



CPS ENERGY DEMAND AND GENERATION UTILIZATION

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Informational Update

AGENDA



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- **POWER & ENERGY**
- **HOW GENERATION RESOURCES ARE USED**
- **CPS ENERGY DEMAND**
- **GENERATION UTILIZATION 2018 to 2021**
- **SUMMER, SPRING, & WINTER UTILIZATION**
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COMMON PREFIXES



The following prefixes are used to indicate multiples of 1,000 which are used to describe large numbers commonly used in the electric power industry:

<u>Prefix</u>	<u>Symbol</u>	<u>Factor</u>	<u>Multiplier</u>	<u>Name</u>
Tera	T	10^{12}	1,000,000,000,000	Trillion
Giga	G	10^9	1,000,000,000	Billion
Mega	M	10^6	1,000,000	Million
Kilo	K	10^3	1,000	Thousand
No Prefix	-	10^0	1	One

POWER & ENERGY



- **Power** is the rate of flow of electrical energy. Power is measured in **watts** (abbreviated "**W**")
- In electrical power systems, power is the product of voltage and current:
Power (W) = Voltage (V) X Current (A)
- The electric power industry buys and sells **Electrical Energy**
- **Electrical Energy** is the product of "power" and "time", and is measured in "watt-hour"
 - Watt-hour or **Wh** = Power (W) X Time (hour)
 - Kilowatt-hour or **kWh** = Power (kW) X Time (hour)
 - Megawatt-hour or **MWh** = Power (MW) X Time (hour)
- Prices for residential, commercial and small industrial energy are measured in: dollars per kilowatt-hour (**\$/kWh**) or (**cent/kWh**)
- Prices for bulk or wholesale energy deliveries are measured in: dollars per megawatt-hour (**\$/MWh**)

