



**VINCE GRIFFIN**

**VICE PRESIDENT**

**ENVIRONMENTAL & ENERGY  
POLICY**

**INDIANA CHAMBER OF COMMERCE**



*“Silver Buckshot”*



**Dr. Richard Smalley, Rice University  
Noble Laureate**

## **Most Critical Issues in This Century**

- 1. Energy**
- 2. Water**
- 3. Food**
- 4. Environment**
- 5. Poverty**
- 6. Terrorism and War**
- 7. Disease**
- 8. Democracy**
- 9. Population**

# Are we using too much Energy?

	Population	Energy	GDP	Energy/GDP 1000Btu/\$
USA	6%	25%	33%	.758
ROW	94%	75%	67%	1.12

## Do the Math

US population consumes 5.26 times the energy of the average person in the rest of the World;

But we produce 7.7 times the goods and services of the Rest Of the World.

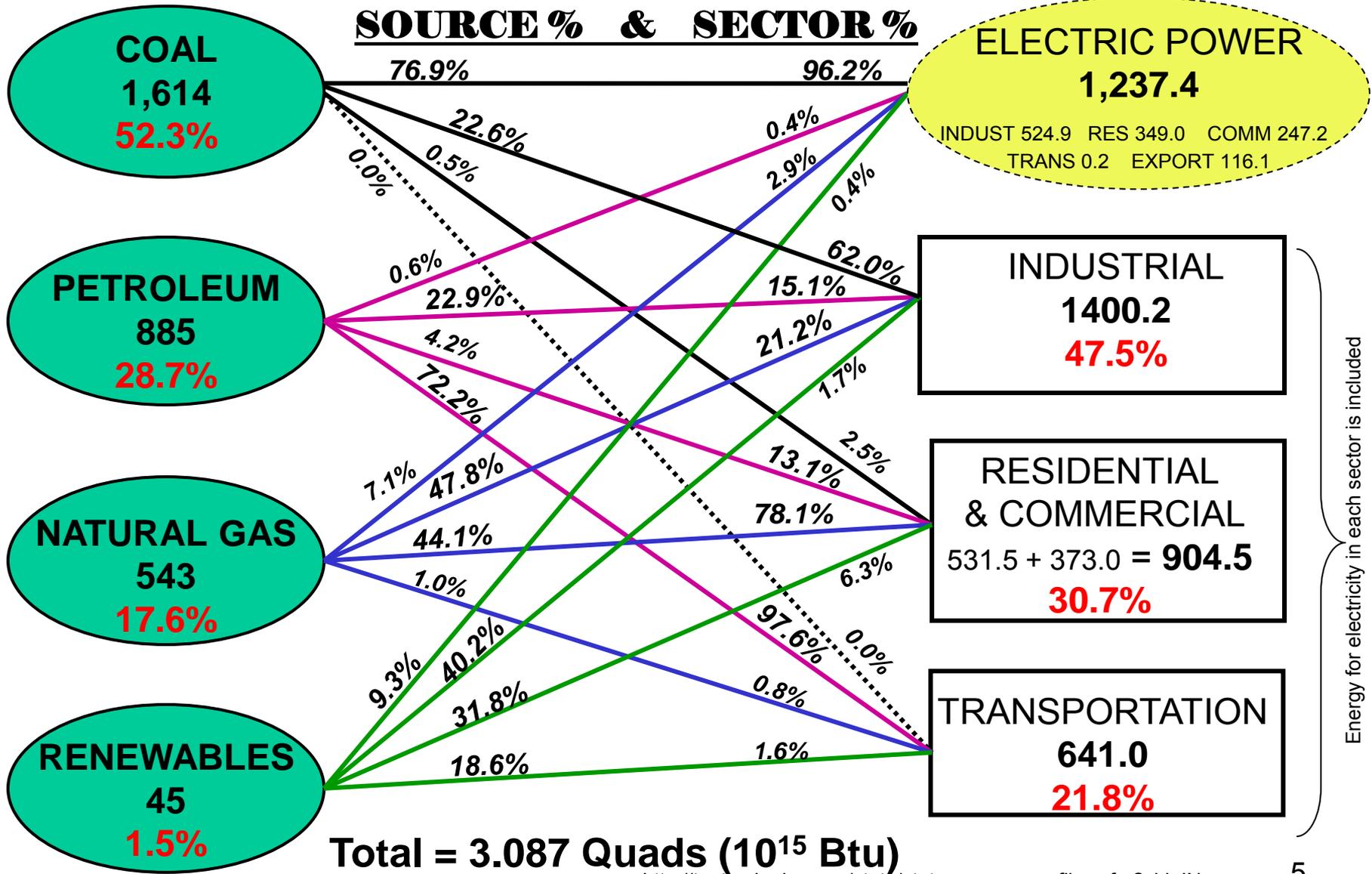
The USA only 67% of the energy per unit of GDP as does the rest of the world.

We are the model of energy efficiency, (only **Japan** and **Lichtenstein** are better).

**Per capita energy is of no value to measure, to reduce your per capita consumption you need only add population.**

**It is what you do with the energy that matters.**

# Indiana Primary Energy Consumption Source & Sector, 2004 (Trillion Btu, 10<sup>12</sup> Btu)



Net inter-state flow of electricity/losses = -142 (export)

[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=IN](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=IN)



# Elements of Indiana's Energy Supply

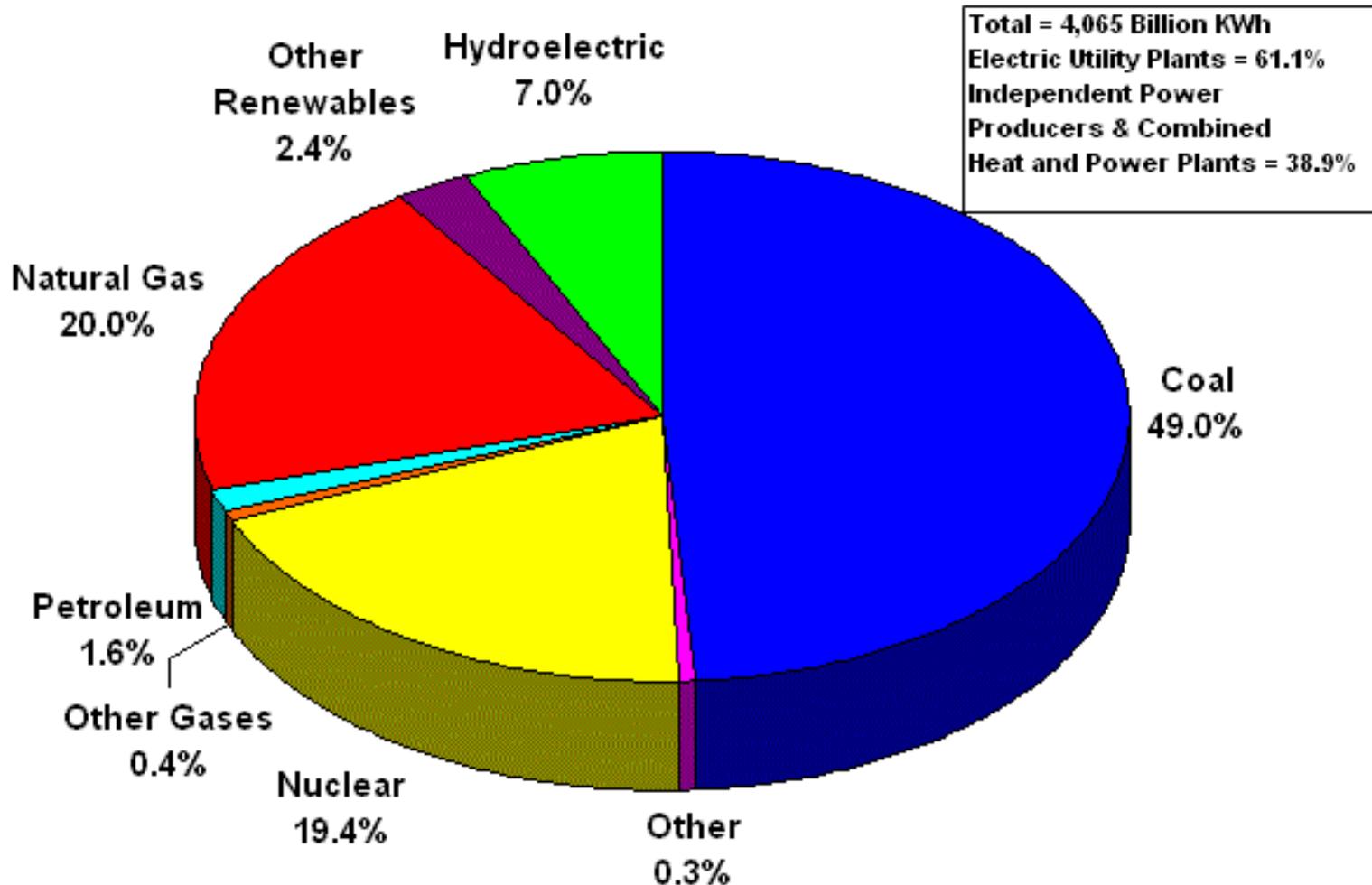
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**Adequate**

