Illinois Governor Rod R. Blagojevich
Climate Change Advisory Group
(ICCAG)

ENERGY 2020 Reference Case

September 6, 2007

ICF INTERNATIONAL

Data Sources - Economic

- Economic output and employment forecast from REMI model (provided by IDCEO)
- Energy prices from U.S. D.O.E. Annual Energy Outlook (AEO) for 2007 to 2030
- Moderate population growth (<1% annually)
- Real personal income expected to grow more rapidly - raising income/capita

Data Sources - Economic

Population and Income	1990	2005	2020	Average Annual Growth	
				1990-2005	2005-2020
Population (thousands)	10,825	12,770	13,816	1.1%	0.5%
Disposable Personal Income (billions 2000 $)	306	385	498	1.5%	1.7%
Disposable Income per Capita (2000 $)	28,306	30,149	36,066	0.4%	1.2%

Data Sources - Economic

- Employment patterns have shifted over the past 15 years.
- Service economy growth has offset decreased industrial/agricultural employment.
- Pattern is expected to continue over the forecast period.

Data Sources - Economic

Employment (thousands)	1990	2005	2020	Average Annual Growth
Industrial	1,335	1,169	1,130	-0.3%
Commercial	4,824	5,173	5,893	0.6%
Government	670	735	776	0.5%
Agriculture and Forestry	123	103	93	-0.9%
Total	**6,951**	**7,181**	**7,892**	**0.4%**

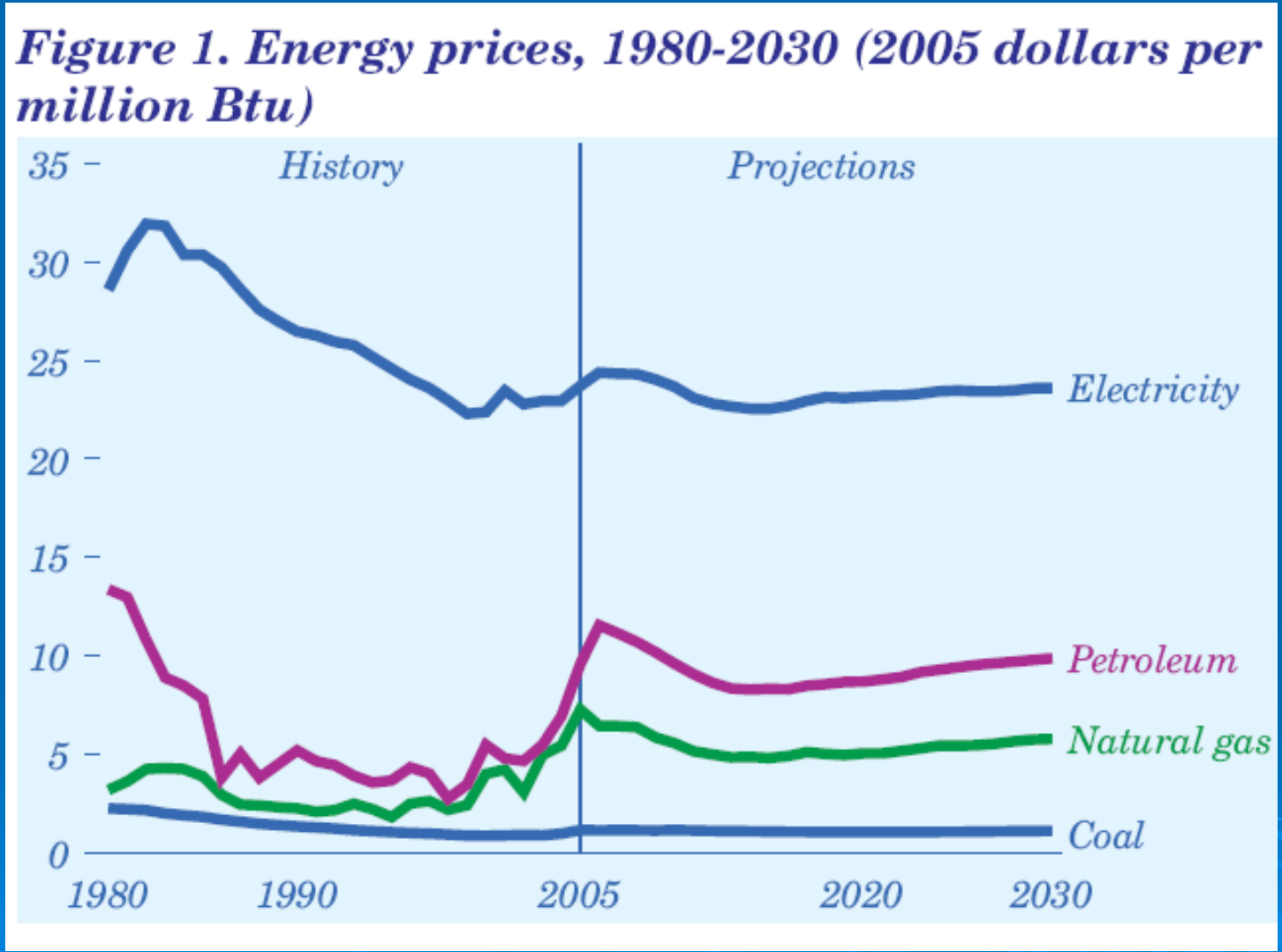
Historic Energy Use Data

Description of Data	Sources
Household Data • Including number of housing units by structure and type	United States Census Bureau
Residential Data • Household income by housing type • Number of people per household • End use data, including primary fuel type for space and water heating, air conditioning saturations, etc.	EIA Residential Energy Consumption Survey by Census Region and Division eia.doe.gov/emeu/recs/content.html
Commercial Data • Floor area by sub-sector • End use data including primary fuel for space and water heating; energy intensities	EIA Commercial Buildings Energy Consumption Survey by Census Region and Division eia.doe.gov/emeu/cbecs/content.html
Industrial/Manufacturing Data • Energy use by sub-sector and end use	EIA Manufacturing Energy Consumption Survey by Census Region eia.doe.gov/emeu/mecs/content.html
State Energy Data • Overall energy consumption and expenditures by sector and energy source	EIA State Energy Data System eia.doe.gov/emeu/states/_seds.html Illinois Commerce Commission Annual Comparison of Sales Statistics for Electricity and Natural Gas icc.illinois.gov/industry/publicutility/energy/salesstatistics.aspcx