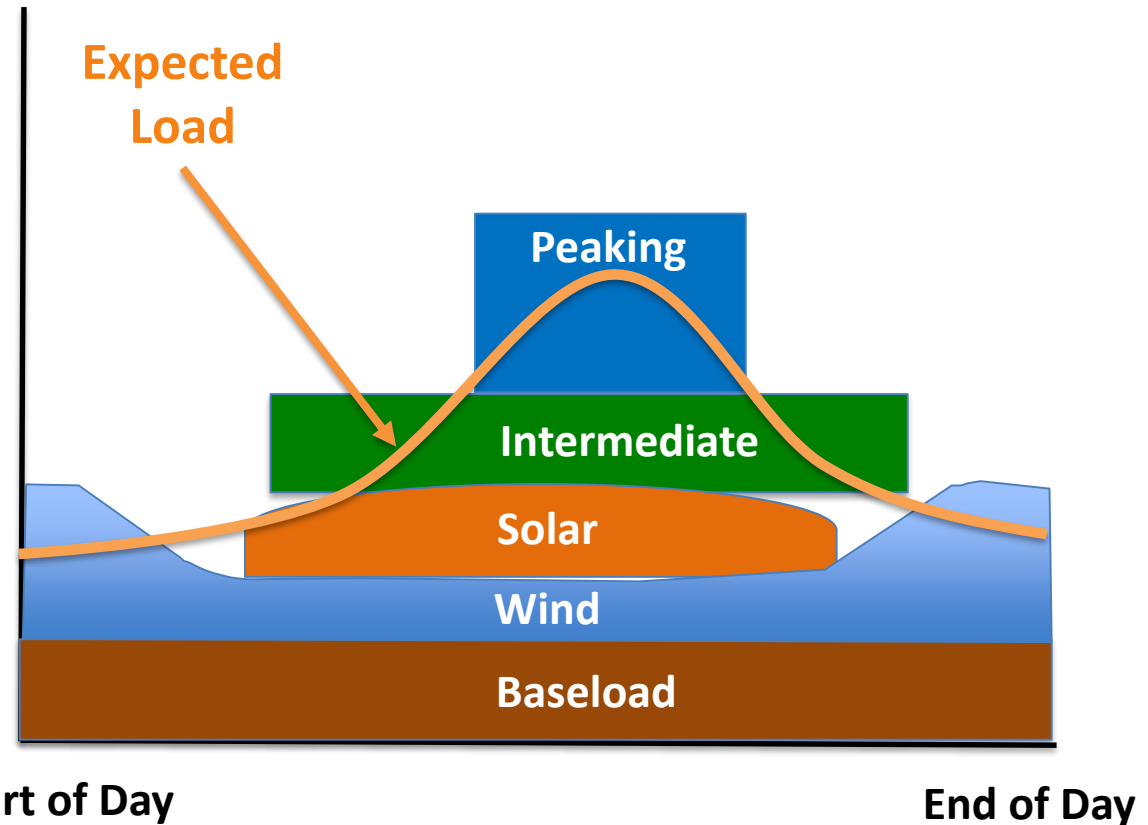
HOW GENERATION RESOURCES ARE USED



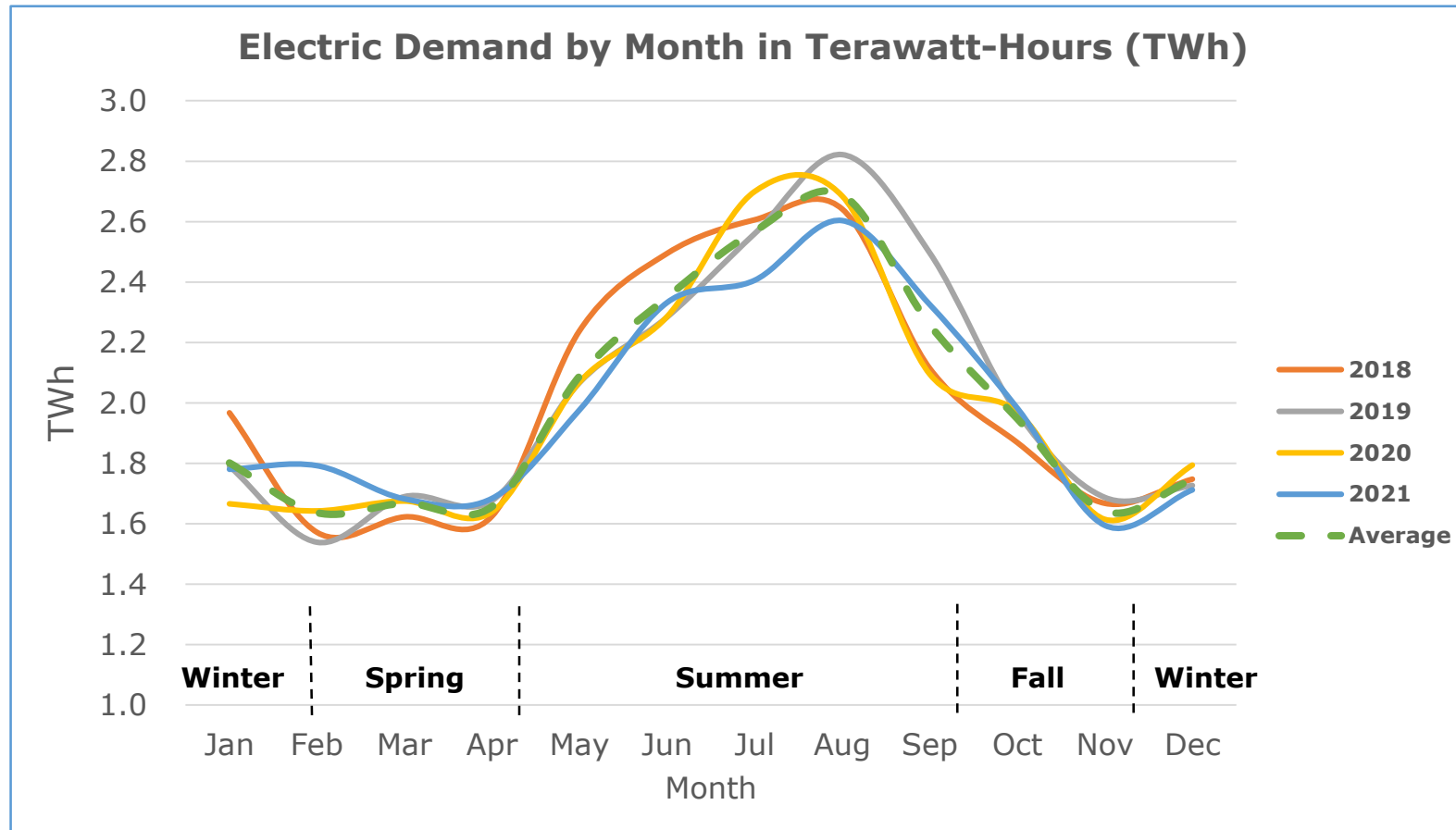
In general, four different types of resources are utilized:

- **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

Total Resources



CPS ENERGY DEMAND



Customer Demand is met by generation production plus purchases including the renewables PPAs and purchases from ERCOT

CPS Energy considers the summer season to be May through September. About 50% of the total demand occurs in the summer.

