2013 Indiana Renewable Resources Study & Preliminary 2013 Forecast

Presented by:
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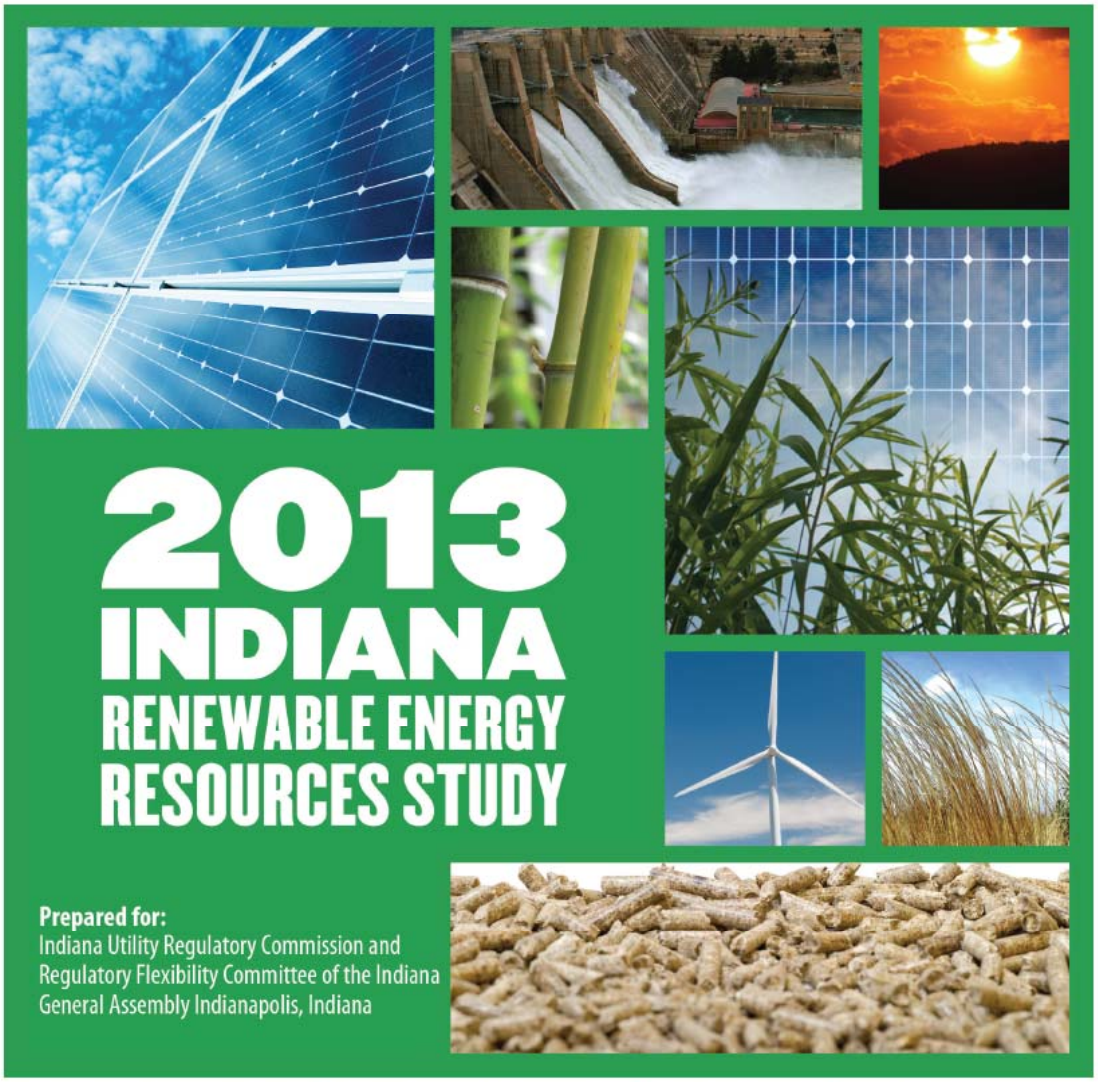
Purdue University

Presented to:
Regulatory Flexibility Committee
Indiana General Assembly

September 4, 2013

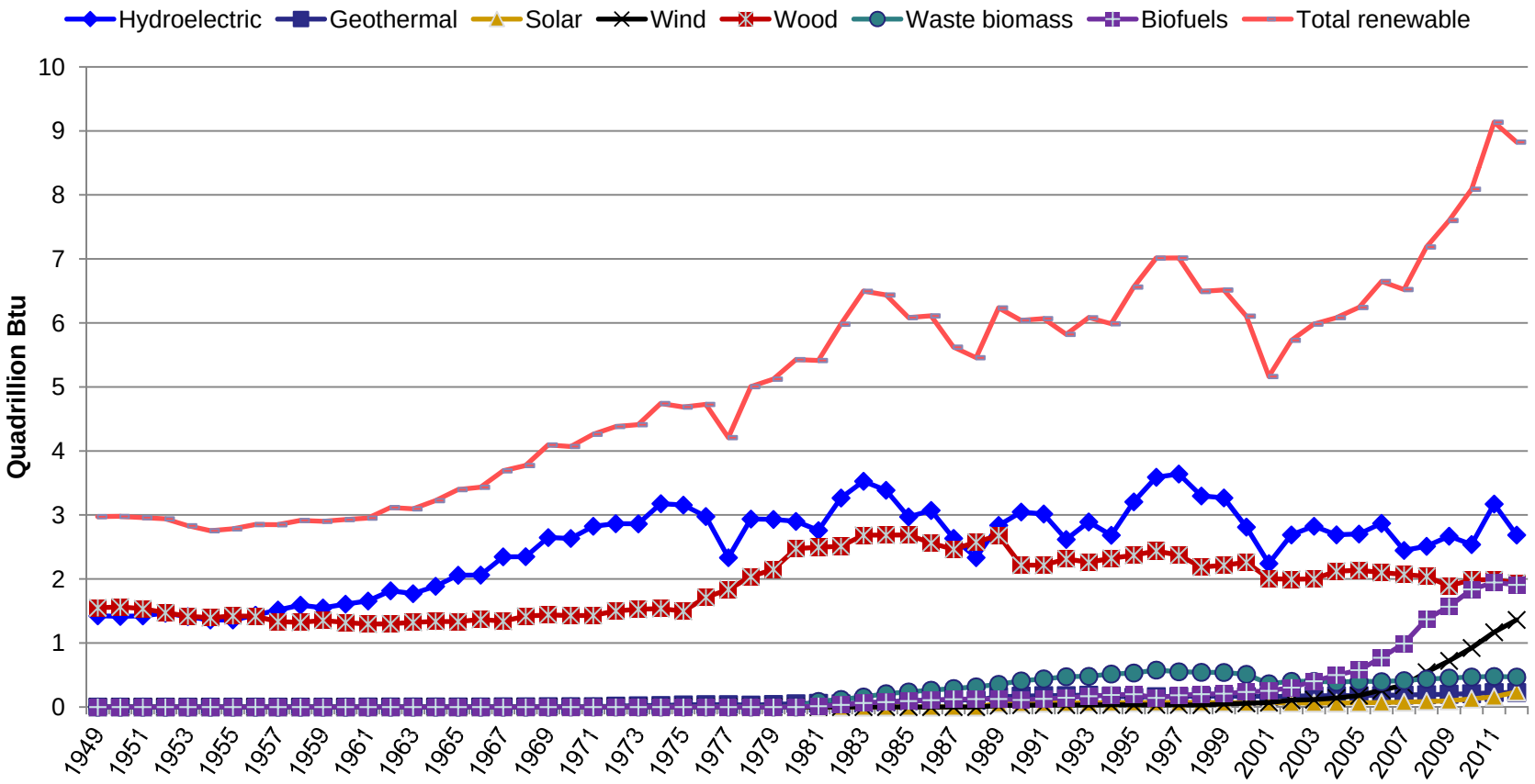
PURDUE UNIVERSITY
Discovery Park Energy Center