Data Sources - Prices

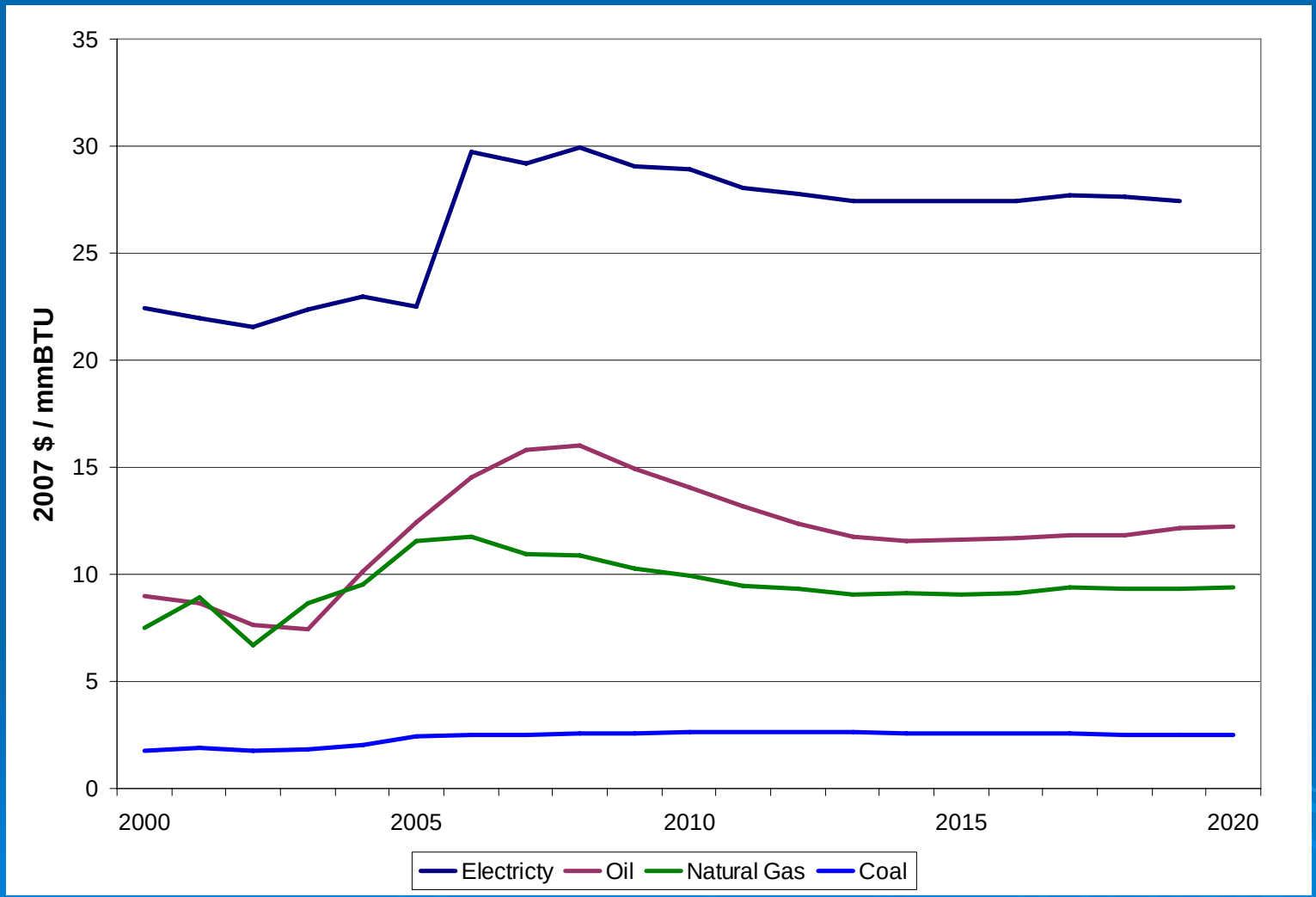
- Oil prices from AEO (figure follows).
- Wellhead price of natural gas based on AEO.
- Coal price based on the AEO (both mine mouth and delivered prices for electric power plant).
- Historic electricity prices from Energy Information Administration (EIA) (Federal Electricity Regulatory Commission (FERC) Form 1).
- Model calculates power prices based on generation costs. (Actual prices may differ as a result of political, regulatory or market influences).

Data Sources – National Prices



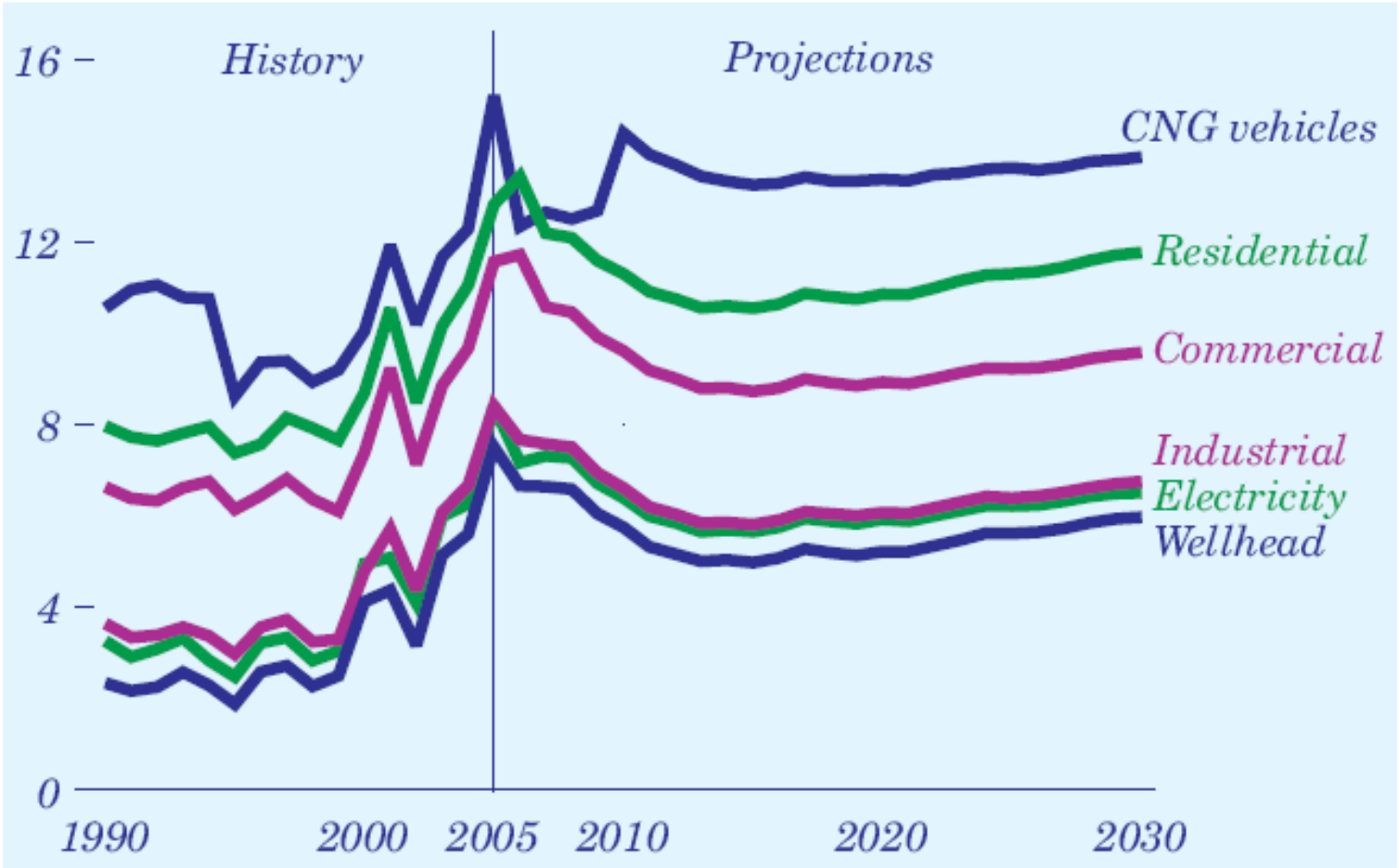
Annual Energy Outlook 2007, Energy Information Administration

Data Sources – Illinois Delivered Prices



Data Sources - Prices

Figure 73. Natural gas prices by end-use sector, 1990-2030 (2005 dollars per thousand cubic feet)



Annual Energy Outlook 2007, Energy Information Administration

Data Sources – Electricity Sector

- Generation from EPA's National Electric Energy Data System (NEEDS) 2006 database.
- Reviewed additional sources regarding planned electricity generation and for calibration:
  - ***Implementation of EGU1 and EGU2 Policies Using the Integrated Planning Model (IPM®) in the Midwest RPO Region Prepared for Lake Michigan Air Directors Consortium (LADCO)***
  - ***Study of Emissions Impact by the Illinois Sustainable Energy Plan Based on Optimal Power Flow Modeling, PowerWorld***
  - ***Tracking New Coal-Fired Power Plants Coal's Resurgence in Electric Power Generation, DOE National Energy Technology Laboratory.***