RESOURCE NAME & TYPE

CONVENTIONAL TECHNOLOGIES



Resource Name	Short Name	Type/Fuel
SOUTH TEXAS 1	STP1	Baseload/Nuclear
SOUTH TEXAS 2	STP2	Baseload/Nuclear
J K SPRUCE 1	JKS1	Baseload/Intermediate/Coal
J K SPRUCE 2	JKS2	Baseload/Intermediate/Coal
J T DEELY 1	JTD1	Baseload/Intermediate/Coal
J T DEELY 2	JTD2	Baseload/Intermediate/Coal
O W SOMMERS 1	OWS1	Intermediate/Peaking/Gas Steam
O W SOMMERS 2	OWS2	Intermediate/Peaking/Gas Steam
V H BRAUNIG 1	VHB1	Intermediate/Peaking/Gas Steam
V H BRAUNIG 2	VHB2	Intermediate/Peaking/Gas Steam
V H BRAUNIG 3	VHB3	Intermediate/Peaking/Gas Steam
A VON ROSENBERG 1	AvR	Baseload/Intermediate/Gas Combined Cycle (CC)
RIO NOGALES	Rio Nogales	Baseload/Intermediate/Gas Combined Cycle (CC)
MILTON LEE PEAKING 5	MBL East 5	Peaking/Gas Combustion Turbine (CT)
MILTON LEE PEAKING 6	MBL East 6	Peaking/Gas Combustion Turbine (CT)
MILTON LEE PEAKING 7	MBL East 7	Peaking/Gas Combustion Turbine (CT)
MILTON LEE PEAKING 8	MBL East 8	Peaking/Gas Combustion Turbine (CT)
MILTON LEE PEAKING 1	MBL West 1	Peaking/Gas Combustion Turbine (CT)
MILTON LEE PEAKING 2	MBL West 2	Peaking/Gas Combustion Turbine (CT)
MILTON LEE PEAKING 3	MBL West 3	Peaking/Gas Combustion Turbine (CT)
MILTON LEE PEAKING 4	MBL West 4	Peaking/Gas Combustion Turbine (CT)

GENERATION UTILIZATION 2018



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

	2018	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseload	STP1	100	100	100	100	100	100	100	100	100	15	66	100
	STP2	100	100	79	10	100	100	100	100	100	100	100	100
Baseload/ Intermediate	JKS1	62	59	48	33	73	67	75	76	73	55	77	50
	JKS2	68	36	60	42	68	85	71	64	83	89	59	0
	JTD1	35	59	50	53	75	76	70	79	77	76	74	77
	JTD2	41	47	27	48	66	70	65	67	63	68	66	68
	AvR	16	52	86	73	91	81	87	87	82	82	71	85
	Rio Nogales	24	10	25	52	63	76	78	77	77	69	38	4
Intermediate /Peaking	OWS1	5	0	0	0	9	30	39	39	3	1	0	5
	OWS2	4	0	10	0	25	37	28	41	8	5	7	3
	VHB1	1	0	0	0	11	4	24	8	0	0	0	0
	VHB2	0	0	0	0	8	1	18	5	0	0	0	0
	VHB3	4	0	0	4	1	16	38	28	1	0	0	1
Peaking	MBL West 1	5	4	9	16	31	21	15	12	7	6	4	3
	MBL West 2	6	4	11	17	32	20	16	15	10	9	7	3
	MBL West 3	6	4	13	13	32	18	15	15	8	6	7	3
	MBL West 4	9	10	16	13	34	22	16	18	10	7	12	9
	MBL East 5	4	8	7	9	9	7	10	9	6	6	7	7
	MBL East 6	3	7	10	7	9	6	10	10	7	7	7	7
	MBL East 7	8	10	14	16	20	22	14	11	6	11	5	4
	MBL East 8	8	10	13	16	26	22	15	9	11	13	6	4
Renewable	Solar	19	16	23	25	27	29	28	27	18	15	19	15
	Wind	34	36	40	42	40	40	26	35	20	31	31	37

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

GENERATION UTILIZATION 2019



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

	2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseload	STP1	100	100	100	100	100	100	100	100	100	100	100	100
	STP2	100	100	100	100	100	100	100	100	100	13	88	100
Baseload/ Intermediate	JKS1	79	61	70	27	44	35	66	64	74	5	0	0
	JKS2	23	44	60	52	52	90	87	88	87	84	60	68
	AvR	74	36	60	75	75	78	83	83	81	85	76	78
	Rio Nogales	59	22	18	38	52	71	78	79	72	74	75	38
Intermediate /Peaking	OWS1	1	1	7	14	10	14	33	66	13	20	3	0
	OWS2	2	4	3	0	10	16	36	41	40	31	0	0
	VHB1	0	0	0	0	0	8	22	46	34	14	0	0
	VHB2	0	0	1	5	2	0	19	39	11	1	2	0
	VHB3	3	0	4	3	9	16	27	41	41	26	6	2
Peaking	MBL West 1	4	10	8	4	7	5	18	21	11	7	6	2
	MBL West 2	7	6	8	3	10	8	21	20	15	10	8	1
	MBL West 3	6	11	9	5	12	10	21	27	16	12	13	2
	MBL West 4	9	11	8	7	13	9	7	22	20	12	9	1
	MBL East 5	5	12	5	7	8	5	7	14	12	5	4	1
	MBL East 6	5	14	5	8	12	5	5	20	15	4	5	0
	MBL East 7	2	12	7	12	11	8	20	29	23	11	5	0
	MBL East 8	3	9	7	11	7	8	19	28	20	11	4	0
Renewable	Solar	18	15	21	27	23	29	32	30	24	23	17	20
	Wind	34	35	36	43	43	31	36	35	28	31	32	30

