

# INDIANA'S ELECTRICITY SECTOR

*Presented to:*

*Indiana Farm Bureau Energy Policy Advisory Group  
Indianapolis, IN*

*Presented by:*

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# History Lesson

- Indiana experienced rapid load growth in the 1950s through the early 70s
  - 5-8 % growth annually
- Indiana utilities built a significant amount of new generating capacity
  - almost all of it was coal-fired due to the relative economics at the time

## Mid-70s through Mid-80s

- The energy crisis, oil embargoes, and rust belt recession caused electricity demand growth to slow
- Utility forecasts continued to project that the previous load growth would return, resulting in overbuilding of generating capacity

# Marble Hill and Bailly

- In the mid-80s, Indiana had a 50% reserve margin
- Electric rates climbed
- Construction was halted on 2 nuclear plants, with one utility entering bankruptcy
- SUFG was formed in 1985 and the IURC was granted Certificate of Need authority

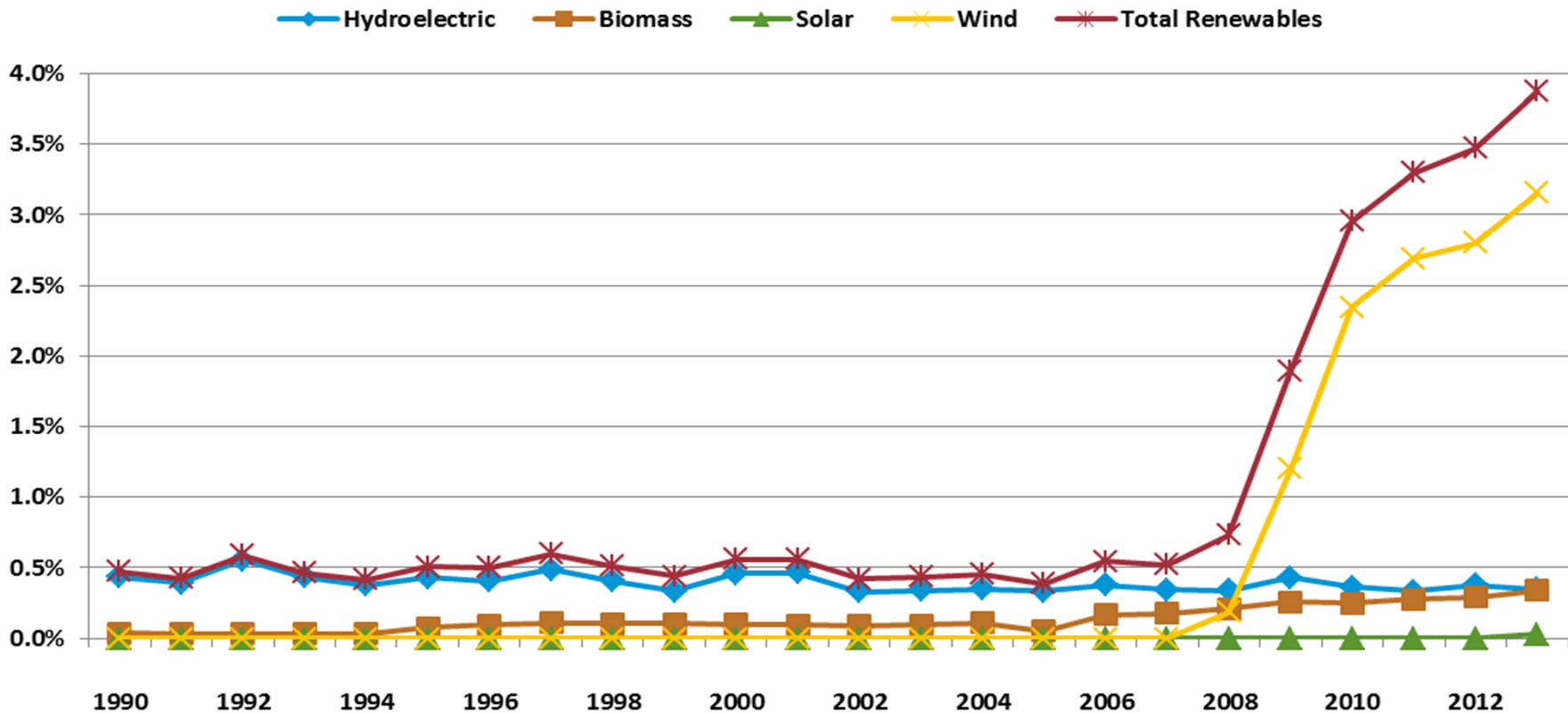
# New Normal

- Coming out of the recession, load growth stabilized at a lower level (2-3% per year)
- Very little generating capacity was built
- Real (inflation-adjusted) electric rates start to drop

## More Recently

- Boom in non-utility (merchant), natural gas-fired generation around 2000
- Real electric rates start to rise around 2003, mostly due to costs associated with environmental controls
- Recession hits in 2008-09
- Hydrofracturing results in lower natural gas prices
- Wind and biogas power start to be significant

# Renewables Share of Indiana Electricity Generation



Data source: EIA

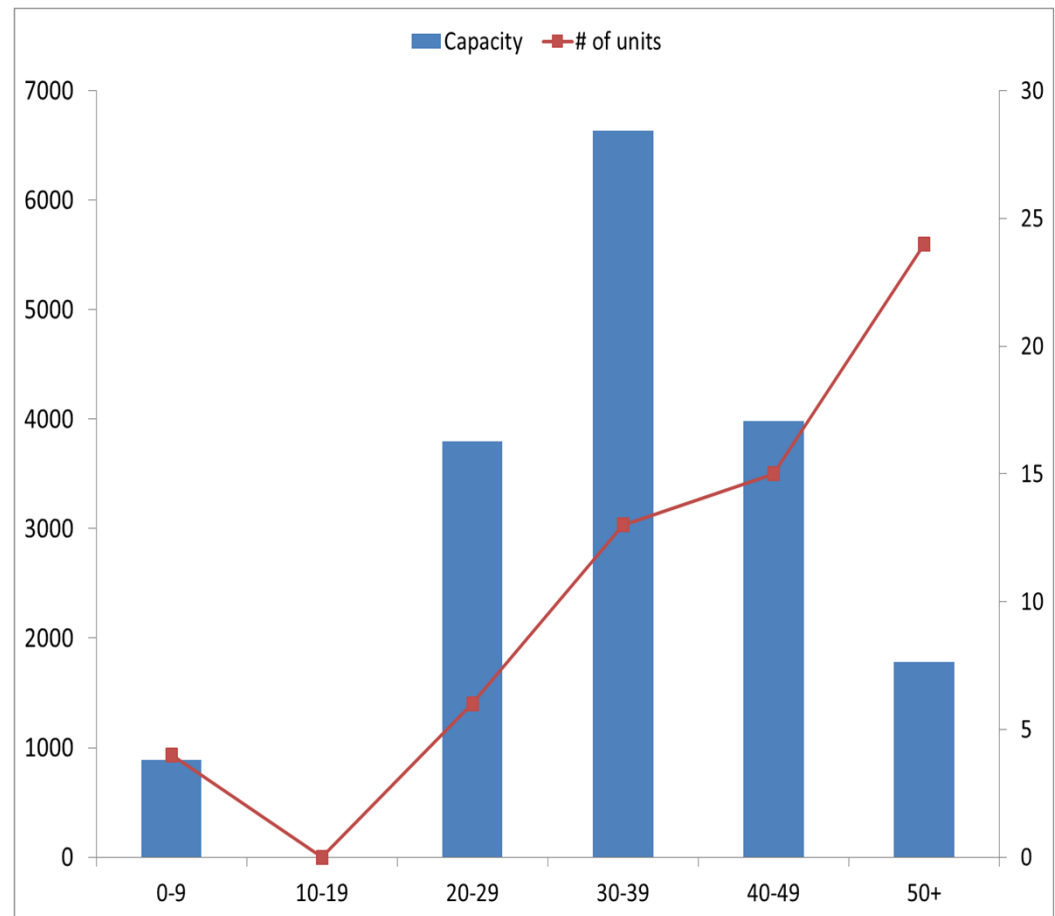
# Present

- Indiana is heavily dependent on coal (76% of electricity in 2013)
  - most of our coal fleet is over 30 years old
- Electric rates are no longer in the lowest group in the nation but are still below the national average
  - 14<sup>th</sup> lowest according to EIA
- Solar is having an impact