**Reliable**

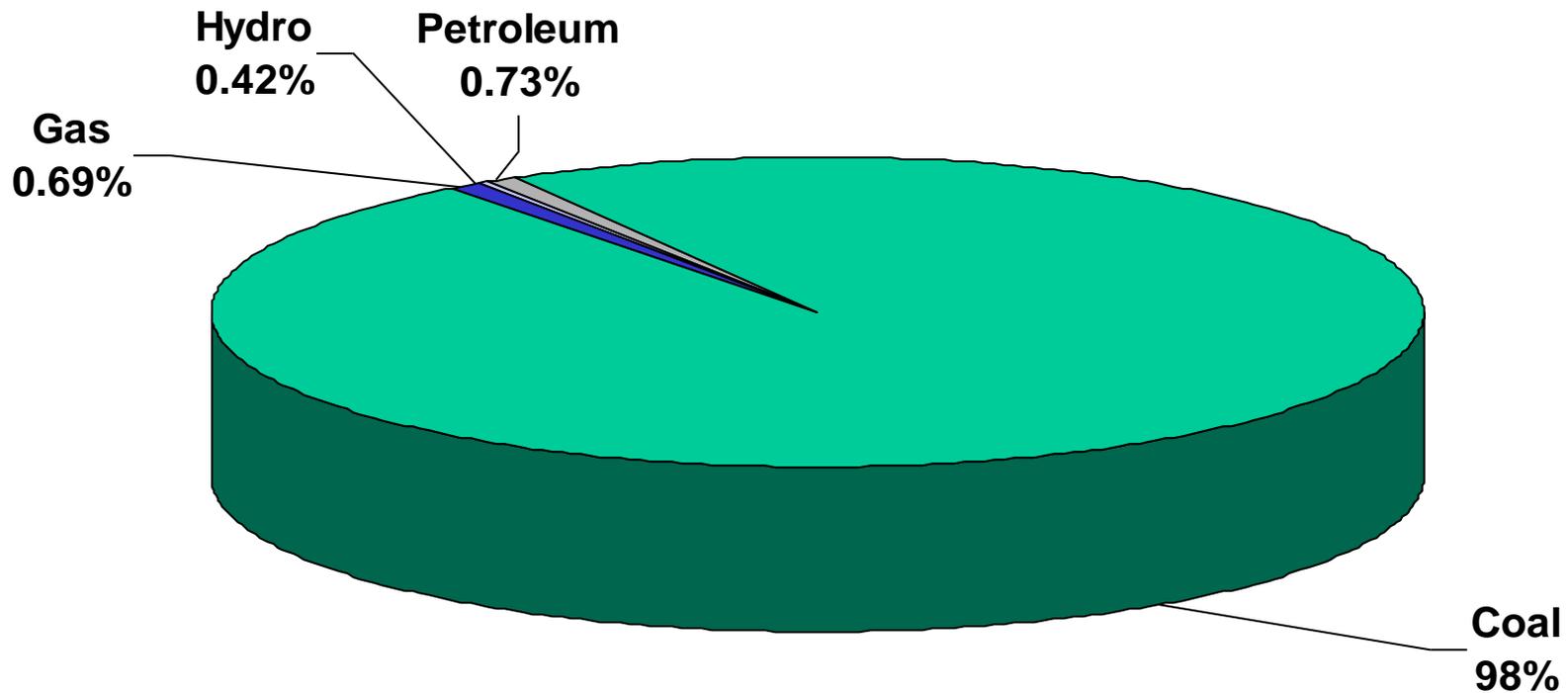
**Affordable**

# U.S. Electric Power Mix

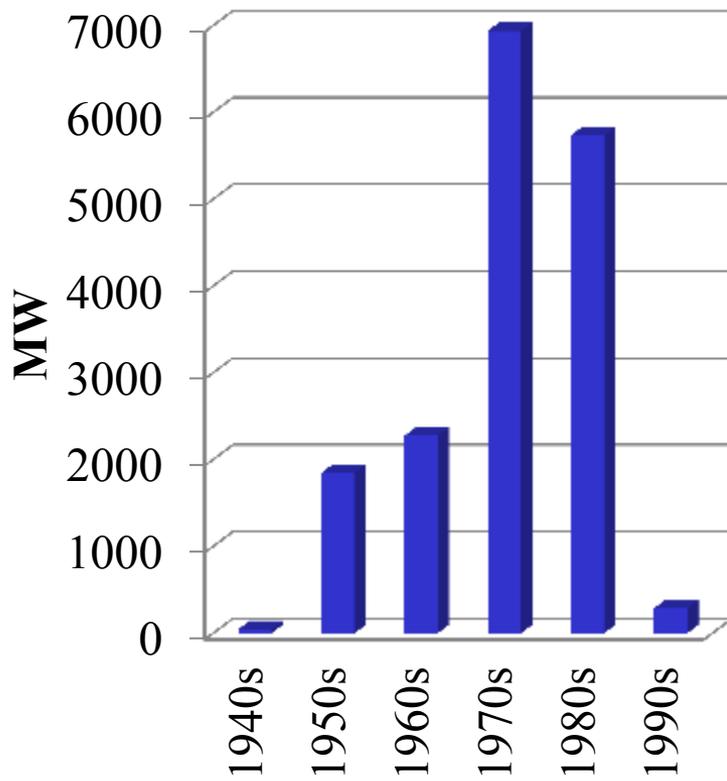




# Indiana Electricity Mix



Indiana Price 5.5¢



	# of units	MW
1940s	1	45
1950s	20	1847
1960s	12	2275
1970s	17	6938
1980s	9	5736
1990s	2	289



PUBLIC EXPECTATIONS Sources of Electricity 15 Years From Now		GOVERNMENT PROJECTIONS*		
		2007	2020	2030
Solar energy	 72%	0%	 0.1%	 0.2%
Wind energy	 65%	 0.8%	 2.1%	 2.4%
Natural gas	 59%	 21.5%	 17.6%	 14.1%
Hydropower	 54%	 5.8%	 6.4%	 5.8%
Nuclear energy	 53%	 19.4%	 18.4%	 17.5%
Oil	 46%	 1.6%	 1.3%	 1.3%
Coal	 40%	 48.6%	 49.9%	 54.2%

\*Source: Energy Information Administration Annual Energy Outlook 2008

# Wind Developments

Project Name	Counties	Developer	Rated Capacity (MW)	Construction Schedule	Status
Benton County Wind Farm	Benton	Orion Energy	130	Completed Spring 2008	Completed
Fowler Ridge Phase 1	Benton	BP Alternative Energy & Dominion	400	To be completed by end of 2008	Under construction
Hoosier Wind Project	Benton	enXco	100	2009	Pending w/ PPA
Fowler Ridge Phase 2	Benton	BP Alternative Energy & Dominion	350	Begin early 2009	Approved
Tri-County Wind Energy Center	Tippecanoe, Montgomery, Fountain	Invenergy	300-500	Begin 2010	Proposed
Meadow Lake Wind Farm	Benton, White	Horizon Energy	600-1000	Begin 2010	Proposed
	Randolph	Horizon Energy	100-200		Proposed
	Howard	Horizon Energy	200		Proposed

The image shows a vertical graphic of the Indiana state flag on the left side of the slide. It features a yellow torch with a flame, surrounded by stars, and the word "INDIANA" written in a banner above the torch. The background is blue with white stars.

