

Powering the Future: A Forecast of Indiana's Electricity Consumption, Prices and Resource Requirements

Presented by:
Douglas J. Gotham

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State Utility Forecasting Group

- Executive Order 3-84, which was issued in January 1984 by Indiana's Governor Robert D. Orr, created a special committee designated to address Indiana's utility future. In December 1984, that committee produced a report providing options and specific recommendations.
- The committee recommended four alternatives models for a forecasting system
 - utilities produce their own forecasts independently
 - utilities work together to produce forecasts as a group
 - the Utility Regulatory Commission produces the forecasts
 - another public or quasi-public entity produces the forecasts
- The 4th option was chosen and Purdue was chosen to house the State Utility Forecasting Group.

Indiana Code 8-1 To 8-5 (Amended in 1985)

“The commission shall establish a permanent forecasting group to be located at a state-supported college or university within Indiana ... This group shall develop and keep current a methodology for forecasting the probable future growth of electricity within Indiana and within this region of the nation.”

SUFG Forecasts

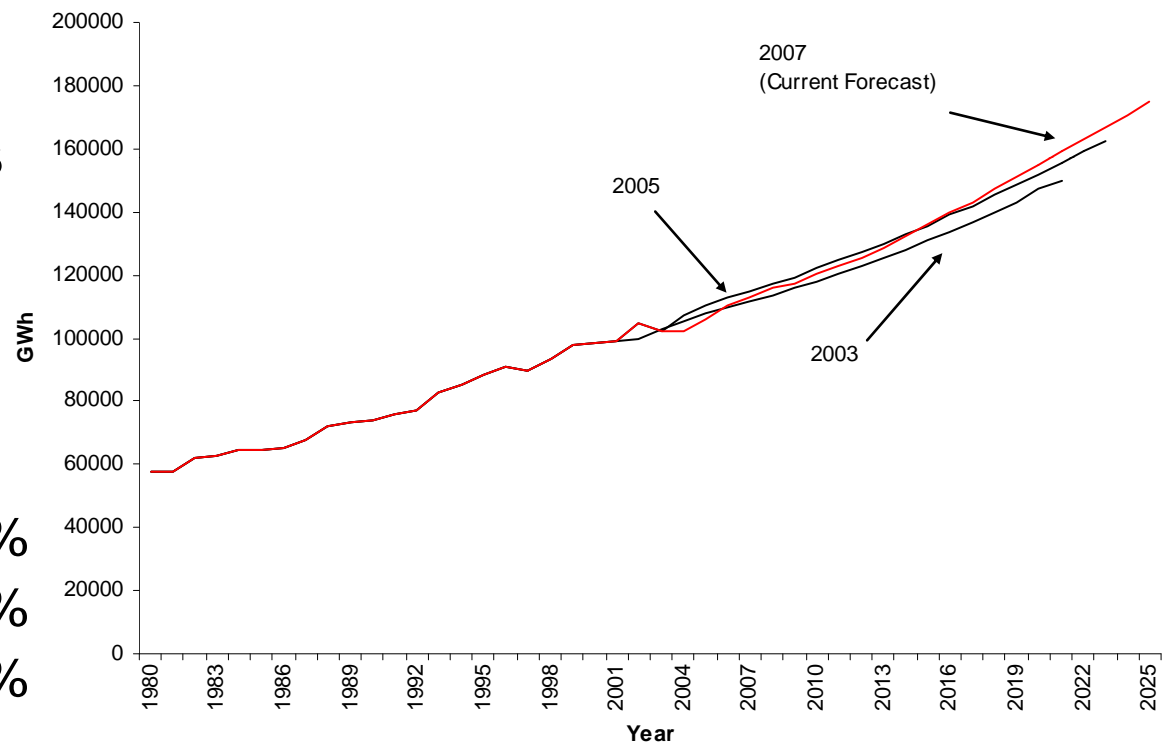
- Roughly every 2 years, SUFG produces a long-term (20 year) set of projections of electricity sales, prices, and resource requirements for Indiana
- Most recent forecast was released in December 2007
- 2009 forecast is in the process of being examined prior to its release

2007 Forecast Highlights

- Significant real electricity price increase through 2012, then leveling off
- Electricity requirements and peak demand projections were projected to grow at an average compound rate of 2.46 percent
 - similar to recent historical observations
- Resource requirements were projected to grow an average of 585 MW per year
 - baseload, intermediate, and peaking resources were all indicated as being needed in the future

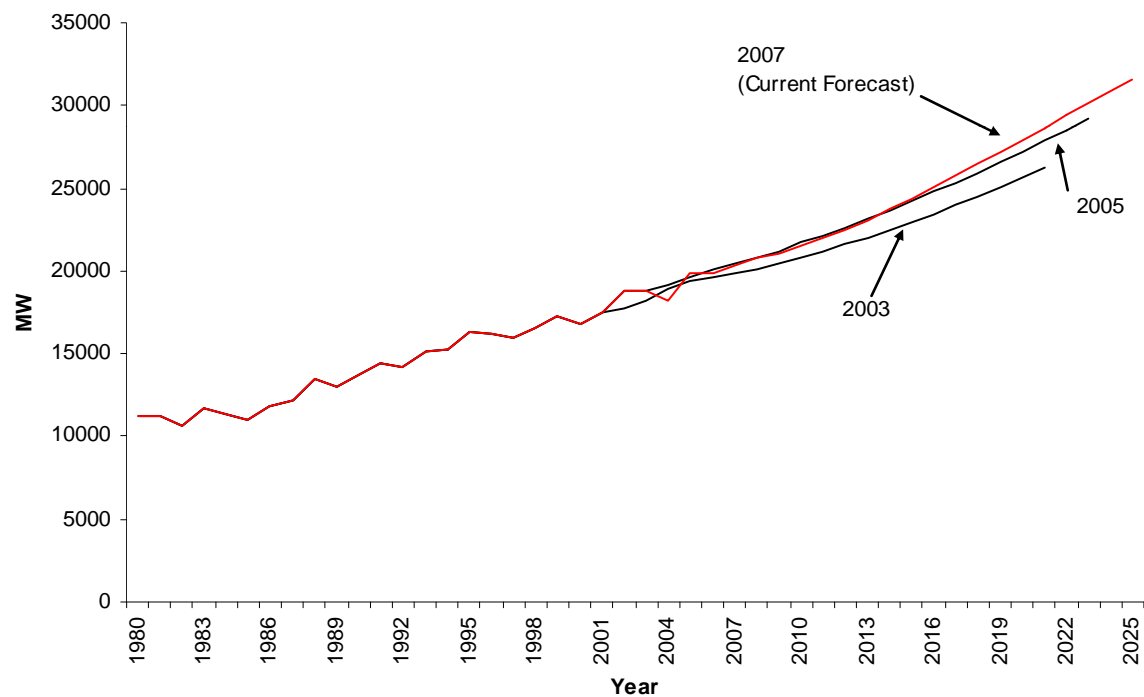
Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Growth rates
 - 2007 forecast: 2.46%
 - 2005 forecast: 2.22%
 - 2003 forecast: 2.16%