# Age of Indiana's Coal Fleet

- ~37% of Indiana's coal fleet is > 40 years old
- ~80% of Indiana's coal fleet is > 30 years old
- ~98% of Indiana's coal fleet is > 20 years old



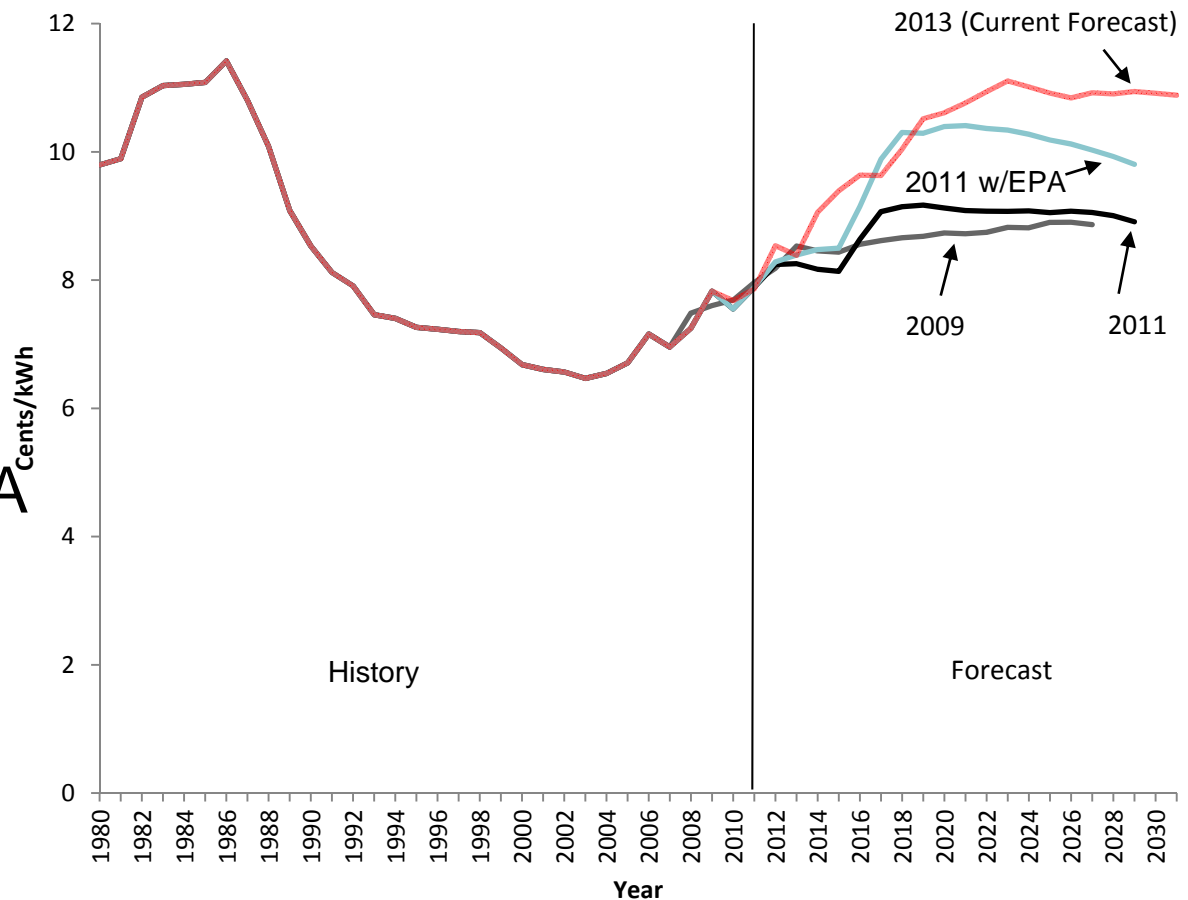
Data source: IURC 2014 Annual Report

# 2013 Forecast Highlights

- 2013 forecast growth is lower than in previous forecasts due to increases in efficiency
  - Higher prices reduce customer usage
  - Utility DSM
  - Efficiency standards
- Resource requirements are lower than in previous forecasts
  - Additional resources needed by 2016

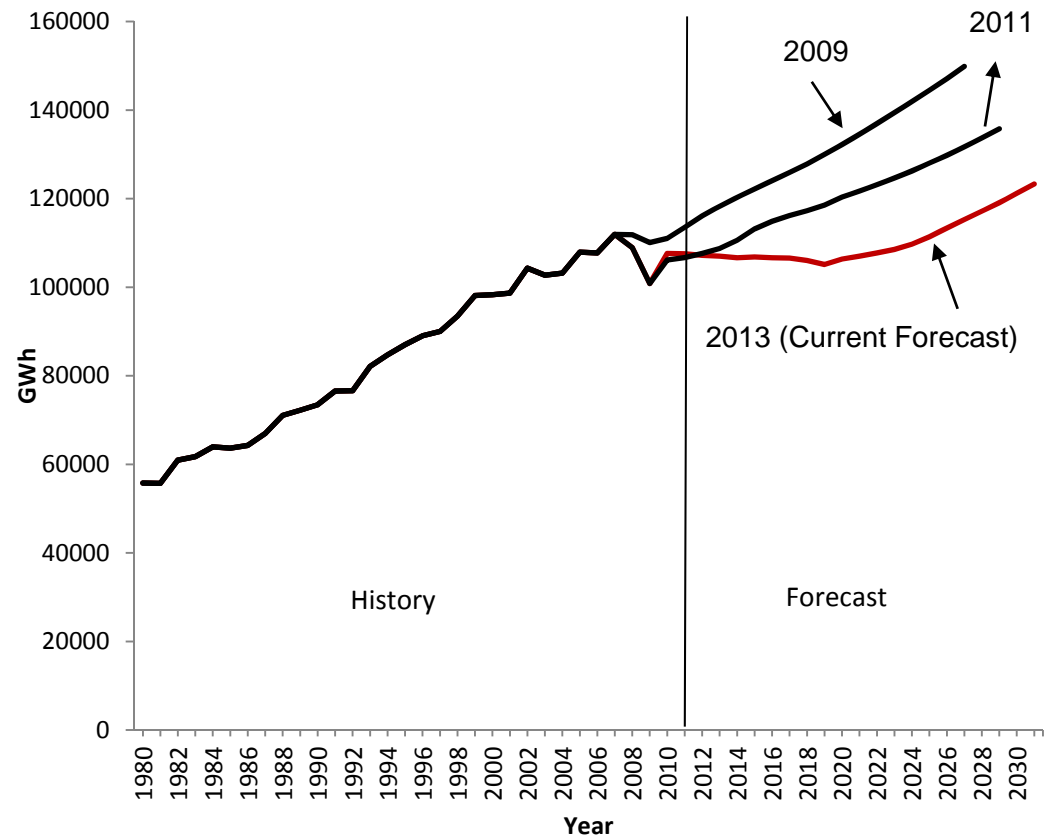
# Indiana Real Price Projections (2011 \$)

- Effect of inflation removed
- Includes the cost of new resources
- Includes expected cost of finalized EPA rules
  - MATS
- Non-finalized rules are not included



