

Indiana Electricity Projections and Environmental Regulations Study

Presented by:

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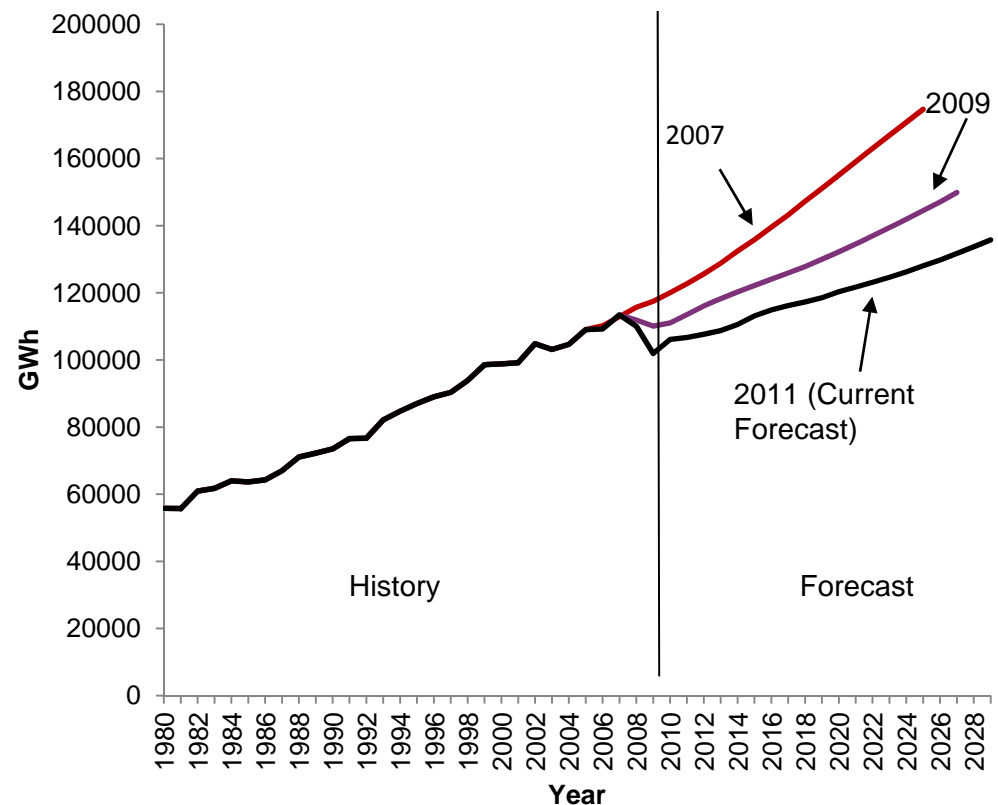
Presented to:

Hoosier Energy Board of Directors
French Lick, IN

August 13, 2012

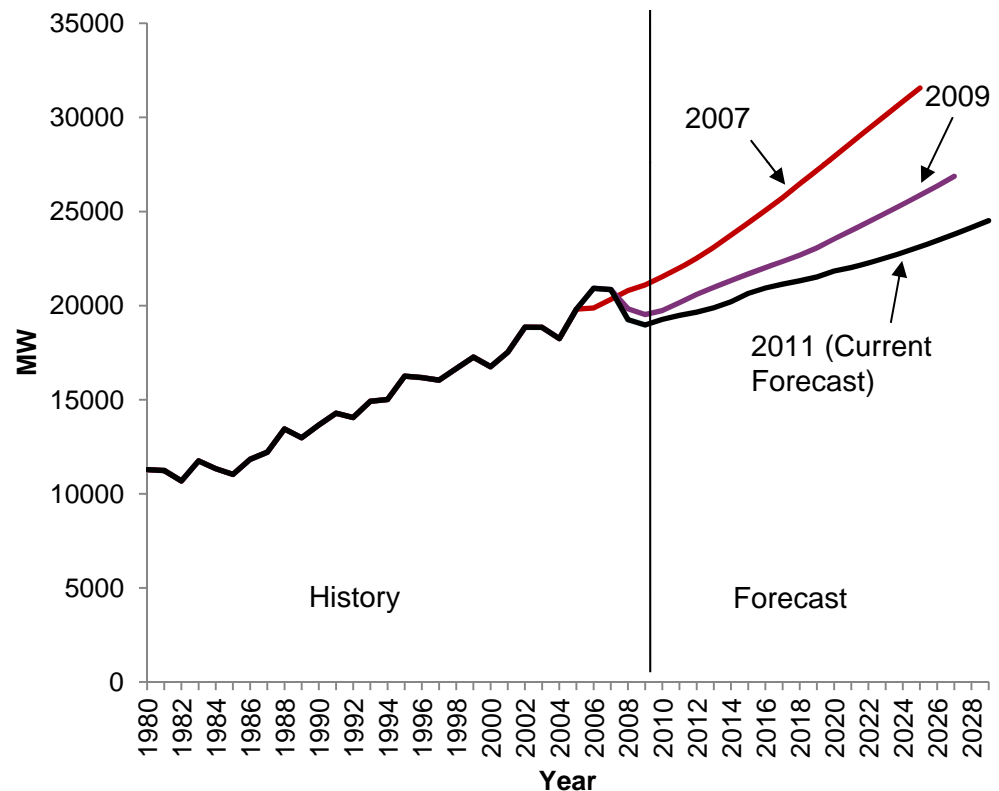
Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Growth rates
 - 2011 forecast: 1.30%
 - 2009 forecast: 1.55%
 - 2007 forecast: 2.46%