# Indiana Utility Wind Projects

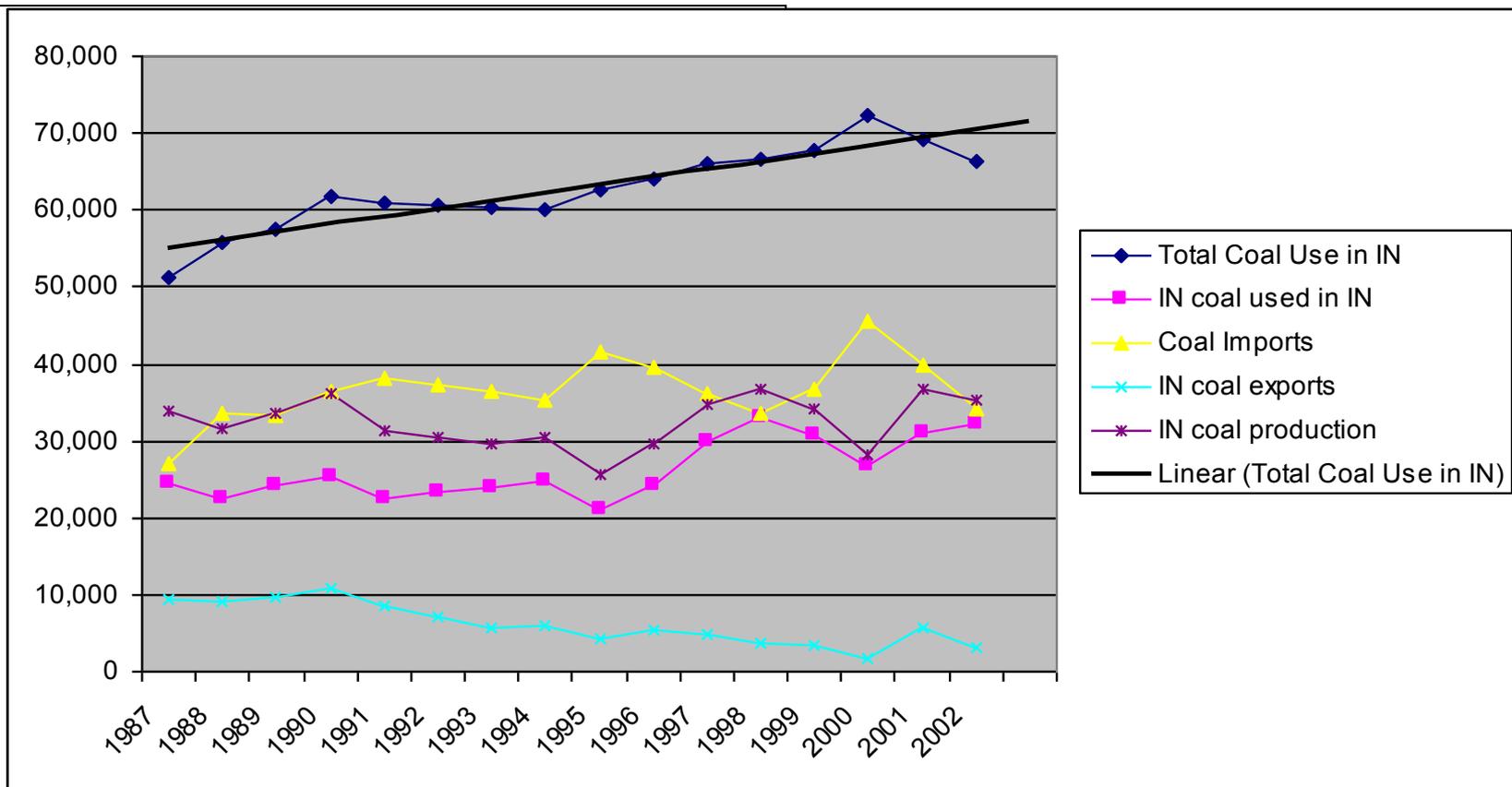
Utility	Project	State	MW	Status
Duke Energy	Benton County Wind Farm	IN	100	Operational
SIGECO	Benton County Wind Farm	IN	30	Operational
WVPA	AgriWind	IL	8	Operational
Indiana Michigan	Fowler Ridge	IN	100	Approved
NIPSCO	Buffalo Ridge	SD	50	Approved
NIPSCO	Barton Windpower	IA	50	Approved
IPALCO	Hoosier Wind	IN	100	Pending





