

# The Evolution of Indiana's Supply and Demand for Energy

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*presented by*

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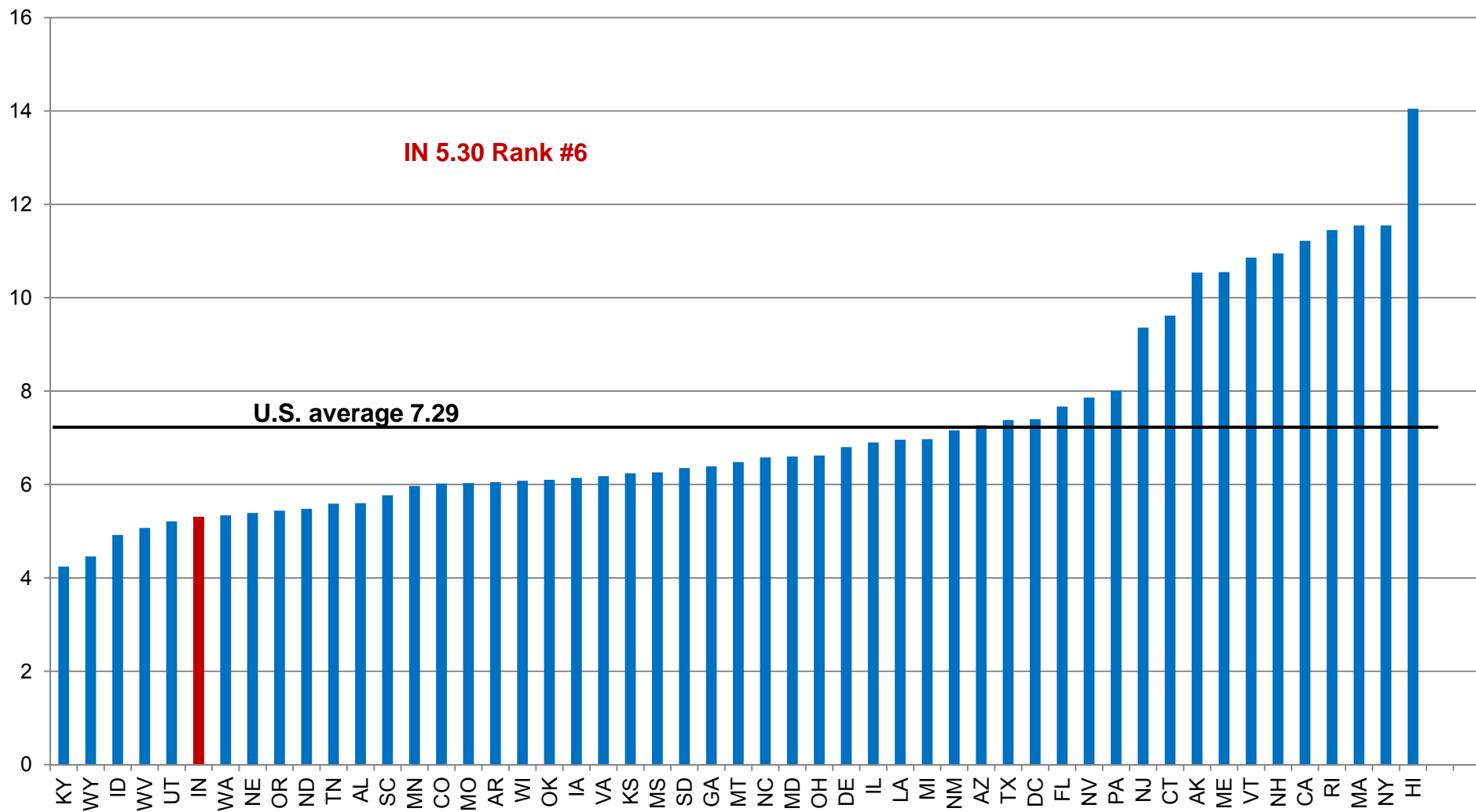
State Utility Forecasting Group

