Kansas Electric Generation: Capacity and Peak Load, 2008 to 2028

Kansas Energy Council (KEC) Staff Summary, Prepared for the KEC Electricity Committee

The tables presented below (Tables 1–3) contain information on current (2008) and forecasted (through 2028) capacity and peak load for the major utilities (and other entities) operating in Kansas. This information represents each utility's current forecasted position, including wholesale power contracts expected to be renewed in the future; it does not include new generation that is not currently approved or under construction. Data presented for KCP&L and Empire represents only the capacity and peak load associated with serving their Kansas customers.

Capacity from jointly owned generation facilities, exclusive of wind generation, is allocated among the owners as follows: **Wolf Creek (current):** Westar 47% (545 MW), KCP&L 47% (545 MW), and KEPCo 6% (70 MW); **Wolf Creek (2011 through 2028, due to improvements in operation):** Westar (565 MW), KCP&L (565 MW), and KEPCo (72.5 MW); **LaCygne:** Westar (709 MW) and KCP&L (709 MW); **State Line:** Westar 40% (200 MW) and Empire 60% (300 MW); **Iatan 1:** KCP&L 70% (455 MW), Aquila 18% (117 MW), and Empire 12% (78 MW).

Capacity from wind generation is either calculated from historical performance or estimated. For wind farms with sufficient historical performance data, capacity is calculated according to Southwest Power Pool's (SPP's) criterion:[1] **Gray County Wind Farm:** 10 MW; **Elk River Wind Farm:** 7 MW; **Spearville Wind Energy Facility:** 15 MW; and **Smoky Hills Wind Farm (2009 through 2028):**[2] 26 MW. Capacity for the following facilities, which will become operational at the end of 2008, are estimated as 5% of nameplate capacity: **Meridian Way Wind Farm** (10 MW), **Flat Ridge Wind Farm** (5 MW), and **Central Plains Wind Farm** (5 MW). Where the power is owned or purchased by more than one utility, capacity is allocated as follows: **Meridian Way Wind Farm:** Empire (5 MW) and Westar (5 MW); **Smoky Hills Wind Farm:** Sunflower (7.8 MW).[3]

In general, the information for these tables was provided by the individual utilities, including their presentations to the KEC Electricity Committee (available on the KEC web site: http://kec.kansas.gov/electricity/index.htm). In addition, staff made calculations for KEPCo, whose forecasted peak load was calculated from data provided, and extended Westar's 10-year forecast to 20 years.

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[1] Southwest Power Pool's Generation Working Group (GWG), September 2004, Wind Power Capacity Accreditation White Paper, Southwest Power Pool (SPP): http://www.spp.org/publications/WindWhite04Sept8_rev5.pdf. Rated capacity for wind is defined as the minimum capacity value that can be expected 85% of the time during the top 10% of load hours in a given month.

[2] Phase 1, roughly 40% of the Smoky Hills Wind Farm, was completed in February 2008 and generation data during the summer of 2008 was used to calculate capacity for the entire project, which is expected to be operational at the end of 2008. Capacity from Smoky Hills during 2008 is not included in these tables.

[3] Buyers Midwest and KC Board of Public Utilities do not include rated capacity from Smoky Hills Wind Farm within their net capacity totals.

Table 1—Overview of current and projected net capacity and capacity responsibility for major utilities and other entities in Kansas, 2008–2028. Net capacity includes existing and planned capacity from generating units (including rated capacity provided by wind generation), as well as any capacity purchased and sold though wholesale power contracts. Capacity responsibility reflects current and projected peak-load demand plus the minimum 12% capacity margin required by Southwest Power Pool (SPP).[1] Capacity responsibility is calculated as projected peak-load demand divided by 0.88.

Utility	Current (2008)		2013 Projected		2018 Projected		2023 Projected		2028 Projected	
	Net Capacity (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Capacity Responsibility (MW)
Westar	5,796.0	5,578.4	6,418.0	6,009.5	6,560.0	6474.0	6,680.0	6974.3	6,622.0	7513.3
KCP&L	1,970.8	1,942.0	2,225.5	2,043.8	2,234.2	2,166.5	2,260.4	2,270.9	2,288.7	2,405.9
KC Board of Public Utilities	560.5	573.9	560.5	602.3	548.0	636.4	406.3	664.8	315.5	693.2
Sunflower and MKEC	1,185.5	1,163.6	1,350.3	1,328.4	1,350.3	1,364.8	1,178.1	1,360.2	1,178.1	1,395.5
Empire	69.1	67.4	68.3	70.6	63.0	74.3	58.7	78.7	54.7	83.6
Midwest Energy	359.0	354.5	379.0	369.5	362.5	378.4	358.0	388.6	358.0	398.9
Kansas Electrical Power Coop.	447.0	419.5	488.4	460.7	411.3	517.5	380.4	572.2	388.5	626.1
Kansas Municipal Energy Agency	323.0	219.2	277.0	247.2	273.0	268.6	273.0	289.4	228.0	311.8
Kansas Power Pool	445.6	331.9	625.8	449.2	618.8	484.3	534.8	507.7	534.8	532.6