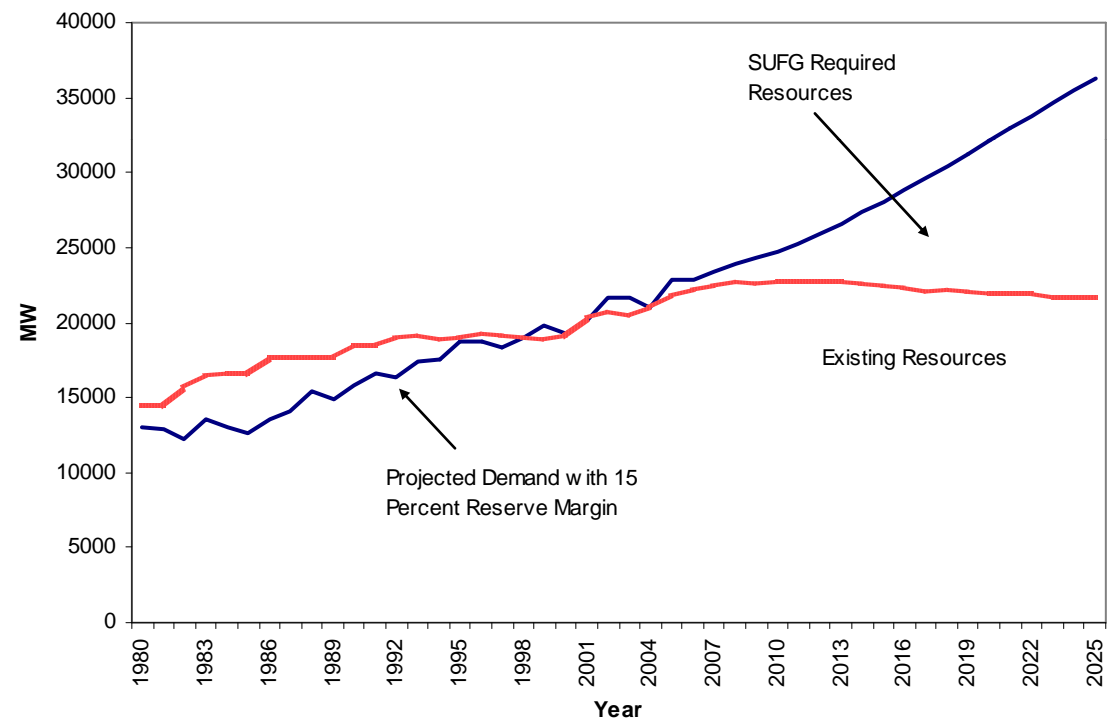
Indiana Peak Demand Requirements

- Peak demand is net of DSM and interruptible loads
- Growth rates
 - 2007 forecast: 2.46%
 - 2005 forecast: 2.24%
 - 2003 forecast: 2.07%



Indiana Resource Requirements

- Resources may be provided by conservation measures, contractual purchases, purchases of existing assets, or new construction
- Existing resources are adjusted into the future for retirements, contract expirations, and IURC approved new resources
 - Did not include Duke IGCC, Sugar Creek and Holland natural gas plants, or wind purchases



Indiana Resource Requirements

	Uncontrolled Peak Demand 1	Interruptible	Net Peak Demand 2	Existing/ Approved Capacity 3	Incremental Change in Capacity 4	Projected Additional Resource Requirements 5				Total Resources 6	Reserve Margin
						Peaking	Cycling	Baseload	Total		
						2005					
2006	20,933	1,059	19,874	22,166	389	90	530	120	740	22,906	15
2007	21,393	1,062	20,331	22,519	353	140	620	90	850	23,369	15
2008	21,865	1,063	20,803	22,779	260	230	730	170	1,130	23,909	15
2009	22,163	1,065	21,099	22,554	-225	310	1,020	390	1,720	24,274	15
2010	22,608	1,067	21,541	22,719	165	330	1,100	620	2,050	24,769	15
2011	23,077	1,068	22,010	22,738	19	480	1,230	880	2,590	25,328	15
2012	23,590	1,071	22,520	22,685	-53	600	1,330	1,290	3,220	25,905	15
2013	24,177	1,073	23,104	22,685	0	770	1,430	1,710	3,910	26,595	15
2014	24,831	1,076	23,756	22,635	-50	1,000	1,510	2,180	4,690	27,325	15
2015	25,464	1,078	24,387	22,511	-125	1,240	1,620	2,710	5,570	28,081	15
2016	26,143	1,081	25,062	22,384	-126	1,440	1,710	3,300	6,450	28,834	15
2017	26,819	1,084	25,736	22,043	-341	1,700	2,090	3,760	7,550	29,593	15
2018	27,562	1,088	26,474	22,149	106	1,940	2,210	4,160	8,310	30,459	15
2019	28,277	1,092	27,185	22,072	-77	2,180	2,310	4,700	9,190	31,262	15
2020	29,016	1,096	27,921	21,909	-163	2,530	2,430	5,220	10,180	32,089	15
2021	29,746	1,100	28,647	21,909	0	2,700	2,520	5,820	11,040	32,949	15
2022	30,504	1,104	29,400	21,869	-41	2,940	2,600	6,400	11,940	33,809	15
2023	31,219	1,108	30,112	21,709	-160	3,100	2,700	7,120	12,920	34,629	15
2024	31,954	1,112	30,843	21,709	0	3,290	2,820	7,640	13,750	35,459	15
2025	32,678	1,116	31,562	21,628	-81	3,470	2,930	8,290	14,690	36,318	15

1 Uncontrolled peak demand is the peak demand with DSM in place but without any interruptible loads being called upon.

2 Net peak demand is the peak demand after interruptible loads are taken into account.

3 Existing/approved capacity includes installed capacity plus approved new capacity plus firm purchases minus firm sales.