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

GENERATION UTILIZATION 2020



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

	2020	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseload	STP1	100	100	44	37	100	100	100	100	100	100	100	100
	STP2	100	100	100	100	100	100	100	100	100	100	100	100
Baseload/ Intermediate	JKS1	13	35	51	34	28	43	49	54	66	72	41	56
	JKS2	15	6	58	55	53	54	64	73	63	15	19	66
	AvR	78	82	61	0	74	83	87	83	45	88	79	76
	Rio Nogales	68	0	55	72	65	80	88	83	84	38	10	62
Intermediate /Peaking	OWS1	0	2	16	3	6	9	34	37	6	23	14	1
	OWS2	0	7	0	15	7	21	33	34	8	15	7	0
	VHB1	0	0	0	4	0	3	9	35	3	3	0	0
	VHB2	0	0	0	0	2	1	3	6	2	4	0	0
	VHB3	0	0	21	28	11	10	34	34	24	30	8	0
Peaking	MBL West 1	1	1	16	8	6	1	4	14	2	4	2	1
	MBL West 2	2	4	18	9	7	2	5	16	4	10	5	1
	MBL West 3	4	10	21	7	7	2	6	18	6	13	5	3
	MBL West 4	3	11	22	9	8	3	6	18	7	15	6	2
	MBL East 5	0	6	11	6	4	5	19	17	5	10	7	7
	MBL East 6	0	6	11	6	5	6	19	17	5	11	7	7
	MBL East 7	1	7	12	6	6	5	17	15	4	15	4	4
	MBL East 8	1	7	11	6	6	4	16	15	4	15	3	4
Renewable	Solar	19	19	19	24	31	32	33	31	23	23	18	19
	Wind	35	38	38	34	38	37	34	29	23	31	32	35