Points of Comparison

- Electric Power Sector
  - LADCO, PowerWorld and Shaw reports
  - National Energy Technology Laboratory (NETL) and IEPA re planned generation
  - September 2006 Illinois Auction Post-Auction Public Report of the Staff, Illinois Commerce Commission re prices
- GHG Emissions
  - US EPA Inventory and WRI report for Illinois
- Transportation
  - Illinois EPA and DOT

Built Environment

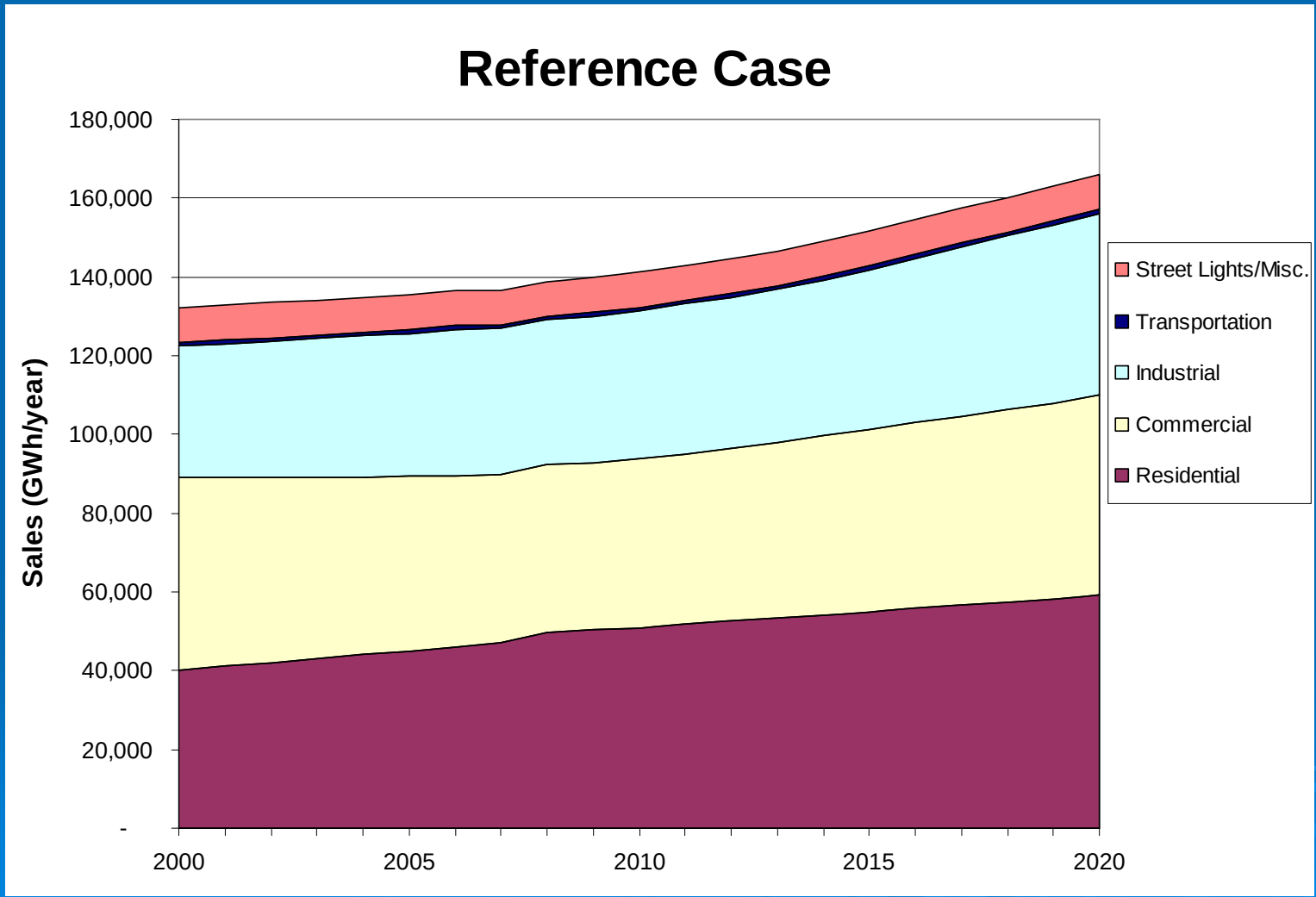
Housing Splits by Type			
	2005	**2015**	**2020**
Single Family	61%	59%	57%
Multi Family	35%	36%	37%
Other Residential	4%	5%	5%

- The Reference Case assumes no significant change in the mix of the housing stock over the forecast period.