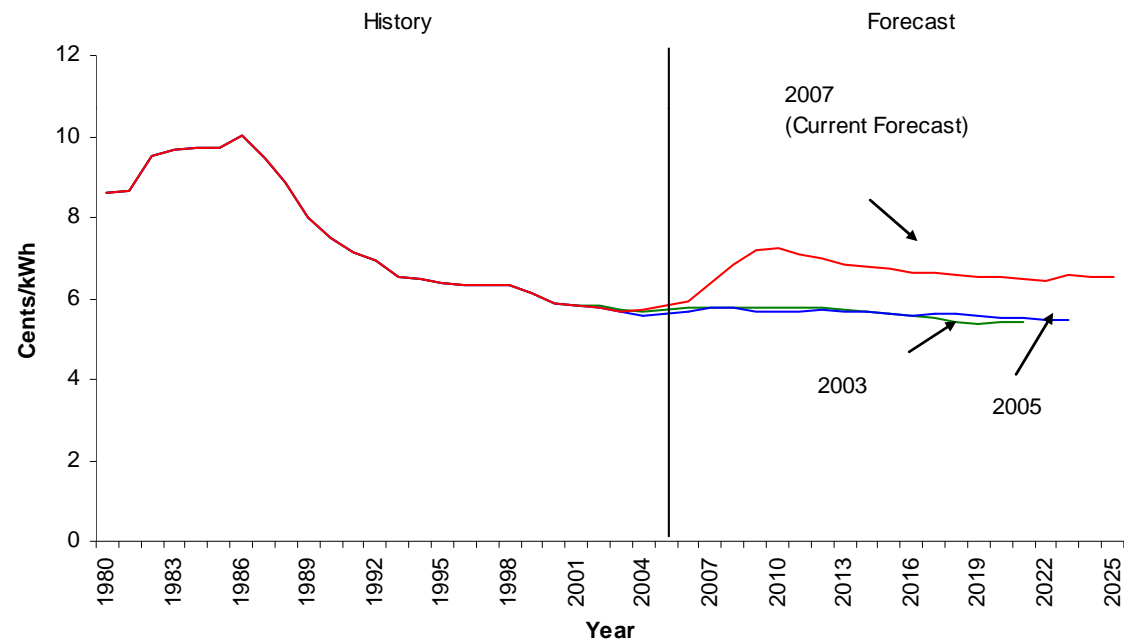
4 Incremental change in capacity is the change in existing/approved capacity from the previous year. The change is due to new, approved capacity becoming operational, retirements of existing capacity, and changes in firm purchases and sales.

5 Projected additional resource requirements is the cumulative amount of additional resources needed to meet future requirements.

6 Total resource requirements are the total statewide resources required including existing/approved capacity and projected additional resource requirements.

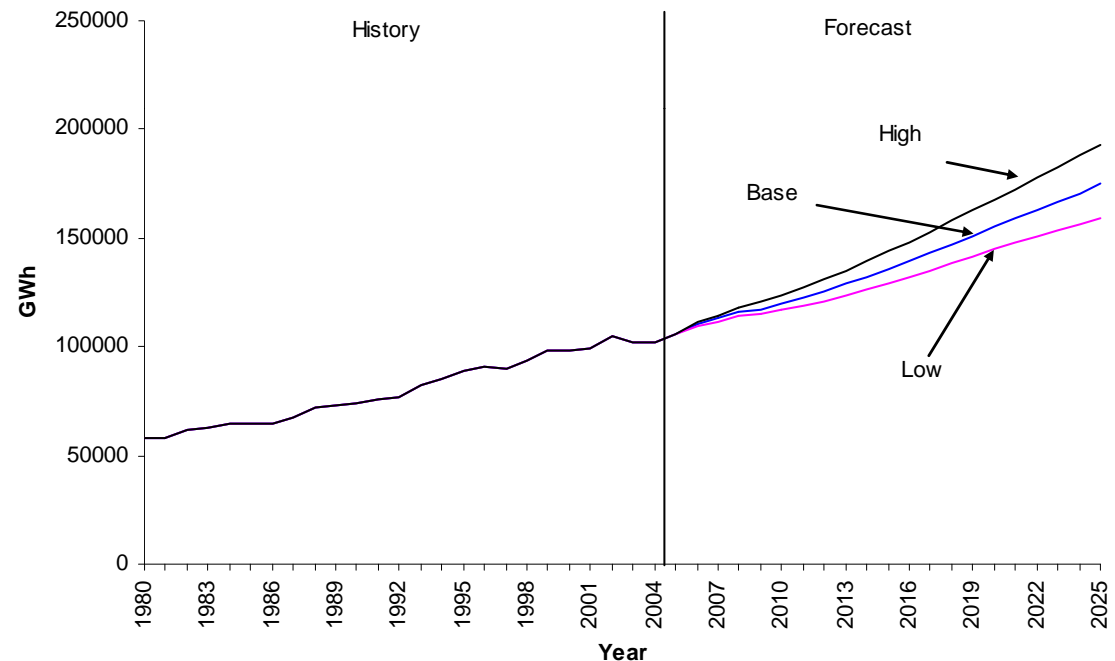
Indiana Real Price Projections (2005 \$)

- Effect of inflation removed
- Included the cost of meeting CAIR and CAMR
- Did not include costs associated with CO₂ or RPS
- Included the cost of new resources