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

GENERATION UTILIZATION 2021

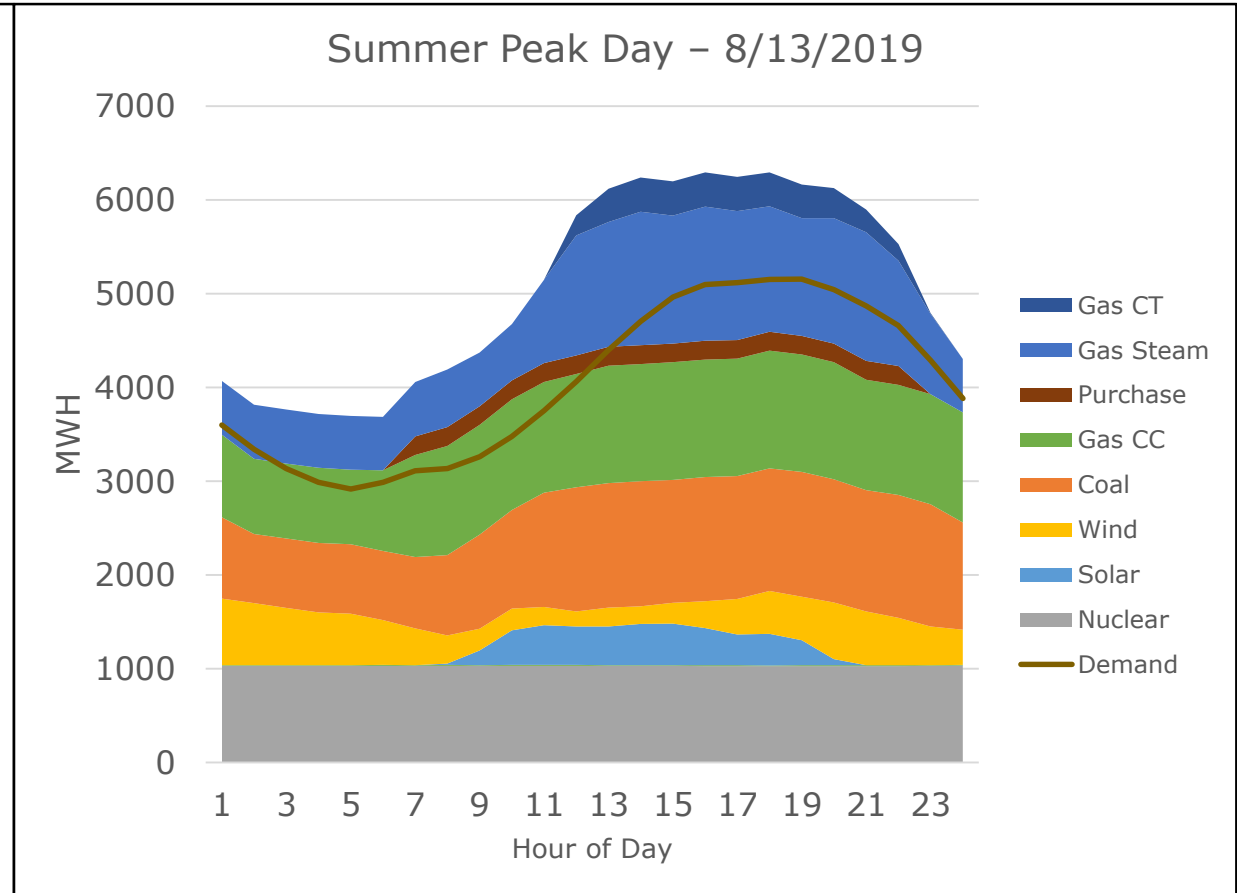
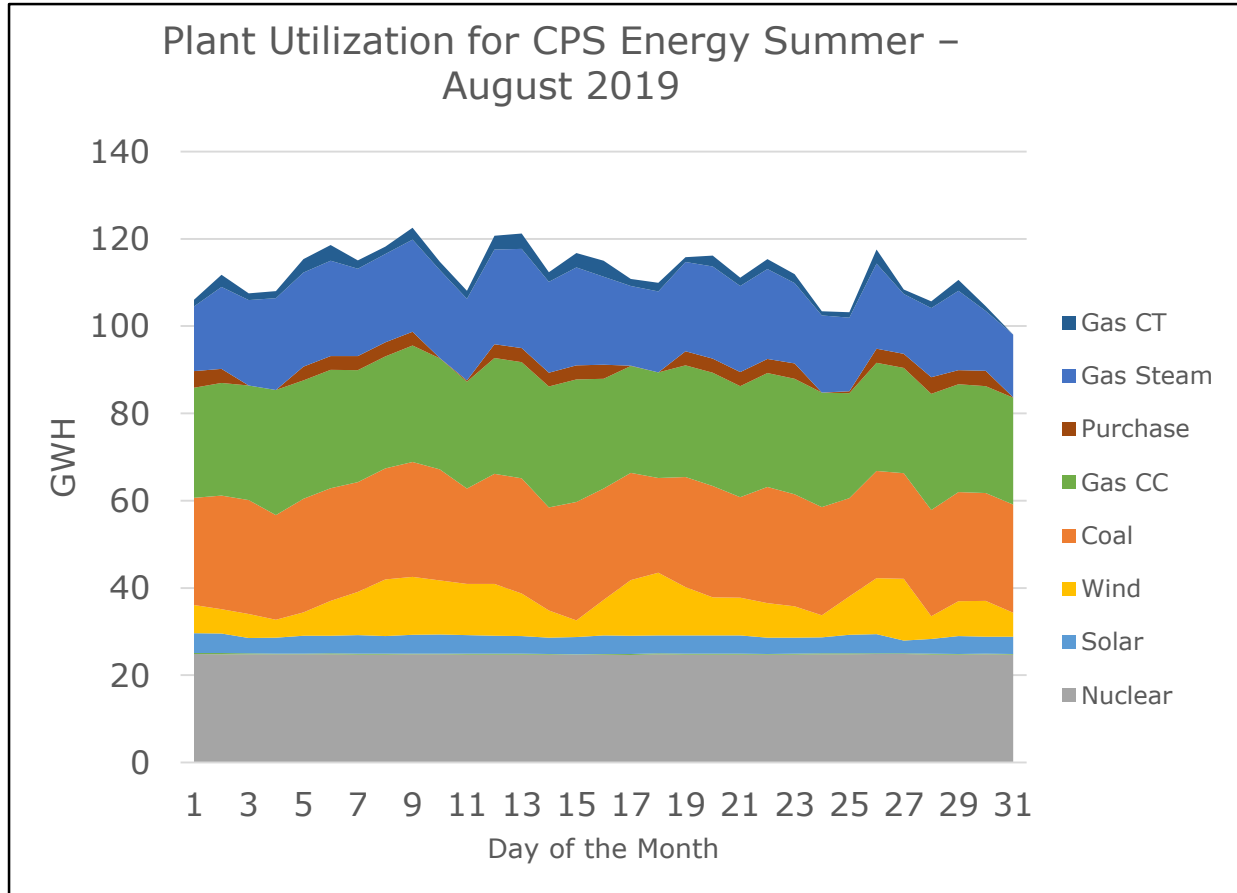