[1] Per SPP criteria, load satisfied by firm power contracts and contracts that include reserve responsibility are included in capacity responsibility numbers without the additional capacity margin.

Table 2—Annual forecasted peak load, capacity responsibility, and net capacity for major utilities and other entities in Kansas, 2008–2028. Peak load is the amount of consumption during the period of maximum demand and, in this table, is synonymous with summer peak load. Capacity responsibility reflects current and projected peak-load demand plus the minimum 12% capacity margin required by Southwest Power Pool (SPP).[1] Capacity responsibility is calculated as projected peak-load demand divided by 0.88. Net capacity includes existing and planned capacity from generating units (including rated capacity provided by wind generation), as well as any capacity purchased and sold though wholesale power contracts (see Table 3 for details). Peak-load data was provided by the individual utilities except where noted.[2]

	Westar			KCP&L			KC Board of Public Utilities		
	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)
2008	4,909.0	5,578.4	5,796.0	1,709.0	1,942.0	1,970.8	505.0	573.9	560.5
2009	4,982.6	5,662.1	6,118.0	1,721.0	1,955.7	1,992.3	510.0	579.5	560.5
2010	5,057.4	5,747.0	6,426.0	1,738.9	1,976.0	2,121.9	515.0	585.2	560.5
2011	5,133.2	5,833.2	6,437.0	1,755.9	1,995.3	2,183.7	520.0	590.9	560.5
2012	5,210.2	5,920.7	6,428.0	1,775.7	2,017.9	2,201.0	525.0	596.6	560.5
2013	5,288.4	6,009.5	6,418.0	1,798.5	2,043.8	2,225.5	530.0	602.3	560.5
2014	5,367.7	6,099.7	6,600.0	1,826.3	2,075.3	2,231.3	535.0	608.0	560.5
2015	5,448.2	6,191.2	6,590.0	1,847.2	2,099.1	2,234.2	540.0	613.6	548.0
2016	5,530.0	6,284.0	6,580.0	1,870.0	2,124.9	2,223.0	545.0	619.3	548.0
2017	5,612.9	6,378.3	6,570.0	1,888.7	2,146.3	2,228.1	550.0	625.0	548.0
2018	5,697.1	6,474.0	6,560.0	1,906.5	2,166.5	2,234.2	560.0	636.4	548.0
2019	5,782.6	6,571.1	6,724.0	1,930.2	2,193.4	2,240.4	565.0	642.0	548.0
2020	5,869.3	6,669.6	6,713.0	1,951.0	2,217.1	2,244.3	570.0	647.7	492.0
2021	5,957.3	6,769.7	6,702.0	1,968.8	2,237.3	2,250.1	575.0	653.4	492.0
2022	6,046.7	6,871.2	6,692.0	1,982.7	2,253.0	2,254.2	580.0	659.1	419.7
2023	6,137.4	6,974.3	6,680.0	1,998.4	2,270.9	2,260.4	585.0	664.8	406.3
2024	6,229.5	7,078.9	6,669.0	2,022.1	2,297.9	2,267.2	590.0	670.5	426.3
2025	6,322.9	7,185.1	6,658.0	2,046.9	2,326.0	2,272.9	595.0	676.1	426.3
2026	6,417.7	7,292.9	6,646.0	2,066.7	2,348.6	2,276.3	600.0	681.8	315.5
2027	6,514.0	7,402.3	6,634.0	2,091.5	2,376.7	2,282.8	605.0	687.5	315.5
2028	6,611.7	7,513.3	6,622.0	2,117.2	2,405.9	2,288.7	610.0	693.2	315.5

Table 2, continued.

