

Approved: 03-05-08
Date

MINUTES OF THE SELECT COMMITTEE ON ENERGY & ENVIRONMENT FOR THE FUTURE

The meeting was called to order by Vice Chairman Robert Olson at 1:30 PM on February 20, 2008 in Room 784 of the Docking State Office Building.

All members were present except

Representative Don Myers, Excused
Representative Vaughn Flora, Excused
Representative Jason Watkins, Excused
Representative Oletha Faust-Goudeau, Excused

Committee staff present:

Mike Corrigan, Revisor of Statutes Office
Melissa Doeblin, Revisor of Statutes Office
Raney Gilliland, Kansas Legislative Research Department
Mary K. Galligan, Kansas Legislative Research Department
Barbara Lewerenz, Committee Assistant

Conferees appearing before the committee:

Larry Holloway, KCC, Chief of Energy Operations
Liz Brosius, Kansas Energy Council, Director

Others attending:

See attached list.

Moved by Representative Whitham, seconded by Representative Proehl for approval of the Minutes of the House Select Committee on Energy and Environment for the Future held February 18, 2008. Motion Carried.

Vice Chairman Olson introduced Larry Holloway, Chief of Energy Operations, Kansas Corporation Commission, who presented a power-point briefing on *Present Electric Power Availability and Future Needs*. Mr. Holloway defined electric generation terms. He gave forecasts of Kansas peak demand and energy needs; existing generation capacity and needed generation capacity for the future. He used a series of charts and graphs to show past, present and future needs. He emphasized the wind development is an important resource, but cannot substitute for dispatchable generation capacity, and that in the next 20 years existing Kansas generation capacity will need to be replaced. (Attachment 1)

Vice Chairman Olson introduced Liz Brosius, Kansas Energy Council Director who briefed the committee on the Kansas Energy Council that was authorized in 2002 by former Governor Graves and reformulated by Governor Sebelius. The council is a 35 member energy policy advisory group chaired by Ken Frahm and Lt Governor Mark Parkinson with the purpose of developing background information and making policy recommendations on selected energy topics.

In 2006, the committee made recommendations on wind generation and the feasibility of carbon capture and storage with respect to coal generation. In 2007, the committee requested and heard presentations on the status of nuclear energy nationwide. Currently the committee has agreed to study utility generation, base load investment, CO2 emissions and anticipated demand on utilities in the future. (Attachment 2)

Vice Chairman Olson announced the next meeting is on February 21, 2008. Representative Tom Sloan will brief the committee on *Present and Future Electric Power Supply and Progress in Development of Alternative Sources of Electric Energy*.

Meeting Adjourned at 2:45 p.m.

Briefing on Present Electric Power Availability and Future Needs

Select Committee on Energy and Environment for the Future

February 20, 2008

Larry Holloway Chief of Energy Operations
Kansas Corporation Commission

Select Committee on Energy
& Environment for the Future
2/20/08
Attachment 1

Electric Generation Definitions

- Capacity Factor

- This is the amount of energy produced by a generator divided by the nameplate capacity rating of the generator times the number of hours in a year.

- For example, suppose a 10 megawatt (MW) generator produces 43,800 megawatt-hours (MWH) of electricity in a year, then

$$43,000 \text{ (MWH)} / [8,760 \text{ (h/yr)} * 10 \text{ MW}]$$

results in a capacity factor of 50%

Electric Generation Definitions (cont)

1-3

- **Nameplate Capacity**
 - The rating of an electric generator at 100% design conditions in MW
 - Note that in some cases this may be more or less than the generator can actually produce in extreme situations.
- **Summer Capacity Rating**
 - The rating of an electric generator at the hottest summer design conditions
 - Often less than nameplate rating

Electric Generation Definitions (cont)

- Dispatchable Capacity
 - The amount of generation capacity that a utility can expect from a generating unit anytime the unit is 100% available
 - This means the generator can be turned on or “dispatched” anytime it is needed, unless it is down for repairs
- Accredited Capacity
 - The amount of dispatchable generation capacity a unit can be expected to deliver during peak load conditions, for dispatchable generation this is usually the Summer rating.
 - For non-dispatchable units, such as wind or solar generation this is normally based upon expected availability during peak demand.
 - Wind is generally accredited at 10% of nameplate capacity rating.

Electric Generation Definitions (cont) ²₁

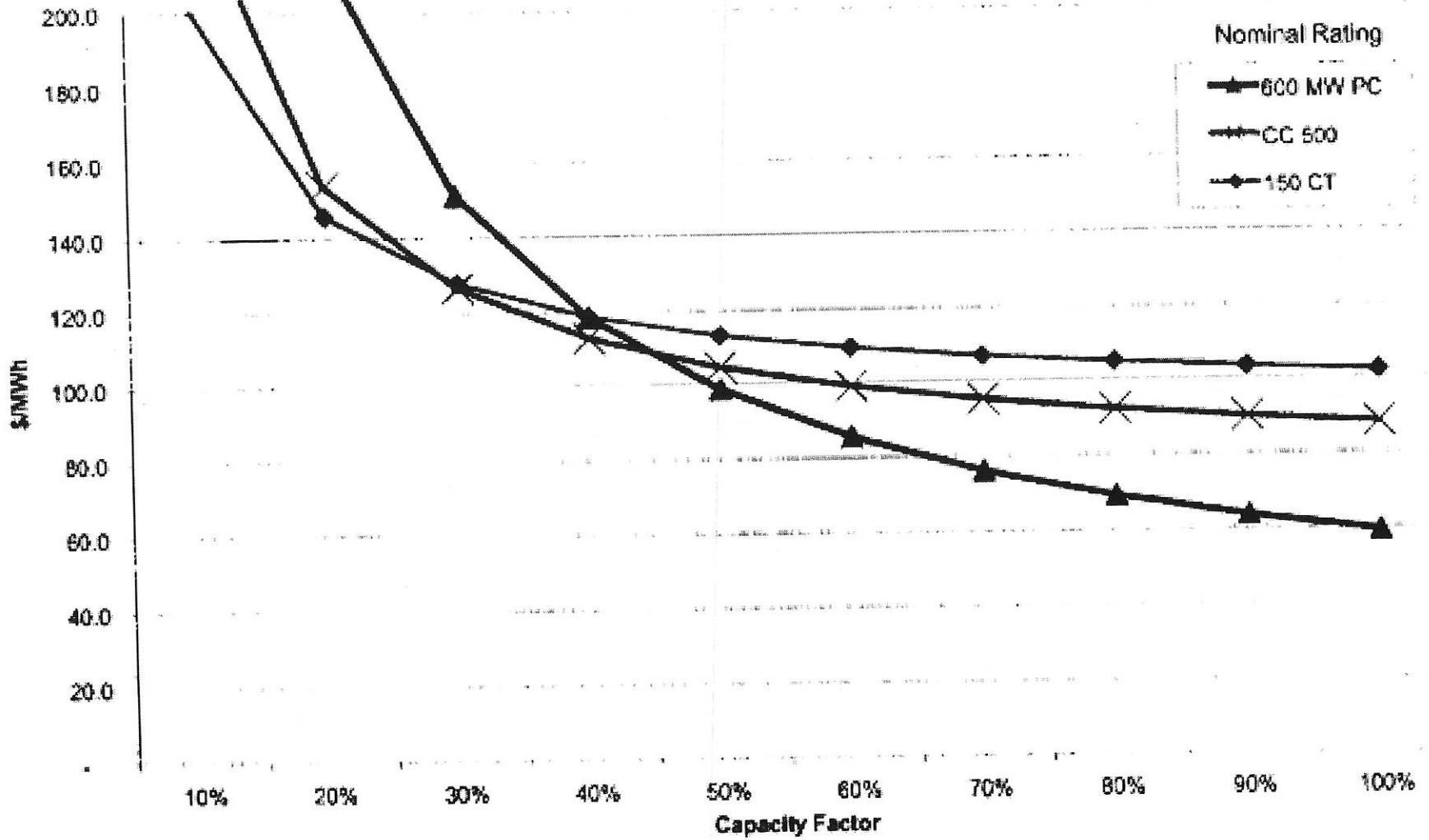
- **Baseload Generation**
 - Dispatchable generation that is expected to be operated at a capacity factor greater than 45 percent, based upon variable fuel costs.
 - Example Coal, Nuclear, Hydro
- **Intermediate Generation**
 - Dispatchable generation that is expected to be operated at a capacity factor between 30 to 45 percent, based upon variable fuel costs.
 - Example, Gas-Fired combined cycle units
- **Peaking Generation**
 - Dispatchable generation that is expected to be operated at a capacity factor less than 30 percent, based upon variable fuel costs.
 - Example combustion turbines, internal combustion engines, gas-fired steam units
- **Intermittent Generation**
 - Generation which has very low variable fuel costs, such as wind or solar which is only available when the resource is available and cannot be dispatched.

Determining the type of Generation Needed

1-6

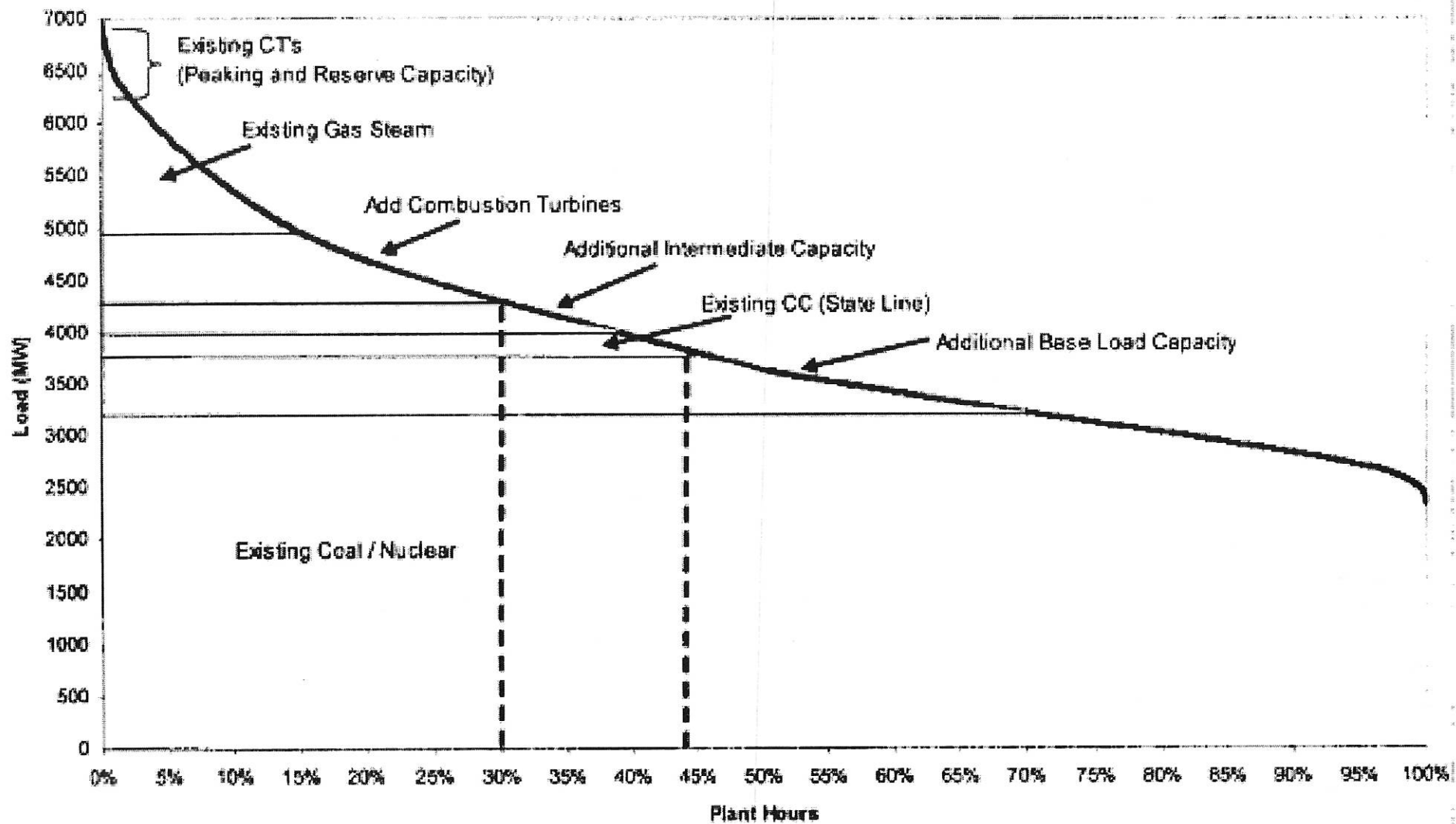
- Depends on the load profile and the overall busbar costs at different capacity factors
- Example
 - Westar provided an analysis of their generation needs through 2018 when they requested KCC approval of their plan to build the Emporia Energy Center, a peaking facility
 - The following two slides are from testimony filed by Natalie Rolph, with Black and Veatch, in Docket 07-WSEE-616-PRE