September 2013



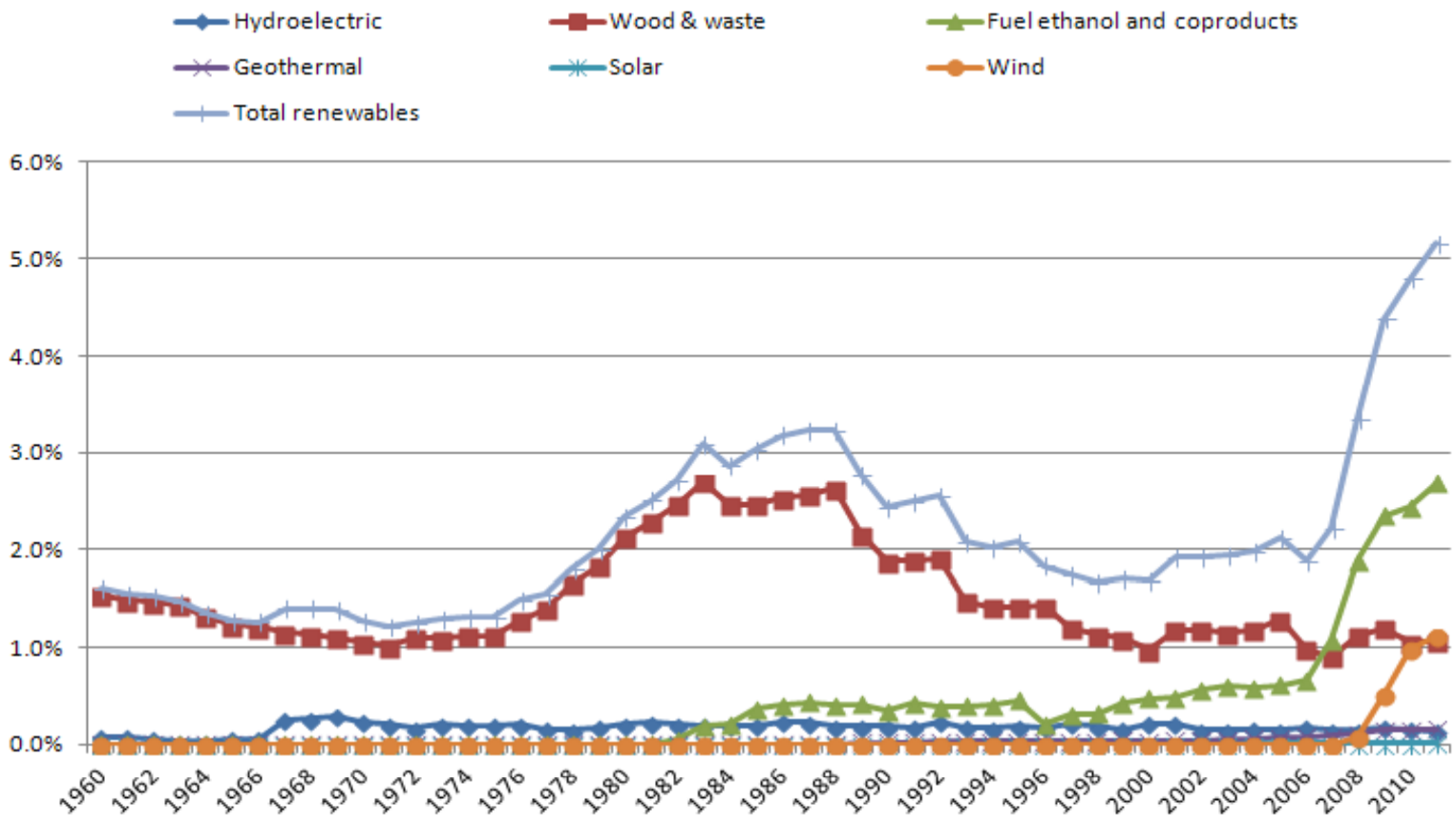
State Utility Forecasting Group | Energy Center at Discovery Park | Purdue University | West Lafayette, Indiana