	Sunflower and MKEC			Empire			Midwest Energy		
	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)
2008	1,024.0	1,163.6	1,185.5	59.3	67.4	69.1	312.0	354.5	359.0
2009	1,040.0	1,181.8	1,352.3	59.9	68.0	70.5	318.0	361.4	364.0
2010	1,096.0	1,245.5	1,350.3	60.4	68.6	71.7	320.0	363.6	369.0
2011	1,131.0	1,285.2	1,350.3	60.9	69.3	70.6	322.0	365.9	369.0
2012	1,147.0	1,303.4	1,350.3	61.5	69.9	69.4	324.0	368.2	379.0
2013	1,169.0	1,328.4	1,350.3	62.1	70.6	68.3	325.0	369.3	379.0
2014	1,175.0	1,335.2	1,350.3	62.7	71.3	67.1	326.0	370.5	375.5
2015	1,182.0	1,343.2	1,350.3	63.3	72.0	66.0	328.0	372.7	371.5
2016	1,189.0	1,351.1	1,350.3	64.0	72.7	65.0	330.0	375.0	362.5
2017	1,196.0	1,359.1	1,350.3	64.7	73.5	64.0	332.0	377.3	362.5
2018	1,201.0	1,364.8	1,350.3	65.4	74.3	63.0	333.0	378.4	362.5
2019	1,173.0	1,333.0	1,178.1	66.1	75.1	62.1	335.0	380.7	358.0
2020	1,179.0	1,339.8	1,178.1	66.9	76.0	61.2	337.0	383.0	358.0
2021	1,185.0	1,346.6	1,178.1	67.6	76.9	60.4	339.0	385.2	358.0
2022	1,191.0	1,353.4	1,178.1	68.4	77.8	59.5	340.0	386.4	358.0
2023	1,197.0	1,360.2	1,178.1	69.2	78.7	58.7	342.0	388.6	358.0
2024	1,203.0	1,367.0	1,178.1	70.1	79.6	57.9	344.0	390.9	358.0
2025	1,210.0	1,375.0	1,178.1	70.9	80.6	57.0	345.0	392.0	358.0
2026	1,216.0	1,381.8	1,178.1	71.8	81.6	56.3	347.0	394.3	358.0
2027	1,222.0	1,388.6	1,178.1	72.7	82.6	55.5	349.0	396.6	358.0
2028	1,228.0	1,395.5	1,178.1	73.6	83.6	54.7	351.0	398.9	358.0

Table 2, continued.

	Kansas Electrical Power Coop.[3]			Kansas Municipal Energy Agency			Kansas Power Pool		
	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)	Peak Load (MW)	Capacity Responsibility (MW)	Net Capacity (MW)
2008	412.0	419.5	447.0	192.9	219.2	323.0	295.4	331.9	445.6
2009	419.2	427.1	451.3	199.9	227.2	275.0	318.4	355.0	499.2
2010	426.5	434.9	485.6	204.8	232.7	277.0	383.0	428.0	625.3
2011	434.0	442.7	492.5	210.1	238.7	277.0	389.4	434.8	625.8
2012	441.6	450.8	497.0	213.8	242.9	277.0	395.8	441.9	625.8
2013	449.3	460.7	488.4	217.5	247.2	277.0	402.1	449.2	625.8
2014	457.2	469.0	492.8	221.2	251.4	277.0	408.6	456.6	625.8
2015	465.2	477.5	497.3	224.9	255.6	277.0	415.2	464.1	625.8
2016	473.3	486.2	501.9	228.9	260.1	273.0	421.9	471.7	625.8
2017	481.6	508.6	406.5	232.9	264.7	273.0	428.8	479.5	625.8
2018	490.1	517.5	411.3	236.4	268.6	273.0	433.1	484.3	618.8
2019	498.6	533.7	364.0	239.9	272.7	273.0	436.9	488.7	618.8
2020	507.4	543.1	368.0	243.5	276.7	273.0	441.0	493.4	534.8
2021	516.2	552.6	372.1	247.2	280.9	273.0	445.2	498.1	534.8
2022	525.3	562.3	376.2	250.9	285.1	273.0	449.4	502.9	534.8
2023	534.5	572.2	380.4	254.7	289.4	273.0	453.7	507.7	534.8
2024	543.8	582.2	384.6	258.5	293.7	273.0	458.0	512.6	534.8
2025	553.3	594.4	375.0	262.4	298.1	273.0	462.3	517.5	534.8
2026	563.0	604.8	379.4	266.3	302.6	228.0	466.7	522.5	534.8
2027	572.9	615.3	383.9	270.3	307.1	228.0	471.1	527.5	534.8
2028	582.9	626.1	388.5	274.3	311.8	228.0	475.5	532.6	534.8

[1] Per SPP criteria, load satisfied by firm power contracts and contracts that include reserve responsibility are included in capacity responsibility numbers without the additional capacity margin.
[2] Peak load data for the years 2018 through 2028 were calculated by KEC staff from the 10 year forecast provided by Westar, assuming 1.5% annual growth.
[3] Peak load data were calculated by KEC staff, using a 1.75% annual growth rate, based on the numbers provided in "Power Supply Overview," Kansas Electrical Power Cooperative PowerPoint presentation to the KEC Electricity Committee: http://kec.kansas.gov/electricity/index.htm.