# Coal Use Trend

Indiana coal consumption growing much faster than  
Indiana coal production



# Evolution of the Coal Power Plant

Yet the electricity per ton of coal input stays level

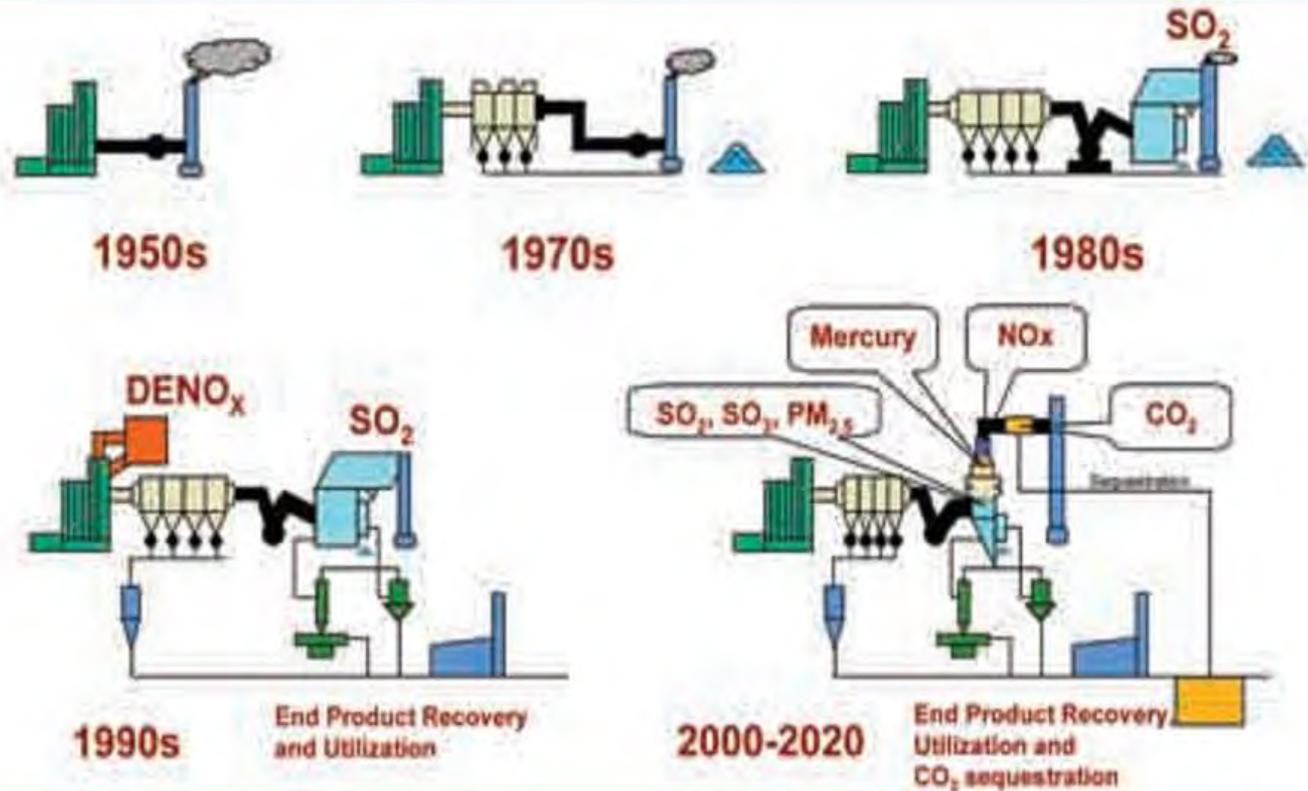


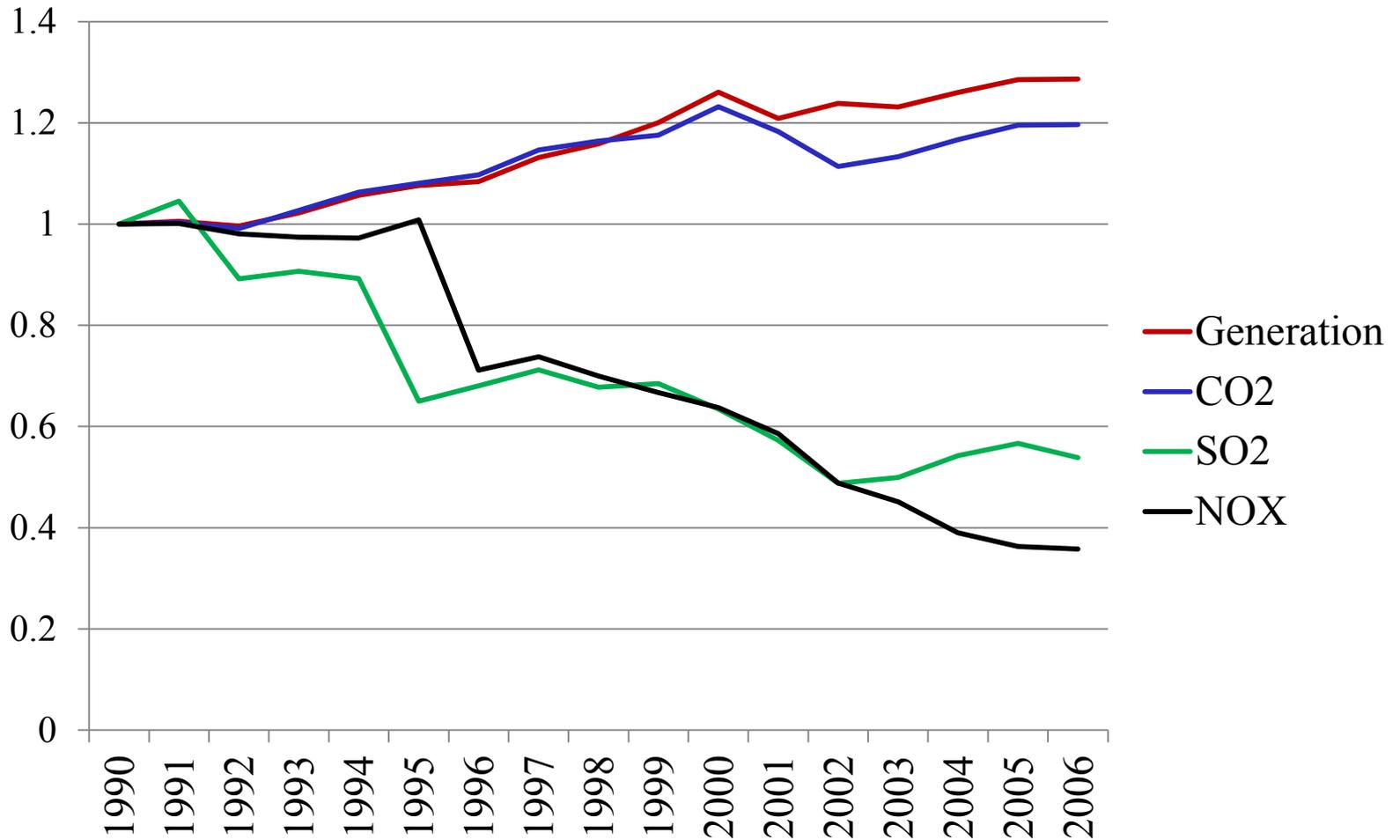
Figure ES-1

Evolution of Coal Fired Power Plant Emissions Capture<sup>2</sup>

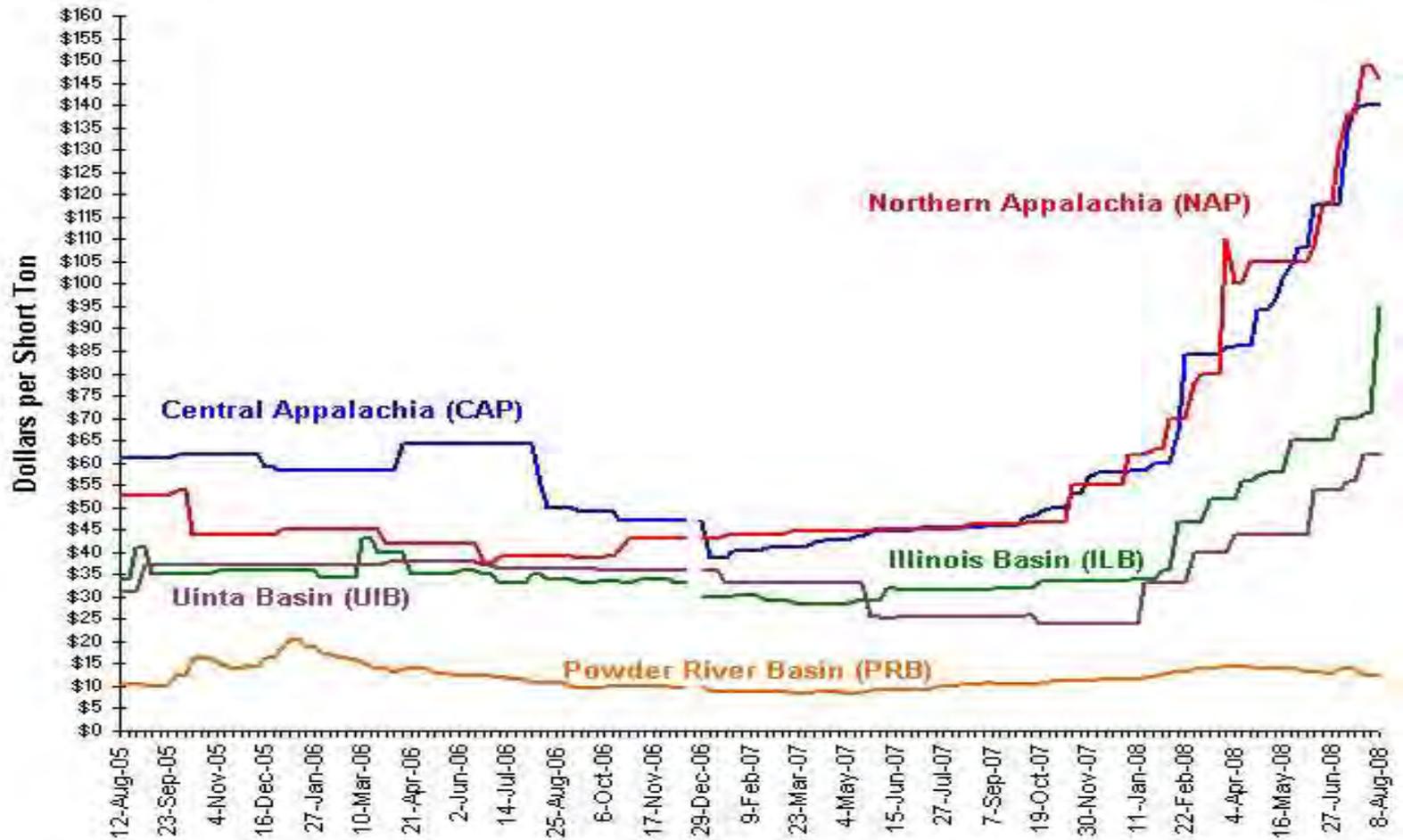
# Emissions Trends for Indiana

## Electricity Industry

(normalized to 1990 values)