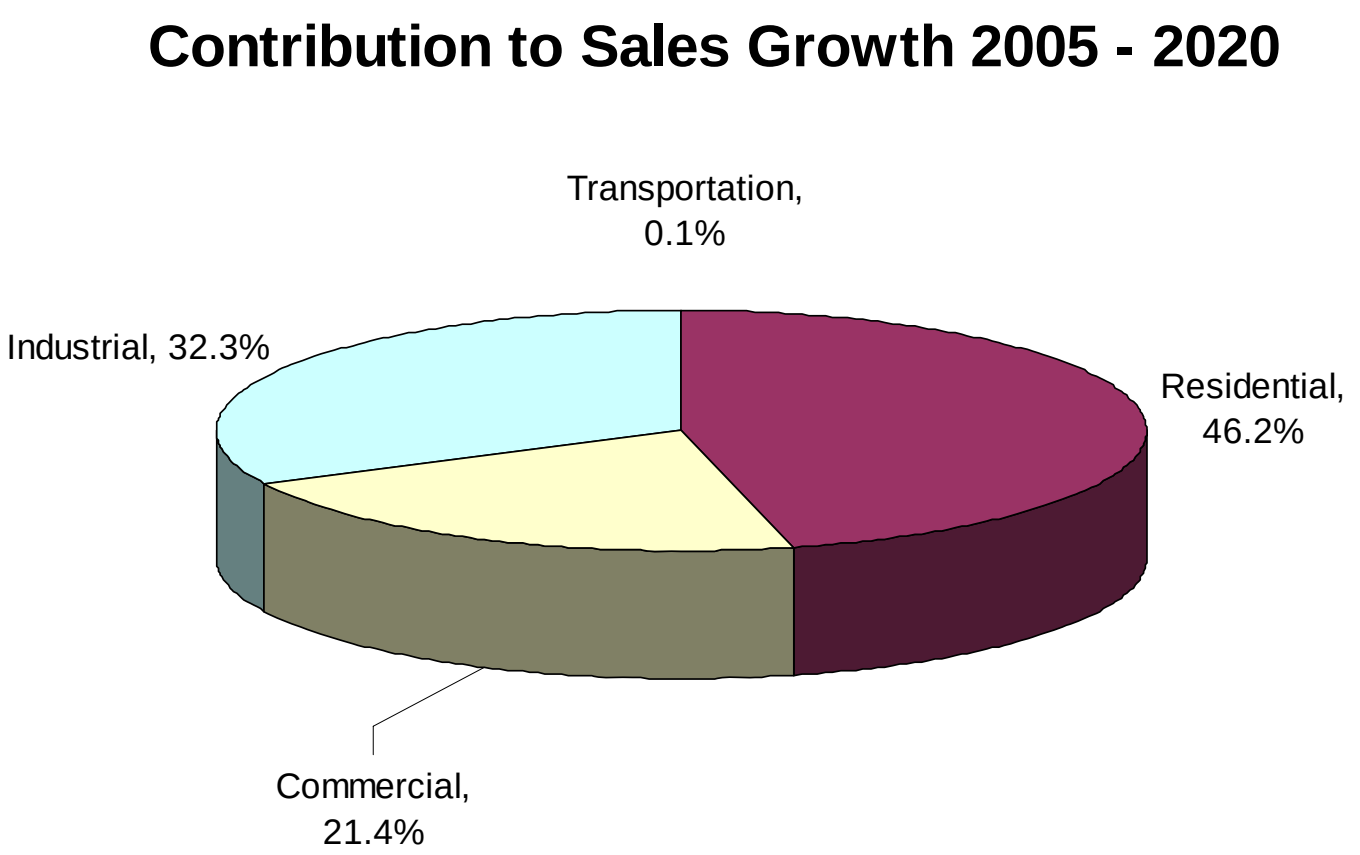
Electricity Sector - Reference Case

- 1,820 MW of coal capacity assumed to be retired prior to 2020.
- Assumed 2,400 MW of coal capacity now in planning stage will come on-line between 2009 and 2011, reflecting additions already in play.
- Assumed for modeling purposes only – does not imply decisions regarding specific plants.
- Transmission interconnections modeled based on existing capacities as obtained from NERC.