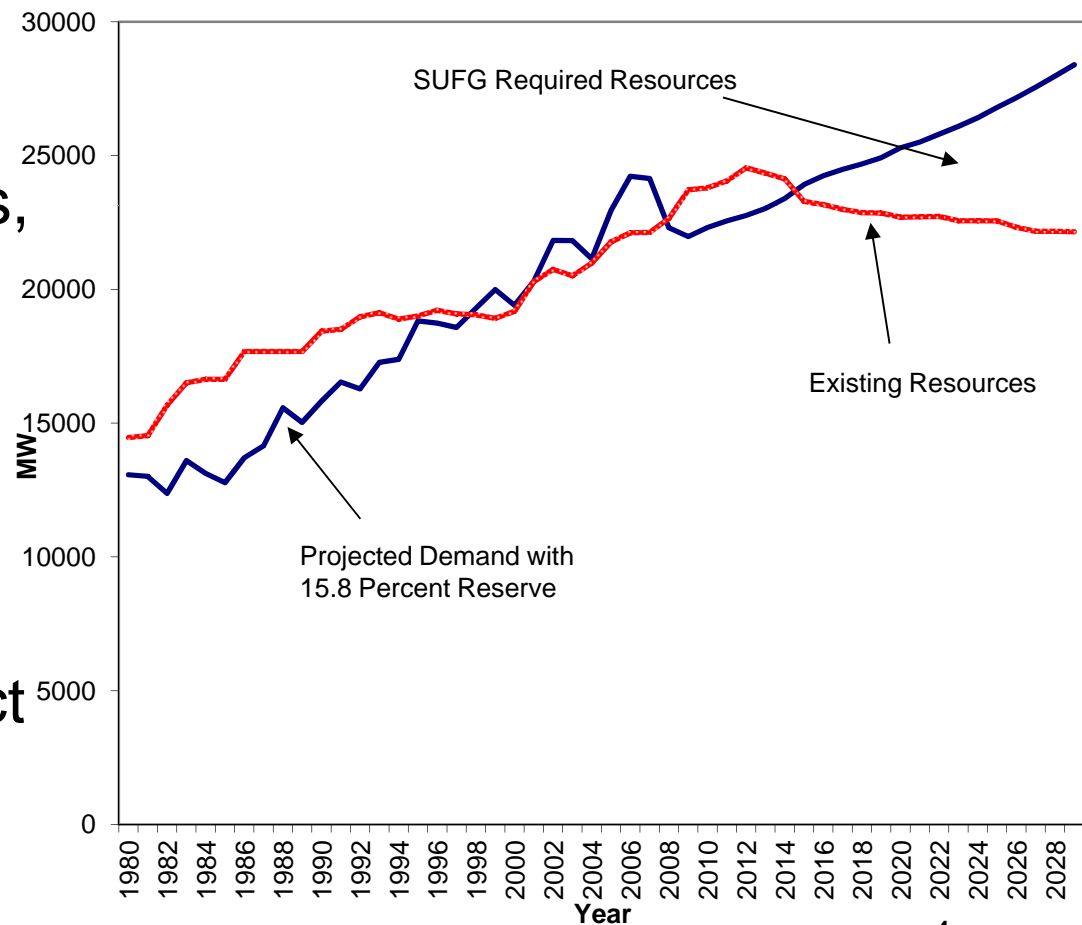
Indiana Peak Demand Requirements

- Peak demand is net of DSM and interruptible loads
- Growth rates
 - 2011 forecast: 1.28%
 - 2009 forecast: 1.61%
 - 2007 forecast: 2.46%



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



	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 ⁷ (percent)
						Peaking	Cycling	Baseload	Total		
2009				23,719							
2010	20,047	778	19,269	23,800	81	0	0	0	0	23800	17
2011	20,251	770	19,481	24,055	255	0	0	0	0	24055	21
2012	20,437	783	19,654	24,543	488	0	0	0	0	24543	24
2013	20,676	795	19,881	24,340	-204	100	20	0	120	24460	23
2014	21,008	805	20,203	24,128	-212	220	30	70	320	24448	25
2015	21,468	818	20,650	23,292	-836	310	90	330	730	24022	23
2016	21,767	832	20,935	23,171	-121	380	160	520	1060	24231	21
2017	21,987	846	21,141	22,991	-180	480	310	700	1490	24481	16
2018	22,180	861	21,319	22,873	-118	520	510	780	1810	24683	16