# Electricity

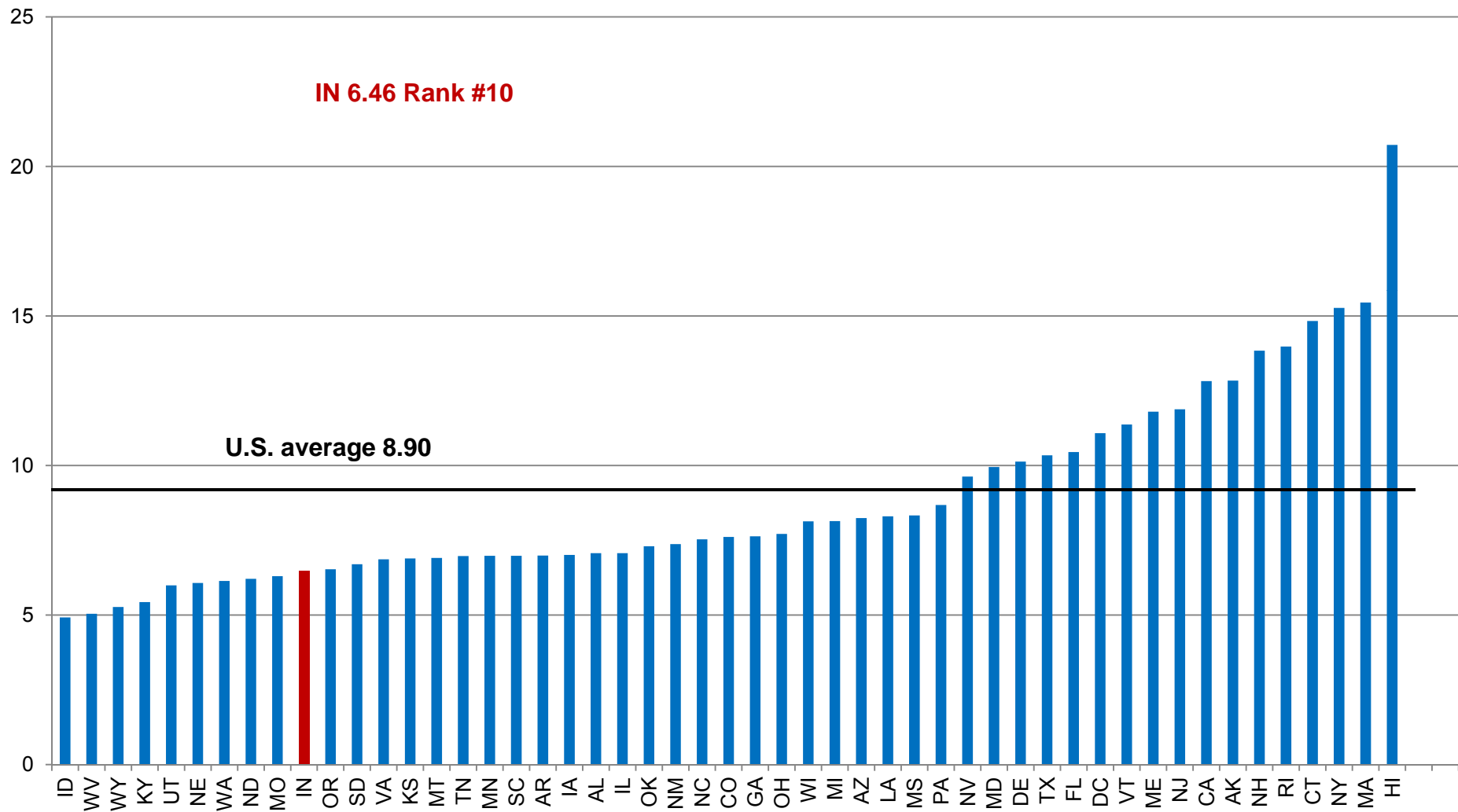
# Electricity Prices

- Electricity prices have been increasing nationally over the past decade.
- While Indiana's price is still below the national average, our relative advantage has been declining recently.

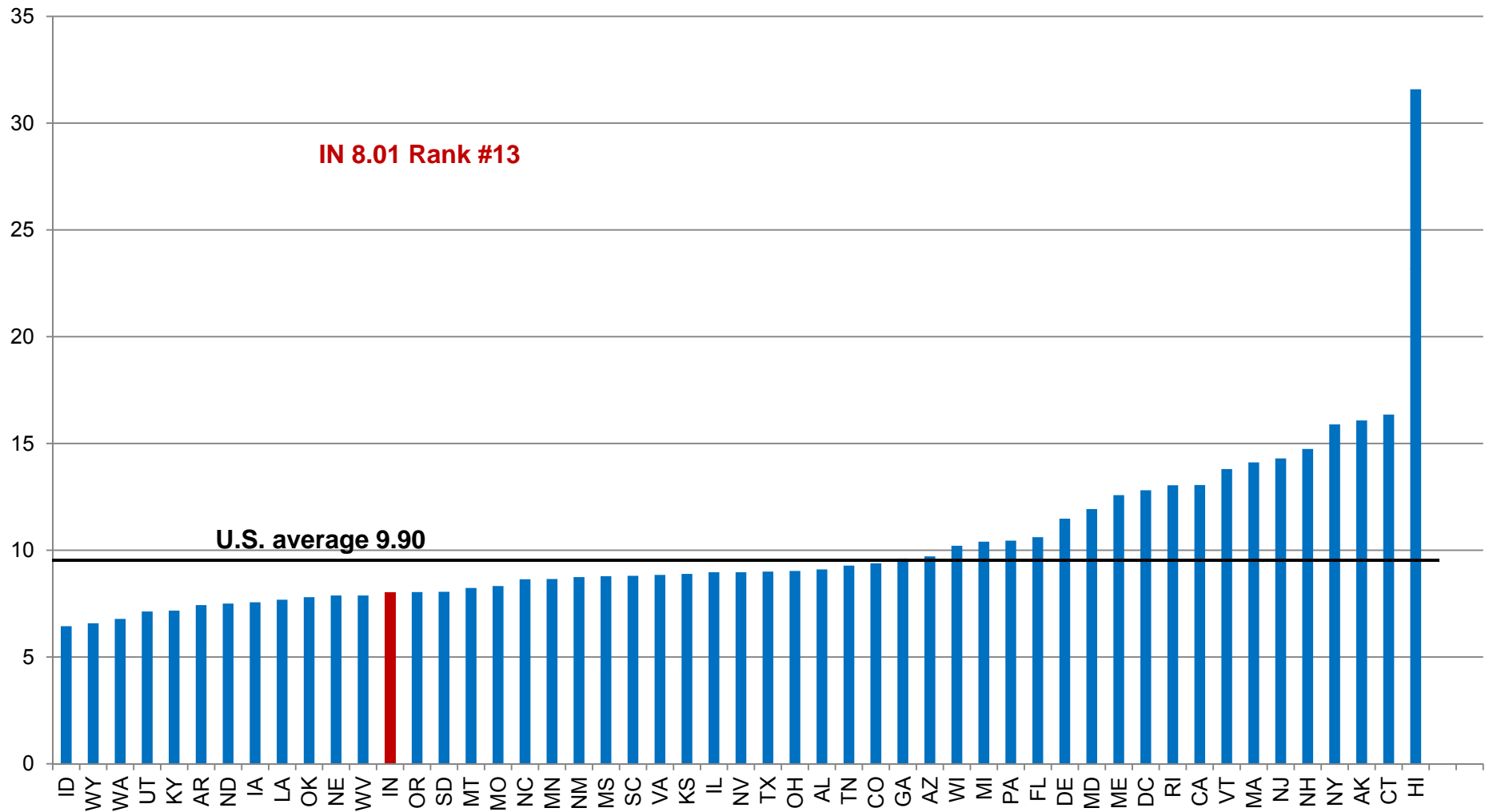
### 2001 Electricity Price (cents/kWh)