Table 3—Current and forecasted capacity breakdown for major utilities and entities in Kansas, 2008–2028. Capacity from generation is the summation of the rated capacity of all of the power plants owned by the utility or entity, including wind generation. Net contracts represent capacity purchased and sold through wholesale power contracts, such as Power Purchase Agreements (PPA's), and is calculated as contracts purchased minus contracts sold (a negative number indicates that more capacity is sold than purchased, while a positive number indicates that more capacity is purchased than sold). Net capacity is the summation of capacity from generation and net contracts

	Westar			KCP&L			KC Board of Public Utilities		
	Capacity from Generation (MW)	Net Contracts (MW)	Net Capacity (MW)	Capacity from Generation (MW)	Net Contracts (MW)	Net Capacity (MW)	Capacity from Generation (MW)	Net Contracts (MW)	Net Capacity (MW)
2008	6,635.0	-839.0	5,796.0	1,915.9	54.9	1,970.8	613.5	-53.0	560.5
2009	6,965.0	-847.0	6,118.0	1,937.3	55.0	1,992.3	613.5	-53.0	560.5
2010	6,965.0	-539.0	6,426.0	2,171.8	-49.9	2,121.9	613.5	-53.0	560.5
2011	6,985.0	-548.0	6,437.0	2,190.9	-7.2	2,183.7	613.5	-53.0	560.5
2012	6,985.0	-557.0	6,428.0	2,207.5	-7.7	2,201.0	613.5	-53.0	560.5
2013	6,985.0	-567.0	6,418.0	2,208.7	16.8	2,225.5	613.5	-53.0	560.5
2014	6,985.0	-385.0	6,600.0	2,214.5	16.8	2,231.3	613.5	-53.0	560.5
2015	6,985.0	-395.0	6,590.0	2,217.4	16.8	2,234.2	601.0	-53.0	548.0
2016	6,985.0	-405.0	6,580.0	2,223.0	0	2,223.0	601.0	-53.0	548.0
2017	6,985.0	-415.0	6,570.0	2,228.1	0	2,228.1	601.0	-53.0	548.0
2018	6,985.0	-425.0	6,560.0	2,234.2	0	2,234.2	601.0	-53.0	548.0
2019	6,985.0	-261.0	6,724.0	2,240.4	0	2,240.4	601.0	-53.0	548.0
2020	6,985.0	-272.0	6,713.0	2,244.3	0	2,244.3	545.0	-53.0	492.0
2021	6,985.0	-283.0	6,702.0	2,250.1	0	2,250.1	545.0	-53.0	492.0
2022	6,985.0	-293.0	6,692.0	2,254.2	0	2,254.2	472.7	-53.0	419.7
2023	6,985.0	-305.0	6,680.0	2,260.4	0	2,260.4	421.3	-15.0	406.3
2024	6,985.0	-316.0	6,669.0	2,267.2	0	2,267.2	421.3	5.0	426.3
2025	6,985.0	-327.0	6,658.0	2,272.9	0	2,272.9	421.3	5.0	426.3
2026	6,985.0	-339.0	6,646.0	2,276.3	0	2,276.3	310.5	5.0	315.5
2027	6,985.0	-351.0	6,634.0	2,282.8	0	2,282.8	310.5	5.0	315.5
2028	6,985.0	-363.0	6,622.0	2,288.7	0	2,288.7	310.5	5.0	315.5

Table 3, continued.