20 Year Levelized Busbar Costs 2012 C/O Date



2018

8-1

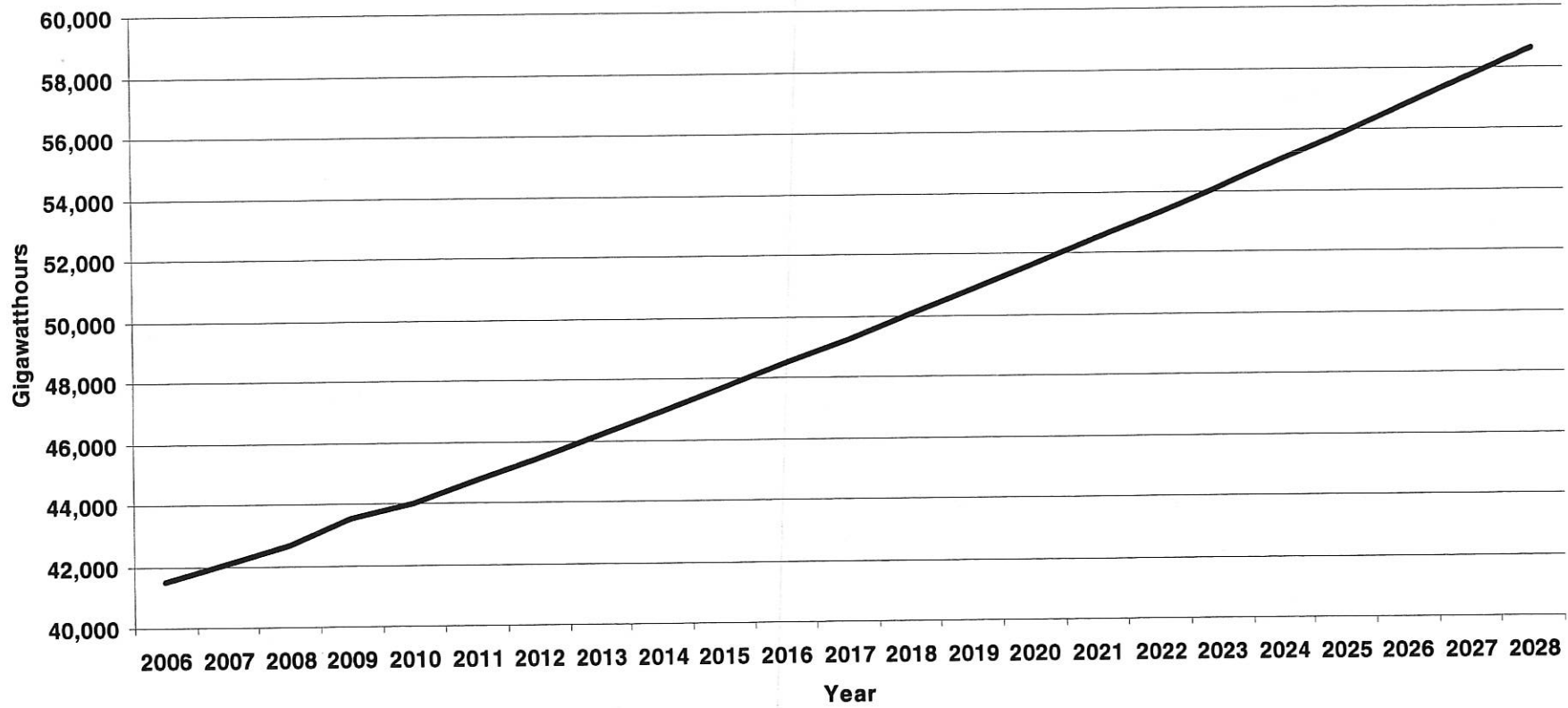


Current Kansas Electric Needs

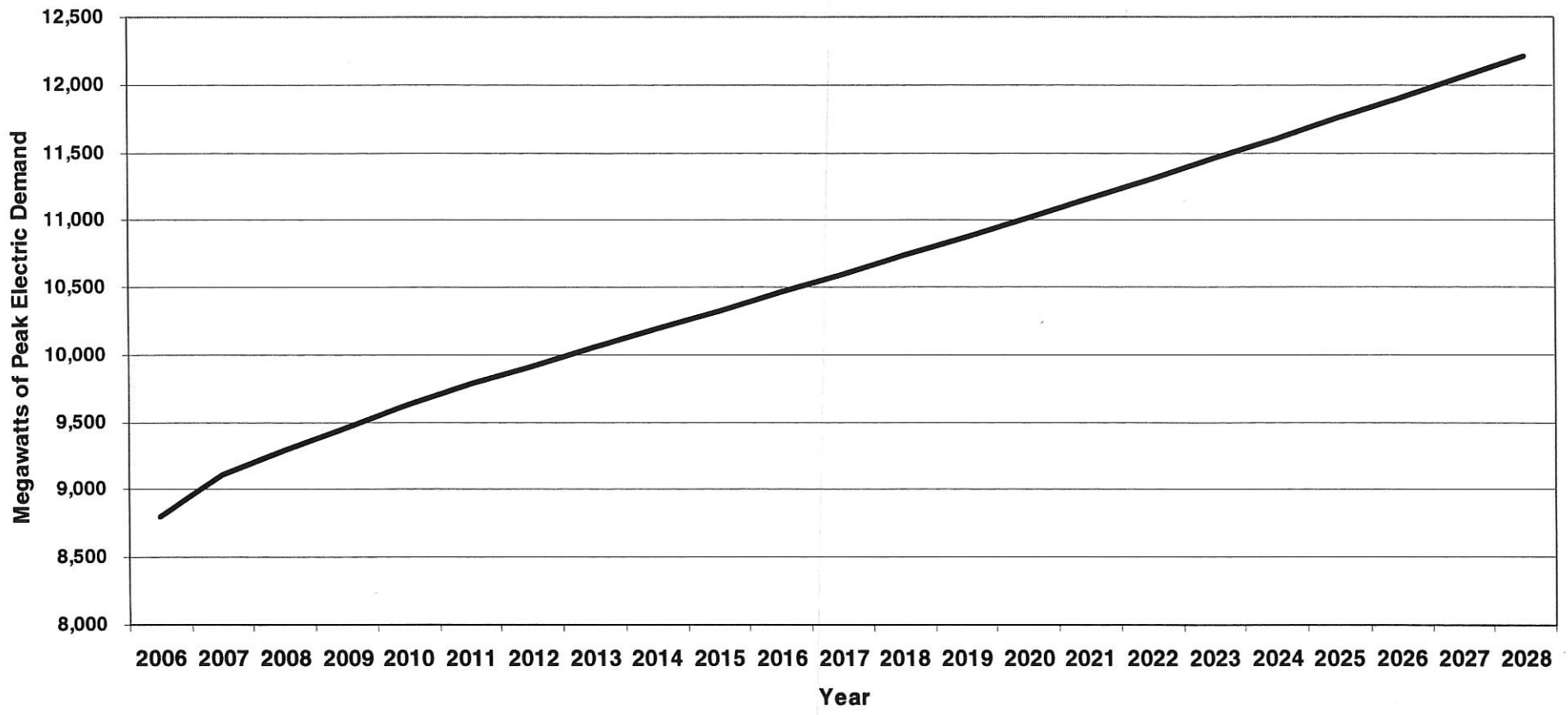
1-9

- Forecasts of Kansas peak demand and energy needs
- Kansas existing generation capacity
 - 2006 data from the Energy Information Agency
- Needed generation capacity for the future

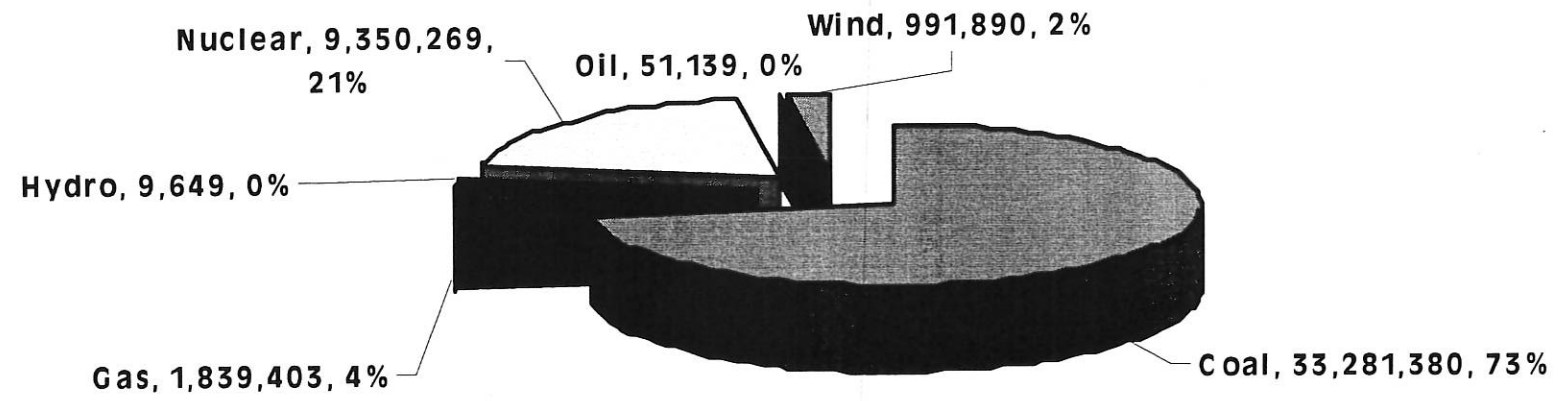
Forecast of Electric Energy Needed for Kansas (from 2007 SPP EIA 411, years after 2016 at 1.6% annual growth)