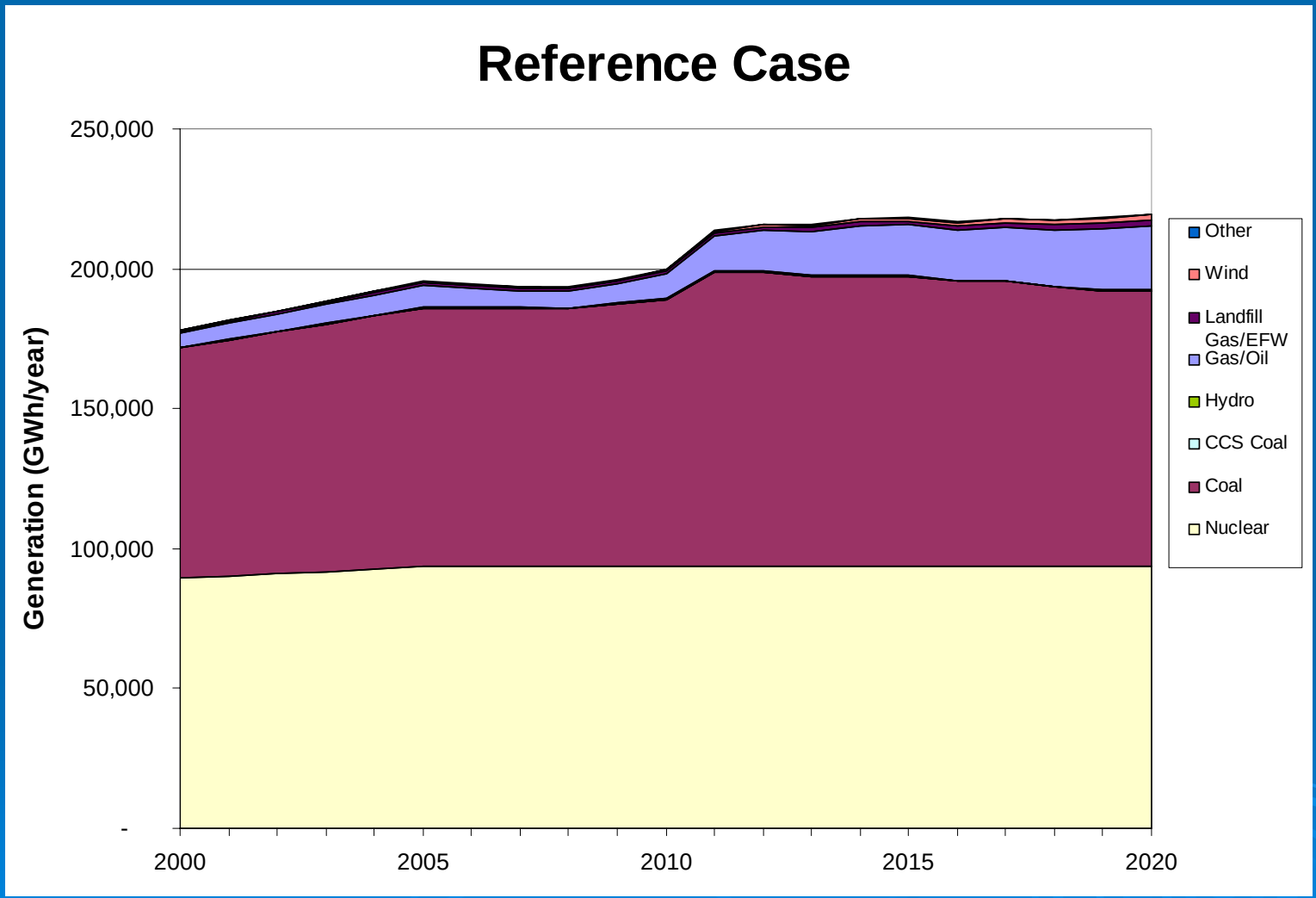
Electricity Sales



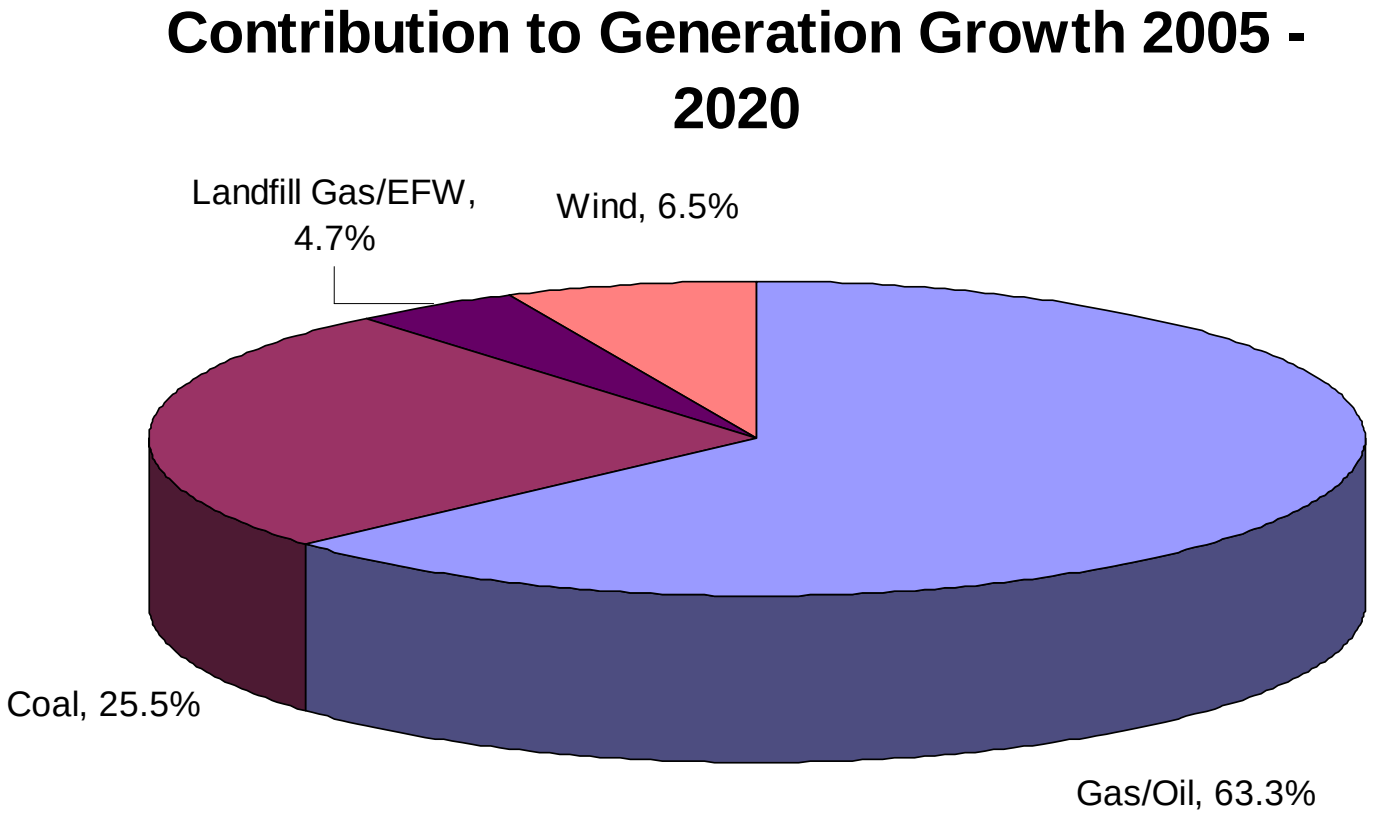
Electricity Sales



Electricity Generation



Electricity Generation

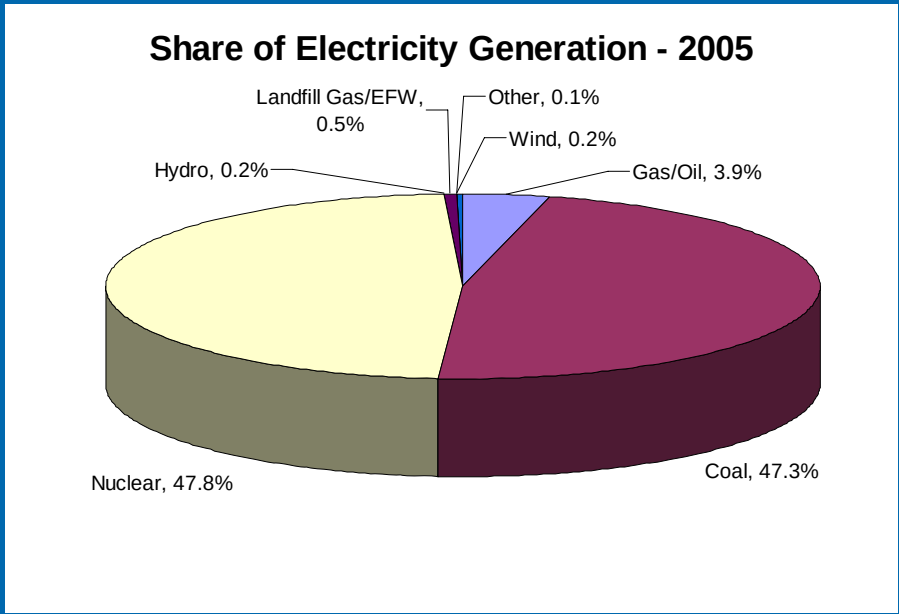


Illinois Electricity Generation

Generation Output (GWh/year)	2010	2015	2020
Gas/Oil	9,104	17,984	22,839
Coal	95,415	103,964	98,661
Nuclear	93,480	93,480	93,480
Hydro	338	338	338
Landfill Gas/EFW	941	1,296	2,055
Wind	311	1,103	1,879
Other	277	277	277
Total	199,866	218,443	219,529

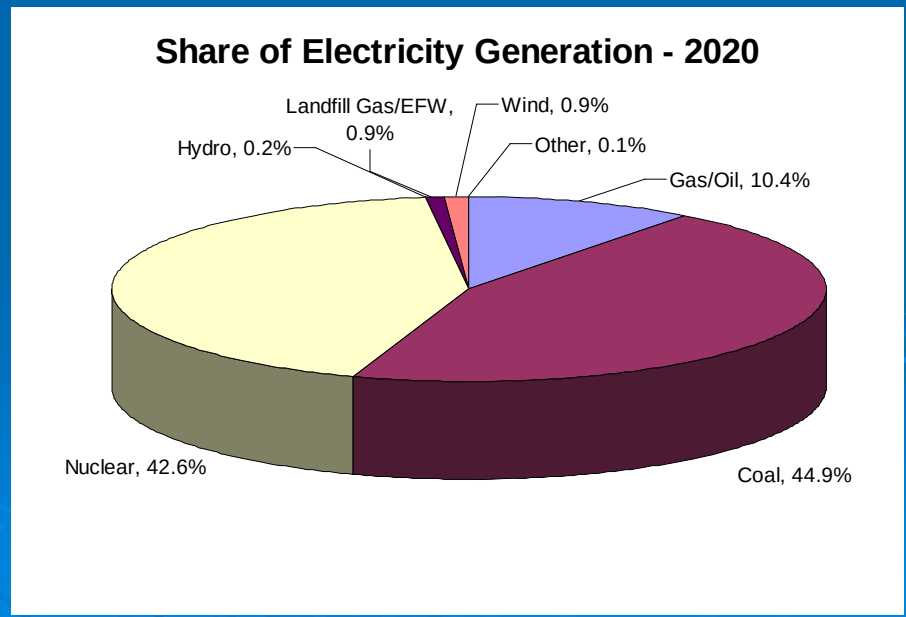
Generation Capacity (MW)	2010	2015	2020
Gas/Oil	15,452	18,642	21,242
Coal	15,628	16,476	15,618
Nuclear	11,448	11,448	11,448
Hydro	49	49	49
Landfill Gas/EFW	119	164	260
Wind	112	399	679
Other	45	45	45
Total	42,853	47,223	49,341

Electricity Generation by Source



- Nuclear and coal contribution declines 2005-2020 (as share of total)
- Oil/Gas share more than doubles
- Wind, LFG and EFW reach almost 2% of supply
- Illinois in-state sales grow ~1.3%/year.