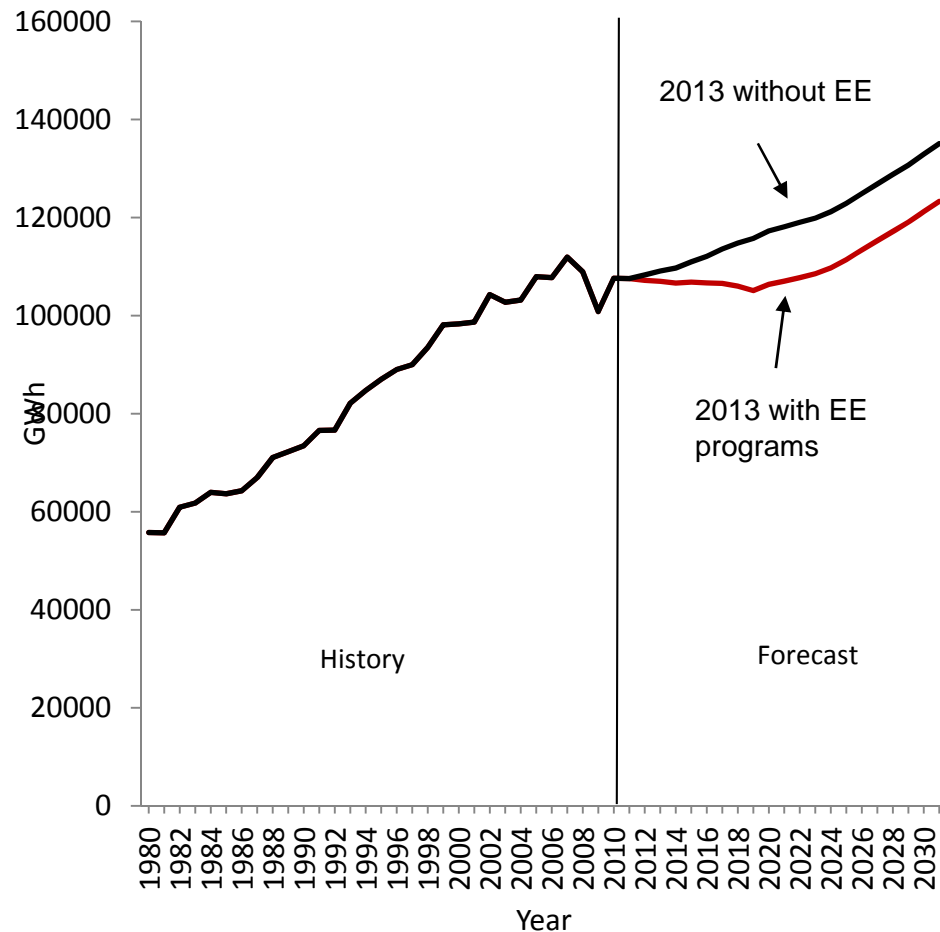
# Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Growth rates
  - 2013 forecast: 0.74%
  - 2011 forecast: 1.30%
  - 2009 forecast: 1.55%



# Energy Efficiency Programs

- SEA 340 (2014) will affect the forecast
- If the utility DSM programs are added back in, energy grows at 1.17% per year
- This does not include the impact of prices changing

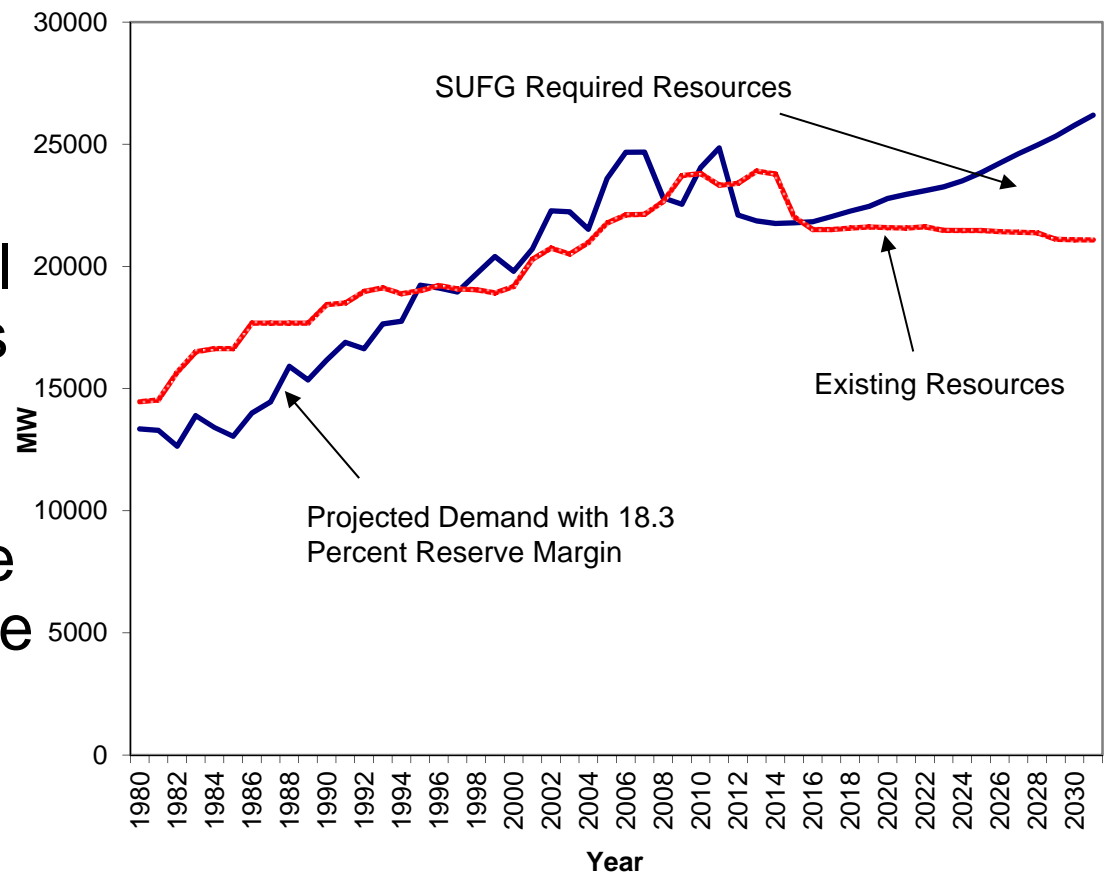


# Retirements

- The 2013 forecast included about 2,300 MW of retirements in 2015, largely associated with MATS compliance
- Another 430 MW of “scheduled” retirements were included between 2020 and 2029
- Compliance with the EPA CO<sub>2</sub> rule could result in earlier retirement of additional generation