# Coal Spot Price



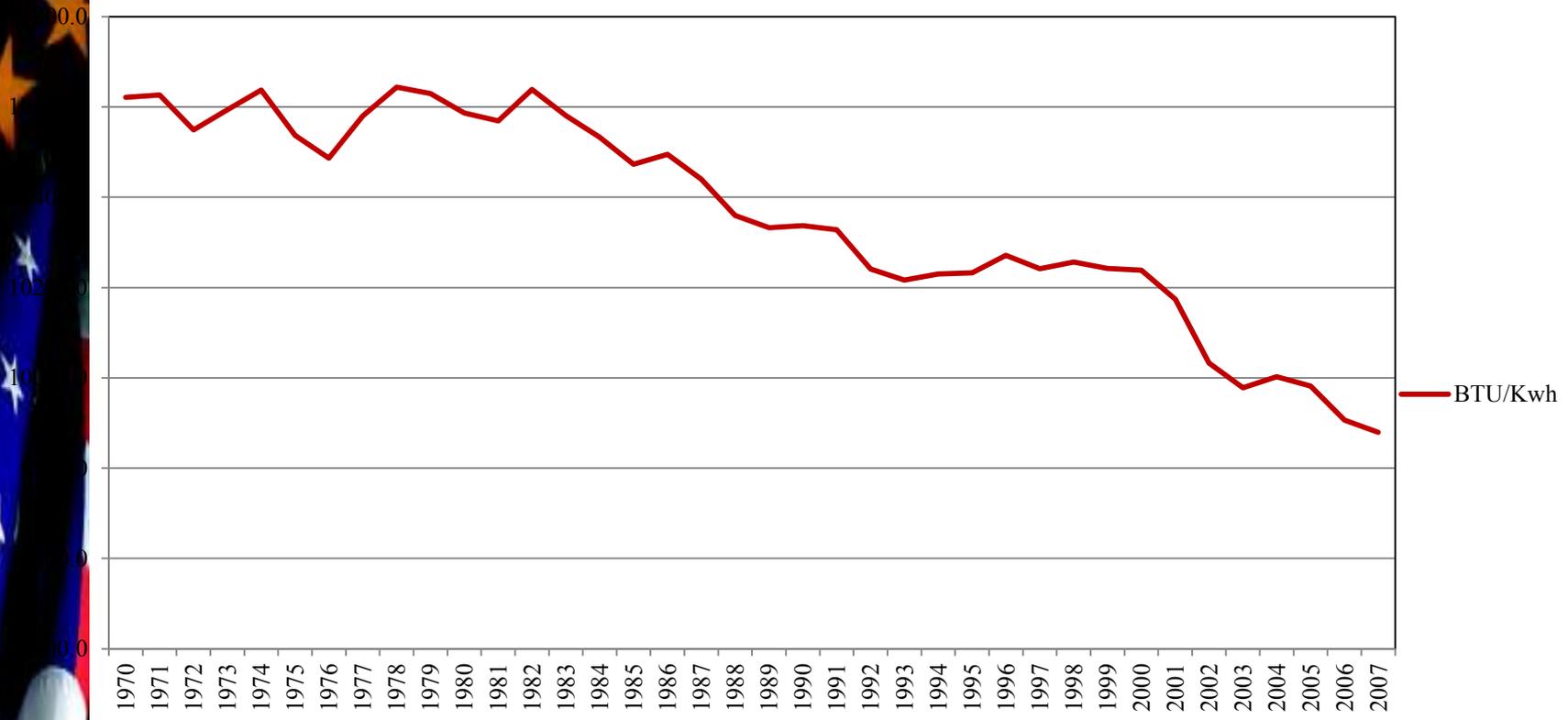
## Key to Coal Commodities by Region<sup>1</sup>

Central Appalachia: Big Sandy/Kanawha 12,500 Btu, 1.2 lb SO<sub>2</sub>/mmBtu  
Northern Appalachia: Pittsburgh Seam 13,000 Btu, <3.0 lb SO<sub>2</sub>/mmBtu  
Illinois Basin: 11,800 Btu, 5.0 lb SO<sub>2</sub>/mmBtu

Powder River Basin: 8,800 Btu, 0.8 lb SO<sub>2</sub>/mmBtu  
Uinta Basin in Colo.: 11,700 Btu, 0.8 lb SO<sub>2</sub>/mmBtu

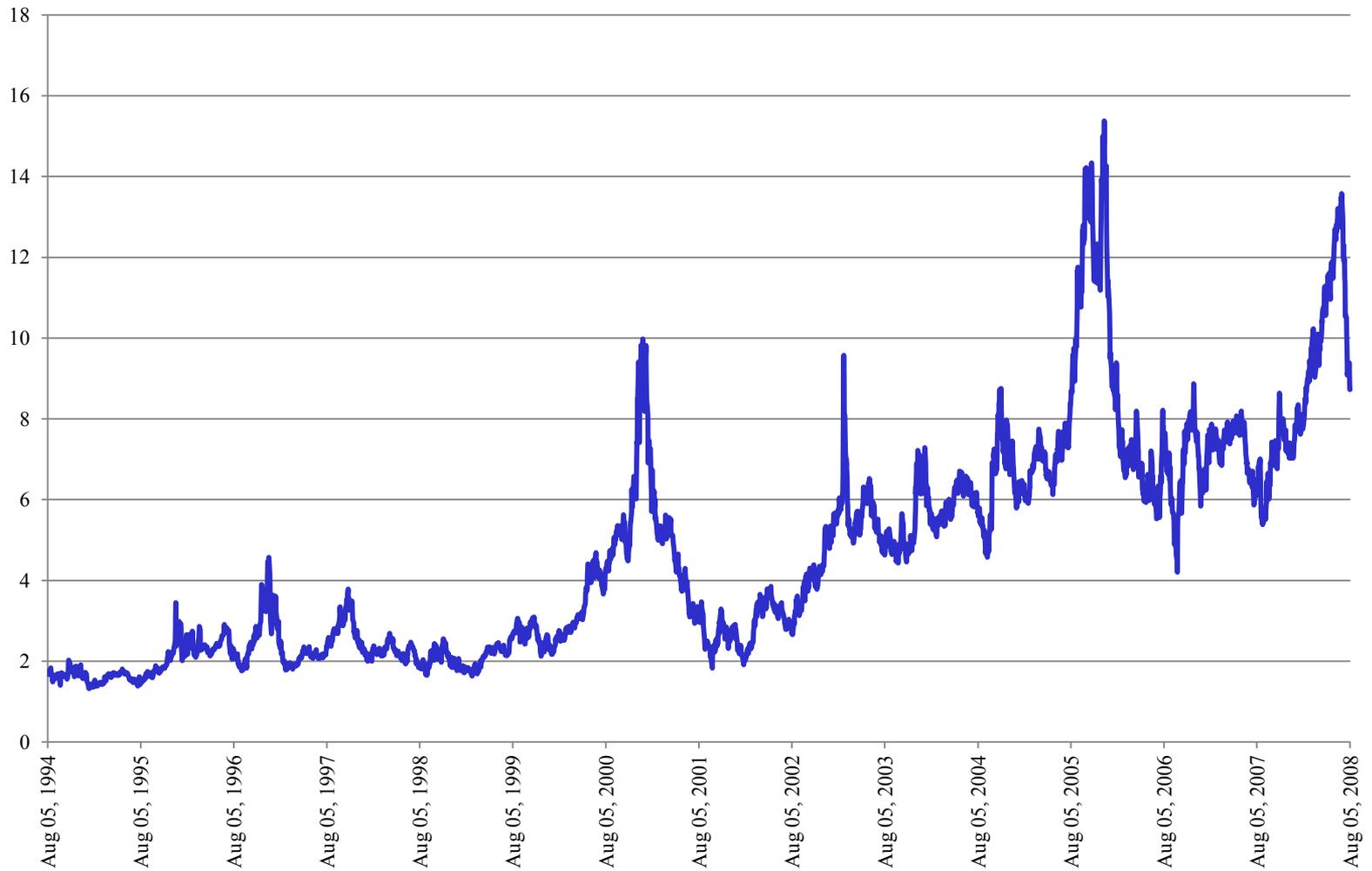
The production of a KWh of electricity even with the added environmental equipment and its parasitic load, takes 9% less energy than it did 35 years ago