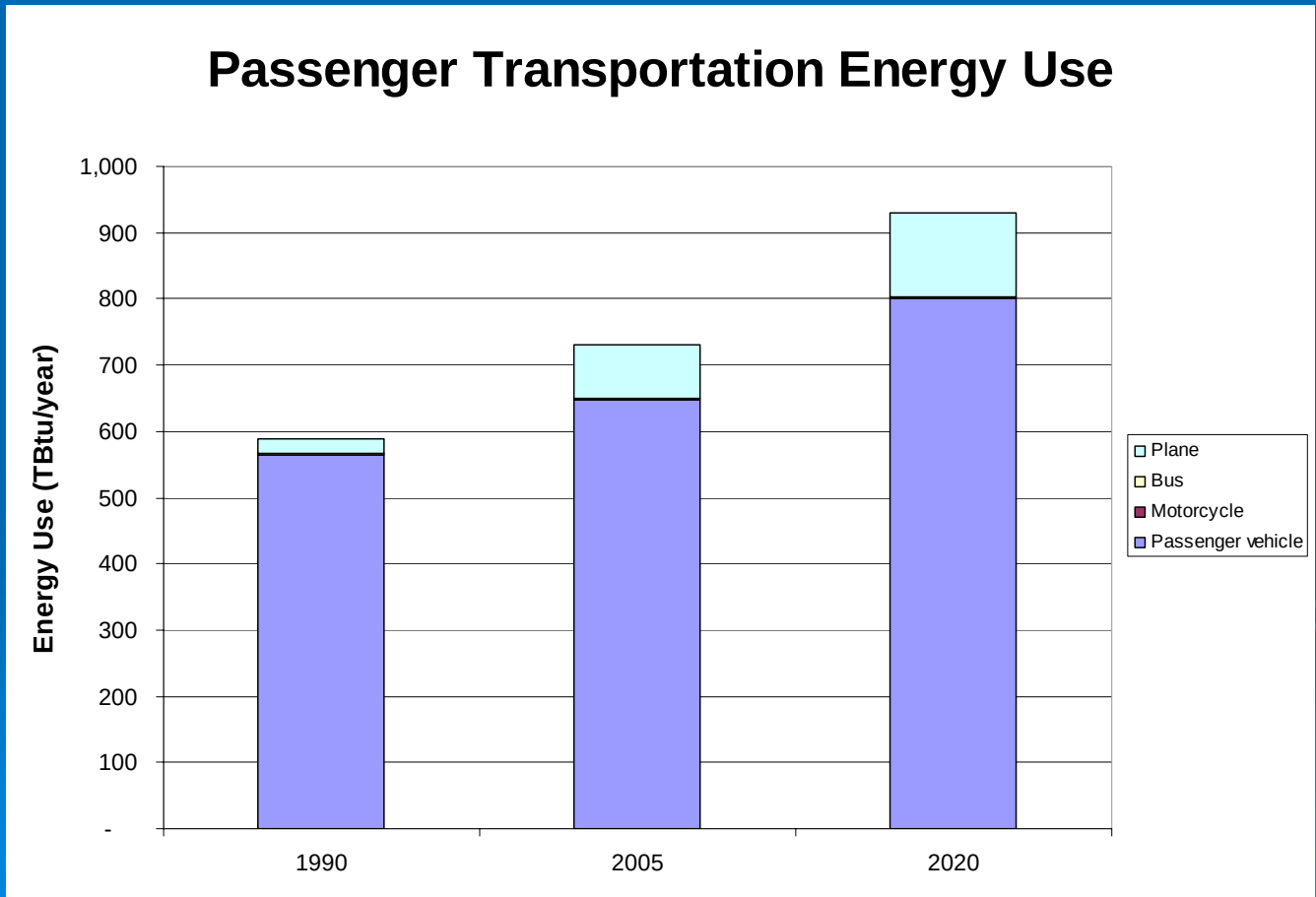
- In line with previous forecasts (LADCO & Shaw reports).
- Historic generation calibrated to US EIA data.
- Continued strong power exports from state through 2020.



Transportation Sector - Demand

Average Annual Transportation Demand Growth	1990-2005	2005-2020
Passenger	0.5%	0.3%
Freight	2.9%	2.3%

- Growth in passenger transportation demand and energy use in line with EIA forecasts. Freight energy use grows more quickly than for passenger vehicles.
- Bulk of passenger energy use for personal vehicles.

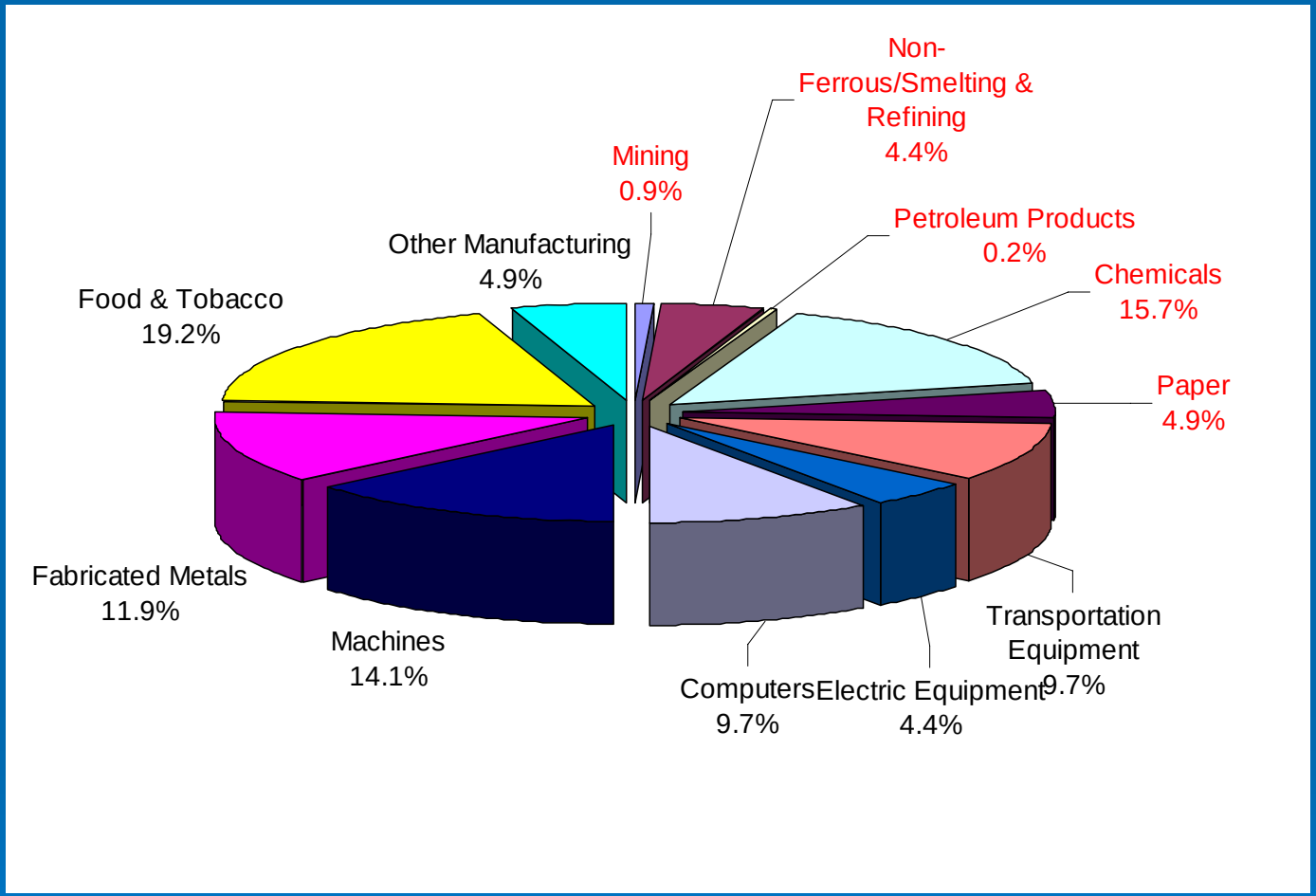


Transportation Sector

Vehicle Efficiency (miles/gallon)			
	2000	2010	2020
Light Gas Vehicles	31.6	32.9	31.6
Medium Vehicles	26.8	29.3	28.6
Heavy Vehicles	20.8	21.4	21.0
Heavy Diesel	20.8	21.7	21.4