### 2006 Electricity Price (cents/kWh)



### 2011 Electricity Price (cents/kWh)



# Electricity Demand

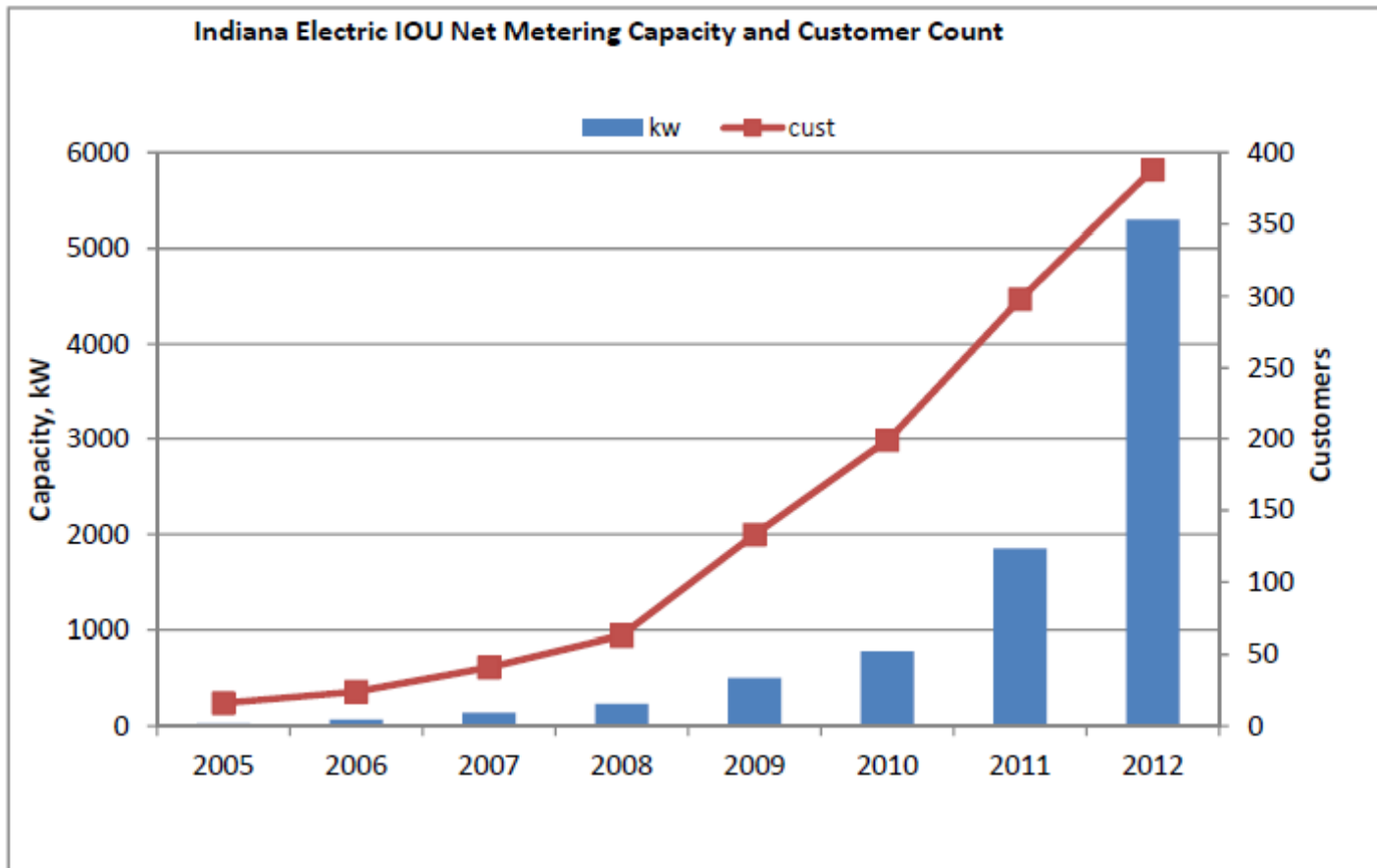
- At the bottom of the recession, utility sales in 2009 were below 2002 levels (combination of economy and cool summer)
- 2010 bounced back with a 6.7% increase in sales, primarily in the industrial and residential sectors (hot summer)
- 2011 similar to 2010 (slow economic growth offset by slightly milder weather)

# Electricity Demand

- Slow demand growth can be expected in the future
  - rising electricity prices
  - utility demand-side management
  - customer-owned generation
  - efficiency standards



# Net Metering



Source: IURC 2013 Net Metering Summary

# Feed-in Tariffs

- IPL and NIPSCO feed-in tariff programs are essentially fully subscribed at 100 MW and 30 MW, respectively