2019	22,396	876	21,520	22,851	-23	570	550	920	2040	24891	16
2020	22,730	889	21,841	22,696	-155	770	640	1190	2600	25296	16
2021	22,915	889	22,026	22,715	20	800	680	1300	2780	25495	16
2022	23,166	889	22,277	22,725	10	860	740	1470	3070	25795	16
2023	23,419	891	22,528	22,565	-160	920	920	1670	3510	26075	16
2024	23,702	893	22,810	22,565	0	990	1010	1830	3830	26395	16
2025	24,035	895	23,140	22,558	-7	1030	1090	2110	4230	26788	16
2026	24,350	896	23,454	22,322	-236	1060	1330	2440	4830	27152	16
2027	24,696	898	23,798	22,173	-150	1270	1400	2690	5360	27533	16
2028	25,052	900	24,152	22,168	-4	1350	1470	2940	5760	27928	16
2029	25,423	902	24,521	22,153	-15	1490	1590	3160	6240	28393	16

1 Uncontrolled peak demand is the peak demand 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.

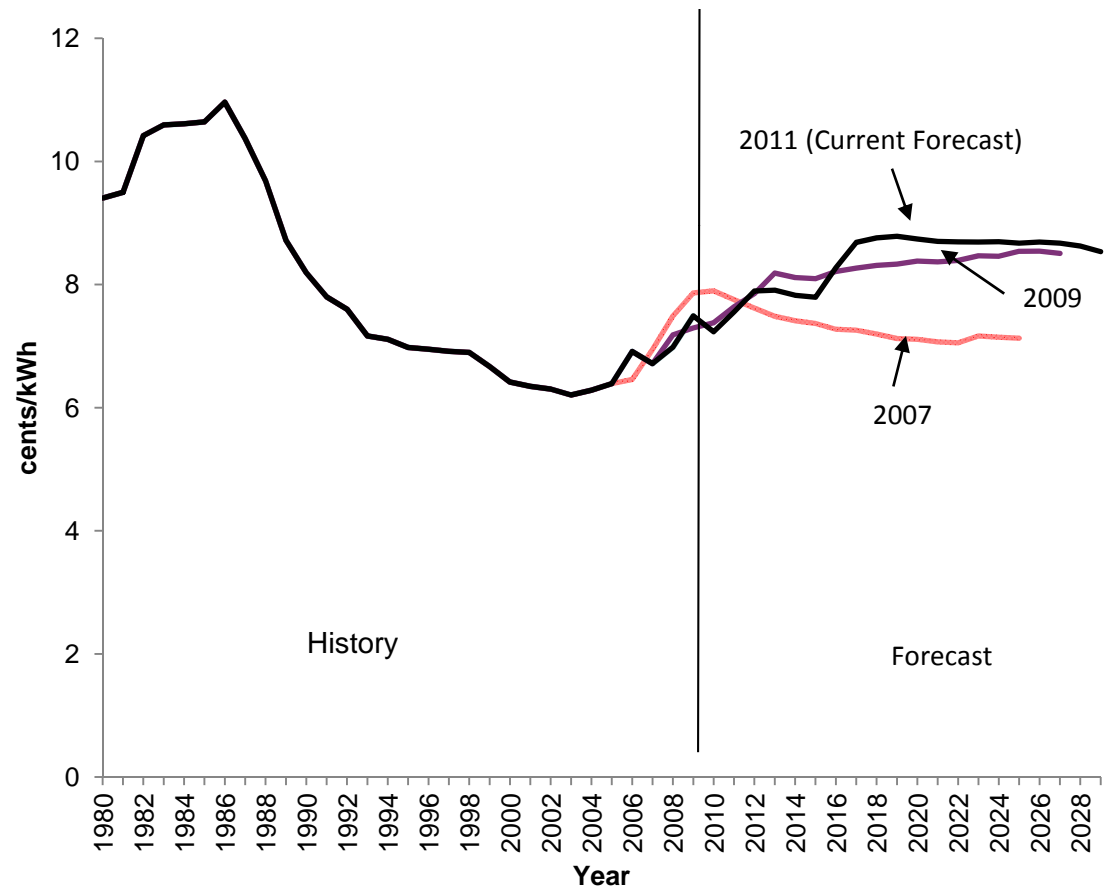
5 Projected additional resource requirements is the cumulative amount of additional resources needed to meet future requirements.