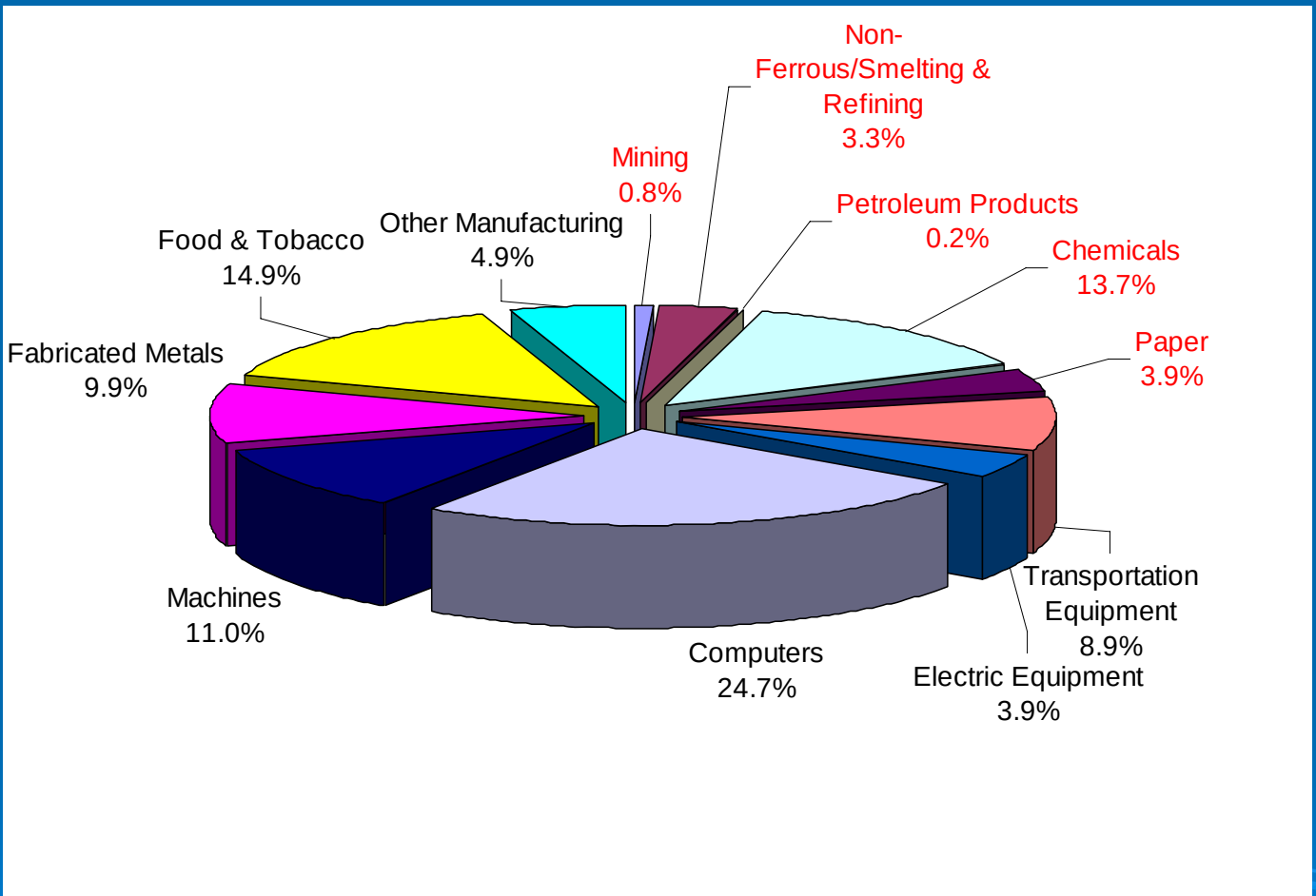
- No major increase in vehicle efficiencies assumed in Reference Case
- Some minor variations in average fleet efficiency due to changes in energy prices.
- Model values close to Bureau of Transportation statistics (average light vehicle efficiency of 30 mpg in 2004).

Gross Output by Industry Sector - 2005



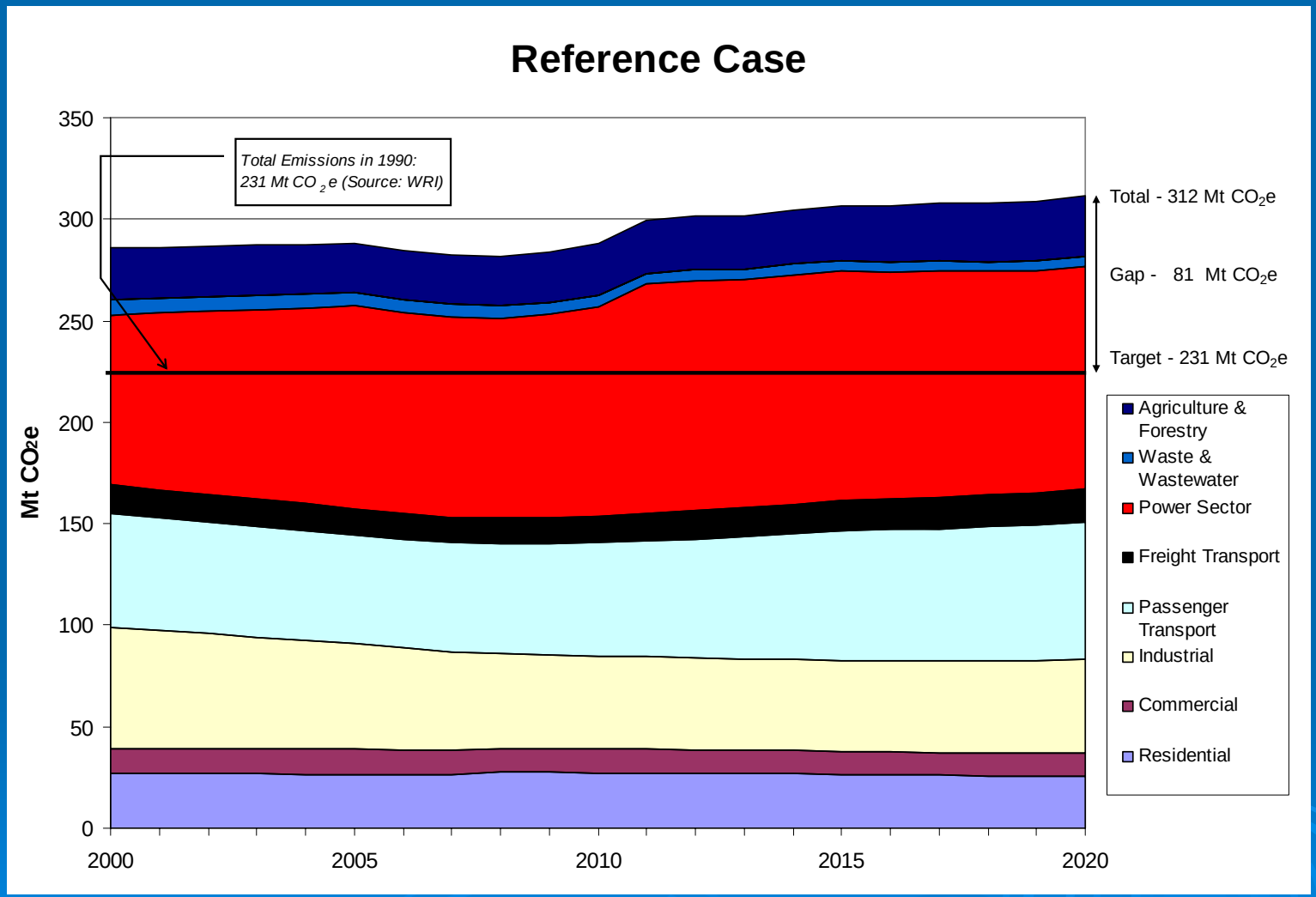
- Energy intensive industries (in red) represent 27% of GO in 2005.
- Energy use per dollar output in these industries is typically an order of magnitude higher than in other/general manufacturing.