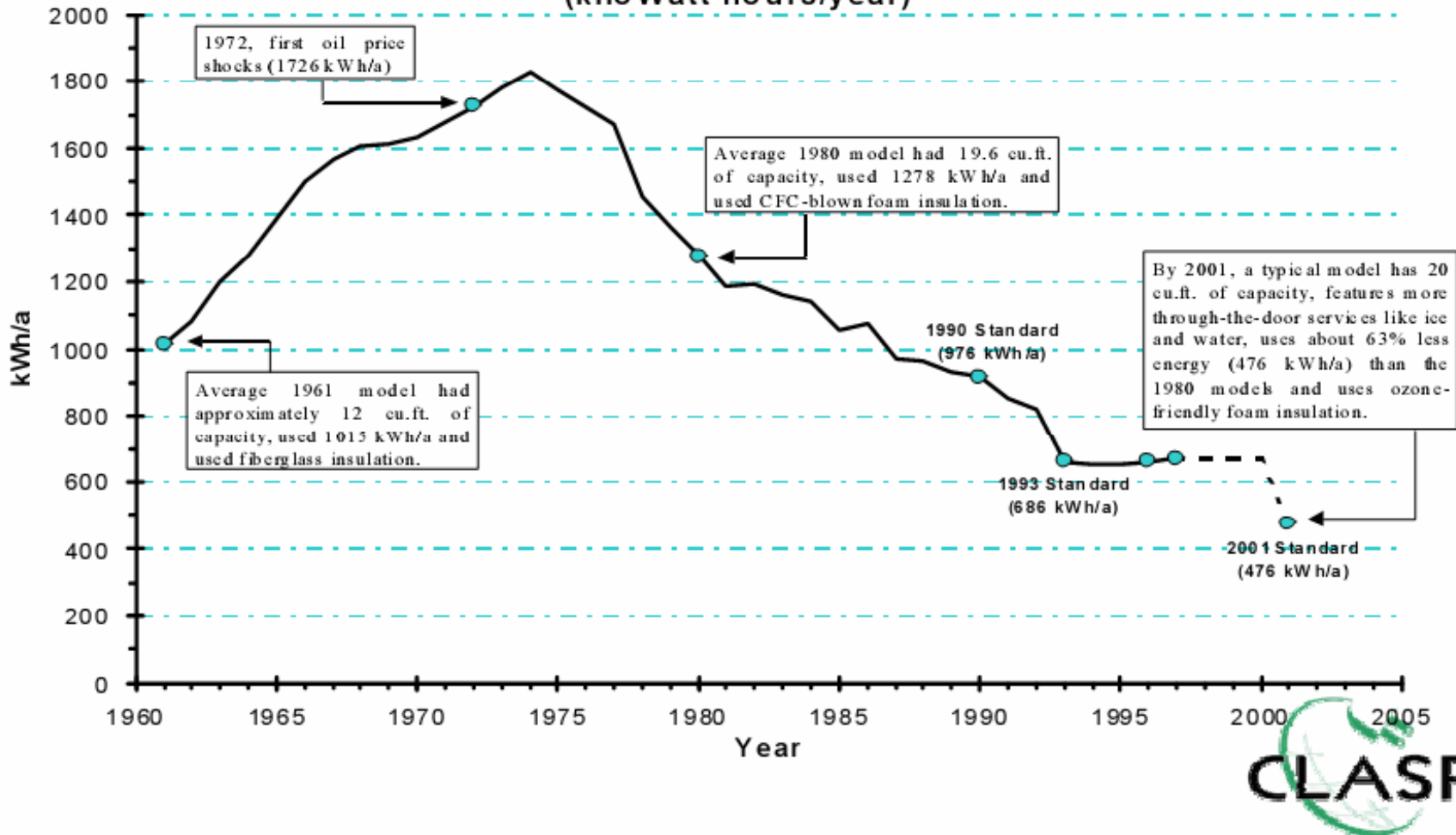
# IPL Feed-in Tariff

- 39 customers
- 100 MW
- All solar photovoltaics
  - all but 1MW are from installations above 100 kW in size

# NIPSCO Feed-in Tariffs

- 67 customers
- 30 MW
  - roughly half solar-half biomass, with a small amount of wind
- 18 MW in service and 12 MW in queue
- Another 10 MW of pending applications
  - since program is full, will only make it if someone drops out

Average Energy Consumption for New Refrigerators  
(kiloWatt-hours/year)