Renewables Share of U.S. Energy Consumption



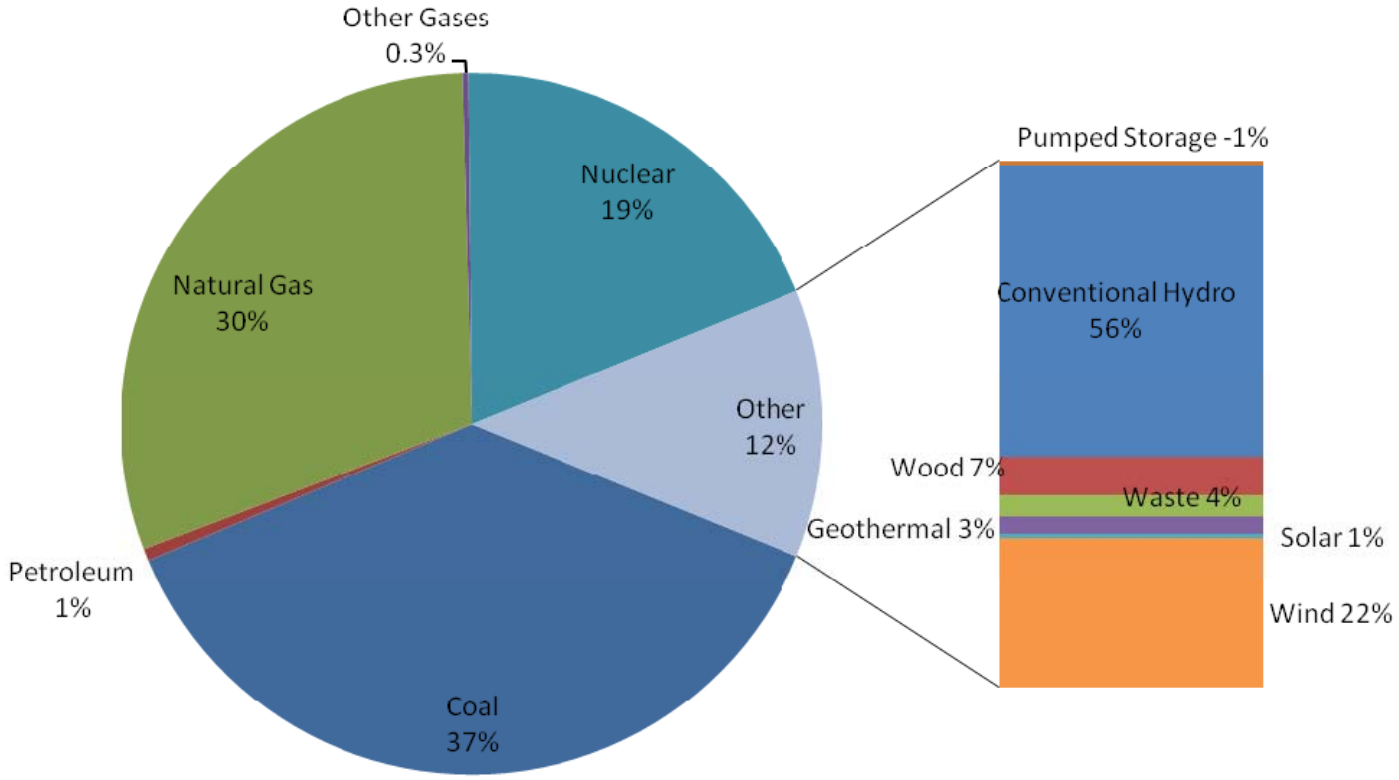
Data source: Energy Information Administration (EIA)