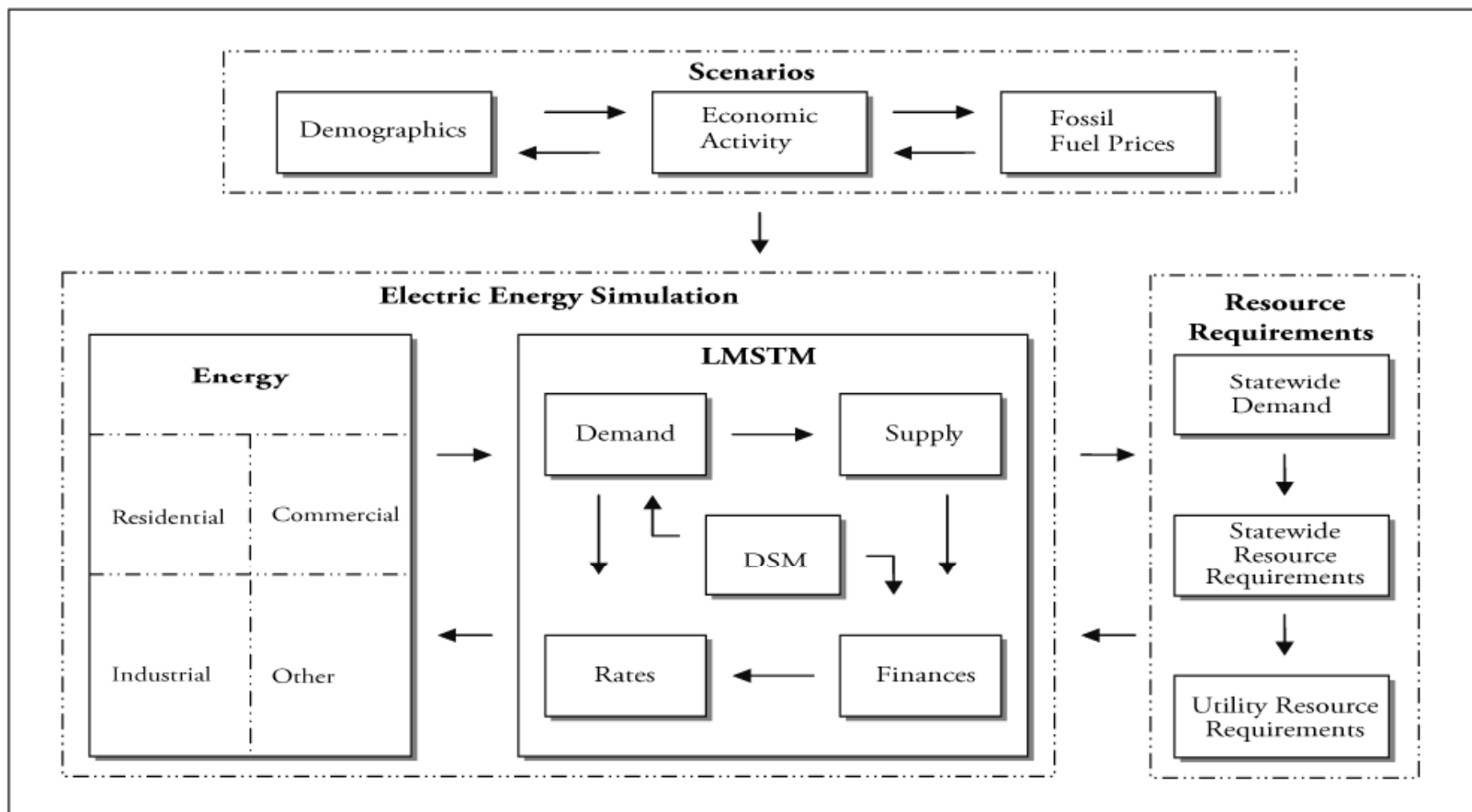


Alternative Scenarios

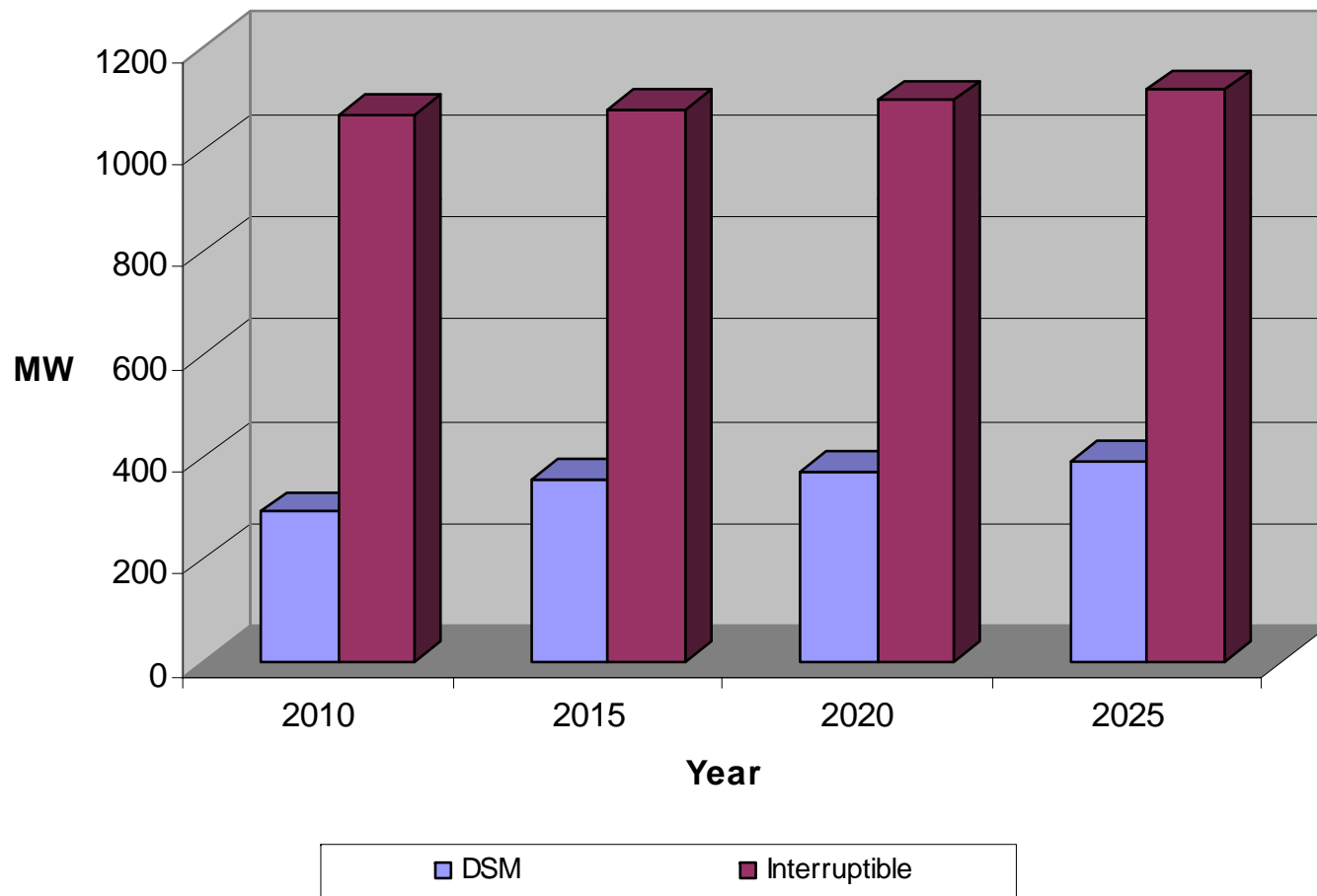
- Any forecast contains uncertainty
- CEMR provides alternative low and high growth econometric forecasts
- Low and high growth scenarios are intended to give a plausible bound to uncertainty