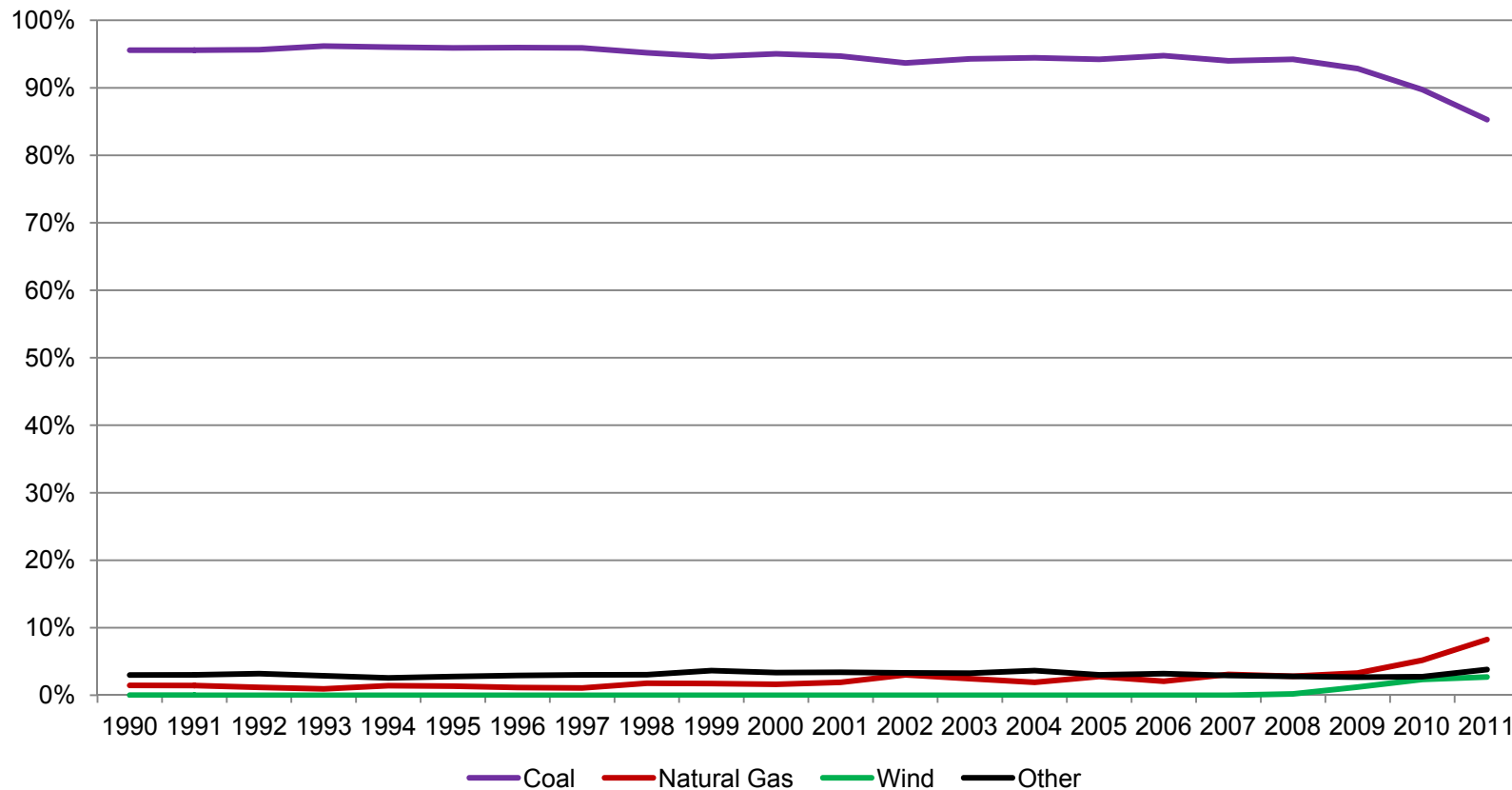


Source: Van Buskirk, Robert. "History and Scope of USA Mandatory Appliance Efficiency Standards." (CLASP/LBNL).

# Electricity Supply

- Coal still supplies the majority of the electricity in Indiana
  - roughly 82-85% in 2011, depending on whether you are looking at generation physically located in Indiana or generation supplying Indiana customers
- Natural gas and wind have increased noticeably

# % of Indiana Generation from Various Sources



# Environmental Regulations

- Recently finalized or proposed environmental regulations continue to put pressure on coal-fired generators
  - Cross-State Air Pollution Rule
  - Mercury and Air Toxics Standards
  - Greenhouse gases
  - Cooling water
  - Coal ash