Renewables Share of Indiana Energy Consumption



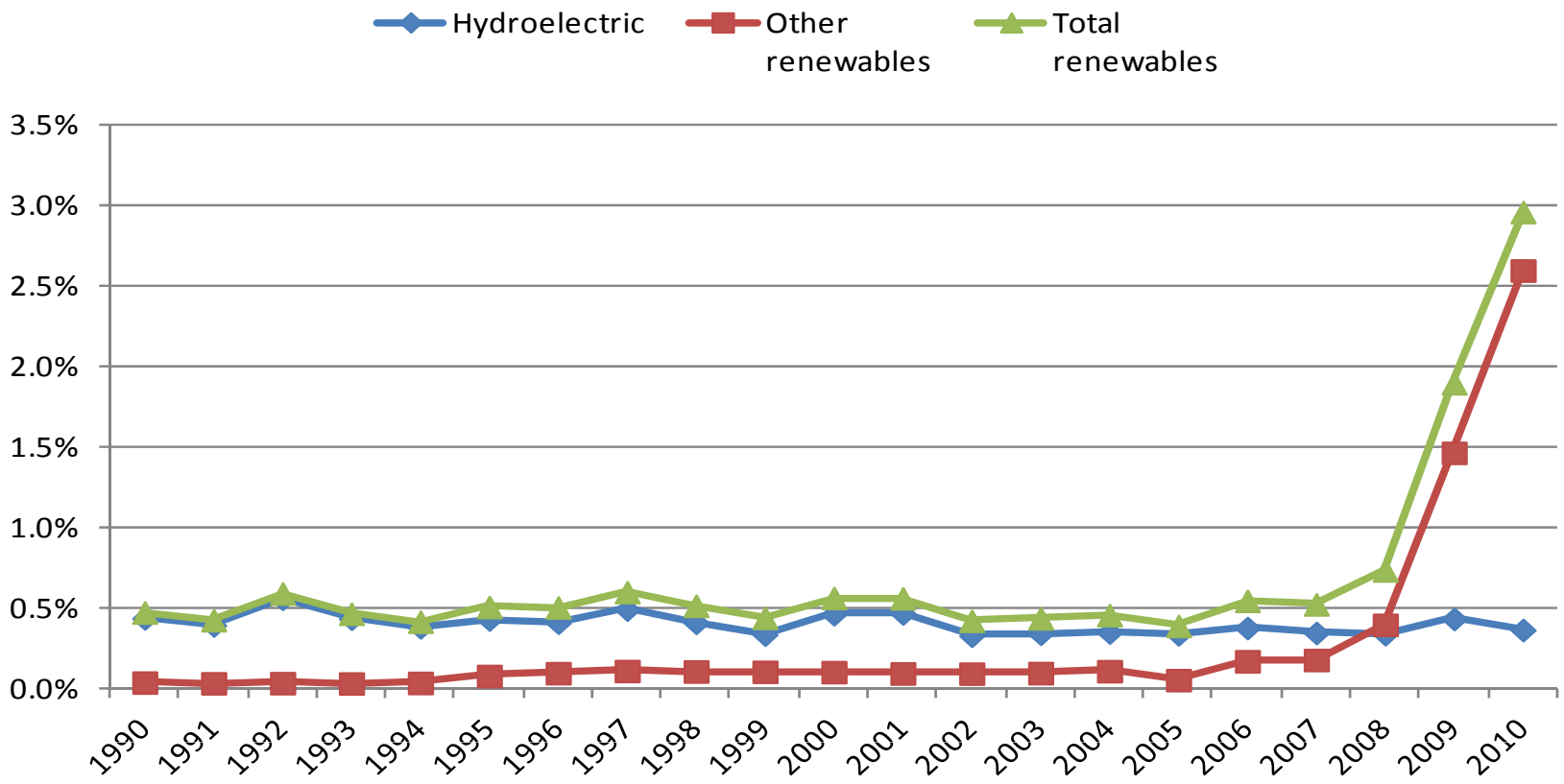
Data source: EIA

2012 U.S. Electricity Generation by Energy Source



Data source: EIA

Renewables Share of Indiana Electricity Generation

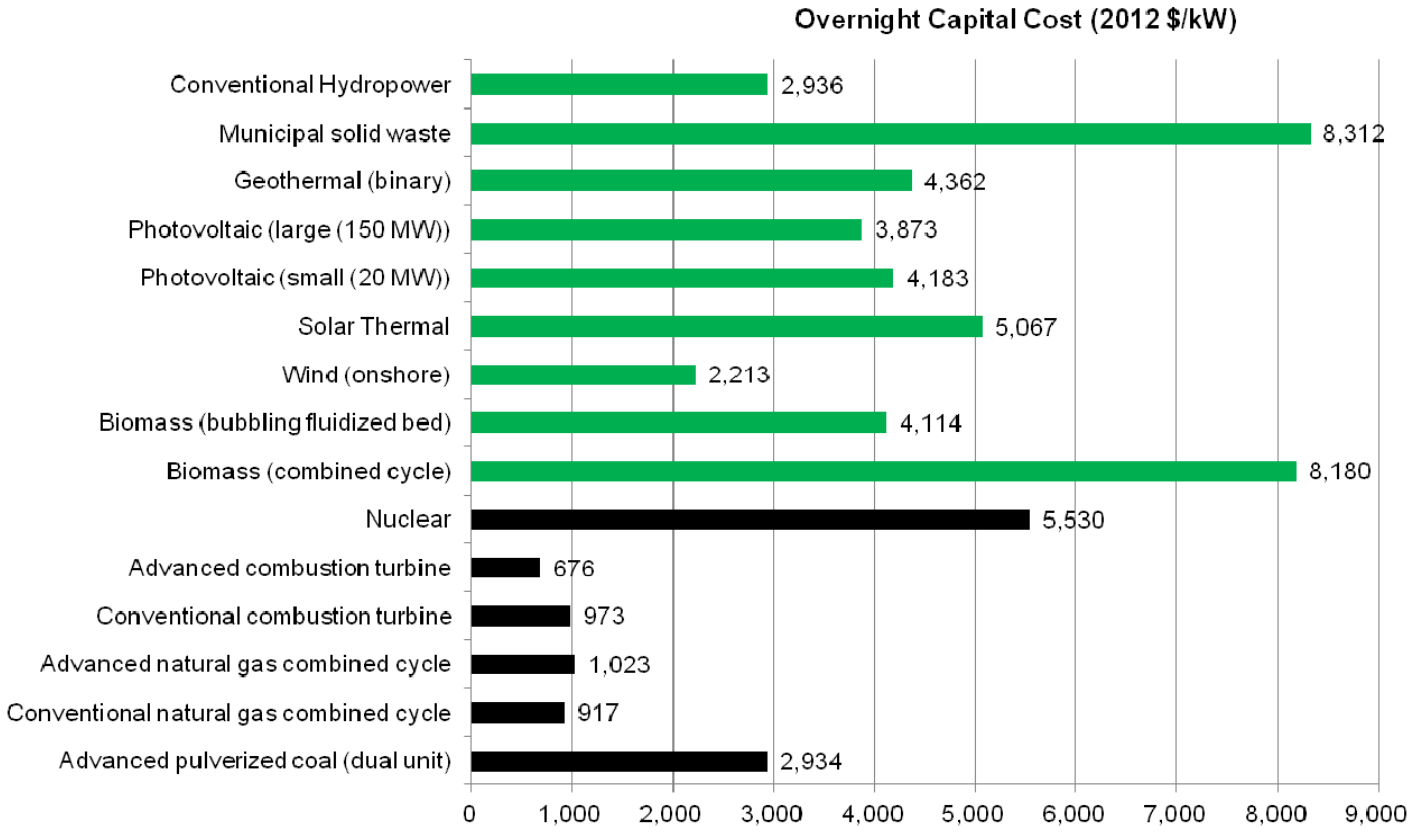


Data source: EIA

Barriers to Renewables

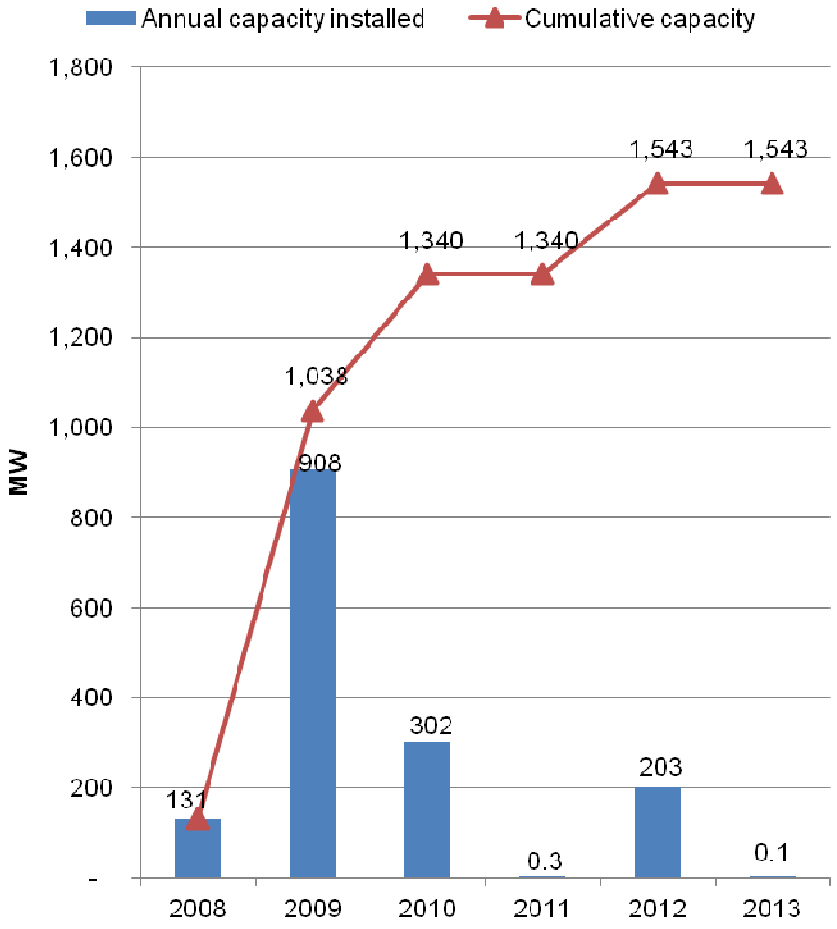
- Major barrier is cost
  - Most renewable technologies have high capital costs
  - According to EIA Indiana's average electric rate in 2011 was 8.01 cents/kWh vs. the national average of 9.90 cents/kWh
- Limited availability for some resources
  - Solar/photovoltaics, hydropower
- Intermittency for some resources
  - Solar/photovoltaics, wind