# 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

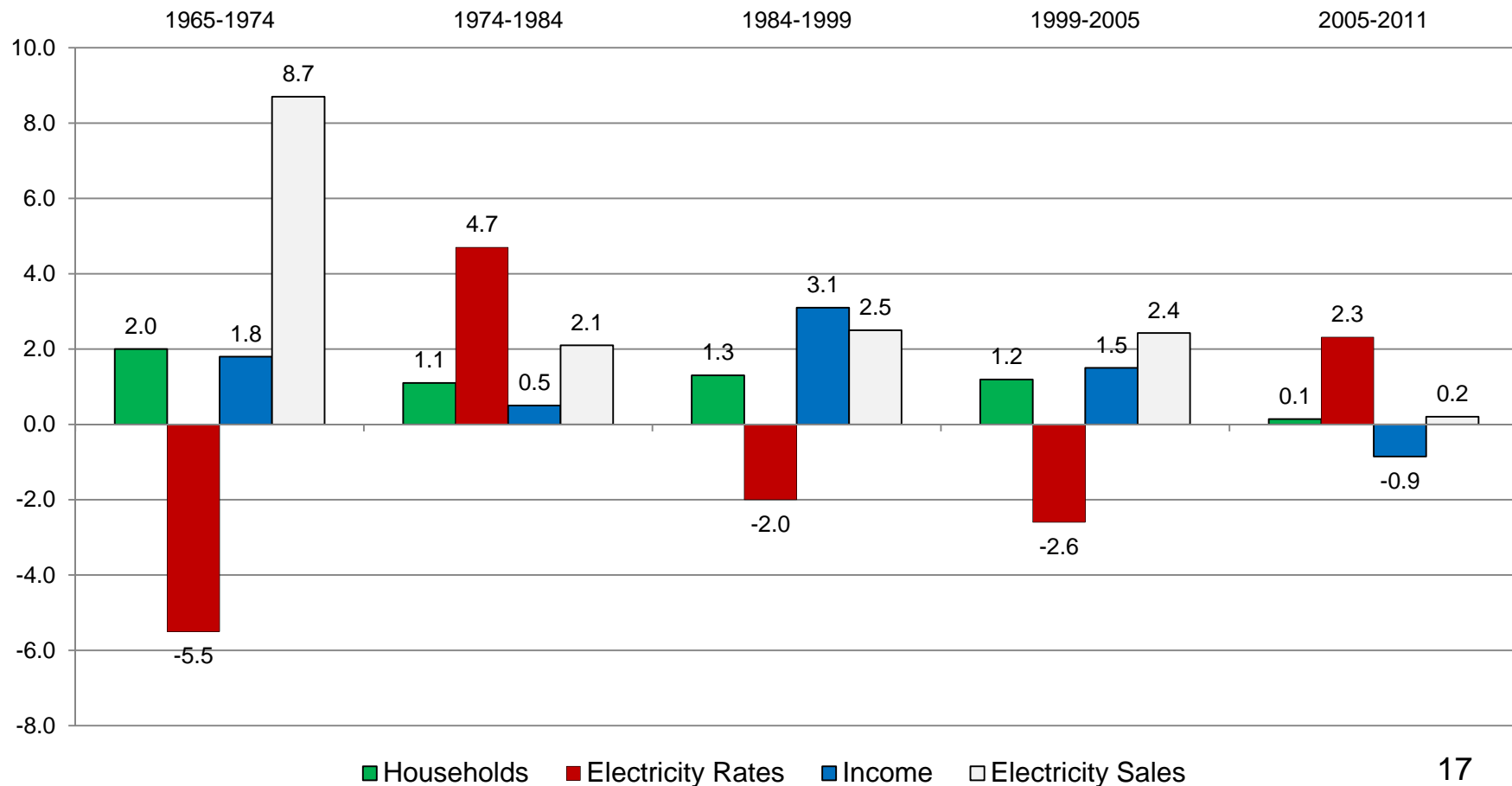


# Indiana Resource Requirements (MW)

	Baseload	Total
2016	120	410
2017	210	630
2018	460	890
2019	570	1,060
2020	650	1,280
2021	740	1,450
2022	790	1,540
2023	920	1,820
2024	1,060	2,050
2025	1,190	2,370
2026	1,420	2,790
2027	1,530	3,210