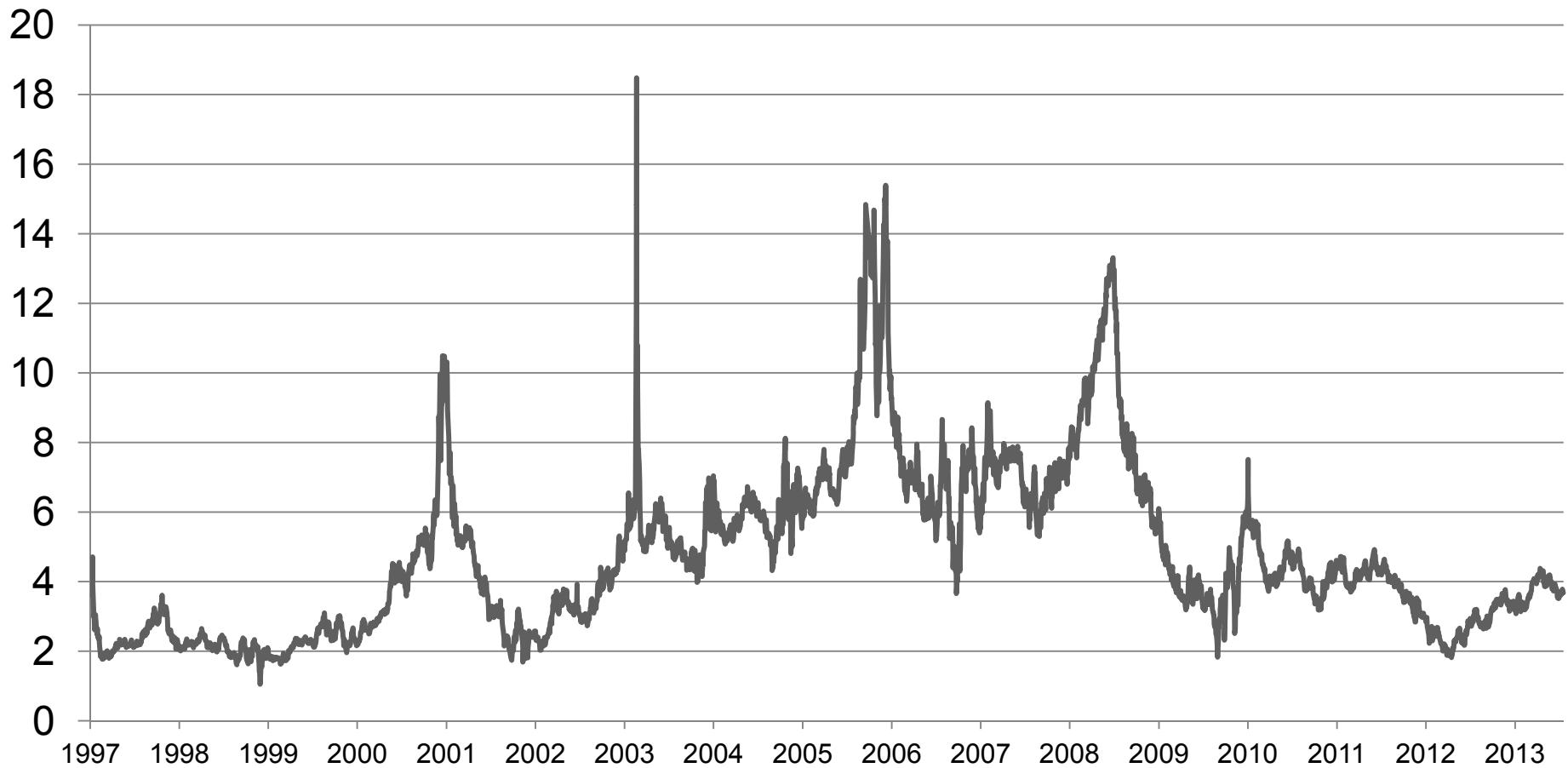


# Coal Retirements & Repowering

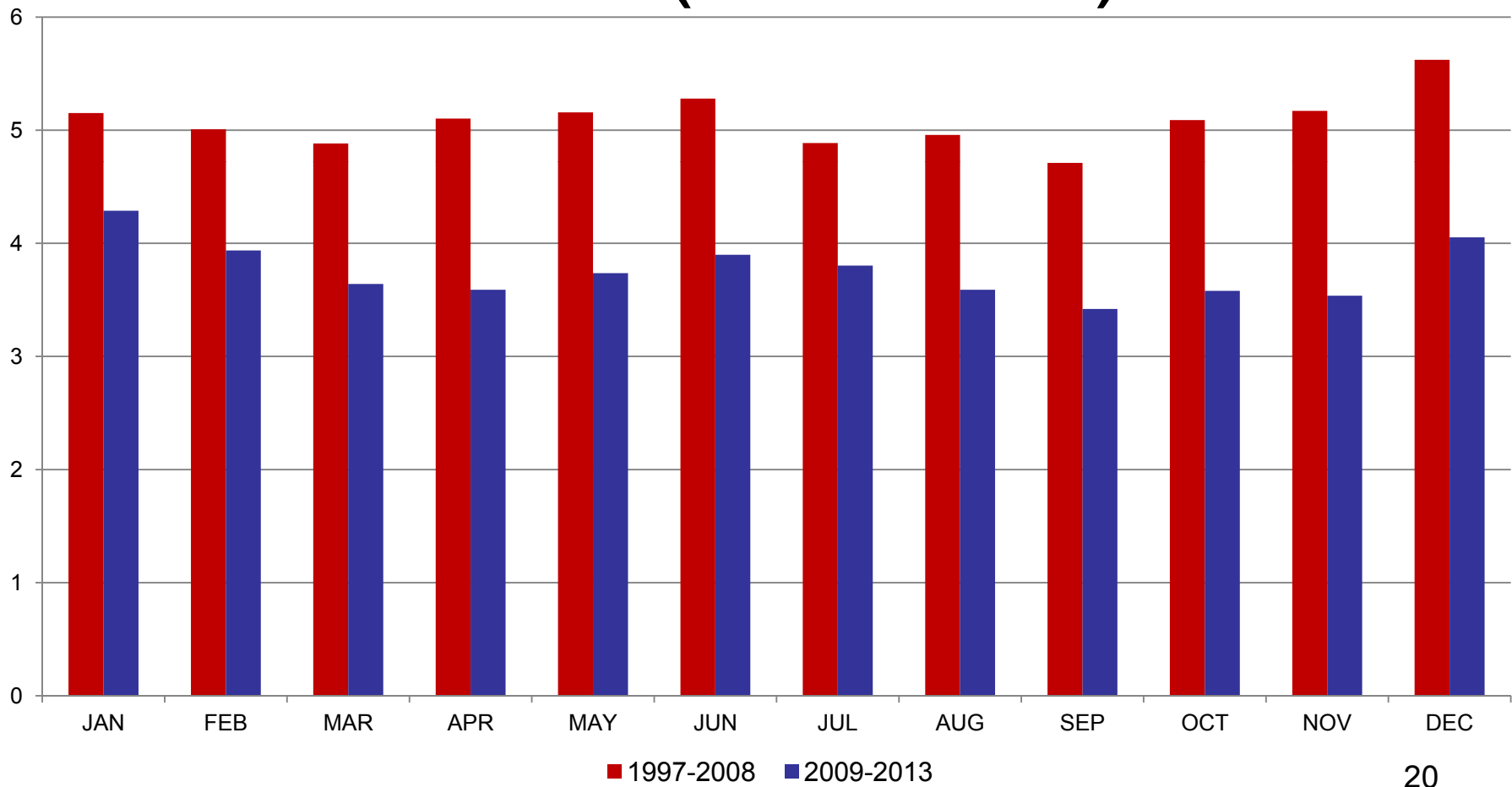
- Over 2,300 MW of Indiana's coal-fired generation is expected to be retired or switched to natural gas by 2016

# Natural Gas

## Henry Hub Gulf Coast Natural Gas Spot Price (\$/MMBTU)



# Natural Gas Monthly Average Price (\$/mmBtu)



# Lower Natural Gas Prices

- Natural gas prices have been lower in the last five years than they were in the period previous to that.
  - Mean price from 1997-2008: \$5.09/mmBtu
  - Mean price from 2009-now: \$3.76/mmBtu
  - These are in nominal dollars, so adjusting for inflation would increase the price difference

# Natural Gas Prices

- The relationship between NG prices and oil prices have changed.
- Prior to 2009, oil prices and NG prices were highly positively correlated
  - Henry Hub vs. WTI crude shows a correlation coefficient of 0.81
- Since 2009, the correlation is actually negative
  - correlation coefficient is -0.33