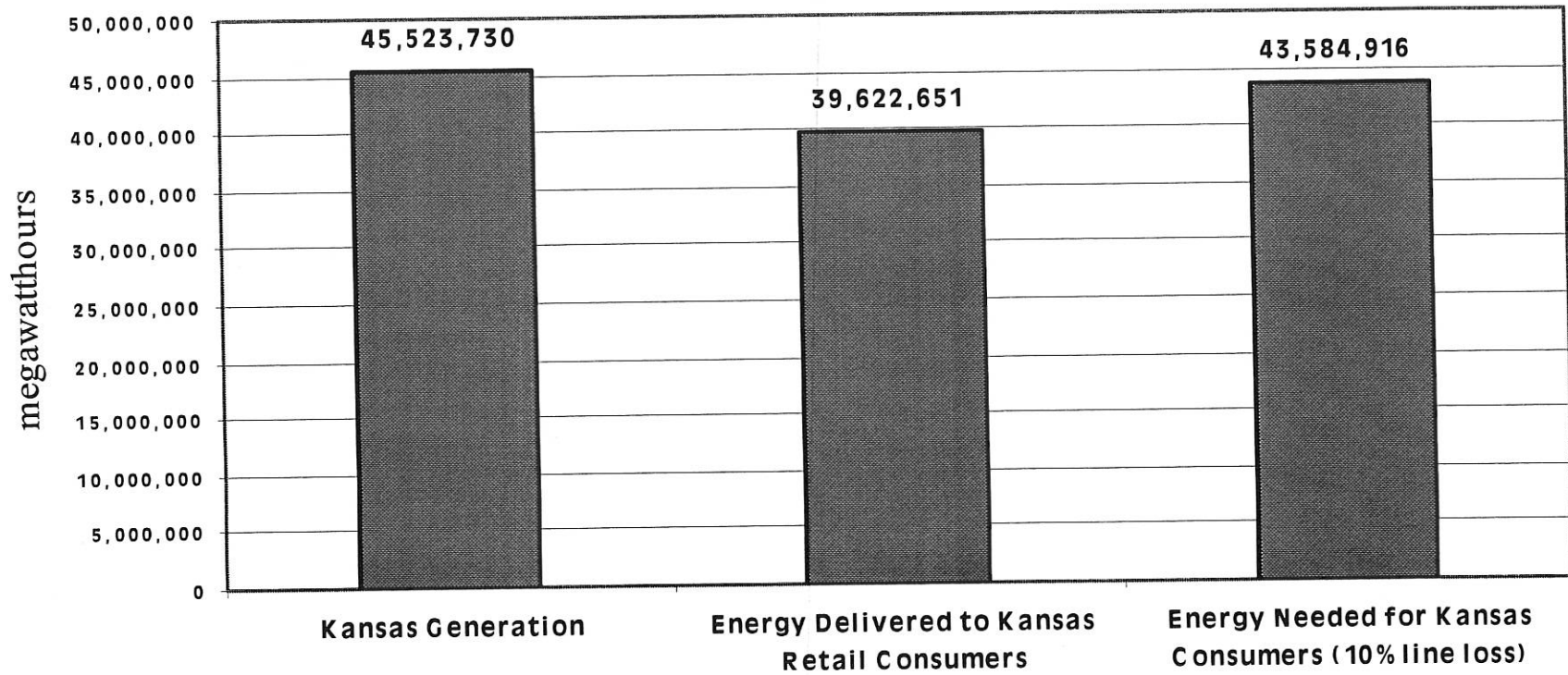
Forecast of Peak Electric Demand for Kansas (from 2007 SPP EIA-411 with 1.3% annual growth after 2016)



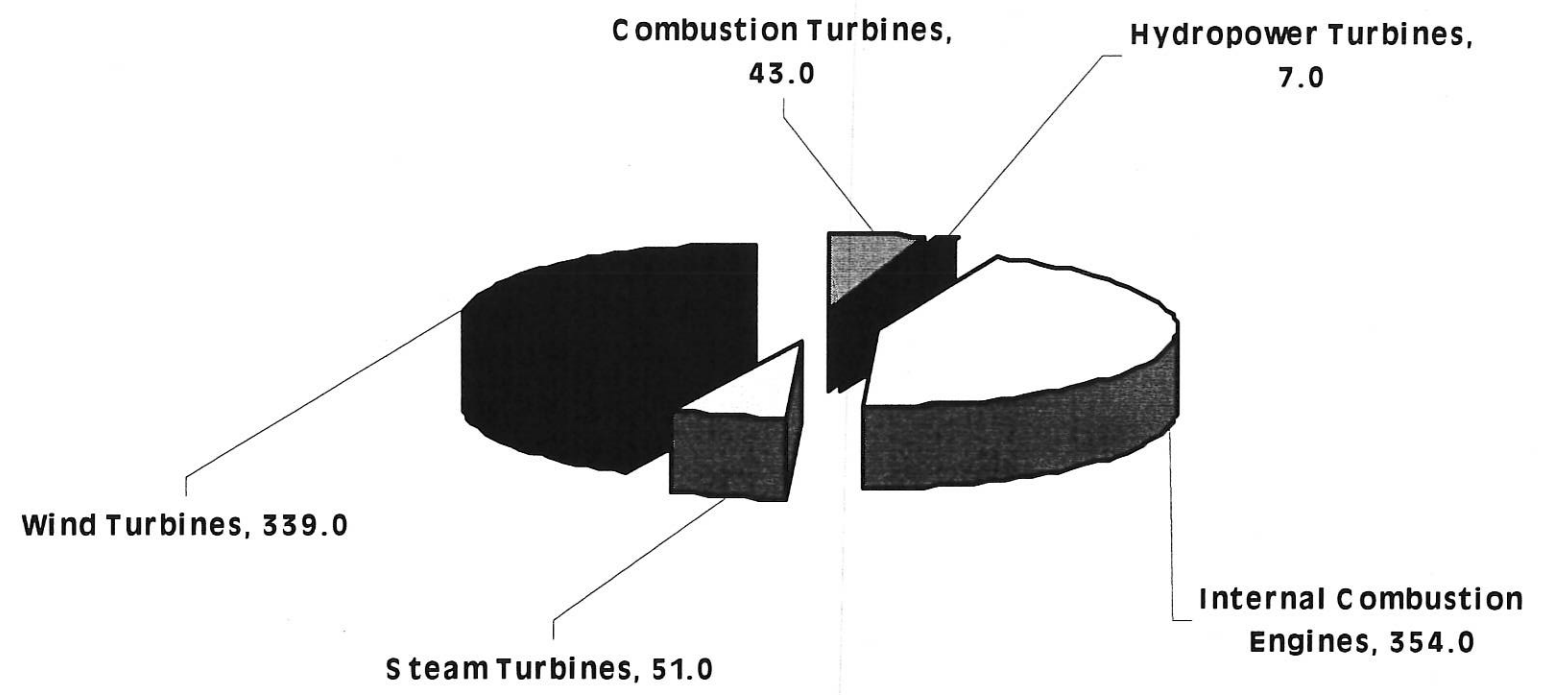
2006 Kansas Generation by Fuel Type (Megawatthours and percentage indicated)



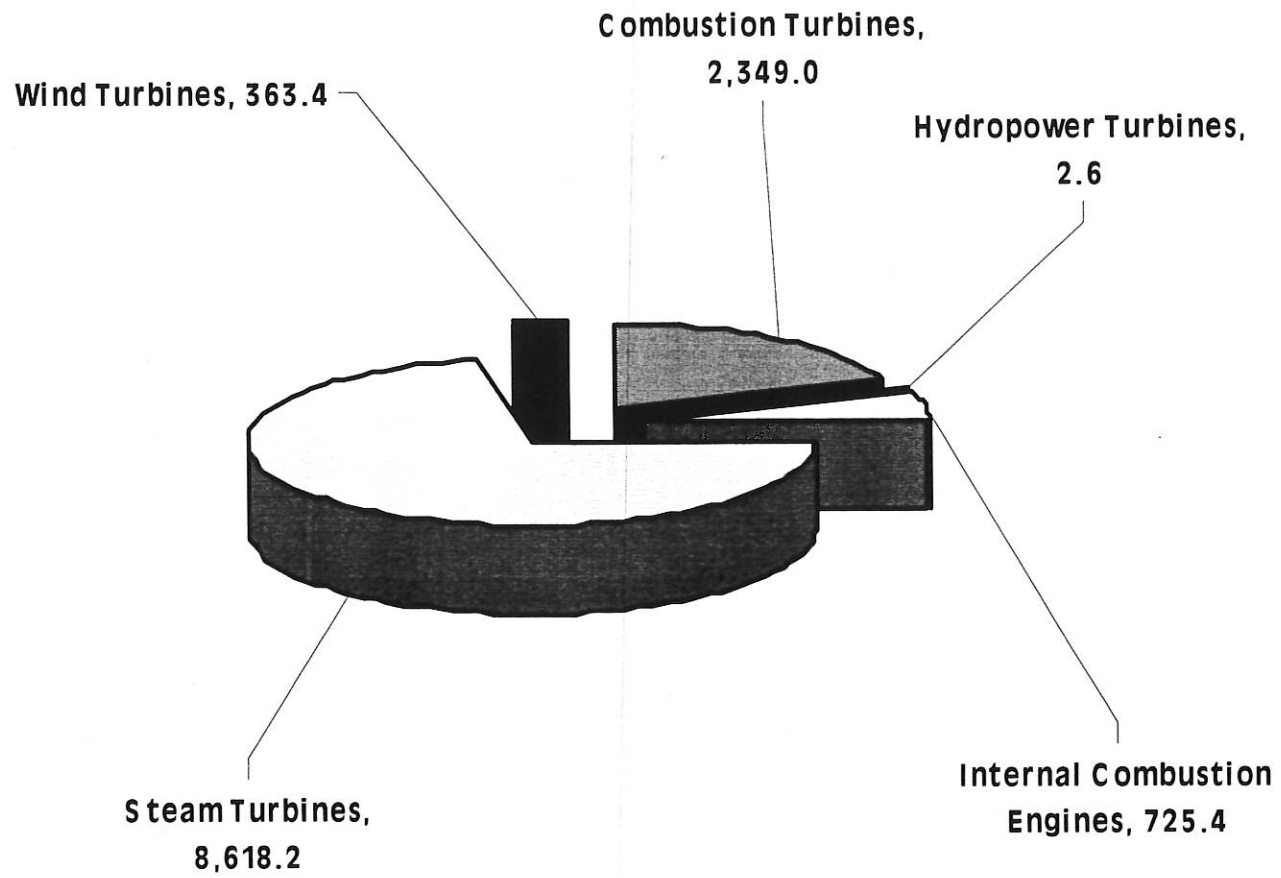
2006 Kansas Electric Generation and Consumption



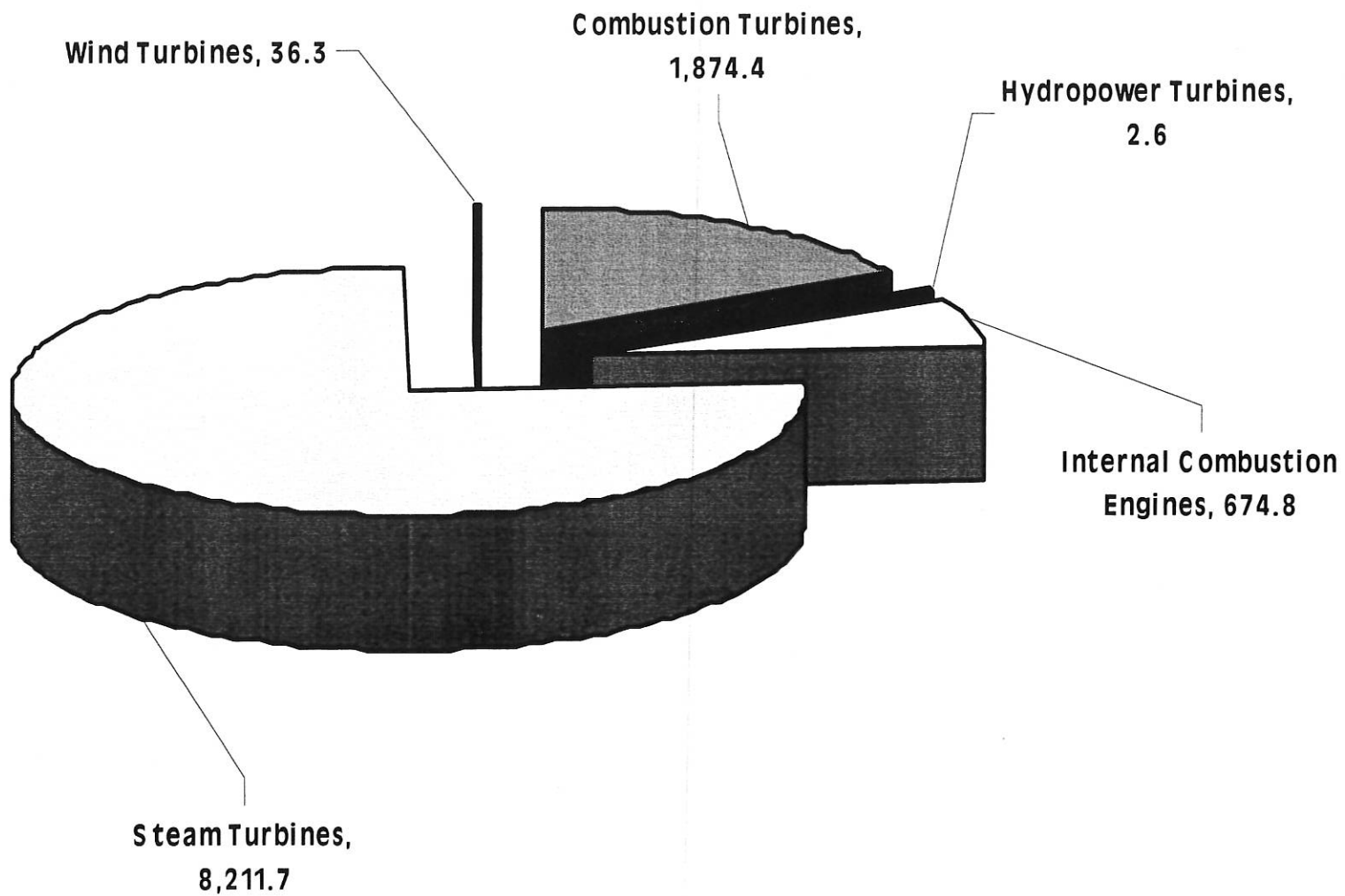
Number of Kansas Electric Generating Units by Type