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

7 Resources may be required by individual utilities even if the state as a whole meets or exceeds the statewide reserve margin. Individual utility reserve margins are not allowed to fall below 6 percent.

Indiana Real Price Projections (2009 \$)

- Effect of inflation removed
- Average across sectors for IOUs
- Includes the cost of new resources
- Does not include cost of expected EPA regulations
 - unless utility has already taken steps or included costs in data request



Environmental Regulations

- SUG performed a follow up study of the expected impacts of recent, proposed, and expected EPA regulations
 - Cross-State Air Pollution Rule
 - Mercury and Air Toxics Standards
 - Greenhouse gases
 - Cooling water
 - Coal ash

Cross-State Air Pollution Rule

- Final rule issued in July 2011
- Appealed & currently stayed by federal court
- Reduces emissions caps for sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in 2012
- Further reductions in 2014

Mercury and Air Toxics Standards

- Final rule issued in December 2011
- Replaces court vacated Clean Air Mercury Rule
- Reduces emissions from mercury, acid gases, and other pollutants
- Prevents release of 91% of mercury
- Expected to go into effect in 2015-16

Greenhouse Gases

- Final rule issued in March 2012
 - after SUFG study released
- Establishes carbon dioxide (CO₂) emissions standards for new sources

Cooling Water Intake Structures

- Proposed rule issued in April 2011
- Final rule expected in June 2013
- Intended to reduce damage to aquatic life
 - impingement – trapping against inlet screen
 - entrainment – drawn into cooling system
- Compliance actions include enhanced screening, reducing water flow rate, and installing cooling towers
- Uncertainty over timing

Coal Combustion Residuals

- Proposed rule issued in June 2010
- No date has been released for final rule
- In response to concerns over the potential failure of coal ash facilities
- Two options
 - classify as special hazardous waste (~2020)
 - regulate as non-hazardous waste (~2018)

