT within five seconds to respond to changes in system frequency.
Regulation Up Service	An Ancillary Service that provides capacity that can respond to signals from ERCOT within five seconds to respond to changes in system frequency.
Responsive Reserve Service	An Ancillary Service that provides operating reserves that is intended to: <ul style="list-style-type: none"> (a) Arrest frequency decay within the first few seconds of a significant frequency deviation; (b) After the first few seconds of a significant frequency deviation, help restore frequency to its scheduled value to return the system to normal; (c) Provide energy or continued load interruption during the implementation of the Energy Emergency Alert (EEA); and (d) Provide backup regulation.
Non-Spinning Reserve	An Ancillary Service that can be synchronized and ramped to a specified output level within 30 minutes and that can operate at a specified output level for at least one hour.

ENERGY UTILIZATION 2021

MONTHLY



Capacity Factor (%) = Actual Generation / Maximum Generation Capability

	2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseload	STP1	100	94	100	100	100	89	100	100	100	27	82	100
	STP2	100	100	66	36	100	100	100	100	100	100	100	100
Baseload/ Intermediate	JKS1	60	47	46	17	65	78	72	73	59	37	0	31
	JKS2	62	76	45	74	74	86	78	49	81	89	84	64
	AvR	15	43	75	61	70	75	76	82	48	39	68	55
	Rio Nogales	66	58	22	68	60	80	87	95	93	0	1	54
Intermediate /Peaking	OWS1	7	22	0	24	2	18	32	34	30	34	3	0
	OWS2	4	24	0	9	0	20	28	28	25	30	14	0
	VHB1	0	25	0	5	2	10	13	27	16	16	6	0
	VHB2	0	16	0	5	2	13	22	9	4	6	0	0
	VHB3	8	0	0	0	3	19	30	33	29	37	14	0
Peaking	MBL West 1	8	22	1	6	2	7	6	2	1	3	1	0
	MBL West 2	7	22	1	6	2	6	6	2	1	2	0	0
	MBL West 3	7	23	0	7	3	10	7	2	1	3	1	1
	MBL West 4	4	23	1	8	3	11	8	2	1	2	1	1
	MBL East 5	4	12	4	4	5	12	12	3	2	2	1	2
	MBL East 6	3	29	4	4	7	12	9	3	2	2	2	2
	MBL East 7	3	25	3	3	5	9	10	4	2	2	2	1
	MBL East 8	3	26	3	3	3	9	8	4	2	1	0	0
Renewable	Solar	18	14	23	20	25	29	28	27	26	22	19	16
	Wind	30	26	44	38	39	25	21	26	22	30	29	28

Utilization - Percentage of each month the resource generated power based on the maximum capability of each resource. Resource availability and Demand affect utilization.

ANCILLARY UTILIZATION 2021

MONTHLY



AS Utilization (%) = Capacity Reserved / Maximum Generation Capability

	2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseload	STP1	0	0	0	0	0	0	0	0	0	0	0	0
	STP2	0	0	0	0	0	0	0	0	0	0	0	0
Baseload/ Intermediate	JKS1	4	2	11	2	9	5	2	0	1	0	0	0
	JKS2	0	4	5	7	4	1	1	0	0	0	1	0
	AvR	1	4	14	8	11	15	5	1	1	2	6	6
	Rio Nogales	4	5	2	2	5	7	0	0	0	0	0	0
Intermediate /Peaking	OWS1	1	8	0	13	2	3	11	21	25	21	1	0
	OWS2	0	1	0	1	0	3	20	20	22	23	9	0
	VHB1	0	9	0	0	0	0	1	1	3	3	2	0
	VHB2	0	2	0	0	0	2	3	2	3	7	0	0
	VHB3	1	0	0	0	0	4	12	14	16	28	10	0
Peaking	MBL West 1	5	12	79	88	88	81	92	94	94	67	92	83
	MBL West 2	1	12	66	77	75	77	86	94	94	44	84	80
	MBL West 3	2	10	31	16	21	26	60	95	95	88	86	71
	MBL West 4	0	0	15	3	6	5	57	94	96	89	84	67
	MBL East 5	0	0	0	0	0	0	0	0	0	0	0	0
	MBL East 6	0	0	0	0	0	0	0	0	0	0	0	0
	MBL East 7	0	0	0	0	0	0	0	0	0	0	0	0
	MBL East 8	0	0	0	0	0	0	0	0	0	0	0	0
Renewable	Solar	0	0	0	0	0	0	0	0	0	0	0	0
	Wind	0	0	0	0	0	0	0	0	0	0	0	0