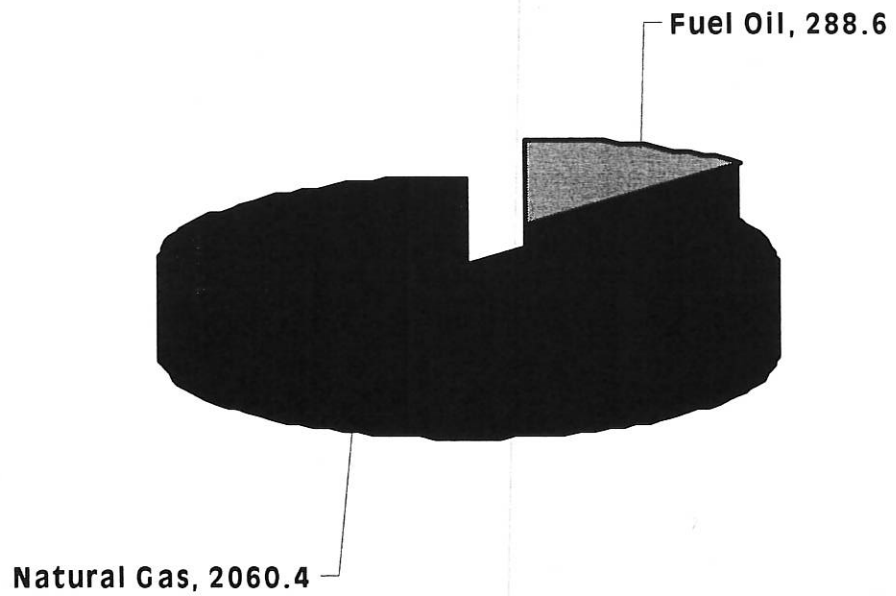
Kansas Electric Generation Nameplate Capacity (MW) by Type



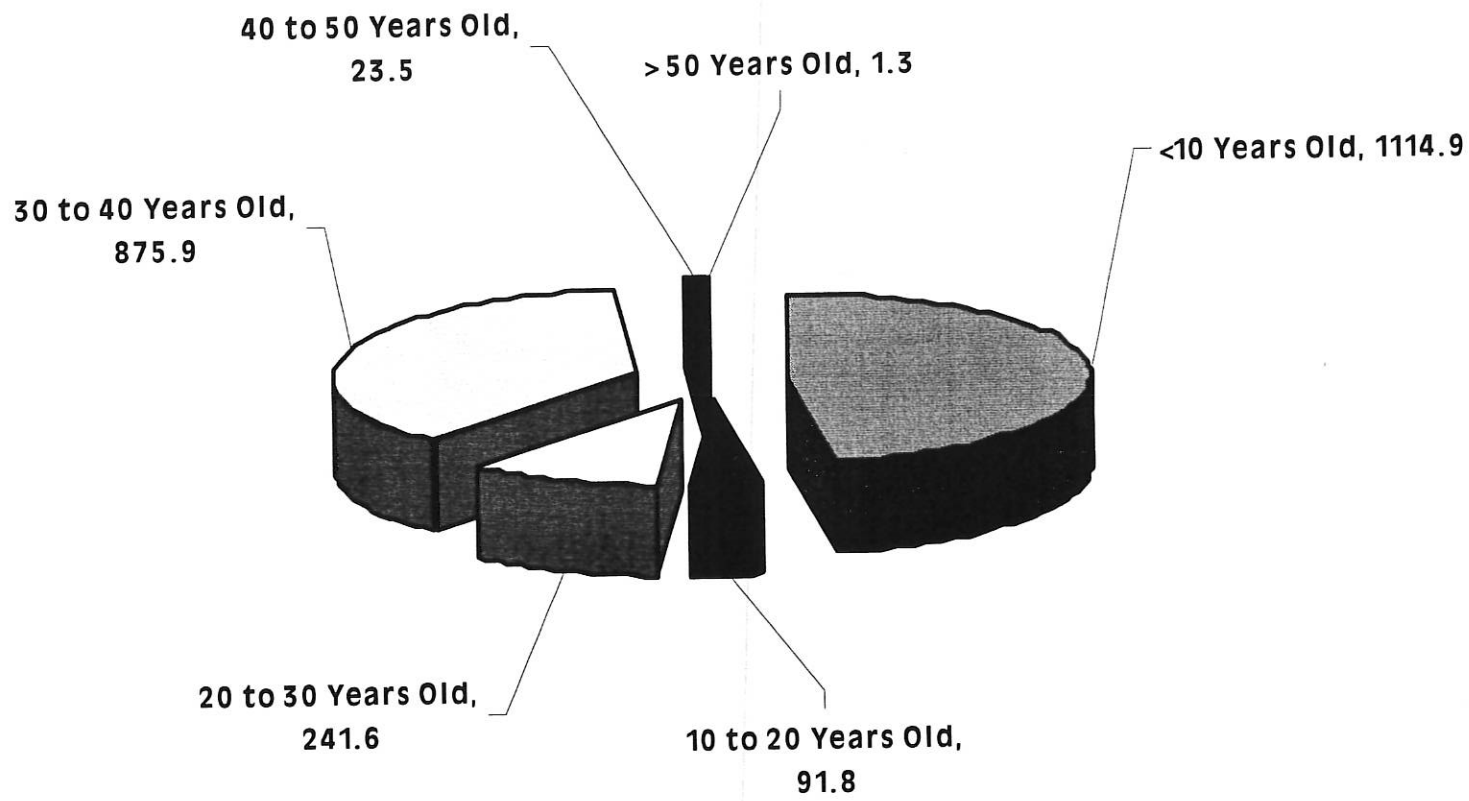
Kansas Generation Accredited Capacity (MW) by Type