# Residential Trends (Annual Percent Change)

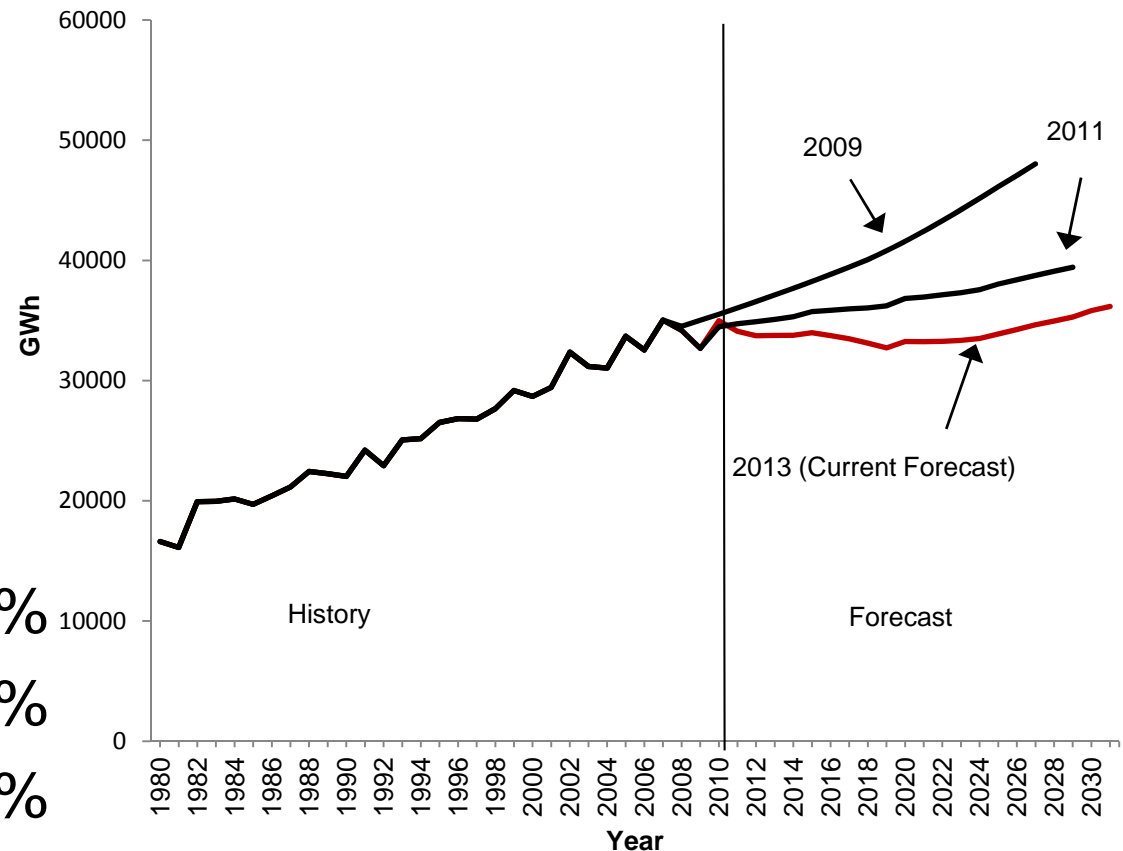


# Residential Drivers

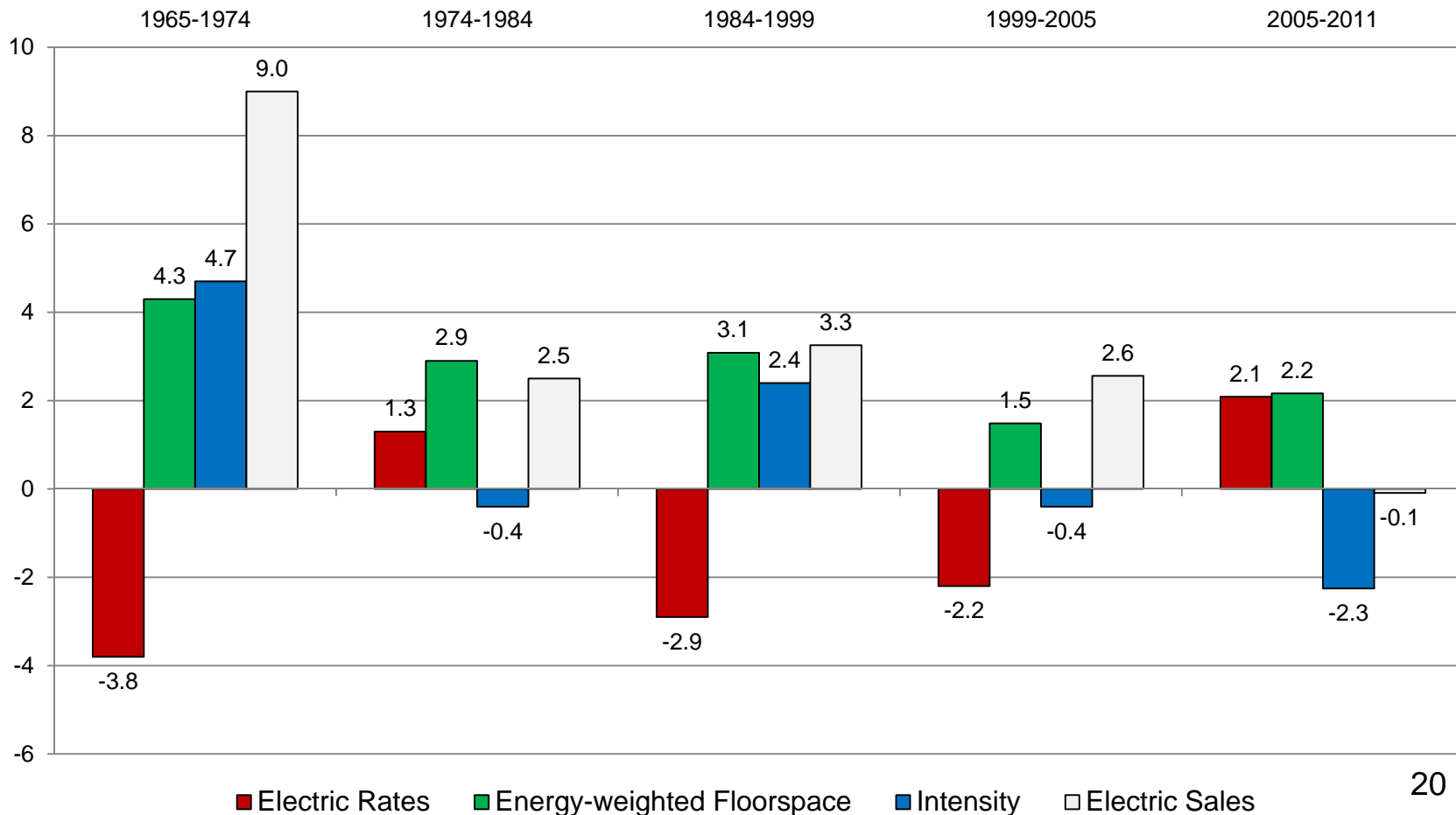
- Households grow at an average of 1.17 percent per year (was 1.00 percent in 2011 forecast)
- Real personal income grows at an average rate of 2.73 percent per year (was 2.80 percent in 2011 forecast)
- Real electric rates increase at an average of 1.34 percent per year (increase occurs in first ten years)

# Residential Electricity Sales

- Estimated from:
  - demographics
  - households
  - energy prices
- Growth rates
  - 2013 forecast: 0.37%
  - 2011 forecast: 0.71%
  - 2009 forecast: 1.75%