SUG's Modeling System



Incremental DSM and Interruptible Loads



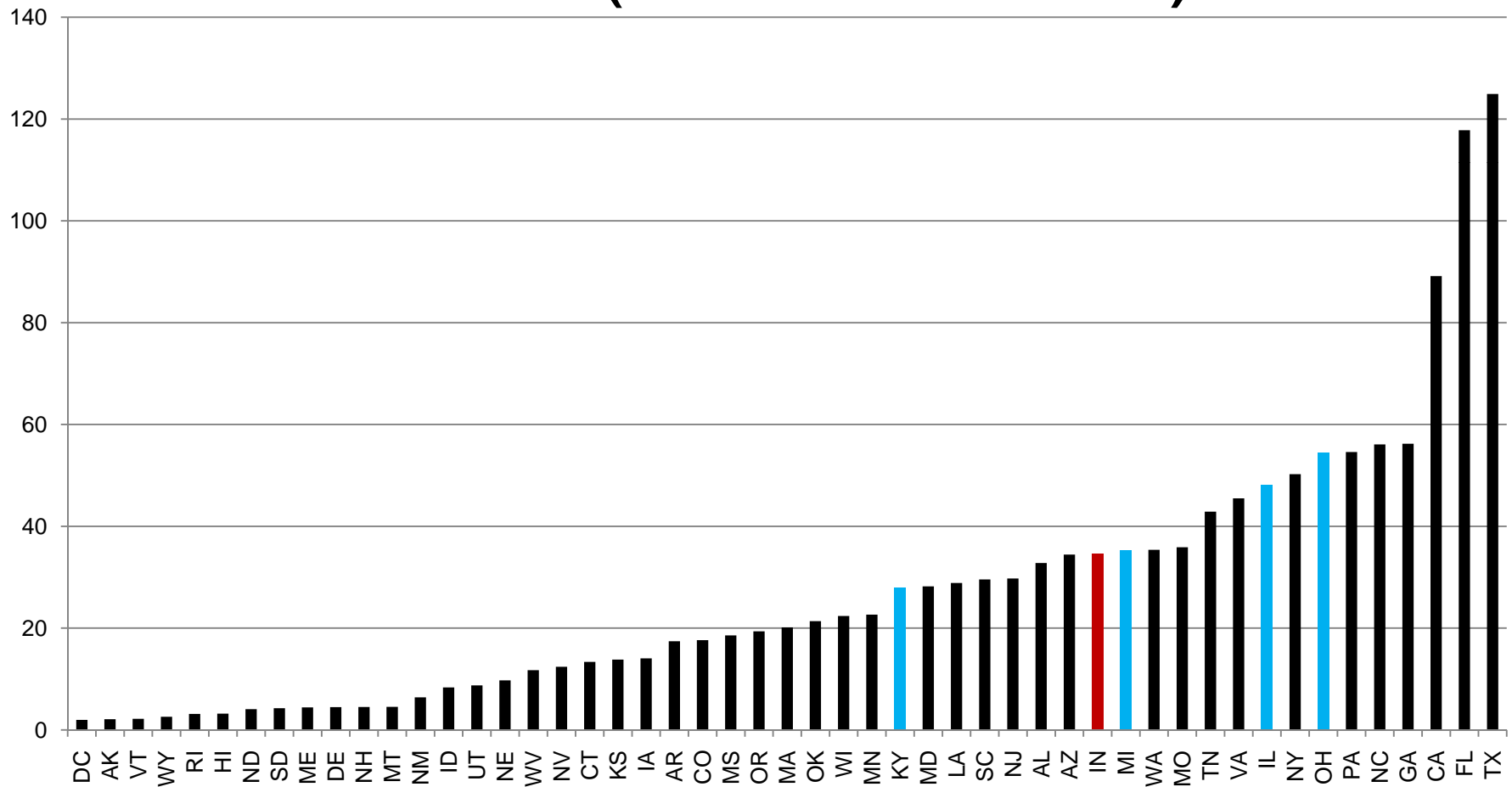
What has Changed?

- Economy
- New resources added to the state's jurisdictional generation fleet
 - Edwardsport IGCC
 - Sugar Creek NGCC
 - Holland NGCC
 - wind purchase power agreements
- Clean Air Mercury Rule