Kansas Combustion Turbine Nameplate Capacity (MW) by Fuel

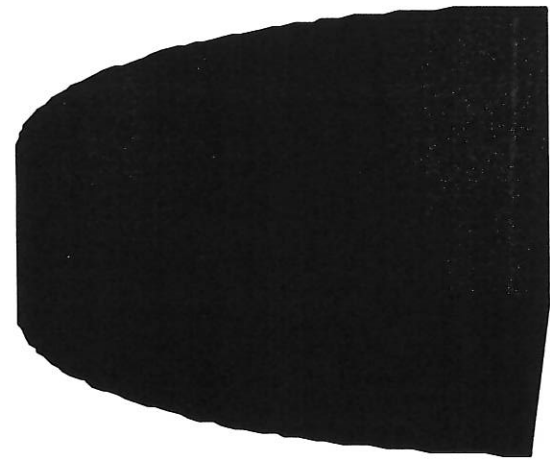


Kansas Combustion Turbine Nameplate Capacity (MW) by Age

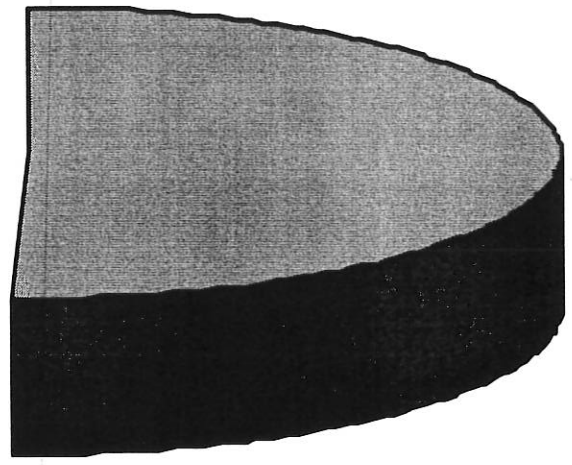


Kansas Internal Combustion Nameplate Capacity (MW) by Fuel

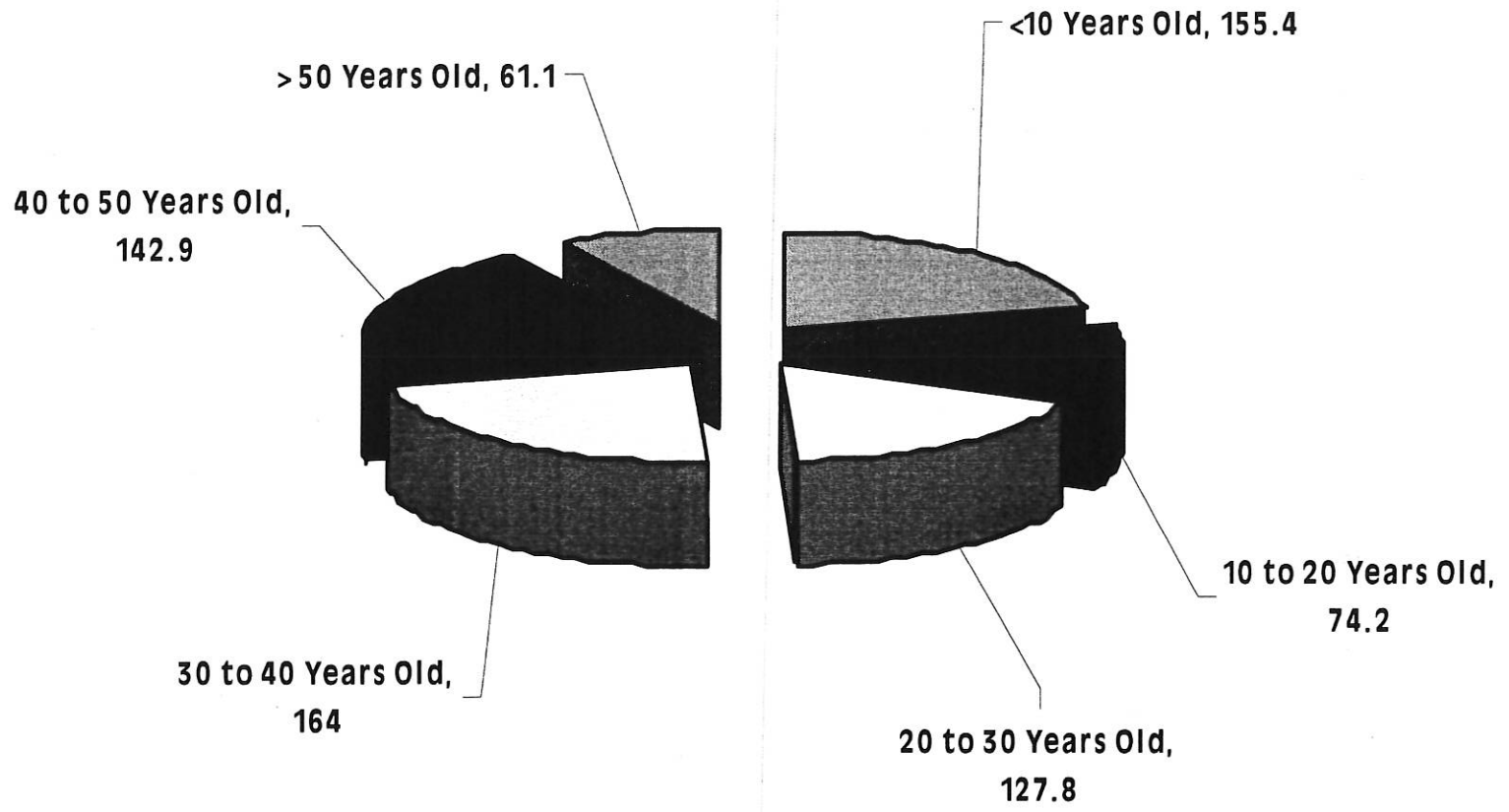
Natural Gas, 359.3



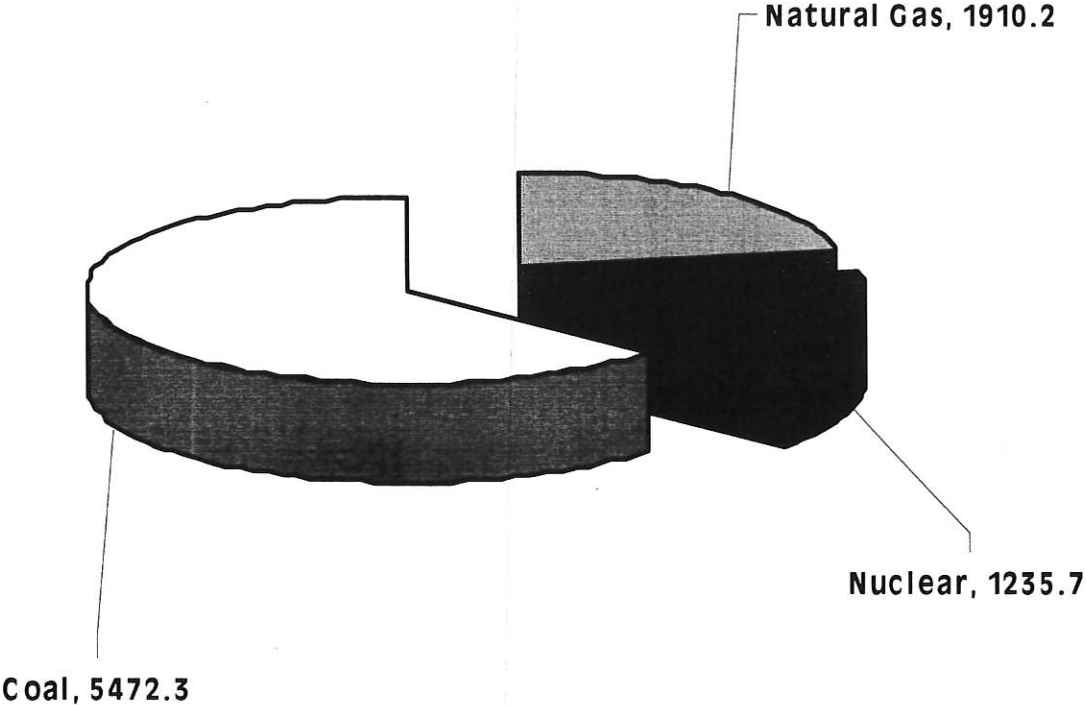
Fuel Oil, 366.1



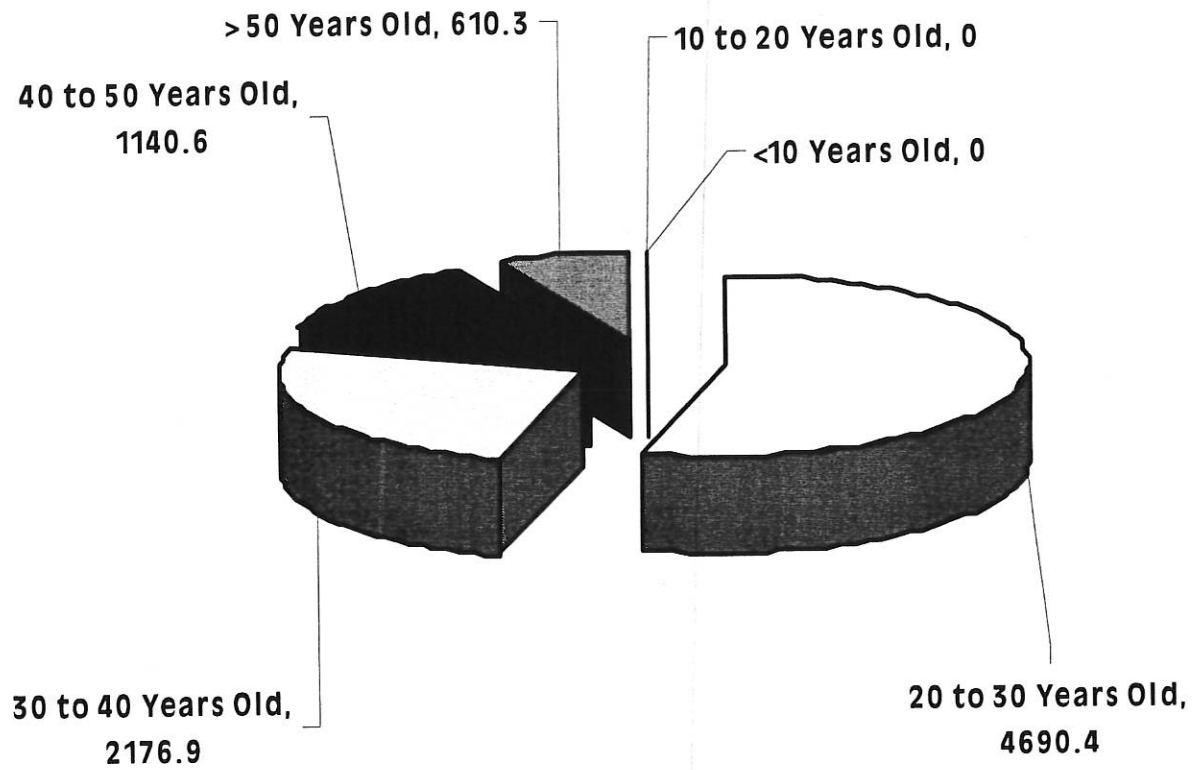
Kansas Internal Combustion Nameplate Capacity (MW) by Age



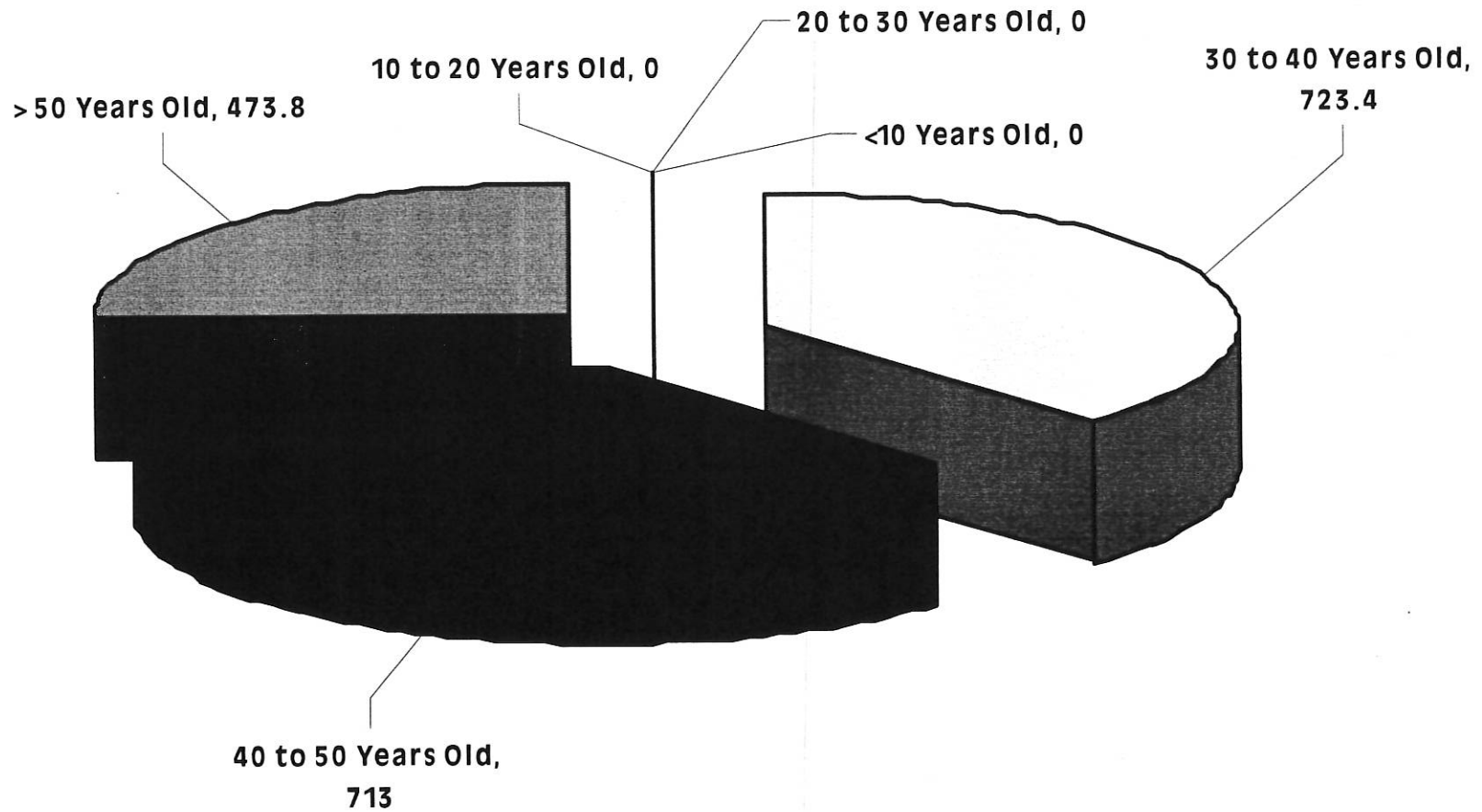
Kansas Steam Turbine Nameplate Capacity (MW) by Fuel