Utilization - Percentage of each month the resource capacity that was reserved for Ancillary Services.

TOTAL UTILIZATION 2021

MONTHLY



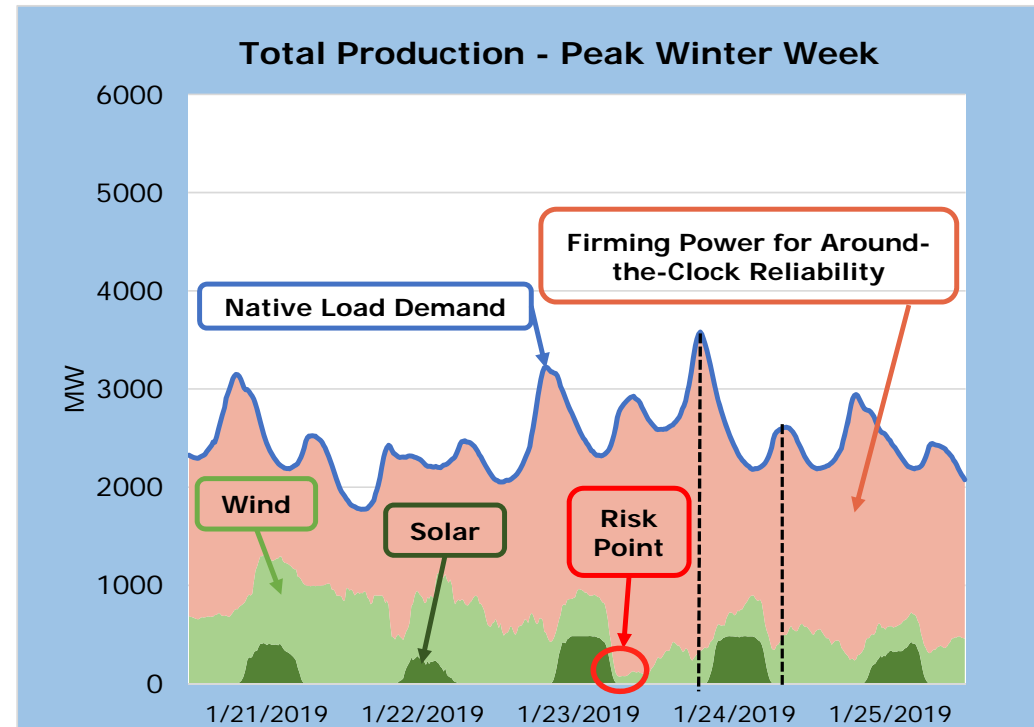
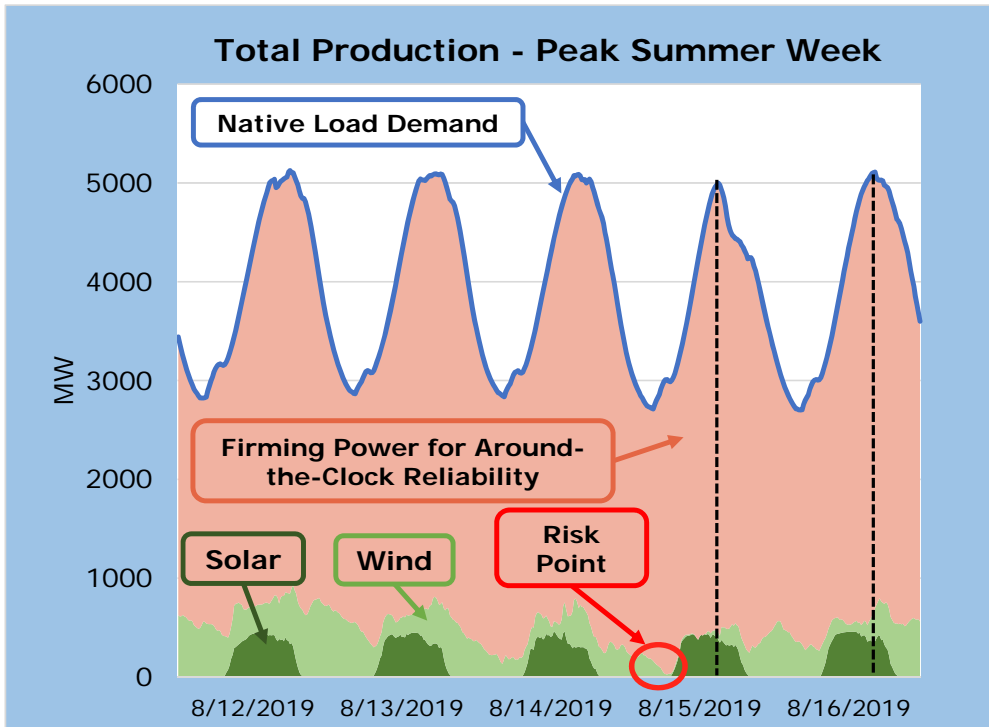
Total Utilization (%) = Capacity Utilized / Maximum Generation Capability