# Commercial Trends (Annual Percent Change)

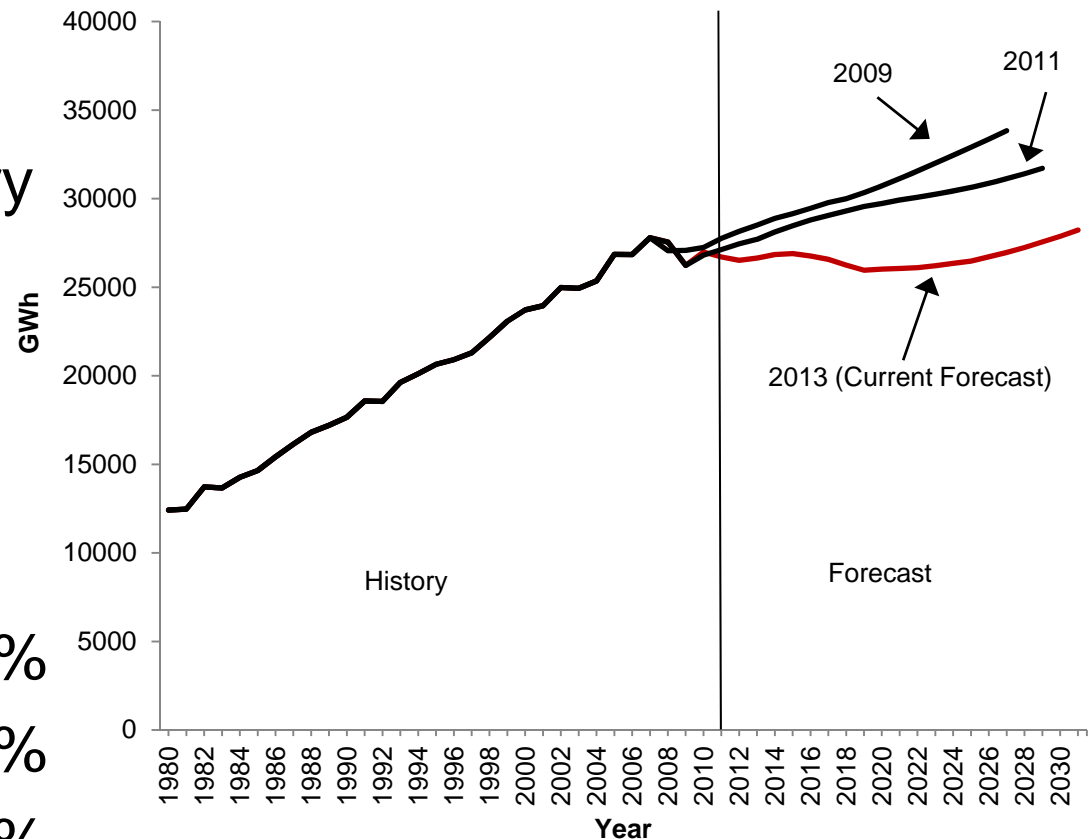


# Commercial Drivers

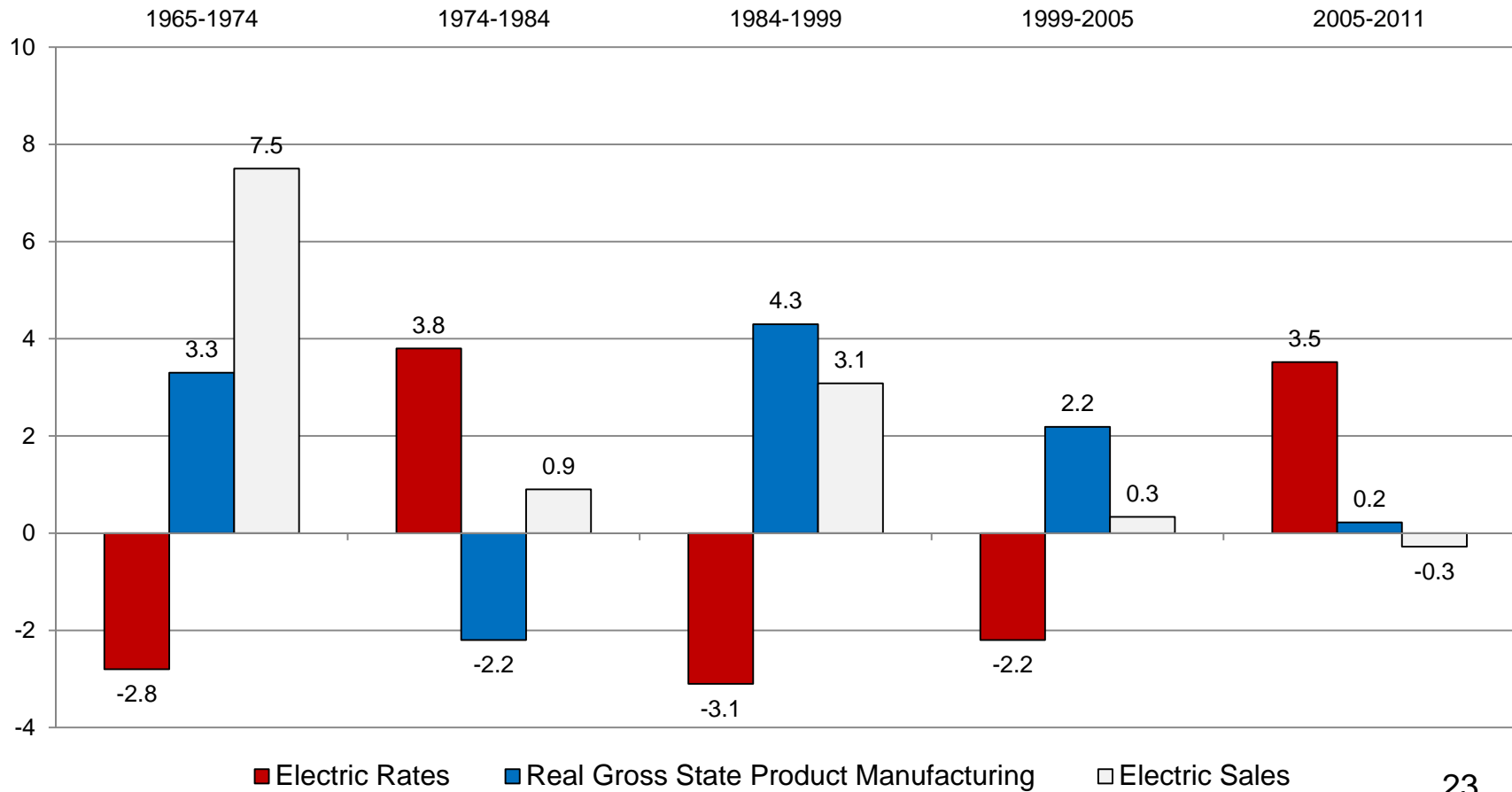
- Energy-weighted floor space grows at an average rate of 0.90 percent per year (was 1.18 percent in 2011 forecast)
- Non-manufacturing employment grows at an average rate of 0.97 percent per year (was 1.31 percent in 2011 forecast)
- Real electric rates increase at an average of 1.43 percent per year (increase occurs in first ten years)

# Commercial Electricity Sales

- Estimated from:
  - floor space inventory
  - end use intensity
  - employment
  - energy prices
- Growth rates
  - 2013 forecast: 0.33%
  - 2011 forecast: 0.89%
  - 2009 forecast: 1.18%



# Industrial Trends (Annual Percent Change)



# Industrial Drivers

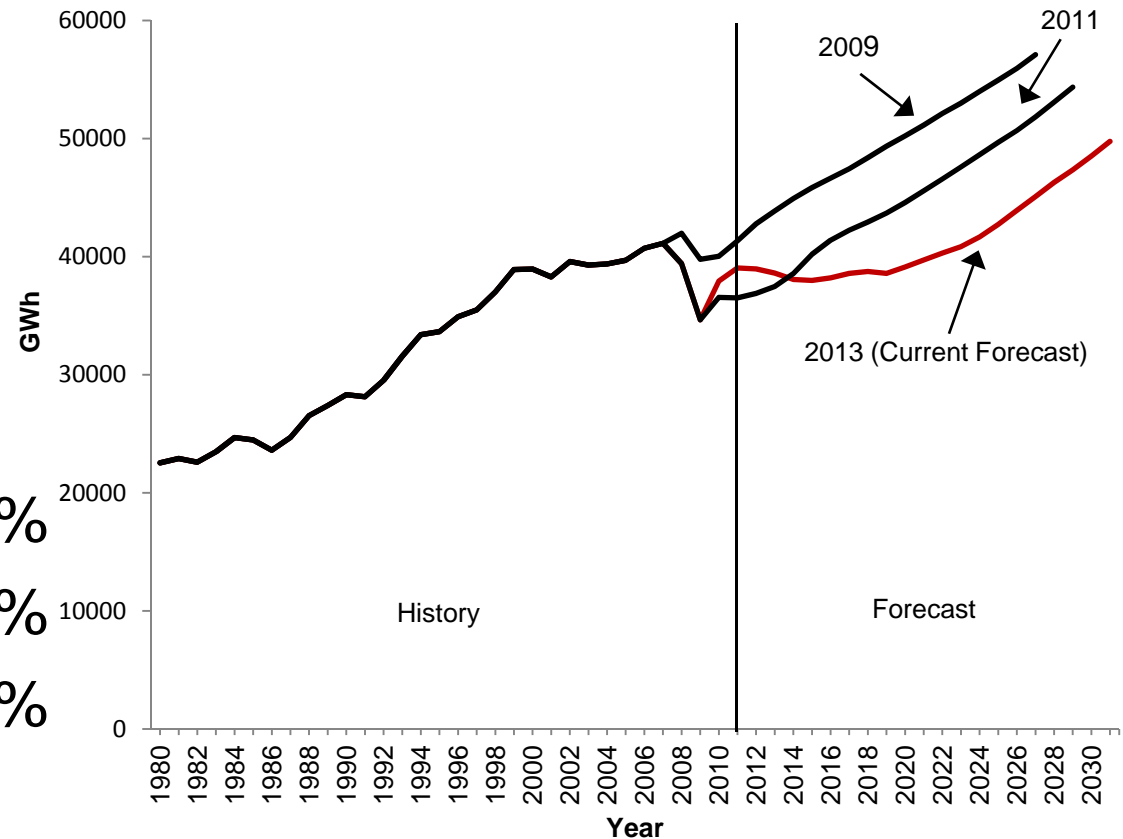
- Manufacturing GSP grows at an average rate of 2.86 percent per year (was 3.95 percent in 2011 forecast)
- Real electric rates increase at an average of 1.56 percent per year (increase occurs in first ten years)



SIC	Name	Current Share of GSP	Current Share of Electricity Sales	Current Intensity	Forecast Growth in GSP Originating by Sector	Forecast Growth in Electricity Intensity by Sector	Forecast Growth in Electricity Sales by Sector
20	Food & Kindred Products	4.73	5.83	0.58	3.40	-1.16	2.24
24	Lumber & Wood Products	2.63	0.66	0.12	3.40	-0.94	2.45
25	Furniture & Fixtures	3.09	0.47	0.07	1.57	-1.09	0.49
26	Paper & Allied Products	1.83	2.94	0.76	3.40	-0.88	2.52
27	Printing & Publishing	3.44	1.24	0.17	3.40	-2.19	1.21
28	Chemicals & Allied Products	16.41	19.98	0.58	3.40	-1.59	1.81
30	Rubber & Plastic Products	3.66	5.76	0.74	2.85	-1.03	1.82
32	Stone, Clay, & Glass Products	3.13	5.08	0.77	1.57	-0.77	0.80
33	Primary Metal Products	7.59	27.01	1.68	0.76	0.59	1.35
34	Fabricated Metal Products	5.95	6.39	0.51	3.20	-1.27	1.92
35	Industrial Machinery & Equip.	10.42	4.62	0.21	2.74	-1.20	1.54
36	Electronic/Electric Equipment	5.18	5.87	0.54	0.71	-0.62	0.09
37	Transportation Equipment	20.01	8.97	0.21	3.61	-1.07	2.54
38	Instruments/Related Products	4.20	1.01	0.11	1.57	-1.86	-0.29
39	Miscellaneous Manufacturing	2.27	1.20	0.25	1.57	-3.32	-1.75
Total	Manufacturing	100.00	100.00	0.47	2.86	-1.20	1.66

# Industrial Electricity Sales

- Estimated from:
  - GSP by industry
  - energy prices
- Growth rates
  - 2013 forecast: 1.29%
  - 2011 forecast: 2.11%
  - 2009 forecast: 1.63%