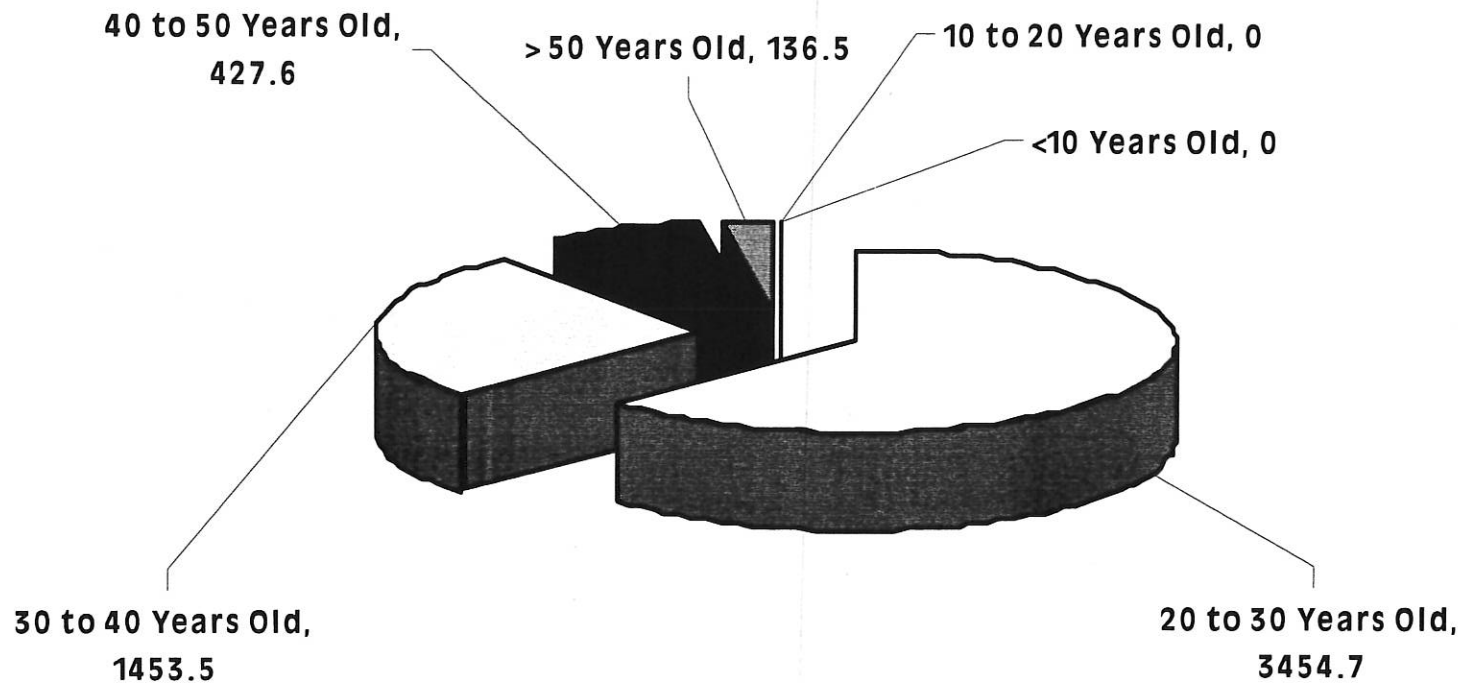
Kansas Steam Turbine Nameplate Capacity (MW) by Age



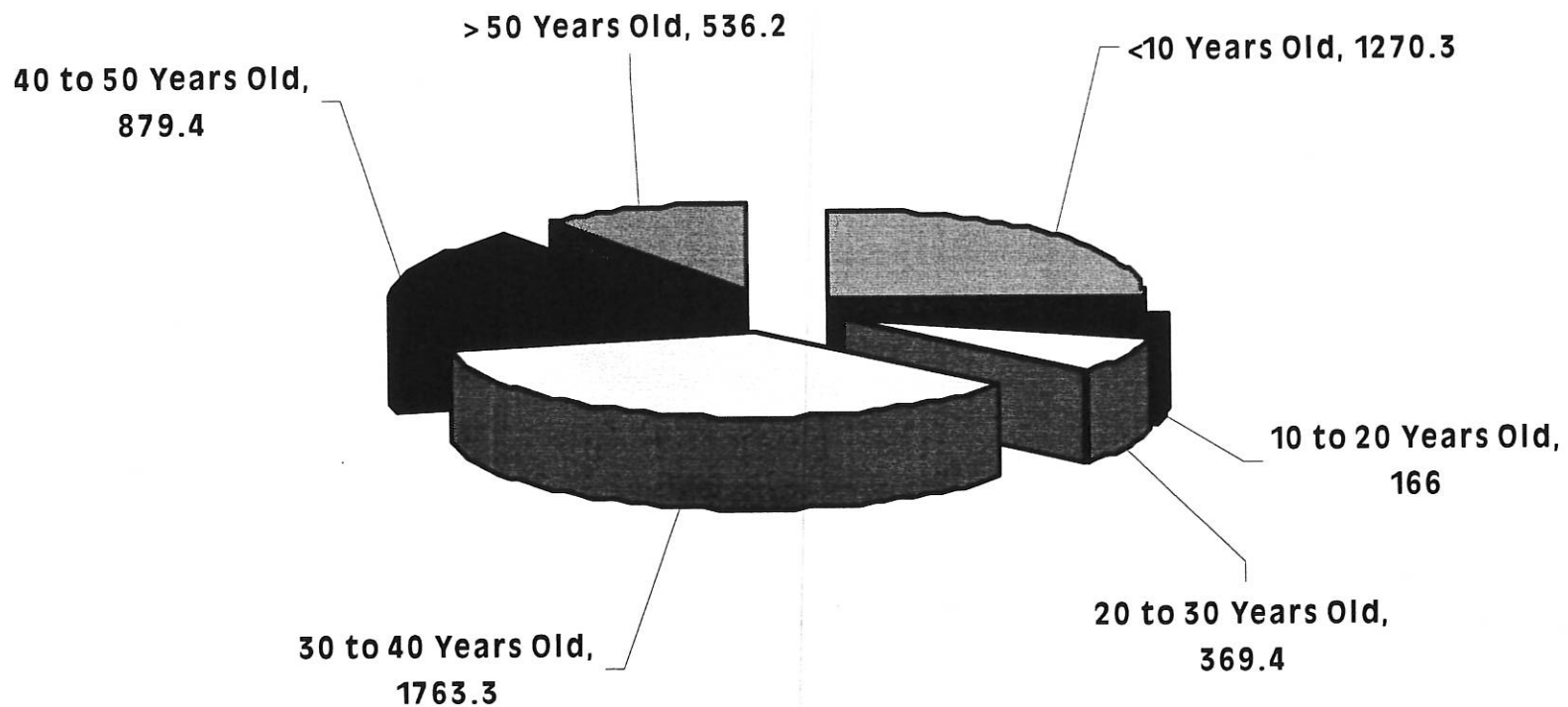
Kansas Gas-Fired Steam Turbine Nameplate Capacity (MW) by Age



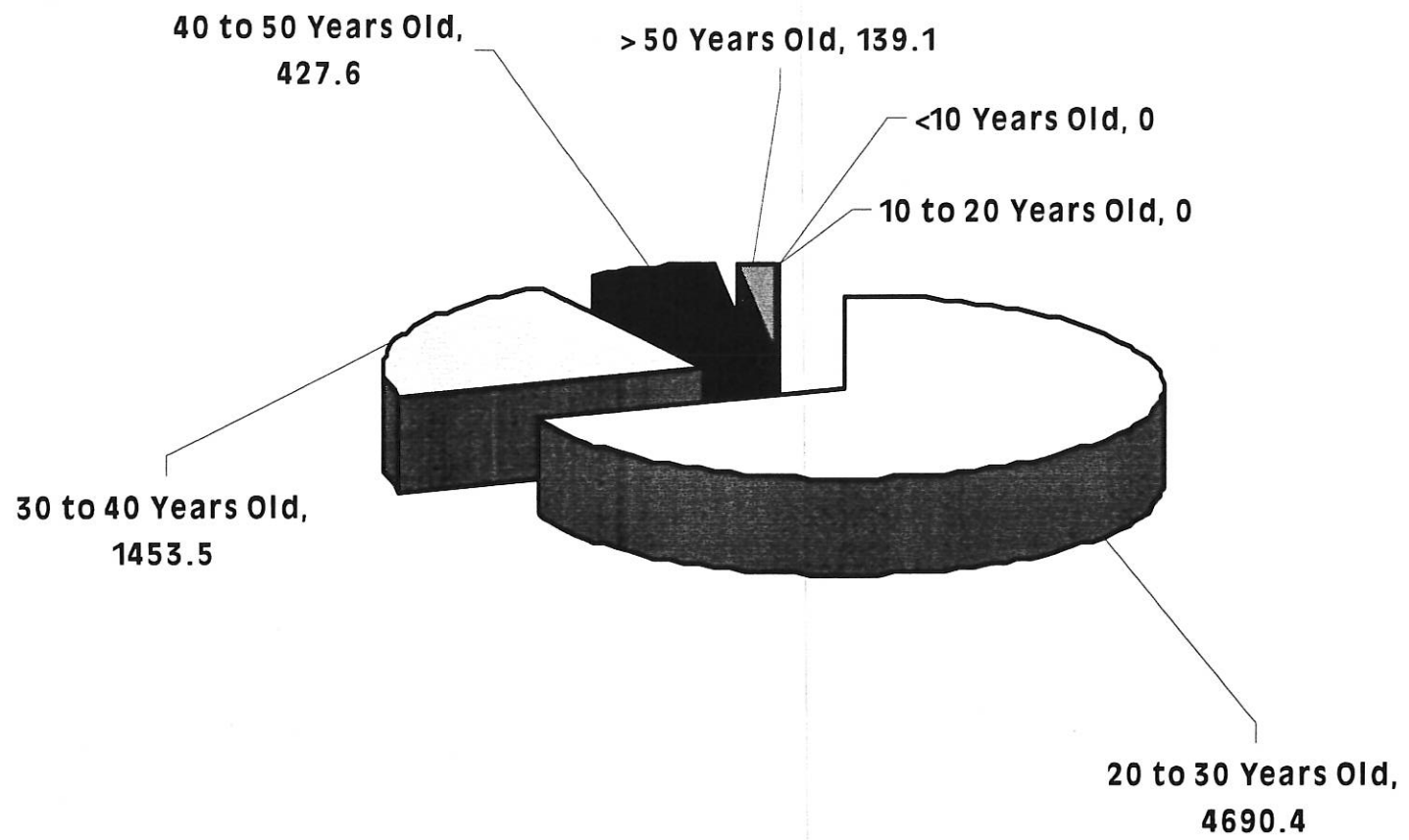
Kansas Coal-Fired Steam Turbine Nameplate Capacity (MW) by Age



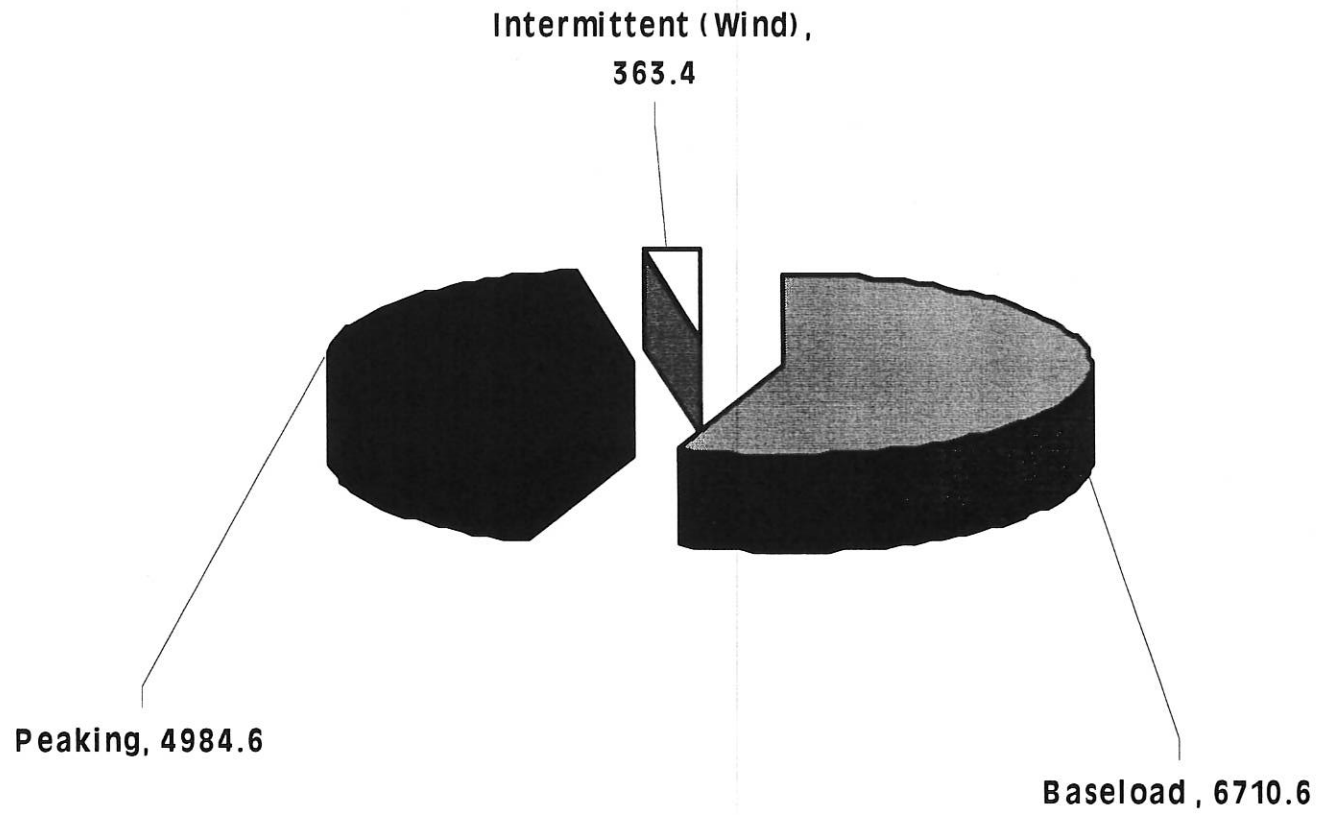
Kansas Peaking Nameplate Capacity (MW) by Age