### BTU/Kwh





# Natural Gas Futures (\$/mmBtu)

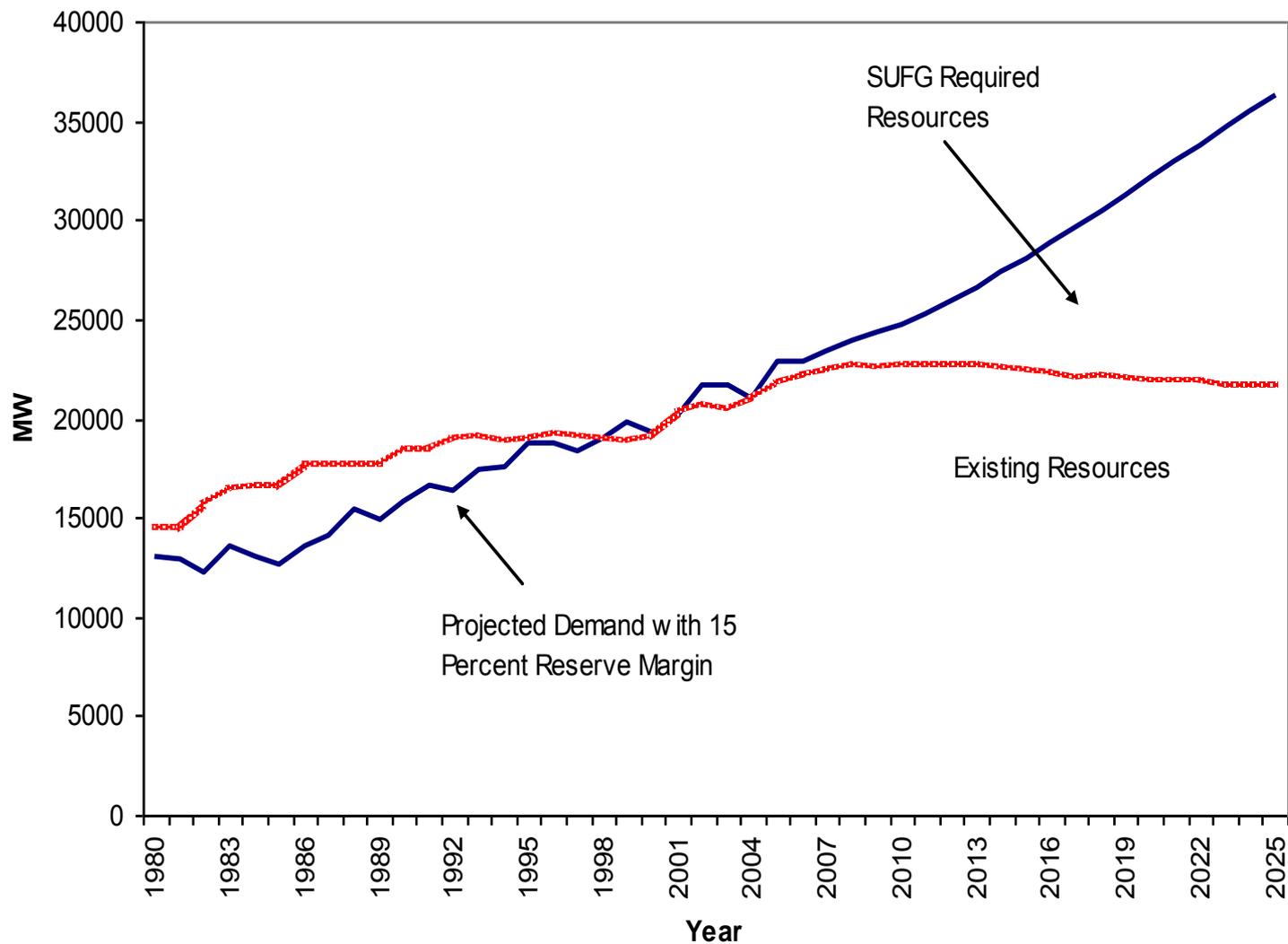


The image shows a vertical strip of the Indiana state flag on the left side of the slide. It features a blue field with a yellow torch in the center, surrounded by yellow stars. The word "INDIANA" is written in yellow at the top. Below the torch, there are white stars on a blue background, and at the bottom, there are red and white stripes.

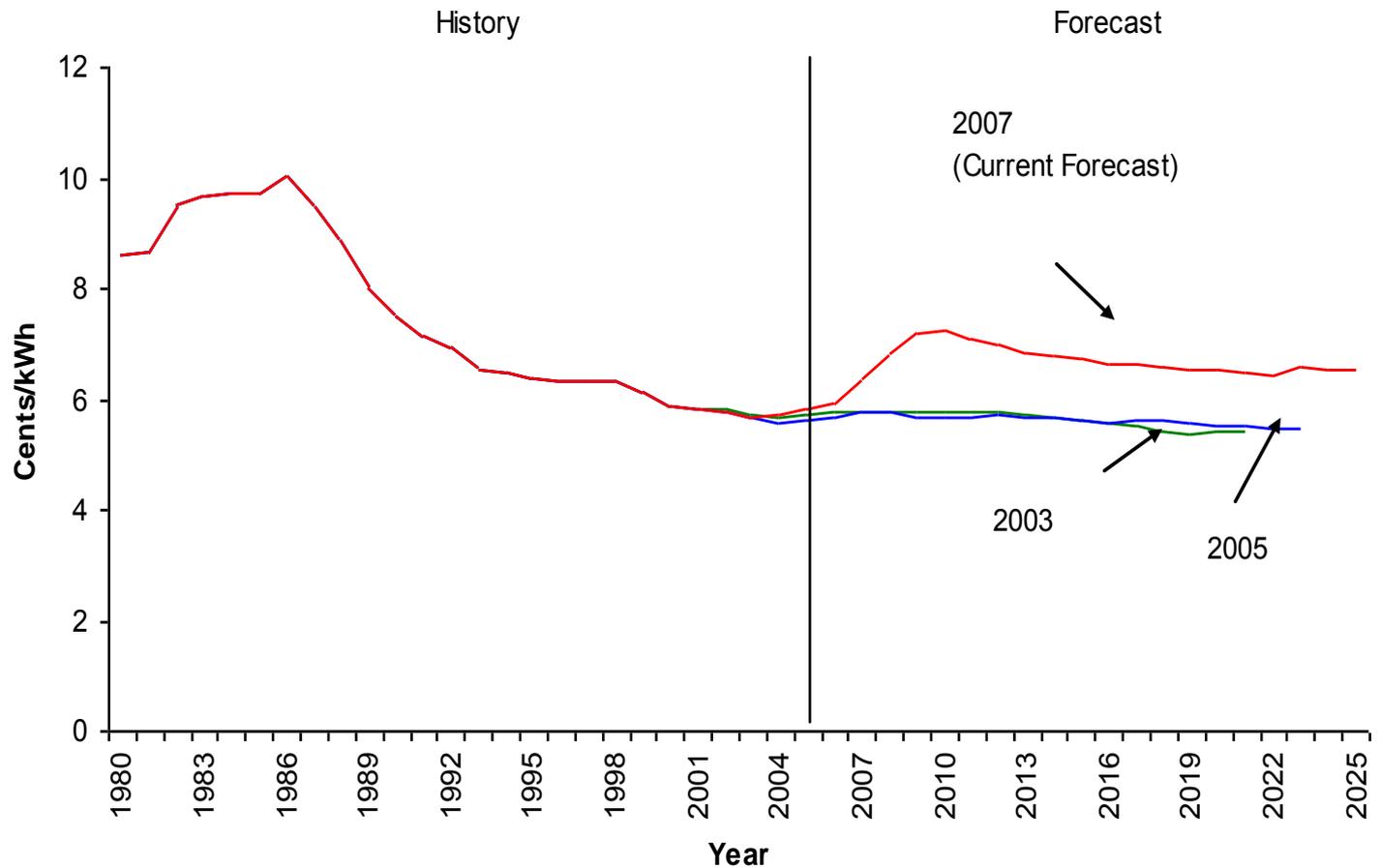
# SUFG Forecast Highlights

- ❑ **Significant** real electricity price increase through **2012**, then leveling off
- ❑ Electricity requirements and peak demand **projections are higher** than the previous forecast in the later years of the forecast
- ❑ **Industrial** electricity consumption is projected to grow **faster** than previously projected