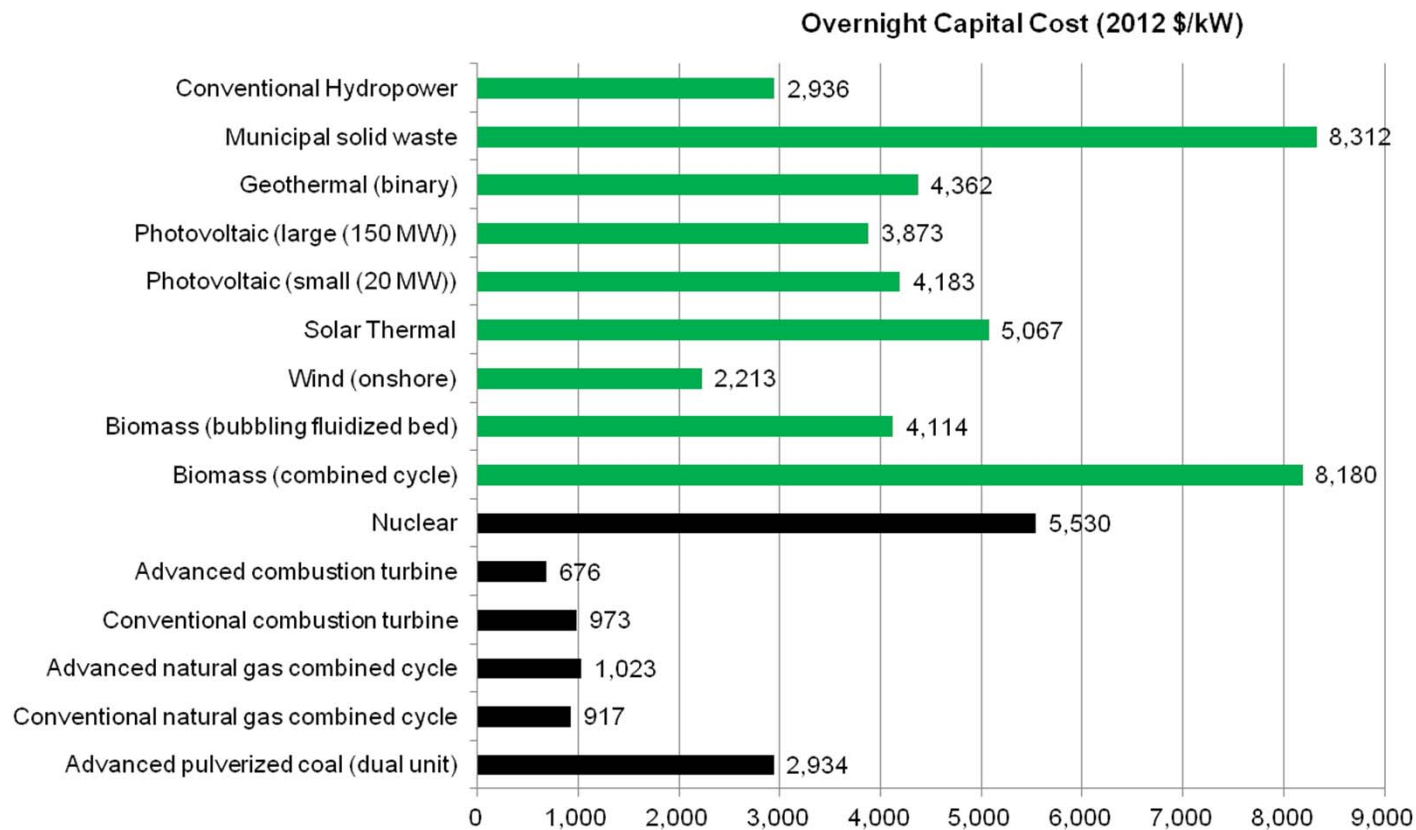
# Sources of Future Generation

- Right now, new coal cannot compete with new natural gas-fired capacity on a purely economic basis
- Renewable sources will probably continue to make some inroads

# Barriers to Renewables

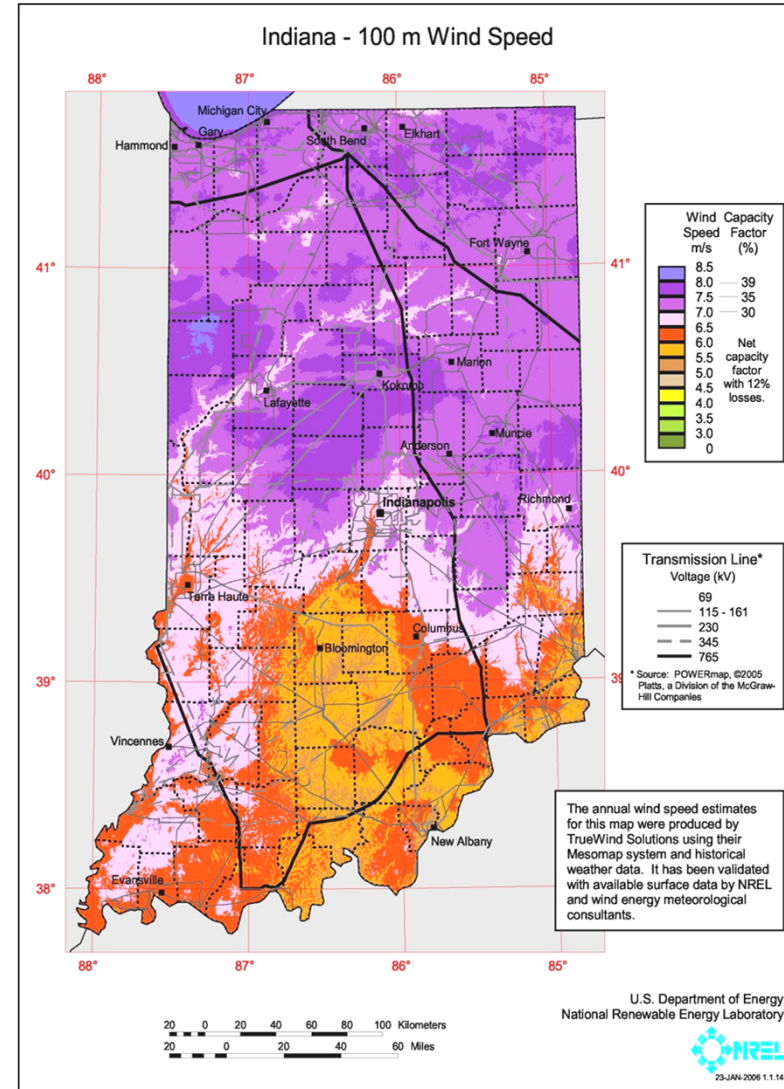
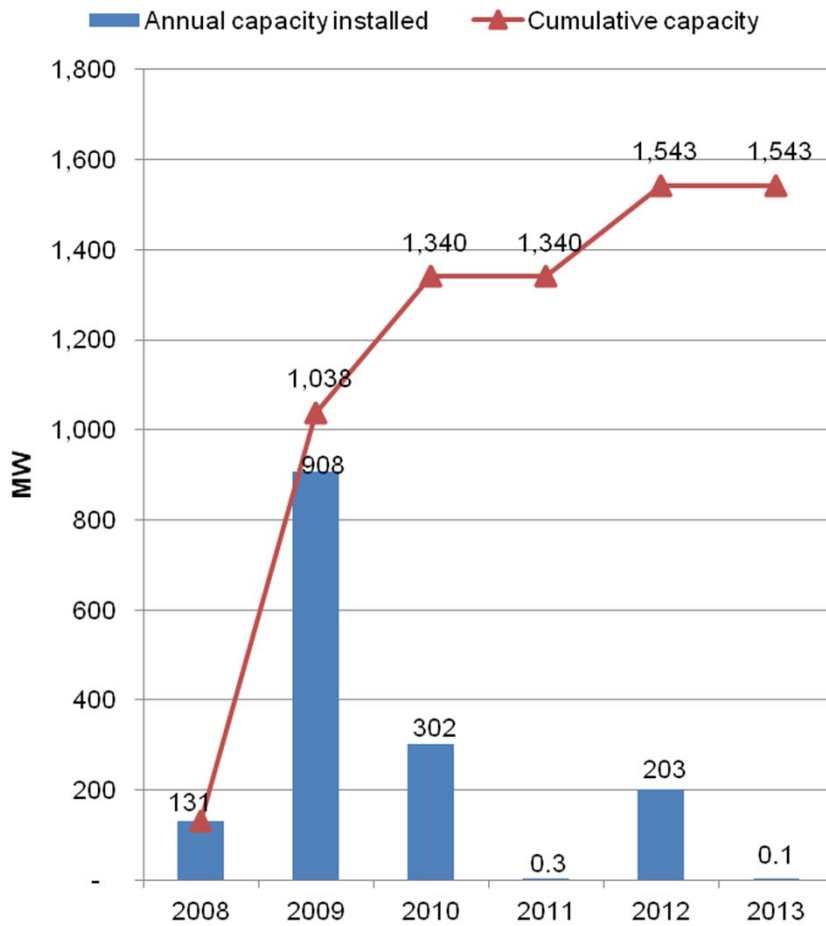
- Major barrier is cost
  - Most renewable technologies have high capital costs
  - According to EIA Indiana's average electric rate in 2014 was 8.97 cents/kWh vs. the national average of 10.45 cents/kWh
- Limited availability for some resources
  - Solar/photovoltaics, hydropower
- Intermittency for some resources
  - Solar/photovoltaics, wind