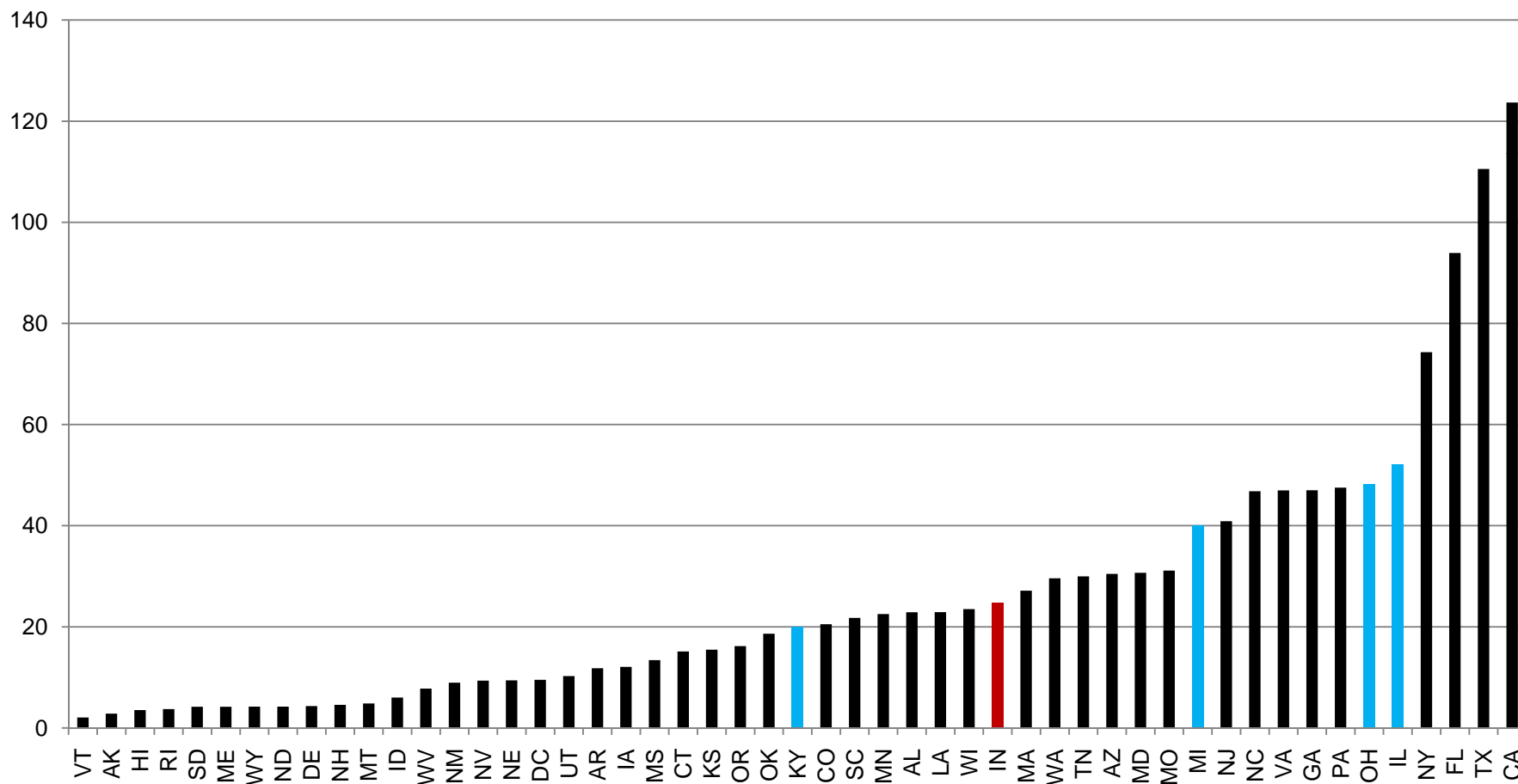
Indiana - an Industrial State

- In 2007, Indiana accounted for 2.9% of the nation's retail electricity sales
 - 11th most in the U.S.
- But Indiana accounted for 4.9% of the nation's industrial sector retail electricity sales
 - 4th most in the U.S.

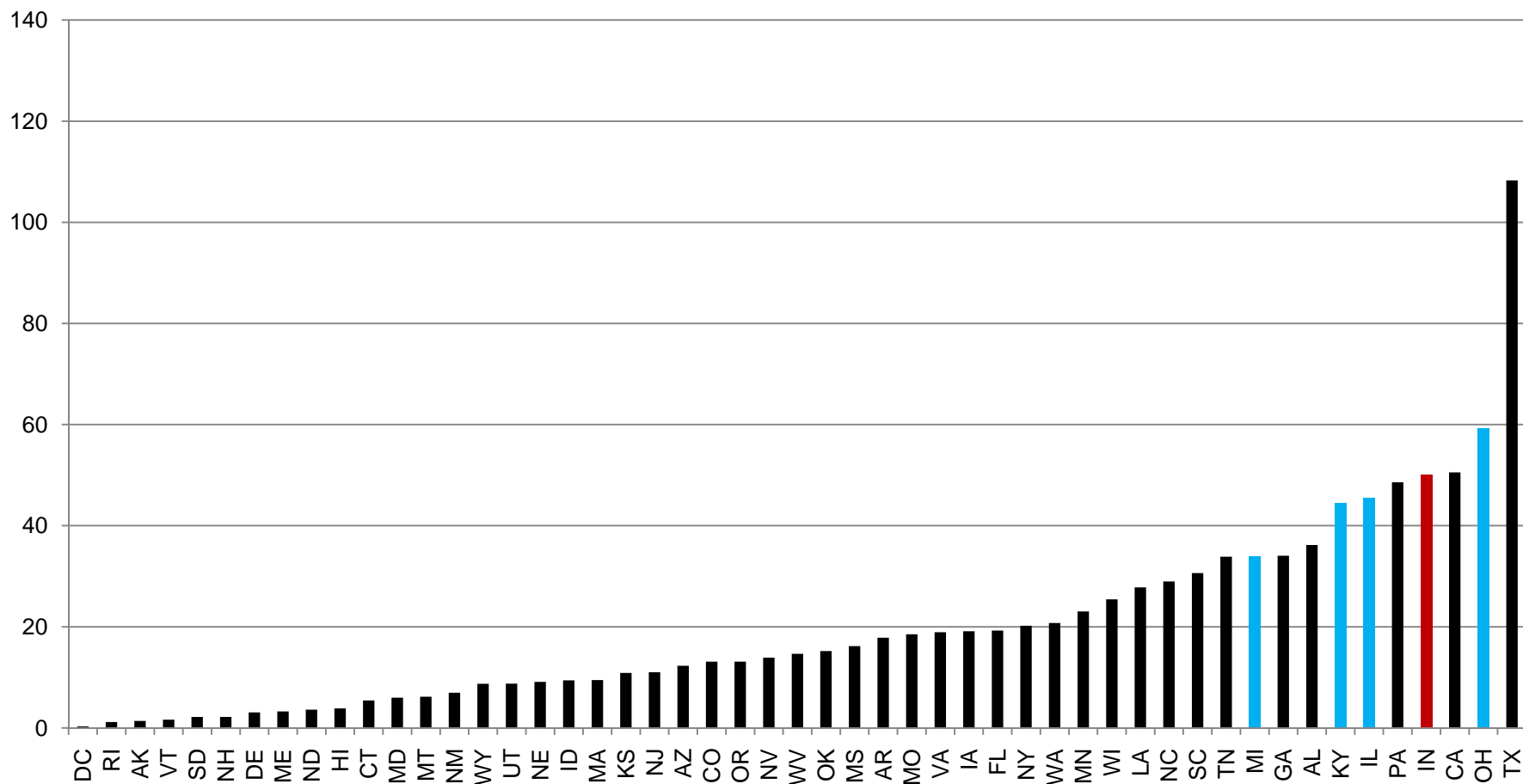
2007 Residential Electricity Sales (million MWh)