Kansas Baseload Nameplate Capacity (MW) by Age



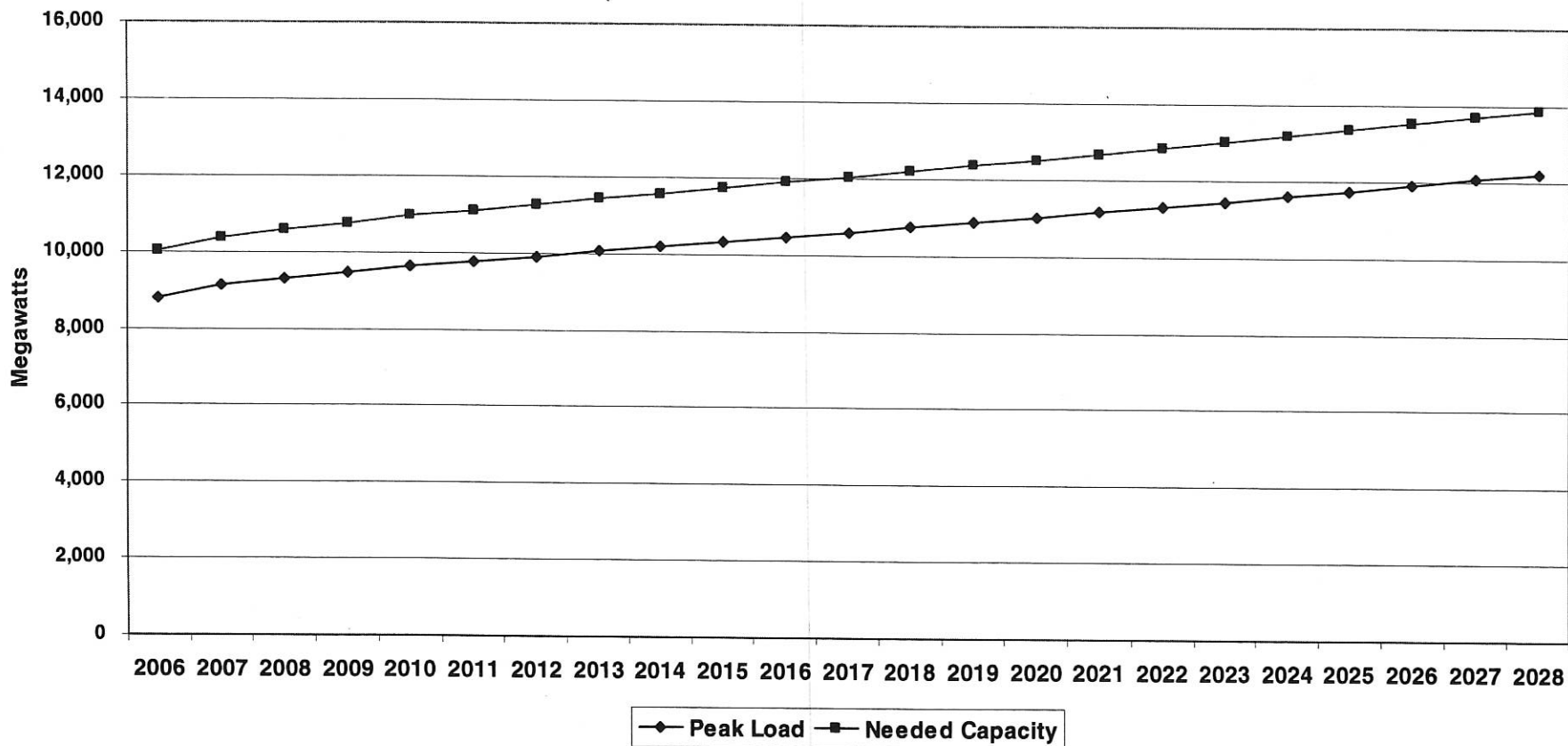
Kansas Nameplate Capacity (MW) by Dispatch



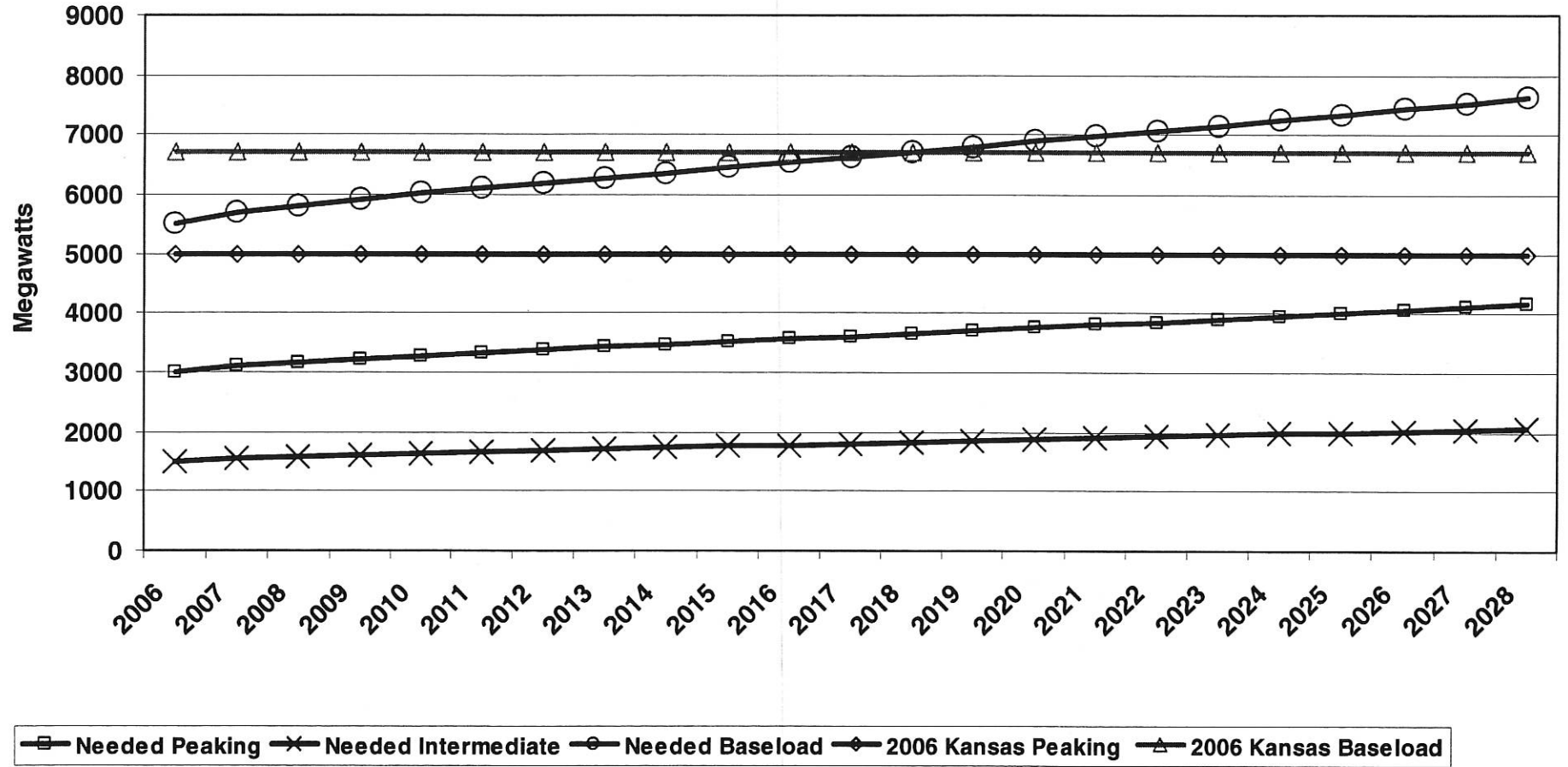
What will we need?

- Currently no intermediate capacity in Kansas
 - Westar and Empire have a 500 MW combined cycle unit near Joplin, MO
- Lots of wind development
 - Important resource but cannot substitute for dispatchable generation capacity
- In the next 20 years
 - New and replacement generation capacity
 - Existing Kansas generation capacity will need replaced
 - Generation capacity must increase to reliably serve load

Forecasted Kansas Peak Load and Needed Generation Capacity
(amount needed to provide 12% capacity margin)



Existing and Needed Kansas Generation Capacity



**Comments Before the Select Committee on Energy
and Environment for the Future
February 20, 2008
Liz Brosius, Director, Kansas Energy Council**

Chairman Myers and members of the committee, thank you for the opportunity to provide information about the Kansas Energy Council and its past and current consideration of issues related to the state's electric generation and transmission.

As you may know, the Kansas Energy Council is a 35-member energy policy advisory group, originally authorized in 2002 by former Governor Graves and subsequently reformulated by Governor Sebelius (see attached brief history). It is jointly chaired by Ken Frahm and Lt. Governor Mark Parkinson and meets five to six times a year. Under its current planning process, adopted in December 2005, the Council develops background information and policy recommendations on selected energy topics that are published in an annual version of the *Kansas Energy Plan*.

Past activities—During the 2006 planning cycle, the Council approved several recommendations related to electric generation. With respect to wind generation, they recommended (1) that the Governor and Legislature consider whether additional support is needed to stimulate development of wind generation, and (2) that the Kansas Corporation Commission consider the advantages associated with wind generation in its evaluation of utilities' decisions to invest in wind capacity or enter purchase power agreements. With respect to IGCC coal generation (in combination with the capture and storage of carbon dioxide), the Council made identical recommendations, noting that the recommendations were dependent on demonstration of technical feasibility of carbon capture and storage.

During 2007, although the Council did not specifically focus on electrical generation or transmission issues, it requested and heard presentations on the status of nuclear energy nationwide (this powerpoint presentation is available on the KEC web site at http://www.kec.kansas.gov/documents/Quillian_KE_Energy_Comm_081507.ppt) and on

greenhouse gas/carbon capture and storage and our energy future (also available online at http://www.kec.kansas.gov/documents/KEC_CCS_Presentation_111607.ppt).

Current activities—Last December the Council selected the priority topics and issues it wanted to pursue in 2008. Chief among these were a wide range of topics and issues associated with electrical generation, and a 13-member KEC Electricity Committee was established. The committee, chaired by Stuart Lowry (Executive Vice President of Kansas Electric Cooperatives), held its first meeting on January 17, 2008, and agreed upon the following objectives:

- 1) Study generation on a utility-by-utility (or unit-by-unit) basis using available KCC resources (determine how baseload demand is being met).
- 2) Study considerations that drove past baseload investment to gain understanding of why were those decisions made.
- 3) Identify CO₂ emissions from existing units by MWh of actual production, and estimate emissions from future options.
- 4) Understand how utilities will meet anticipated demand, not limited to baseload, on a 5 to 20 year planning horizon.
 - a) Address the issue of sale of available generation capacity from Kansas resources.
 - b) Consider how energy conservation will affect generation planning.
 - c) Study on a utility-by-utility basis the cost impacts of the available generation resources. Will those impacts be significantly changed when transmission costs are considered?