# Capital Costs for Various Generation Sources



Data source: EIA

# Wind



# Energy Crops

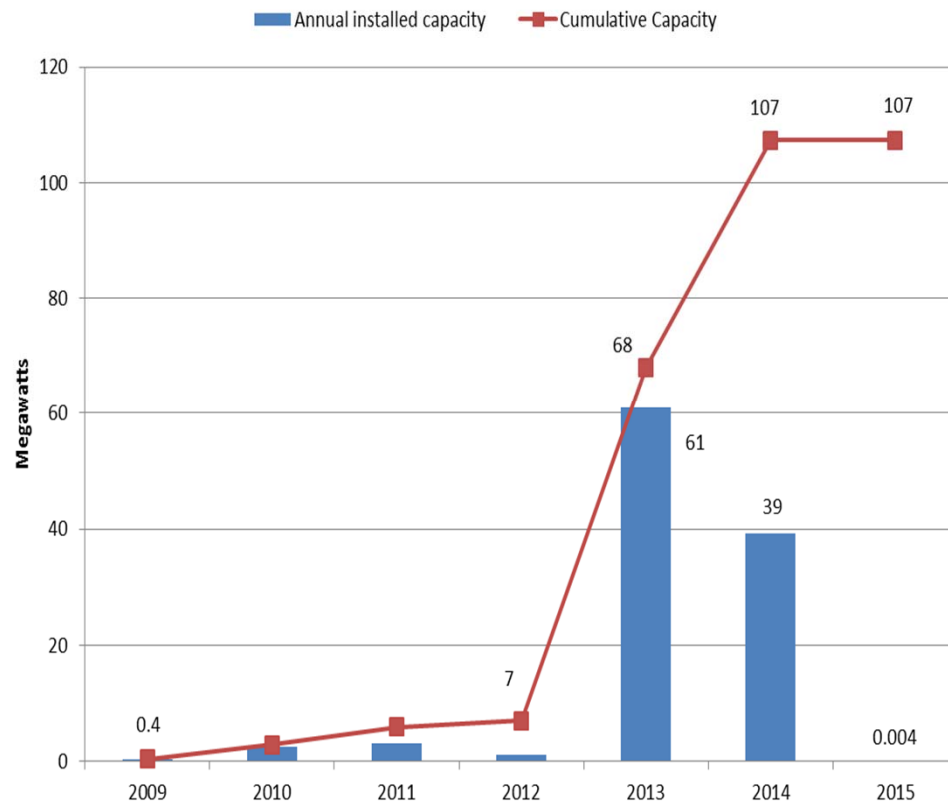
- Transportation fuels
  - Ethanol
  - Biodiesel
- Other possibilities
  - Fast growing hardwood trees (hybrid poplar/willow)
  - Grasses (switchgrass)
- Barriers to overcome
  - Other high-value uses for the land
  - Price of competing fossil fuels
  - Harvesting and transportation costs

# 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 3<sup>rd</sup> behind ethanol and wind
- It is the 3<sup>rd</sup> largest source of renewable electricity generation in the state
  - Landfill gas
  - Municipal solid waste
  - Animal waste biogas
  - Wastewater treatment

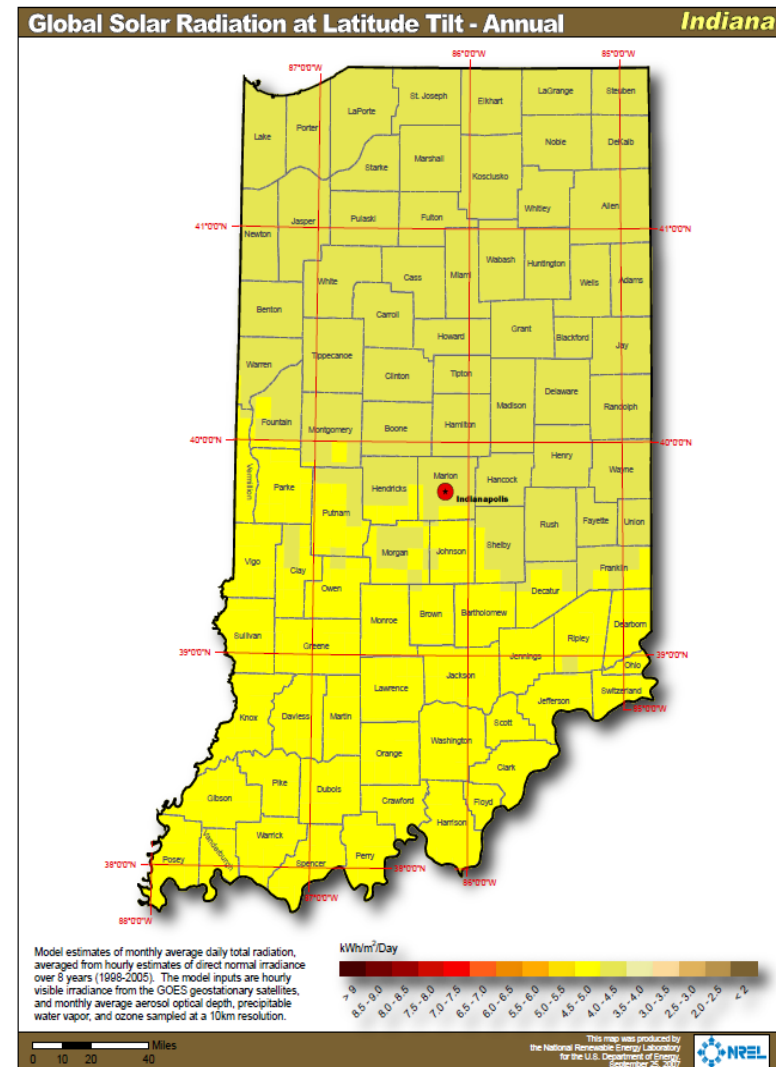


# Solar Energy



## 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)
  - 2<sup>nd</sup> largest source of renewable electricity
- American Municipal Power is constructing an 84 MW facility at the Cannelton Locks on the Ohio River
  - originally expected to be operational in 2014 but has been pushed back to 2015/16

# Further Information

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