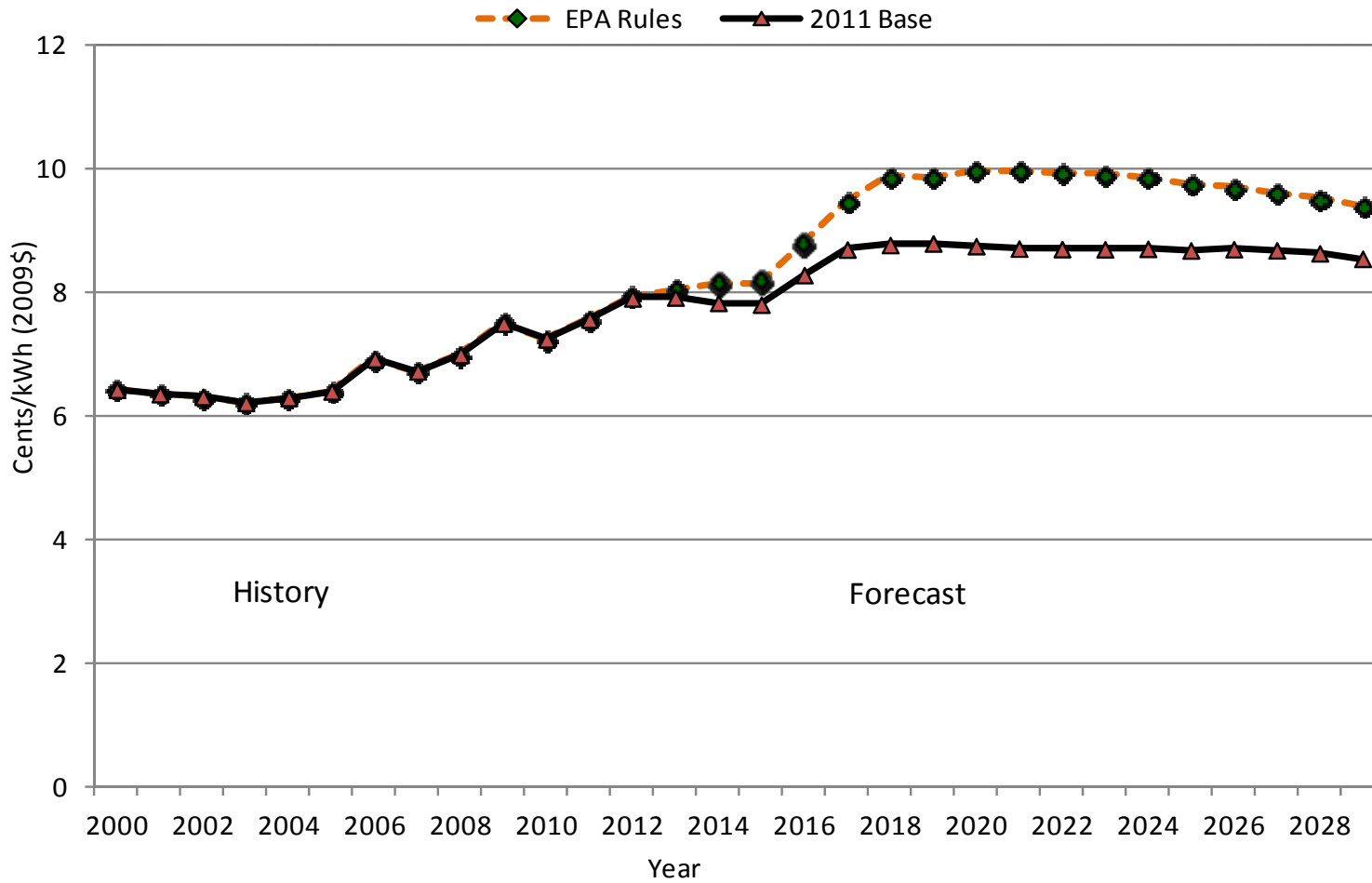
SUFG Study Inputs

- Model inclusion of SO₂ scrubbers (wet FGD), NO_x control (SCR), and mercury control (activated charcoal injection with bag house)
- Conversion of cooling water systems to recirculating
- Conversion of ash disposal from wet to dry

Retire vs. Retrofit

- For each unit, if the cost of retrofitting was greater than the cost of replacing it with a natural gas combined cycle facility, the unit was considered retired for the study
- If not, the retrofit costs were included
- Approximately 2,280 MW modeled as retired

Results



Comparison to Base Forecast (2009 cents/kWh)

Year	2011 Base	EPA Rules	Change
2015	7.80	8.14	4.4%
2020	8.74	9.96	13.9%
2025	8.67	9.76	12.5%

Caveats

- Uncertainty in EPA rules
- Impact on transmission investment
- Fuel switching option
- Accuracy of price elasticity modeled
- Macroeconomic effects
- Technological innovations
- Compliance strategies
- Engineering considerations
- Materials and labor premiums
- Efficiency and outage impacts

Further Information

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