# Wet Gas

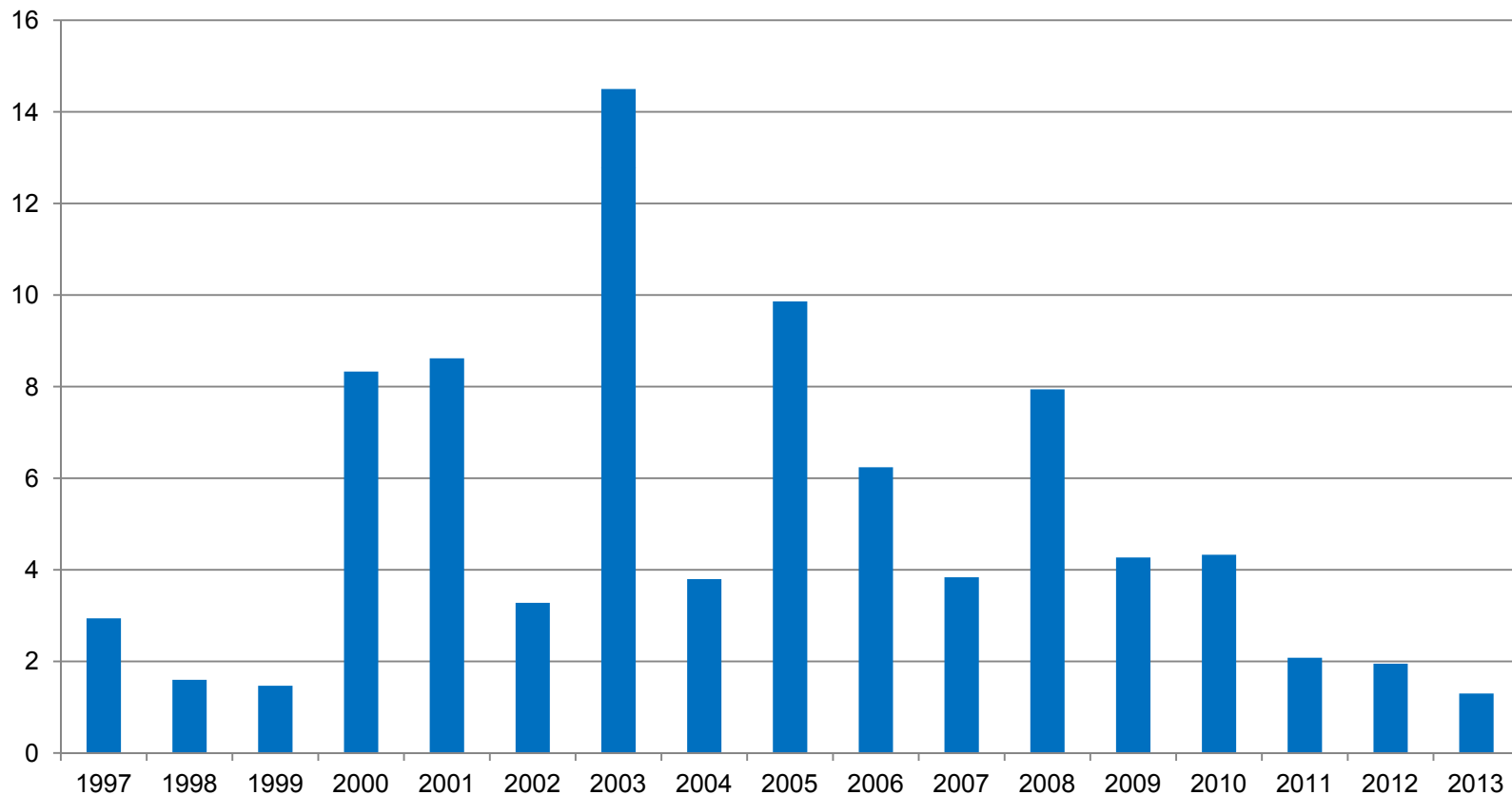
- Shale gas development has been focused on wet gas (includes petroleum liquids) instead of dry gas
- High petroleum prices lead to increased shale drilling, which leads to increased NG production, which lowers the NG price

# Reduced NG Price Volatility

- Natural gas prices have become much more stable as well
  - Price variance from 1997-2008: 7.05
  - Price variance from 2009-now: 0.69
- Fuel switching for electricity generation
- No major supply disruptions



# Annual Price Spread (max – min) (\$/mmBtu)



Note: 2013 is a partial year

# Fuel Switching

- Over the past few years, there has been sufficient electricity generating capacity in the region to allow switching between natural gas-fired generators and coal-fired generators depending on the NG price
  - An increase in NG price results in switching to coal, reducing demand for NG
  - A decrease in NG price results in switching from coal, increasing demand for NG

# Fuel Switching

- As coal retirements occur due to economics, environmental regulations, and age, we may not have the flexibility to switch back and forth