To support the work of the Electricity Committee, staff has compiled a summary of the major baseload, intermediate, and peaking power plants in the state (see attachment) and calculated the annual CO₂ emissions per MWh for each. At its next meeting on February 22nd, the Electricity Committee will hear a presentation from Westar Energy about the considerations that go into decisions to invest in new generation and plans to meet expected demand 20 years from now. The Committee will similar presentations from the state's other major utilities at future meetings between now and the end of May 2008.

It is perhaps important to emphasize that the KEC Electricity Committee agreed that it does not intend to dictate to utilities the decisions they should make regarding future decisions, but rather to better understand what goes into such decisions and see if there are state policy implications. The Committee will meet as needed to accomplish its objectives and determine what, if any, preliminary policy recommendations to take to the full Council in June.

Related activities—In support of its policy advisory function, the Council has undertaken the following reports related to electrical generation issues:

Community Wind Incentives

Kansas Energy Incentives

Greenhouse Gas Emissions: Policy and Economics

Status of Energy Efficiency Codes in Kansas Cities

Kansas Utility-sponsored Energy Efficiency Programs

These reports are available online (<http://www.kec.kansas.gov/reports.htm>).

The Council has also hired Summit Blue Consulting to develop a statewide estimate of the potential for energy efficiency in the residential and commercial and industrial sectors (for both electricity and natural gas). Several of the state's utilities have assisted by providing residential end-use and other data. The study will be completed in late spring and results presented to the Council at its June 10th meeting.

Thank you for the opportunity to present this information. I will be happy to stand for questions at the appropriate time.

Kansas Energy Council / Kansas Energy Program History February 2008

1975 - 2002

- The State Energy Office was established in law (KSA 74-6801) in 1975 as an extension of the Governor Bennett's Office.
- In 1978 the State Energy Office (SEO) was given agency status and the Energy Advisory Council was established. By FY 1980 the SEO had 21.5 positions funded by a combination of federal and state funds.
- In 1983 the State Energy Office and Energy Advisory Council authorizing legislation sunset provision kicked in. Governor Carlin negotiated a compromise with the Legislature in which the SEO was abolished and all its functions—including the responsibility to develop a state energy conservation plan—were transferred to the Kansas Corporation Commission. There was no provision for the continuation of the Energy Advisory Council.
- The State Energy Office (now called the Energy Programs Division) has been part of the KCC since 1983. It has been funded with federal funds and petroleum violation escrow (PVE) funds.

2002 - 2005

- In 2002 legislation was introduced to establish an energy advisory body. That legislation failed and Governor Graves then established the State Energy Resources Coordinating Council (SERCC) by Executive Order.
- In 2004 Governor Sebelius issued a revised Executive Order that changed the name of the Council to the Kansas Energy Council (KEC) and modified its membership.
- In 2006 Governor Sebelius issued two more revised Executive Orders—the first changing some State agency representatives and adding 6 legislators, the second appointing the Lt. Governor to serve as Co-Chair.
- No funds were initially appropriated to support the SERCC/KEC; in FY 2005 and 2006, \$150,000 and \$100,000, respectively, were appropriated from KCC funds to pay for staff support at the KGS and contractual services.
- In 2005, the SERCC/KEC adopted a planning process but did not implement it. It did not adopt a taxonomy of a comprehensive energy plan. With limited staffing and funding, productivity did not meet expectations of many Council members and there was a need expressed for revitalizing the process.

2005 - present

- In December 2005, the KEC adopted a planning process, approved the outline for the Kansas Energy Plan, and selected planning priorities for the coming year.
- In June 2007 Governor Sebelius issued another Executive Order, adding 5 members.
- The background information and policy recommendations developed during 2006 and 2007, respectively, were released in the 2007 and 2008 versions of the *Kansas Energy Plan*, with accompanying graphs and charts contained in the *Kansas Energy Chart Book*.

Kansas Electric Generation: Summary of Existing Power Plants

Kansas Energy Council Staff Summary

Prepared for the KEC Electricity Committee, February 2008

The table below contains preliminary information on the major electric generation facilities currently operating in Kansas, exclusive of intermittent power generation (e.g., wind facilities). Information comes primarily from the Department of Energy's Energy Information Administration (EIA) Forms 860 and 906-920 (for 2006 and 2007) and from data compiled by Kansas Electric Cooperatives for units with Continuous Emissions Monitoring Systems (CEMS). The information will be reviewed by the Electricity Committee at its next meeting.

Utility / Operator	Power Plant / Unit / Primary Fuel Source / Type (B = Baseload, I = Intermediate, P = Peaking)	County	Nameplate Capacity (MW)	Initial Year of Operation	Net Generation (MWh) 10/06-9/07 (tons CO ₂ per MWh)
Wolf Creek Nuclear Generating Corp. (owned by Westar, KCP&L, KEPCo)	Wolf Creek 1: Nuclear (B)	Coffey	1,235.7	1985	10,071,556 (0)
Westar	<u>Jeffrey EC</u> 1: Coal (B)	Pottawatomie	720	1978	5,357,060* (1.119)*
	2: Coal (B)		720	1980	5,441,437* (1.116)*
	3: Coal (B)		720	1983	4,917,419* (1.041)*
	<u>Lawrence EC</u> 3: Coal (B)	Douglas	49	1955	357,015* (1.450)*
	4: Coal (B)		114	1960	796,498* (1.389)*
	5: Coal (B)		403	1971	2,444,513* (1.109)*
	<u>Hutchinson EC</u> GT1: Natural gas (P) GT2: Natural gas (P) GT3: Natural gas (P) GT4: distillate fuel oil (?) H1DG: distillate fuel oil (**) ST1: natural gas (P) ST2: natural gas (P) ST3: natural gas (P) ST4: natural gas (P)	Reno	71	1974	0?
	71		1974	0?	
	71		1974	0?	
	86		1975	0?	
	2.7		1983	0?	
	23		1950	0?	
	23		1950	0?	
35	1951		0?		
172	1965		141,628* (0.691)*		
<u>Abilene EC</u> GT1: Natural gas (P)	Dickinson	49	1973	0?	
<u>Tecumseh EC</u> 1: Natural gas (P) 2: Natural gas (P) 7: Natural gas (B) 8: Coal (B)	Shawnee	29	1972	0?	
29		1972	0?		
82		1957	558,526* (1.308)*		
150		1962	933,149* (1.189)*		

Utility / Operator	Power Plant / Unit / Primary Fuel Source / Type (B = Baseload, I = Intermediate, P = Peaking)	County	Nameplate Capacity (MW)	Initial Year of Operation	Net Generation (MWh)/ Tons of CO ₂ per MWh, 10/06-9/07	
KCP&L	<u>LaCygne</u> 1: Coal (B)	Linn	893	1973	5,211,880* (1.075)*	
	2: Coal (B)		685	1977	5,442,701* (1.065)*	
	<u>Osawatomie</u> 1: Natural gas (P)	Miami	90	2003	9,952* (0.799)*	
	<u>West Gardner</u> 1: Natural gas (I)	Johnson	91.3	2003	26,332* (0.750)*	
	2: Natural gas (I)		91.2	2003	25,015* (0.759)*	
	3: Natural gas (I)		91.3	2003	25,586* (0.753)*	
	4: Natural gas (I)		91.3	2003	23,993* (0.743)*	
	KCBPU	<u>Quindaro</u> GT1: Natural gas (P)	Wyandotte	17.9	1969	2,560
		GT2: Distillate fuel oil (P)		65.7	1974	(1.83)
		GT3: Distillate fuel oil (P)		65.7	1977	
ST1: Coal (B)		81.6		1965	498,100* (1.207)*	
ST2: Coal (B)		157.5		1971	643,926* (1.237)*	
<u>Nearman Creek</u> ST1*: Coal (B)		Wyandotte	261	1981	1,675,715* (1.306)*	
GT1*: Natural gas (P)		94	2006	24,516* (0.883)*		
KG&E	<u>Gordon Evans</u> ST1: Natural gas (P)	Sedgwick	136	1961	117,879* (0.677)*	
	ST2: Natural gas (P)		390	1967	367,023* (0.706)*	
	5: Distillate fuel oil (P)**		2.9	1969	0?	
	GT1: Natural gas (P)		98.3	2000	11,693* (0.764)*	
	GT2: Natural gas (P)		98.3	2000	9,773* (0.811)*	
	GT3: Natural gas (P)		178.5	2001	42,406* (0.663)*	
	<u>Murray Gill</u> 1: Natural gas (P)	Sedgwick	46	1952	4,589* (0.916)*	
	2: Natural gas (P)		75	1954	15,165* (0.711)*	
	3: Natural gas (P)		114	1956	71,448* (0.820)*	
	4: Natural gas (P)		114	1959	69,382* (0.710)*	
<u>Neosho 3: Natural gas (P)</u>	Labette	69	1954	8,854* (0.748)*		

Utility / Operator	Power Plant / Unit / Primary Fuel Source / Type (B = Baseload, I = Intermediate, P = Peaking)	County	Nameplate Capacity (MW)	Initial Year of Operation	Net Generation (MWh)/ Tons of CO ₂ per MWh, 10/06-9/07
Sunflower	<u>Holcomb East</u> 1: Coal (B)	Finney	348.7	1983	2,825,053* (1.067)*
	<u>Garden City</u> GC3: Natural gas (I)** S2: Natural gas (I) S3: Natural gas (I)** S4: Natural gas (I) S5: Natural gas (I)	Finney	11.5 97.9 16 71.2 71.2	1961 1973 1968 1976 1979	0? 36,557* (0.637)* 0? 0? 0?
	<u>Cimarron River***</u> 1: Natural gas (I)	Seward	50 (61)***	1963	141,236 (0.763)
	2: Natural gas (P)		15	1967	
	<u>Clifton***</u> 1: Natural gas (P) 2: Distillate fuel oil (P)	Washington	85 15	1974 1974	0 0
	<u>Fort Dodge 4:</u> Natural gas (load following)	Ford	145	1968	428,275* (0.690)*
	<u>Great Bend 3:</u> Natural gas (I)	Barton	98	1963	0
	<u>S-2:</u> Natural gas (I)		98	1973	0
	<u>S-3:</u> Natural gas (P)		14	1968	0
	<u>S-4:</u> Natural gas (P)		51	1976	0
	<u>S-5:</u> Natural gas (P)		53	1963	0
	<u>GC-3:</u> Natural gas (I)		9	1962	0
	<u>Arthur Mullergren 3:</u> Natural gas***	Barton	81.6	1963	127,418* (0.703)*
Empire	<u>Riverton</u> 10: Distillate fuel oil (?) 11: Distillate fuel oil (?) 12: fuel? (?)	Cherokee	16.3 16.3	1988 1988	0? 0? 80,948* (0.716)*
	7: Coal (B)		37.5	1950	185,128* (1.480)*
	8: Coal (B)		50	1954	334,657* (1.376)*
	9: Distillate fuel oil (?)		12.5	1964	0?
City of McPherson	<u>McPherson 2</u> GT1: Natural gas (P) GT2: Distillate fuel oil (P) GT3: Natural gas (P)	McPherson	72.4 71.2 71.2	1973 1976 1979	4,946 0.82
	<u>McPherson 3</u> NA1: Natural gas (P)	McPherson	115.6	1998	405 1.06
Bowersock	<u>Kansas River Project (1.3-7):</u> Hydro (B)	Douglas	2.6	1922-1925	10,540 0

* Based on information provided by Kansas Electric Cooperatives (February 2008); net generation calculated from CEMS data.

** Standby facility.

*** Former Aquila generating facilities that were sold to Mid-Kansas Electric Company (MKEC), a coalition of six consumer-owned cooperatives that also owns Sunflower Electric Power Corporation.