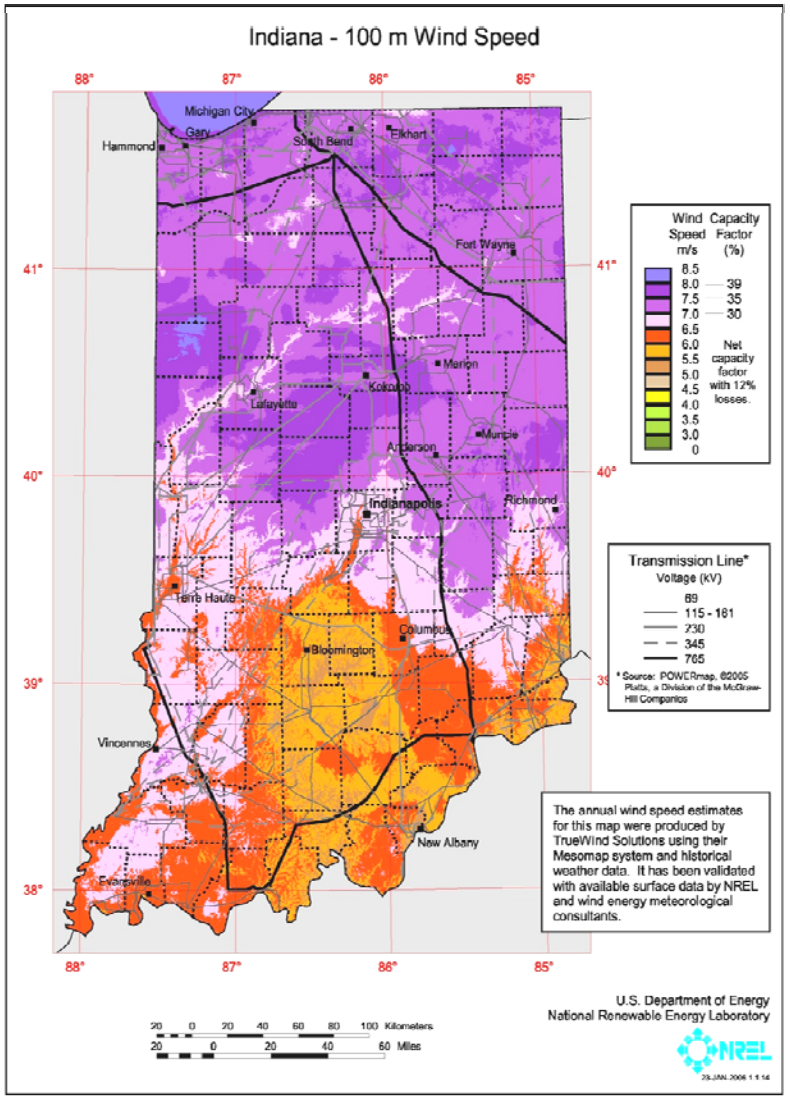
Capital Costs for Various Generation Sources



Data source: EIA

Wind


Annual capacity installed
Cumulative capacity
MW
1,800
1,600
1,400
1,200
1,000
800
600
400
200
-
131
908
302
0.3
203
0.1
1,038
1,340
1,340
1,543
1,543
2008
2009
2010
2011
2012
2013


Indiana - 100 m Wind Speed
Wind Speed m/s
Capacity Factor (%)
Net capacity factor with 12% losses.
Transmission Line*
Voltage (kV)
69
115 - 161
230
345
765
* Source: POWERmap, ©2005 Platts, a Division of the McGraw-Hill Companies
The annual wind speed estimates for this map were produced by TrueWind Solutions using their Mesomap system and historical weather data. It has been validated with available surface data by NREL and wind energy meteorological consultants.
U.S. Department of Energy
National Renewable Energy Laboratory
NREL
Michigan City
Gary
Hammond
South Bend
Elkhart
Fort Wayne
Marion
Kokomo
Lafayette
Muncie
Anderson
Indianapolis
Richmond
Terre Haute
Columbus
Bloomington
Vincennes
New Albany
Evansville