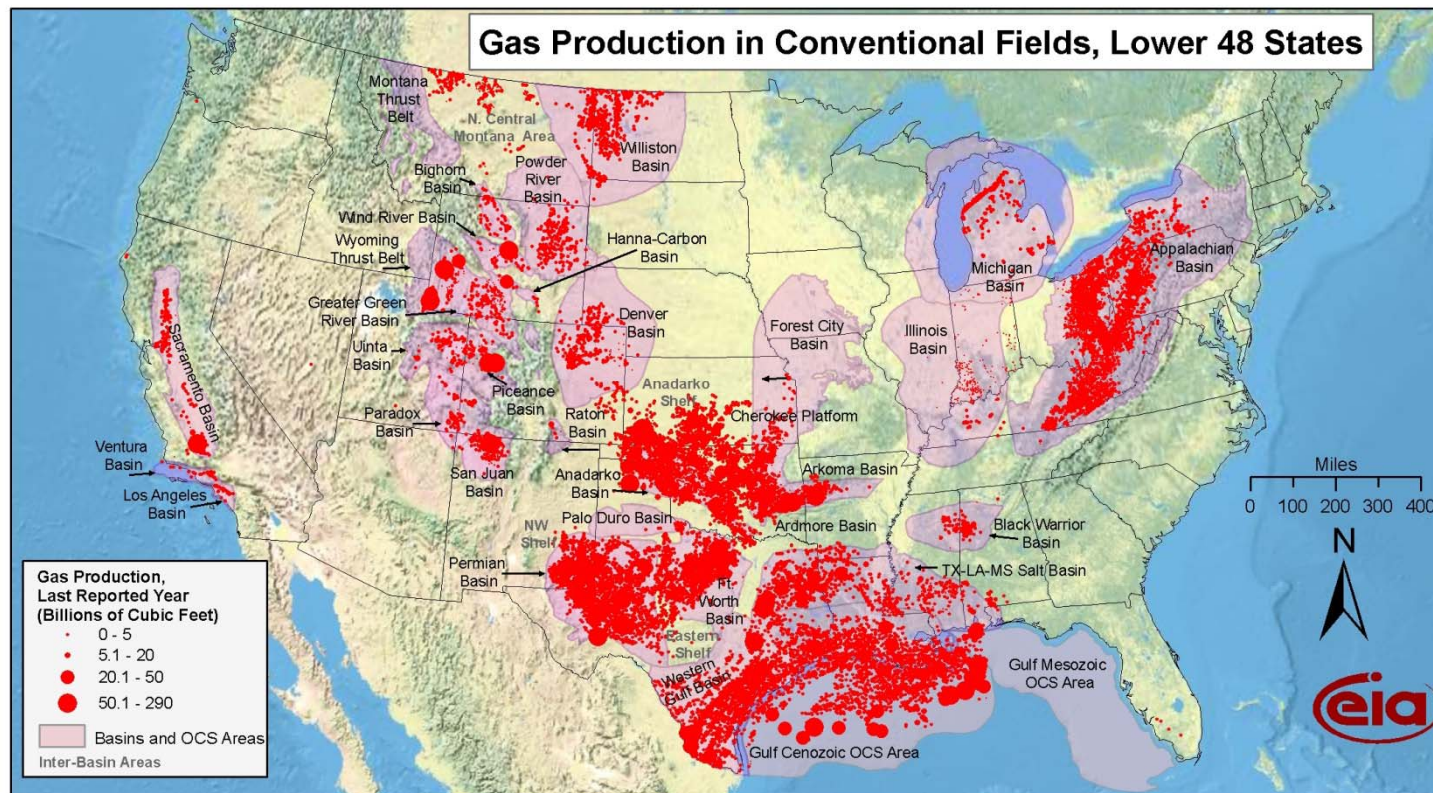
# NG Supply Diversity

- The development of unconventional sources has increased the geographic diversity of NG supply
  - less susceptible to single event disruptions, such as hurricanes
- In 2000, six states produced at least 1Tcf
- In 2011, nine states did

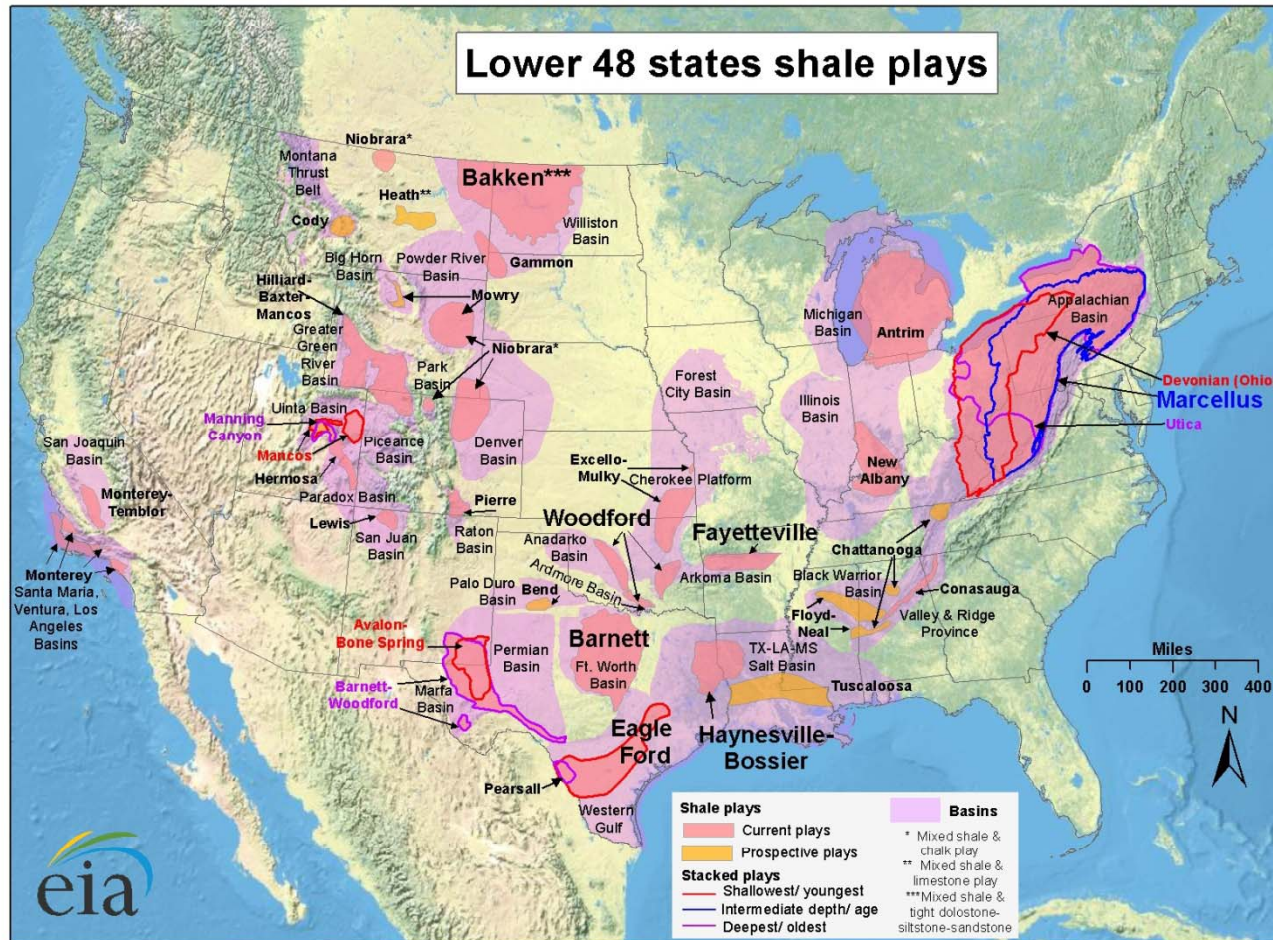
## From 2007 to 2011

- U.S. production ↑ by 15%, while U.S. off-shore production ↓ by 30%
- PA production ↑ by 620%
- AR production ↑ by 300%
- ND production ↑ by 120%
- IN production ↑ by 150% (but still very small)

# Conventional Gas Production (2009)



# Shale Gas



Source: Energy Information Administration based on data from various published studies.  
Updated: May 9, 2011

# Risks For The Future

- Environmental restrictions
  - water
  - earthquakes
- Increased demand
  - LNG exports
  - transportation
  - industrial feedstock/processes



# From My Crystal Ball....

- Slower demand growth for electricity
- Increasing electricity prices
- Continued reduction in reliance on coal for electricity
- Reduced natural gas price volatility, at least in the short term

# Further Information

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