Capacity Factor (%) = Actual Generation / Maximum Generation Capability

	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

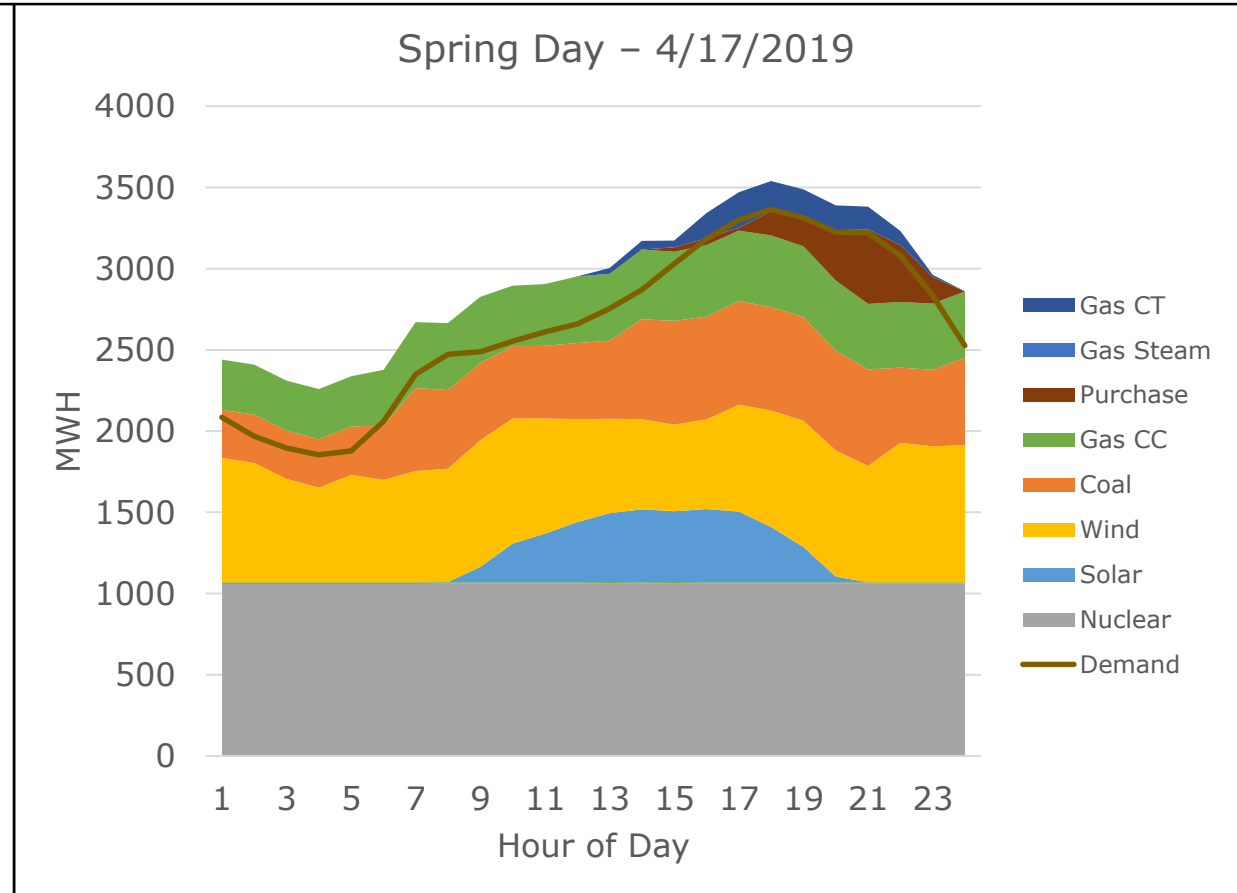
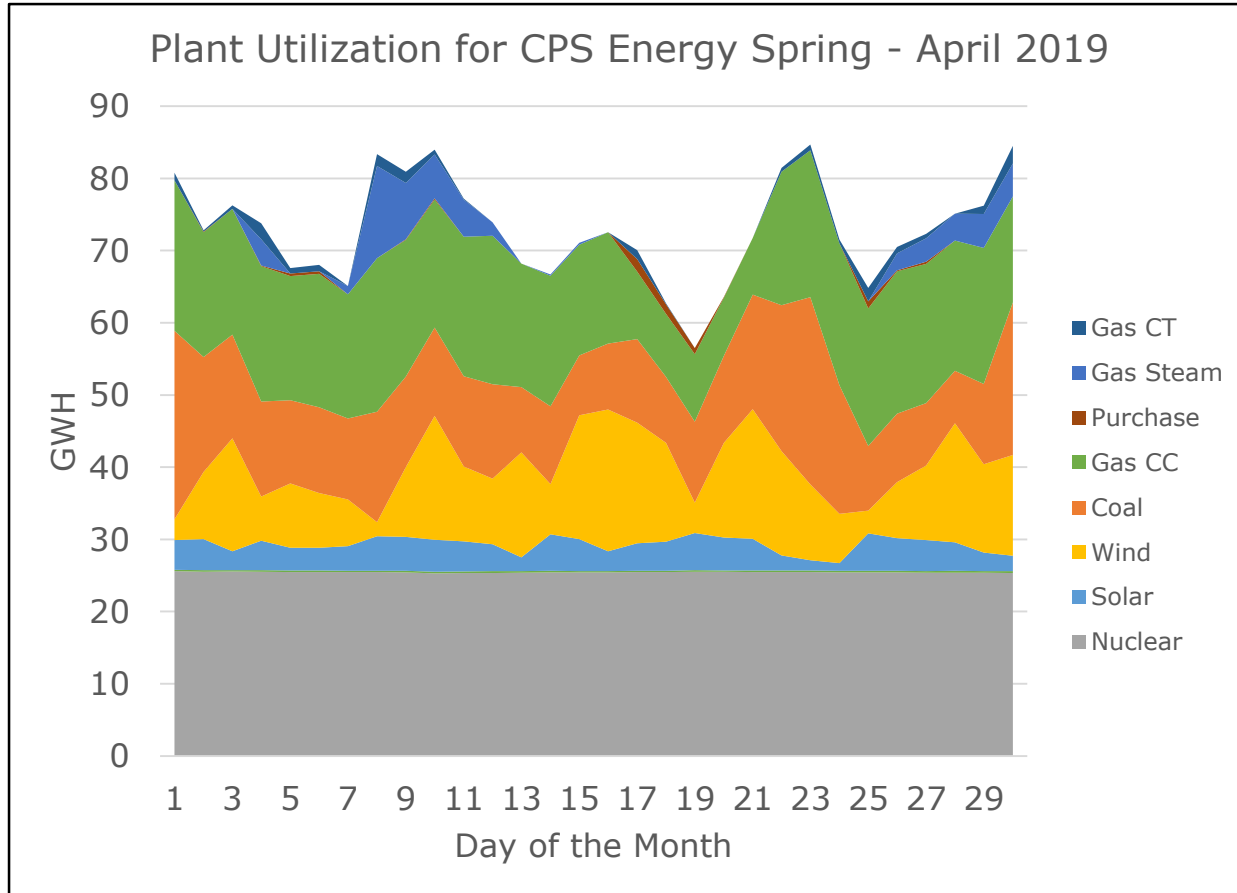
Utilization - Percentage of each month the resource generated power based on the maximum capability of each resource. Resource availability and Demand affect utilization.