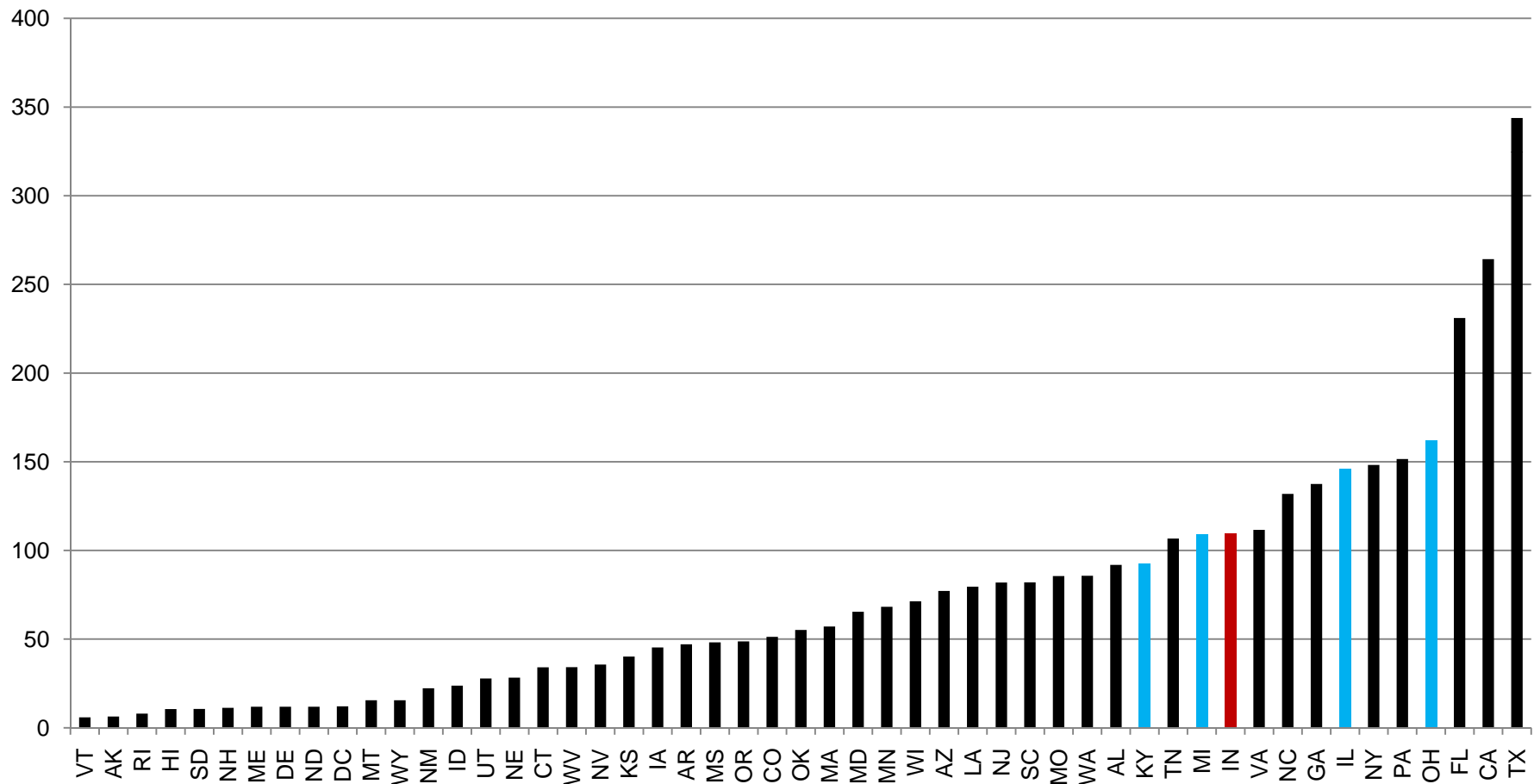
2007 Commercial Electricity Sales (million MWh)



2007 Industrial Electricity Sales (million MWh)



2007 Total Electricity Sales (million MWh)



Changes in Electricity Sales from 2007 to 2008

- Investor-owned utilities -3.0%
- Not-for-profit utilities +1.8%
- All utilities -2.0%