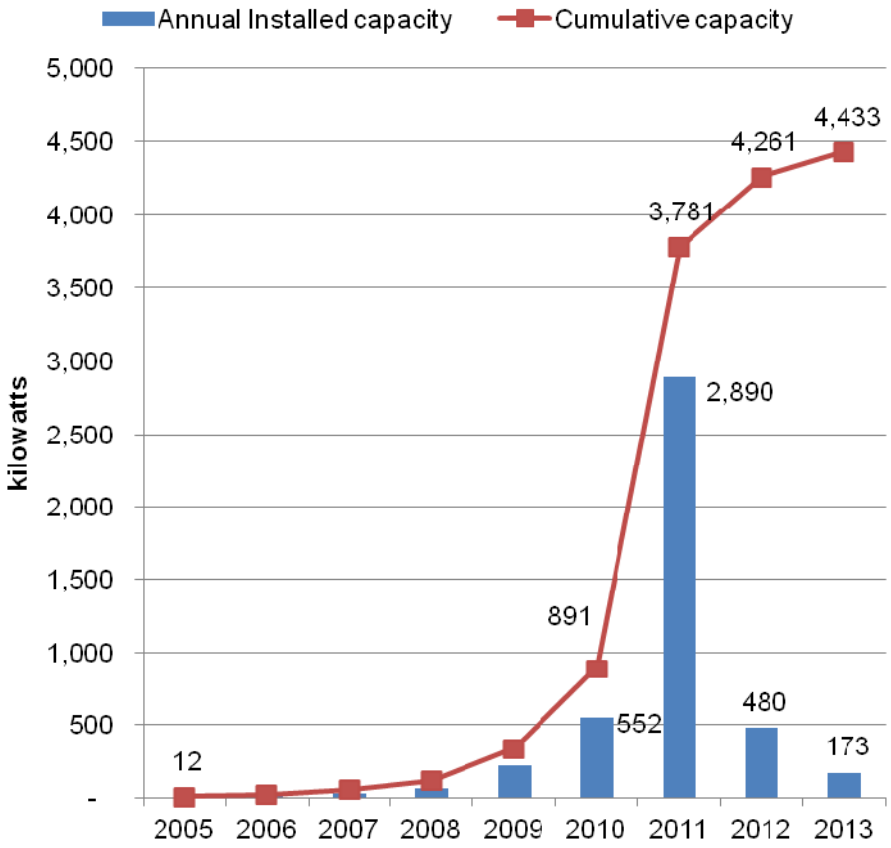
Energy Crops

- Transportation fuels
  - Ethanol
  - Biodiesel
- Other possibilities
  - Fast growing hardwood trees (hybrid poplar/willow)
  - Grasses (switchgrass)
- Barriers to be overcome
  - Other high-value uses for the land
  - Price of competing fossil fuels
  - Harvesting and transportation costs

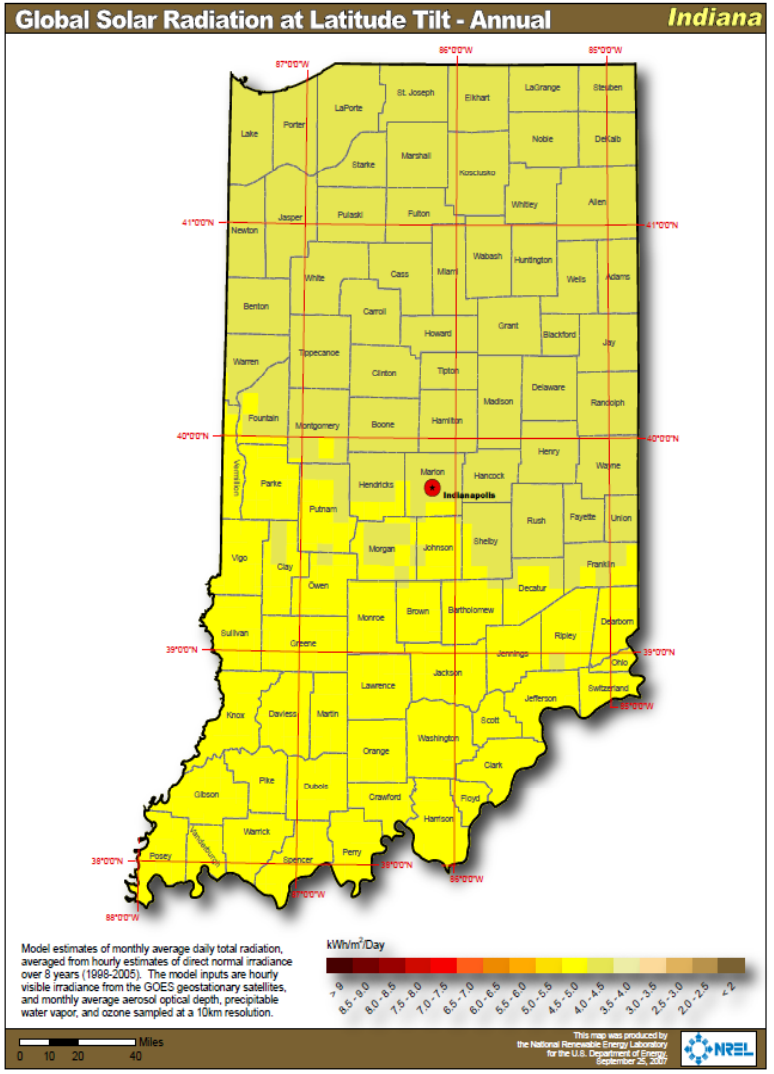
Organic Waste Biomass

- Until 2007, this resource was the largest source of renewable energy in Indiana, primarily due to the use of wood waste
  - Now 3rd behind ethanol and wind
- It is the 3rd largest source of renewable electricity generation in the state
  - Landfill gas
  - Municipal solid waste
  - Animal waste biogas
  - Wastewater treatment

Solar Energy



Photovoltaic capacity in Indiana



Data source: National Renewable Energy Laboratory

Photovoltaics

- Growing rapidly in Indiana, but still a small contributor overall
- 313 installations totaling over 4.4 MW of capacity
  - Fort Harrison Federal Compound
  - Metal Pro Roofing
  - Johnson Melloh
- 10 MW project under construction at Indianapolis airport
- Feed-in tariffs have large PV capacity committed
  - IPL 100 MW
  - NIPSCO 12.3 MW