SUMMER UTILIZATION



All resources are utilized to meet summer demand. Peak demand hours can extend through the 7:00 p.m. hour.

SPRING UTILIZATION

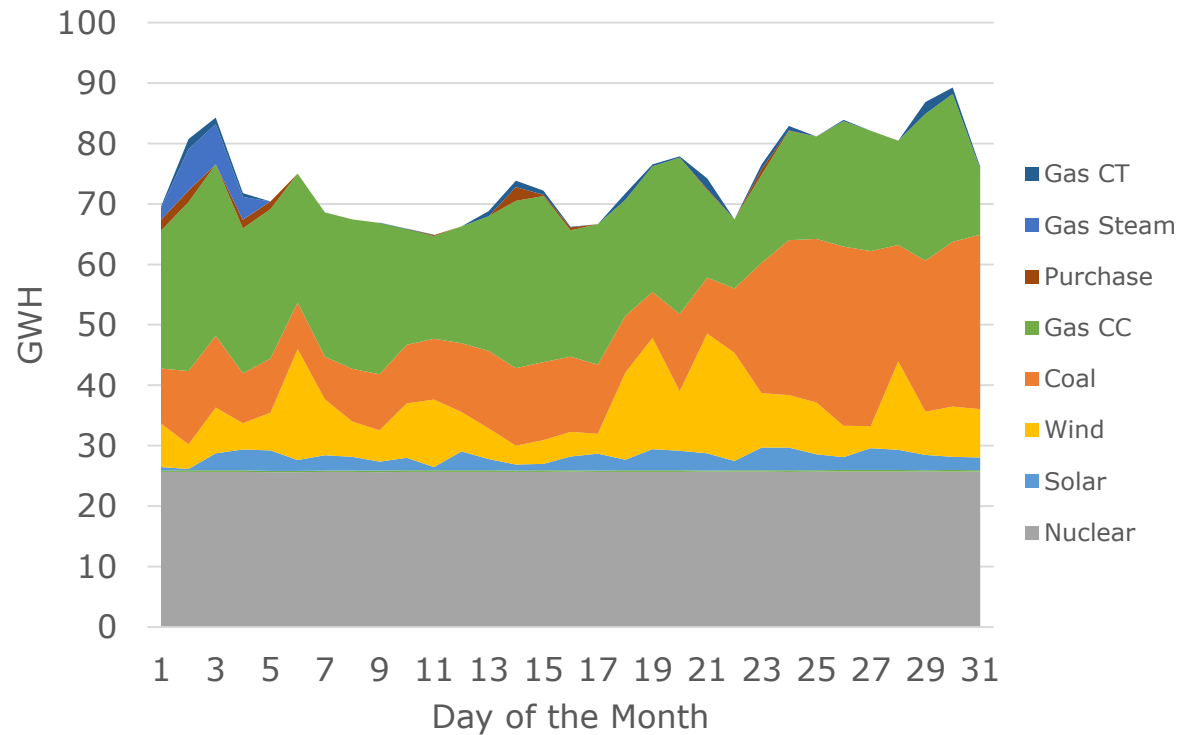


Gas Steam and Peaker resources are utilized to meet the peak demand periods and to replace other resources on planned outages.

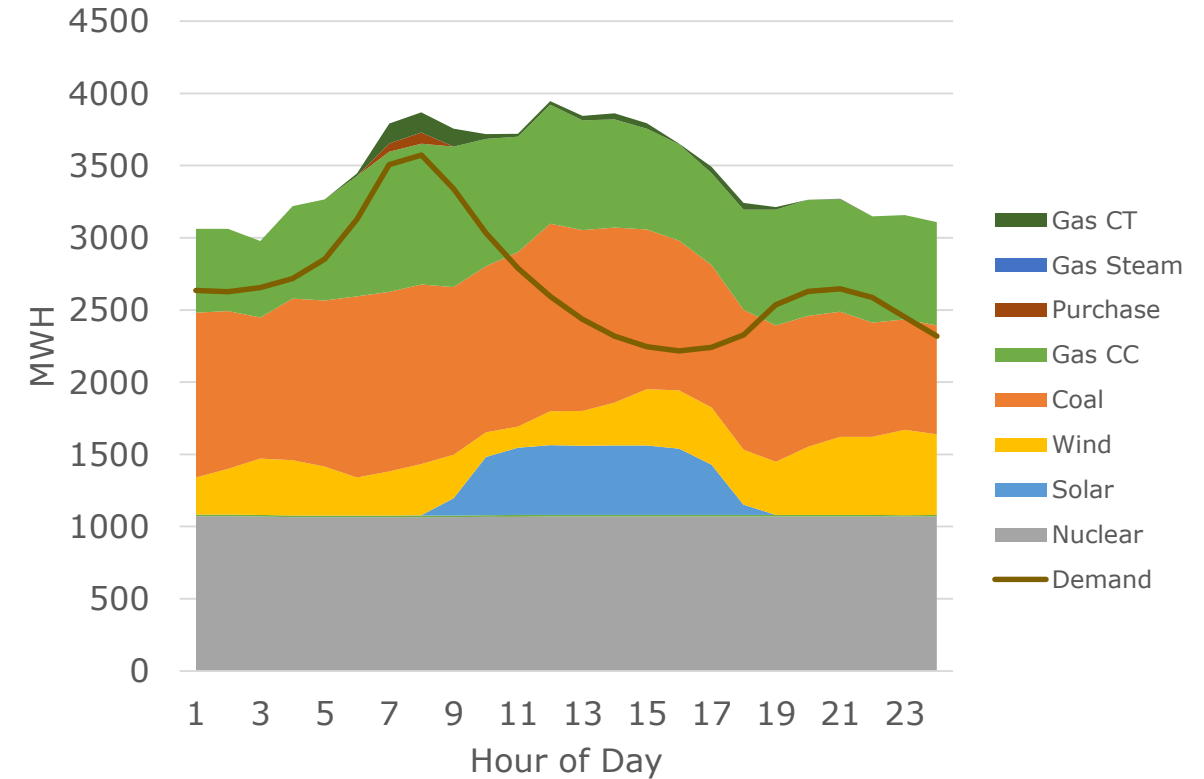
WINTER UTILIZATION



Plant Utilization for CPS Energy Winter – January 2019



Winter Peak Day - 1/24/2019



Gas Steam and Peaker resources are utilized to meet the peak demand periods of early morning or late evening.

Questions?