	Sunflower and MKEC			Empire			Midwest Energy[1]		
	Generation (MW)	Net Contracts (MW)	Net Capacity (MW)	Generation (MW)	Net Contracts (MW)	Net Capacity (MW)	Generation (MW)	Net Contracts (MW)	Net Capacity (MW)
2008	980.2	205.3	1,185.5	63.1	6.0	69.1	71.0	288.0	359.0
2009	988.6	364.7	1,352.3	62.1	8.4	70.5	101.0	263.0	364.0
2010	988.6	364.7	1,350.3	68.7	3.0	71.7	101.0	268.0	369.0
2011	988.6	364.7	1,350.3	67.6	3.0	70.6	101.0	268.0	369.0
2012	988.6	364.7	1,350.3	66.5	2.9	69.4	101.0	278.0	379.0
2013	988.6	364.7	1,350.3	65.4	2.9	68.3	101.0	278.0	379.0
2014	988.6	364.7	1,350.3	64.3	2.8	67.1	101.0	274.5	375.5
2015	988.6	364.7	1,350.3	65.5	0.5	66.0	97.0	274.5	371.5
2016	988.6	364.7	1,350.3	64.5	0.5	65.0	88.0	274.5	362.5
2017	988.6	364.7	1,350.3	63.5	0.5	64.0	88.0	274.5	362.5
2018	988.6	364.7	1,350.3	62.5	0.5	63.0	88.0	274.5	362.5
2019	988.6	189.5	1,178.1	61.6	0.5	62.1	88.0	270.0	358.0
2020	988.6	189.5	1,178.1	60.7	0.5	61.2	88.0	270.0	358.0
2021	988.6	189.5	1,178.1	59.9	0.5	60.4	88.0	270.0	358.0
2022	988.6	189.5	1,178.1	59.1	0.5	59.5	88.0	270.0	358.0
2023	988.6	189.5	1,178.1	58.2	0.5	58.7	88.0	270.0	358.0
2024	988.6	189.5	1,178.1	57.4	0.5	57.9	88.0	270.0	358.0
2025	988.6	189.5	1,178.1	56.6	0.5	57.0	88.0	270.0	358.0
2026	988.6	189.5	1,178.1	55.8	0.5	56.3	88.0	270.0	358.0
2027	988.6	189.5	1,178.1	55.0	0.5	55.5	88.0	270.0	358.0
2028	988.6	189.5	1,178.1	54.2	0.4	54.7	88.0	270.0	358.0

Table 3, continued.

	Kansas Electrical Power Coop.[2]			Kansas Municipal Energy Agency			Kansas Power Pool		
	Generation (MW)	Net Contracts (MW)	Net Capacity (MW)	Generation (MW)	Net Contracts (MW)	Net Capacity (MW)	Generation (MW)	Net Contracts (MW)	Net Capacity (MW)
2008	90.0	357.0	447.0	205.0	118.0	323.0	234.5	211.1	445.6
2009	90.0	361.3	451.3	205.0	70.0	275.0	237.7	261.5	499.2
2010	120.0	365.6	485.6	205.0	72.0	277.0	359.3	266.0	625.3
2011	122.5	370.0	492.5	205.0	72.0	277.0	359.3	266.5	625.8
2012	122.5	374.5	497.0	205.0	72.0	277.0	359.3	266.5	625.8
2013	122.5	365.9	488.4	205.0	72.0	277.0	359.3	266.5	625.8
2014	122.5	370.3	492.8	205.0	72.0	277.0	359.3	266.5	625.8
2015	122.5	374.8	497.3	205.0	72.0	277.0	359.3	266.5	625.8
2016	122.5	379.4	501.9	205.0	68.0	273.0	359.3	266.5	625.8
2017	122.5	284.0	406.5	205.0	68.0	273.0	359.3	266.5	625.8
2018	122.5	288.8	411.3	205.0	68.0	273.0	359.3	259.5	618.8
2019	122.5	241.5	364.0	205.0	68.0	273.0	359.3	259.5	618.8
2020	122.5	245.5	368.0	205.0	68.0	273.0	359.3	175.5	534.8
2021	122.5	249.6	372.1	205.0	68.0	273.0	359.3	175.5	534.8
2022	122.5	253.7	376.2	205.0	68.0	273.0	359.3	175.5	534.8
2023	122.5	257.9	380.4	205.0	68.0	273.0	359.3	175.5	534.8
2024	122.5	262.1	384.6	205.0	68.0	273.0	359.3	175.5	534.8
2025	122.5	252.5	375.0	205.0	68.0	273.0	359.3	175.5	534.8
2026	122.5	256.9	379.4	205.0	23.0	228.0	359.3	175.5	534.8
2027	122.5	261.4	383.9	205.0	23.0	228.0	359.3	175.5	534.8
2028	122.5	266.0	388.5	205.0	23.0	228.0	359.3	175.5	534.8

[1] Net contract data for Midwest Energy includes wholesale contracts that are under negotiation as of Fall 2008.
[2] "Power Supply Overview," Kansas Electrical Power Cooperative PowerPoint presentation to the KEC Electricity Committee, May 21, 2008: http://kec.kansas.gov/electricity/index.htm. Generation data for the years after 2010 include a 3.5% ownership of Iatan 2, currently under construction by KCP&L. Additionally, net contract data include contracts that adjust based on changes (growth) in peak load; for these, peak load growth is assumed to be 1.75% per year.