		2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseload	STP1		100	94	100	100	100	89	100	100	100	27	82	100
	STP2		100	100	66	36	100	100	100	100	100	100	100	100
Baseload/ Intermediate	JKS1		63	50	57	19	74	82	74	73	60	37	0	31
	JKS2		63	79	49	81	78	87	79	49	82	89	85	65
	AvR		16	47	89	69	81	89	81	83	49	41	74	61
	Rio Nogales		70	63	24	70	65	88	87	95	93	0	1	54
Intermediate /Peaking	OWS1		8	31	0	37	4	21	43	55	55	55	4	0
	OWS2		4	25	0	11	0	23	48	47	47	53	23	0
	VHB1		0	34	0	5	2	10	15	29	19	20	8	0
	VHB2		0	18	0	5	2	14	25	10	7	13	0	0
	VHB3		9	0	0	0	3	23	42	47	45	65	24	0
Peaking	MBL West 1		13	34	79	95	90	87	97	96	95	70	93	83
	MBL West 2		8	34	67	83	77	83	92	96	95	47	84	81
	MBL West 3		9	34	32	22	24	37	68	96	97	91	87	72
	MBL West 4		4	23	17	12	9	16	65	96	97	90	85	68
	MBL East 5		4	12	4	4	5	12	12	3	2	2	1	2
	MBL East 6		3	29	4	4	7	12	9	3	2	2	2	2
	MBL East 7		3	25	3	3	5	9	10	4	2	2	2	1
	MBL East 8		3	26	3	3	3	9	8	4	2	1	0	0
Renewable	Solar		18	14	23	20	25	29	28	27	26	22	19	16
	Wind		30	26	44	38	39	25	21	26	22	30	29	28

Total Utilization - Percentage of each month the resource capacity that was used for Energy or Ancillary Services.

PEAK DAYS FOR SAN ANTONIO

IMPORTANCE OF DIVERSITY & RESERVES



Note: CPS Energy wind and solar production data is in 15-minute intervals.

The intermittent nature of solar and wind production shows the need for diversity & reserves to provide around-the-clock reliability.