# Indiana Resource Requirements



# Indiana Real Price Projections (2005 \$)



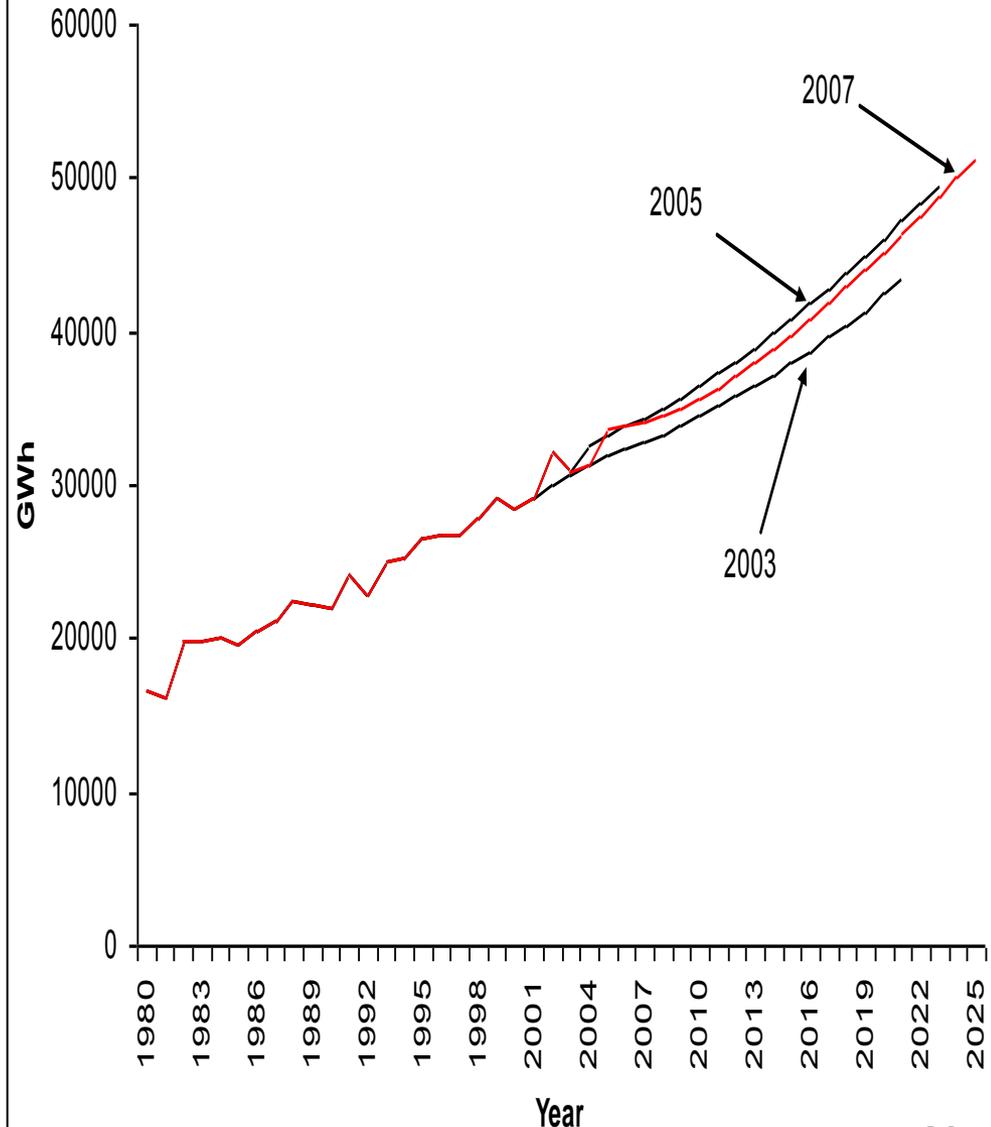
# Residential Electricity Sales

Estimated from:

- demographics
- households
- household income
- energy prices

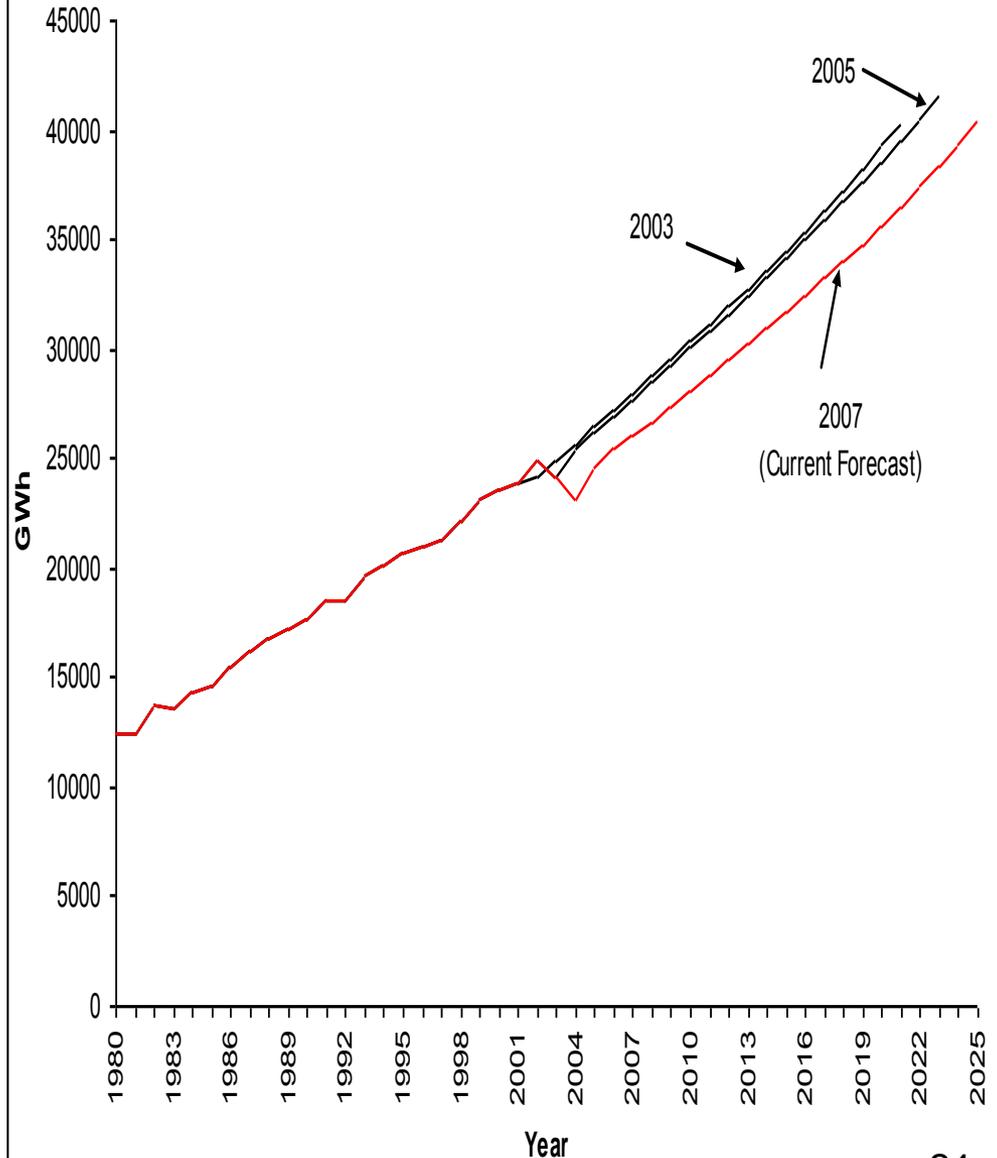
Growth rates

- 2007 forecast: 2.21%
- 2005 forecast: 2.22%
- 2003 forecast: 1.95%



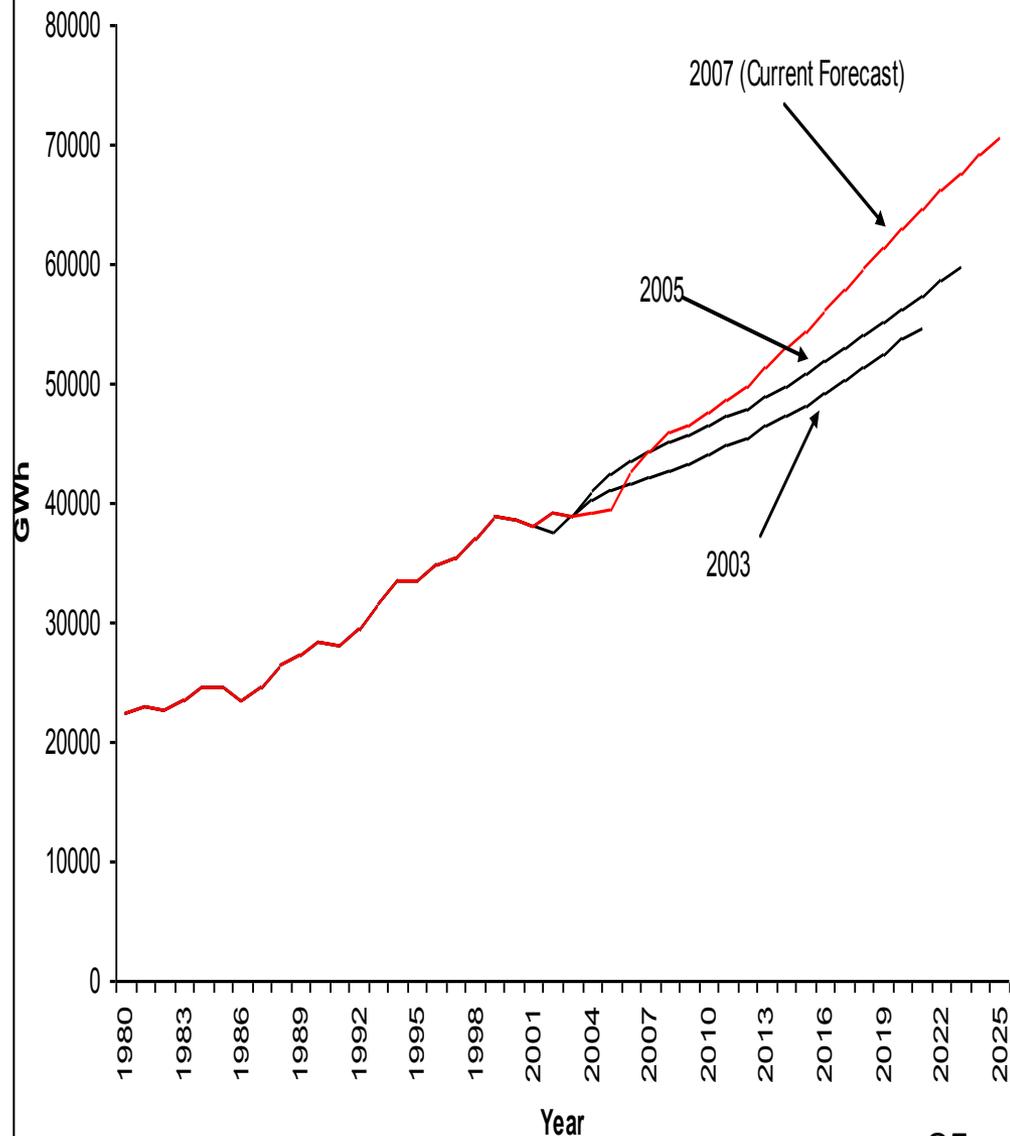
# Commercial Electricity Sales

- Estimated from:
  - floor space inventory
  - end use intensity
  - employment
  - energy prices
- Growth rates
  - 2007 forecast: 2.46%
  - 2005 forecast: 2.61%
  - 2003 forecast: 2.71%



# Industrial Electricity Sales

- Estimated from:
  - GSP by industry
  - energy prices
- Growth rates
  - 2007 forecast: 2.67%
  - 2005 forecast: 1.99%
  - 2003 forecast: 1.97%

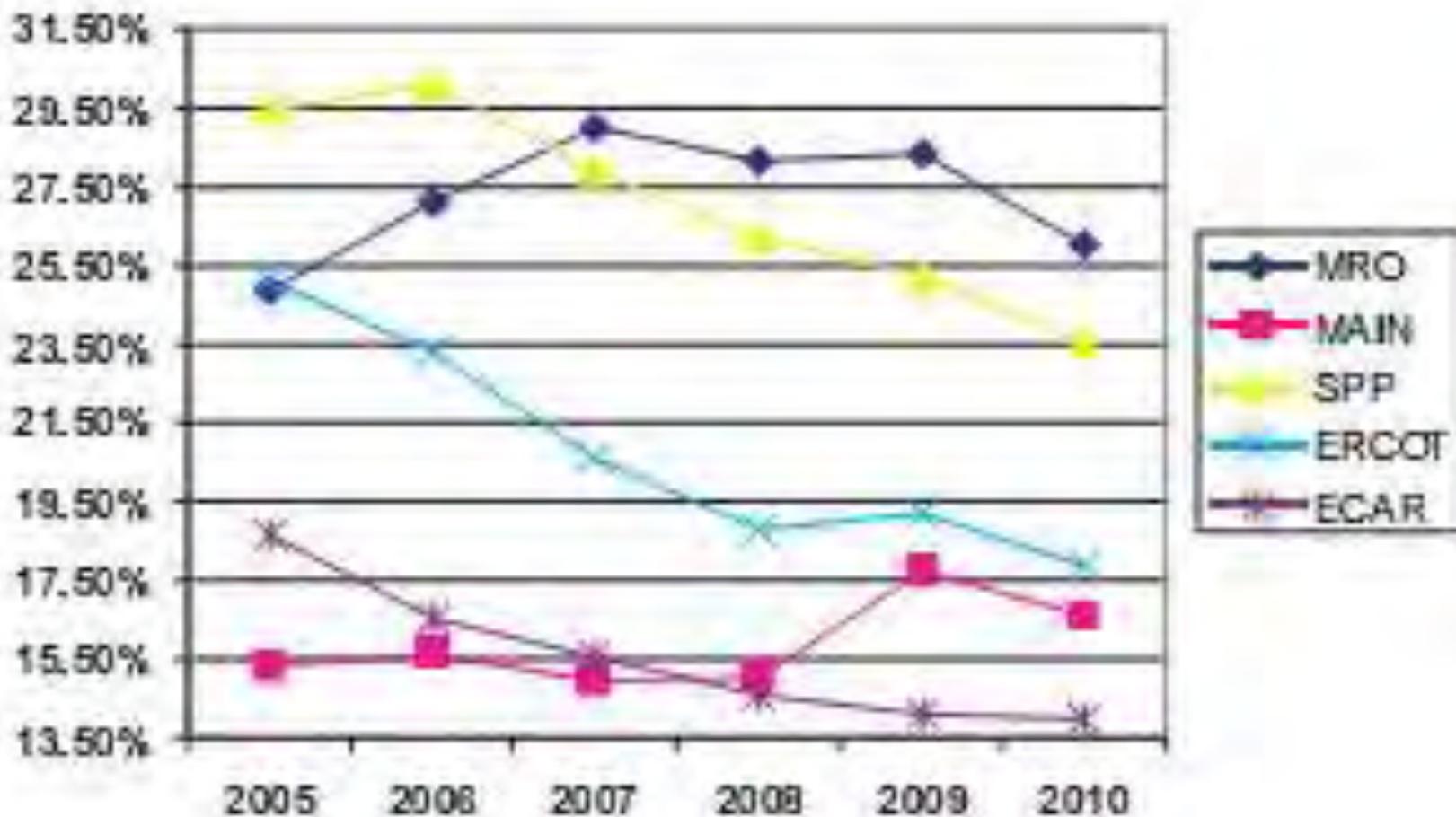


The image features a vertical graphic on the left side, which is a stylized representation of the Indiana state flag. It includes a yellow torch with a flame, a banner with the word "INDIANA" in blue letters, and a field of yellow stars on a blue background. The bottom of the graphic shows red and white stripes, suggesting the American flag.

# Growth in Electricity Use

- ❑ Economic development
  - ❑ **Toyota** adds production at Lafayette **SIA** plant
  - ❑ **Honda** announces new plant near Greensburg
  - ❑ Several new **ethanol** production facilities
- ❑ Suppliers will increase production and the suppliers' suppliers will increase production
  - ❑ e.g., an increase in automobiles may result in an increase in steel. Indiana is **#1 steel producer.**

# Declining Reserve Margins



Source: Megawatt Daily, January 3, 2006



# Fuel Sources for New Resources

## Coal

- Environmental permitting, construction time

## Natural gas

- Fuel cost

## Nuclear

- Permitting, public opposition, construction time

## Wind

- Limited resource, intermittent supply

## Solar

- Limited resource, cost, intermittent supply

## Biogas

- Limited resource



# Indiana Chamber of Commerce Energy Leadership Elements

- A diversified fuel mix including clean coal technologies, natural gas, nuclear and renewable energy sources
- Investment in new energy technologies
  - such as the fuel cell
- Assessment of our electric power infrastructure, including transmission and distribution capabilities



# Indiana Chamber of Commerce

## Energy Leadership Elements

- Sensible regulatory controls that promote the responsible building of new electric power stations
- Energy efficiency and conservation