Hydroelectric Power

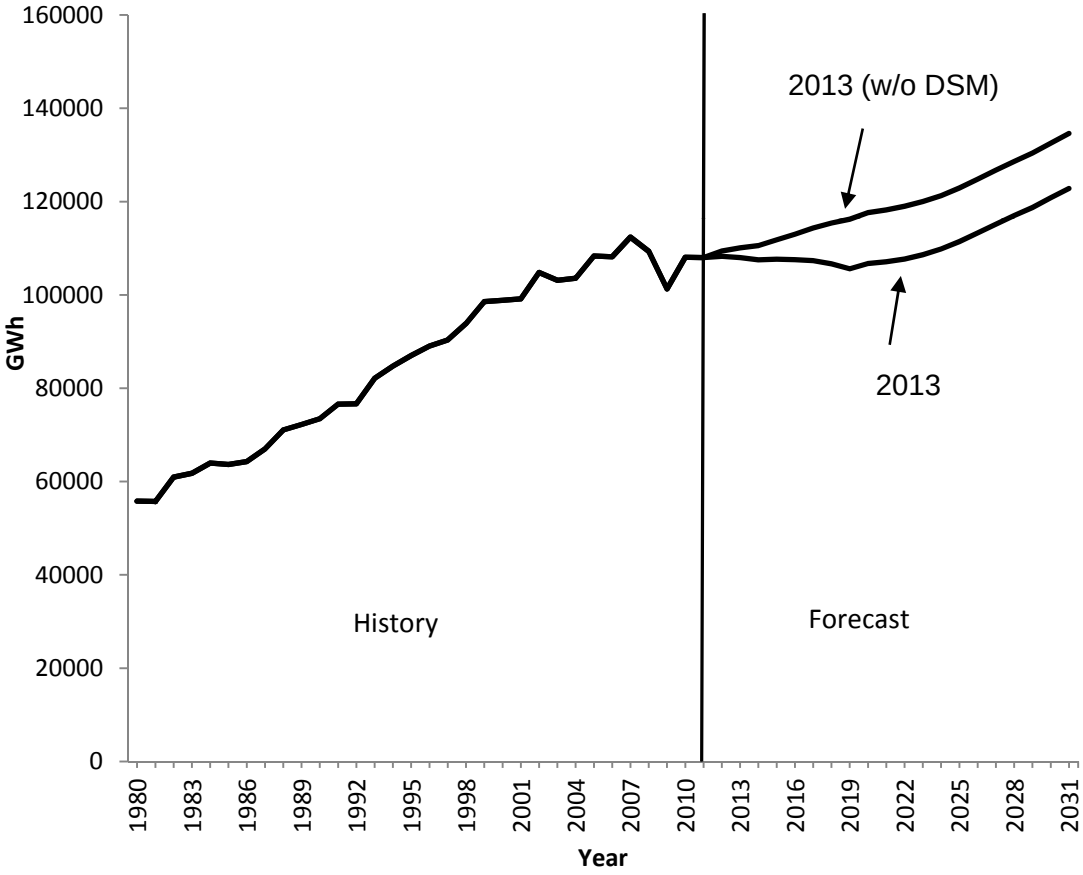
- Indiana has 73 MW of hydroelectric generating capacity.
  - mostly run-of-the-river (no dam)
  - 2nd largest source of renewable electricity
- American Municipal Power is constructing an 84 MW facility at the Cannelton Locks on the Ohio River
  - expected to be operational in 2014

2013 Forecast

- The 2013 electricity projections are a work in progress
- The results presented here should be considered to be preliminary and are subject to revision

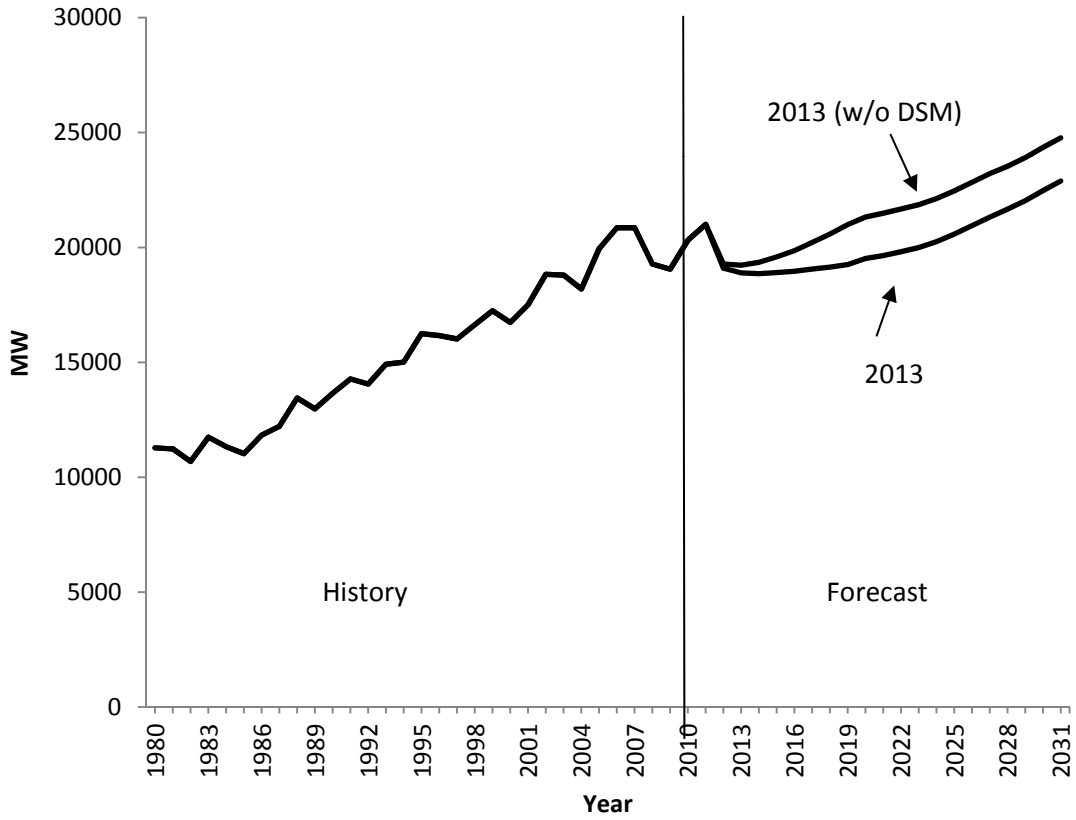
Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Without DSM indicates the growth in electricity requirements without utility demand-side management programs
- Growth rates
  - 2013 forecast: 0.64%
  - Without DSM: 1.11%
  - 2011 forecast: 1.30%