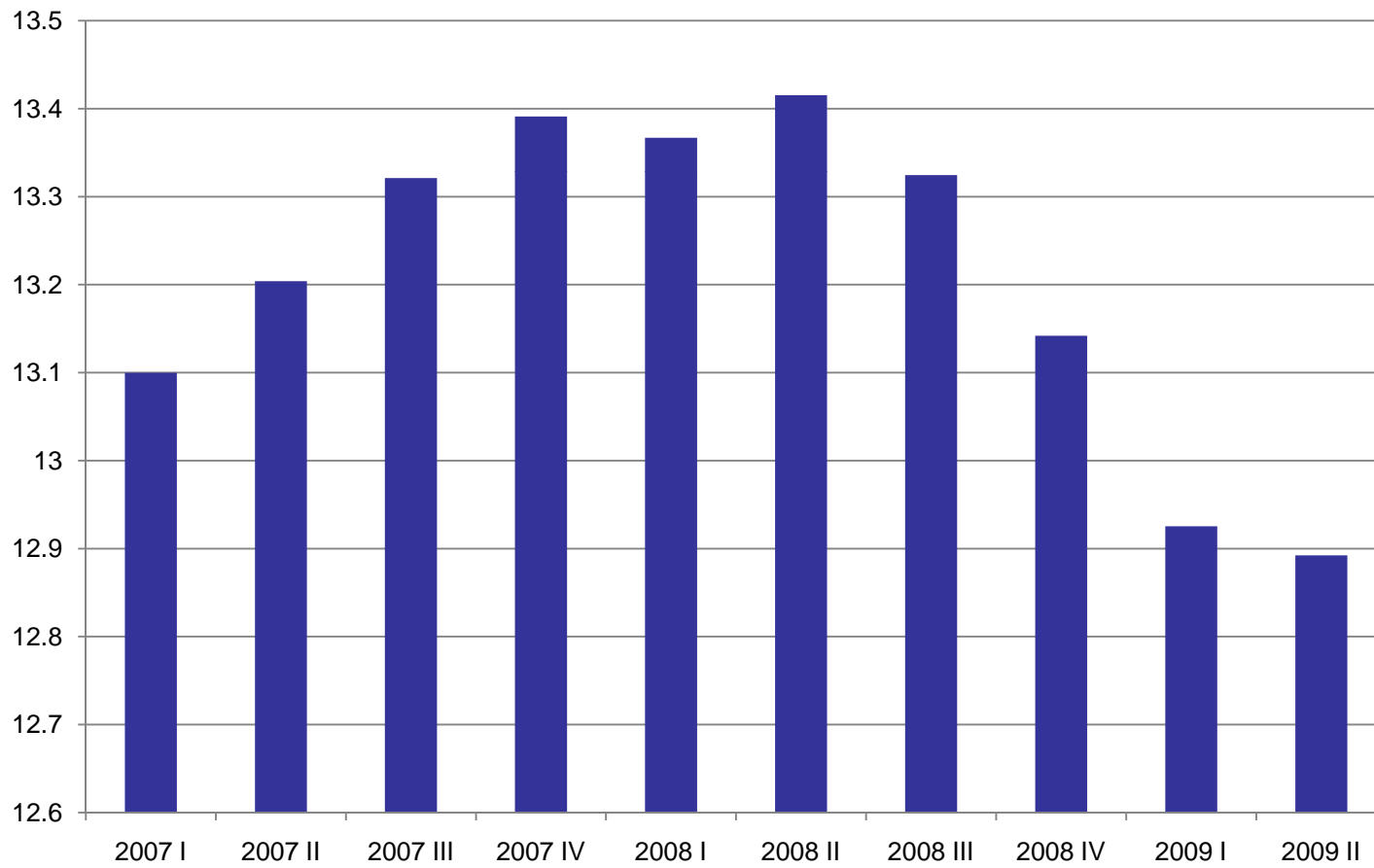
Was it the Economy?

- Indiana Gross Domestic Product dropped by 0.6% from 2007 to 2008
- But 2008 was an exceptionally cool summer, which reduces electricity demand
 - Cooling degree days in Indianapolis dropped by 30% from 2007

For the Investor-Owned Utilities:

- Residential electricity sales dropped by 2.4% from 2007 to 2008
 - More sensitive to weather than other sectors
- Commercial and industrial sales dropped by 3.3% from 2007 to 2008
 - More sensitive to economic factors than the residential sector

U.S. Gross Domestic Product (trillions of 2005 dollars)



This Year – Effects are More Pronounced

- Economic impact largely confined to last quarter of 2008
- Economic impact will be felt across all 4 quarters of 2009
- The mild summer of 2008 has been repeated

Impact on 2009 Forecast

- Price trajectory should have similar shape (increase in early years, relatively constant in later years)
- Electricity sales and peak demand projections relatively stagnant in early years, then growing
- Resource requirements lower than previous projections (combination of new resources and delayed growth in demand)

Potential Future Resources

- Energy efficiency/demand-side management/price responsive demand
 - recent renewed interest in efficiency
 - smart grid may enhance opportunities (but at some cost)
- Purchases from non-jurisdictional generators (either in or out of Indiana)
 - opportunities becoming more limited

Fuel Sources for New Resources

- Coal
 - permitting, construction time, CO₂ uncertainty
- Natural gas
 - fuel cost variability
- Nuclear
 - permitting, public opposition, construction time
- Wind
 - limited resource, intermittent supply
- Solar
 - limited resource, cost, intermittent supply
- Biogas
 - limited resource

Wind Developments

Project Name	Counties	Developer	Rated Capacity (MW)	Construction Schedule	Status
Benton County Wind Farm	Benton	Orion Energy	130	Completed May 2008	Completed
Fowler Ridge Wind Farm I	Benton	BP Alternative Energy & Dominion	400	Completed March 2009	Completed
Fowler Ridge Wind Farm II	Benton	BP Alternative Energy & Dominion	350	Under Construction	Under Construction
Fowler Ridge Wind Farm III	Benton	BP Alternative Energy & Dominion	350		Pending
Hoosier Wind Project	Benton	enXco	106	Under Construction	Under Construction
Tri-County Wind Energy Center	Tippecanoe, Montgomery, Fountain	Invenergy	300-500	Begin 2010	Proposed
Meadow Lake Wind Farm I	Benton, White	Horizon Energy	200	Under Construction	Under Construction
Meadow Lake Wind Farm II	Benton, White	Horizon Energy	800		Proposed
	Randolph	Horizon Energy	100-200		Proposed
	Howard	Horizon Energy	200		Proposed
	Boone	enXco	200-400		Proposed

Indiana Utility Wind PPAs

Utility	Project	State	MW	Status
Duke Energy	Benton County Wind Farm	Indiana	100	Operational
Vectren	Benton County Wind Farm	Indiana	30	Operational
WVPA	AgriWind	Illinois	8	Operational
Indiana Michigan	Fowler Ridge I	Indiana	100	Operational
Hoosier Energy	Story County Wind Energy Center	Iowa	25	Operational
NIPSCO	Buffalo Ridge	South Dakota	50	Approved
NIPSCO	Barton Windpower	Iowa	50	Approved
IPALCO	Hoosier Wind	Indiana	106	Approved
IPALCO	Lakefield Wind	Minnesota	201	Pending
Indiana Michigan	Fowler Ridge II	Indiana	50	Pending
Vectren	Fowler Ridge II	Indiana	50	Pending

Further Information

State Utility Forecasting Group

765-494-4223

sufg@ecn.purdue.edu

<http://www.purdue.edu/dp/energy/SUG/>

Douglas Gotham

765-494-0851

gotham@purdue.edu