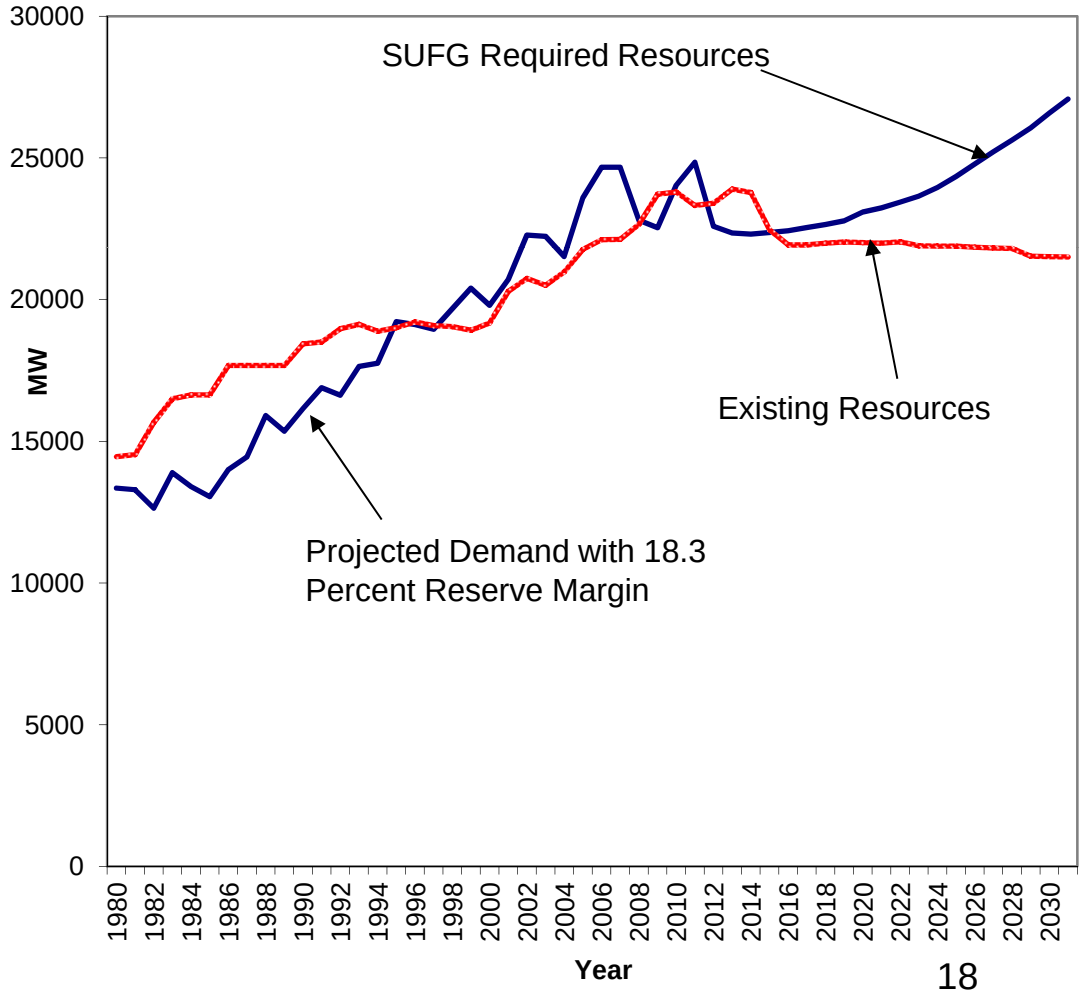
Indiana Peak Demand Requirements

- Peak demand is net of demand response
  - interruptible loads
  - direct load control
- Growth rates
  - 2013 forecast: 0.96%
  - Without DSM: 1.33%
  - 2011 forecast: 1.28%



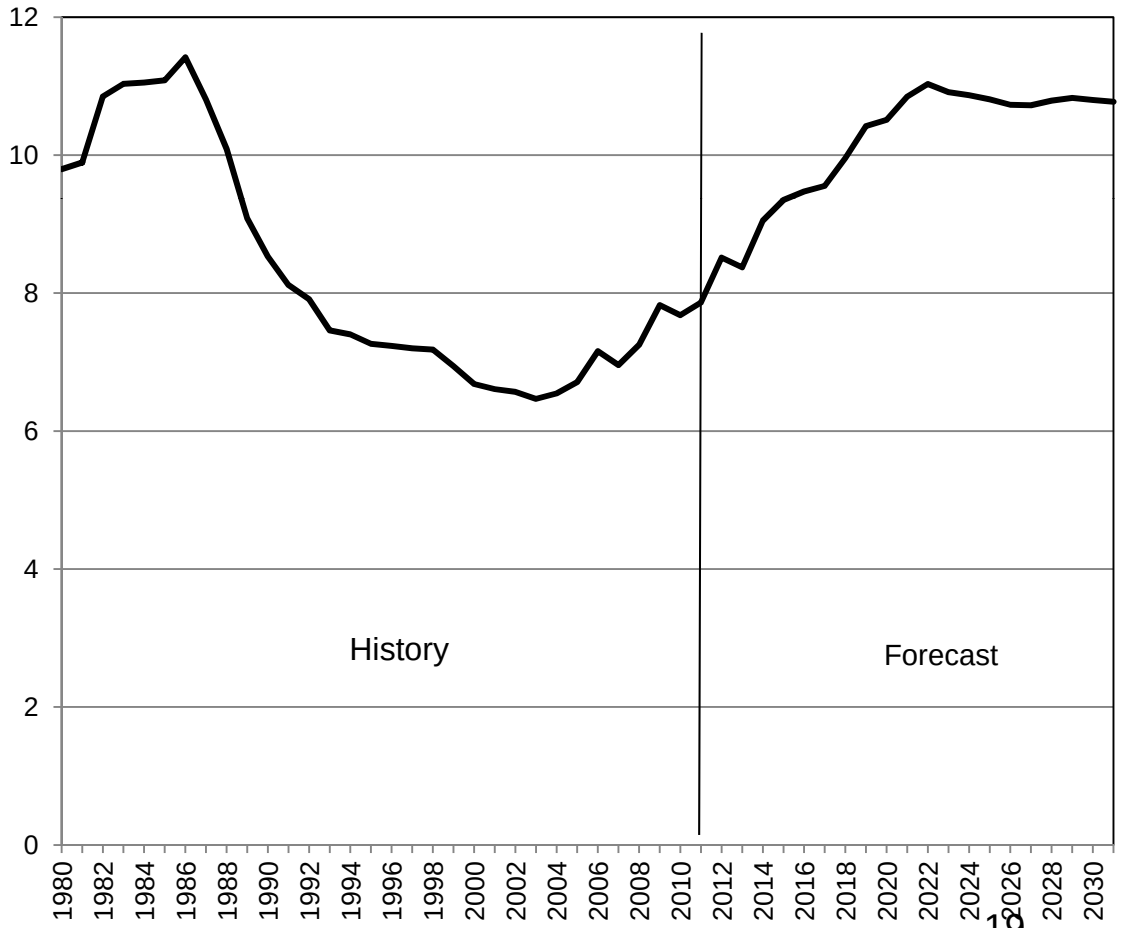
Indiana Resource Requirements

- Resources may be provided by additional conservation measures, contractual purchases, purchases of existing assets, or new construction
- Existing resources are adjusted into the future for retirements and contract expirations
- Future requirements
  - 2017: 260 MW
  - 2020: 850 MW
  - 2025: 1,690 MW
  - 2030: 3,820 MW



Indiana Real Price Projections (2011$)

- Average retail rates for all customers of investor-owned utilities
- Effect of inflation removed
- Includes the cost of new resources
- Includes the cost of meeting EPA regulations that have been finalized
  - Mercury and Air Toxics Standard



Further Information

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http://www.purdue.edu/discoverypark/energy/SUFG/

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