Gross Output by Industry Sector - 2020

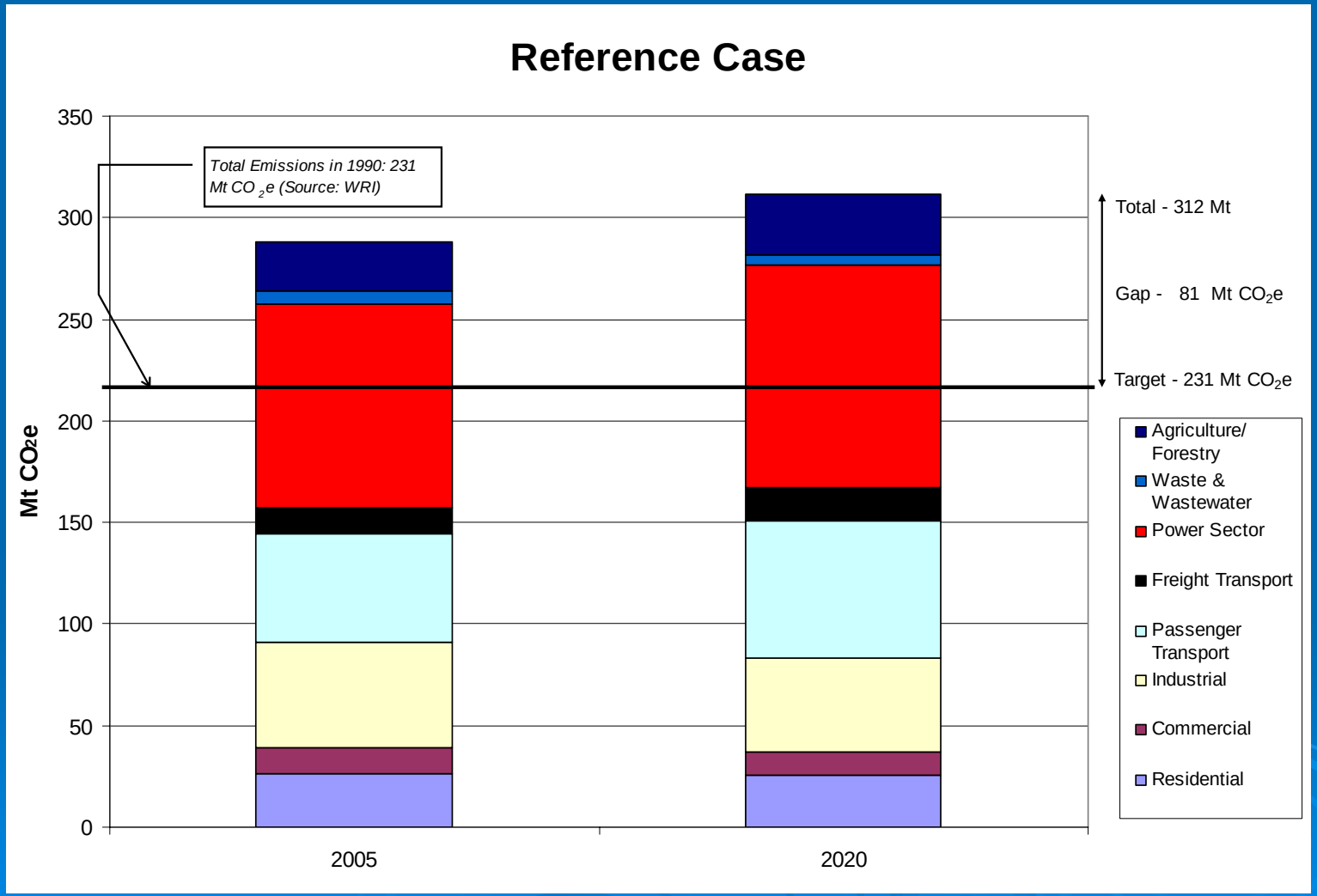


- Energy intensive industries (in red) projected to fall from 27% of industrial gross output in 2005 to 22% by 2020.

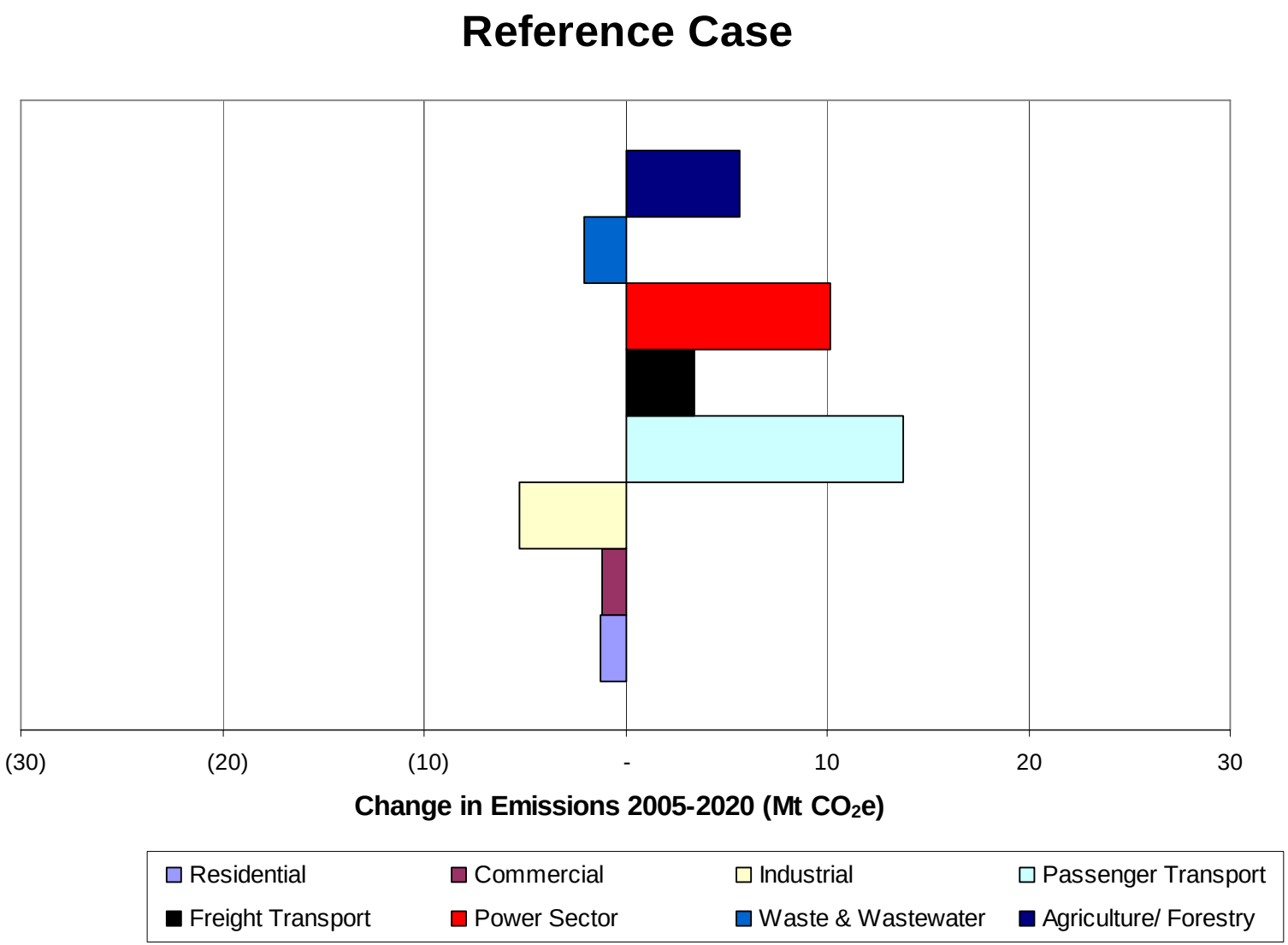
Illinois GHG Emissions – Reference Case



Illinois GHG Emissions by Sector - Reference Case

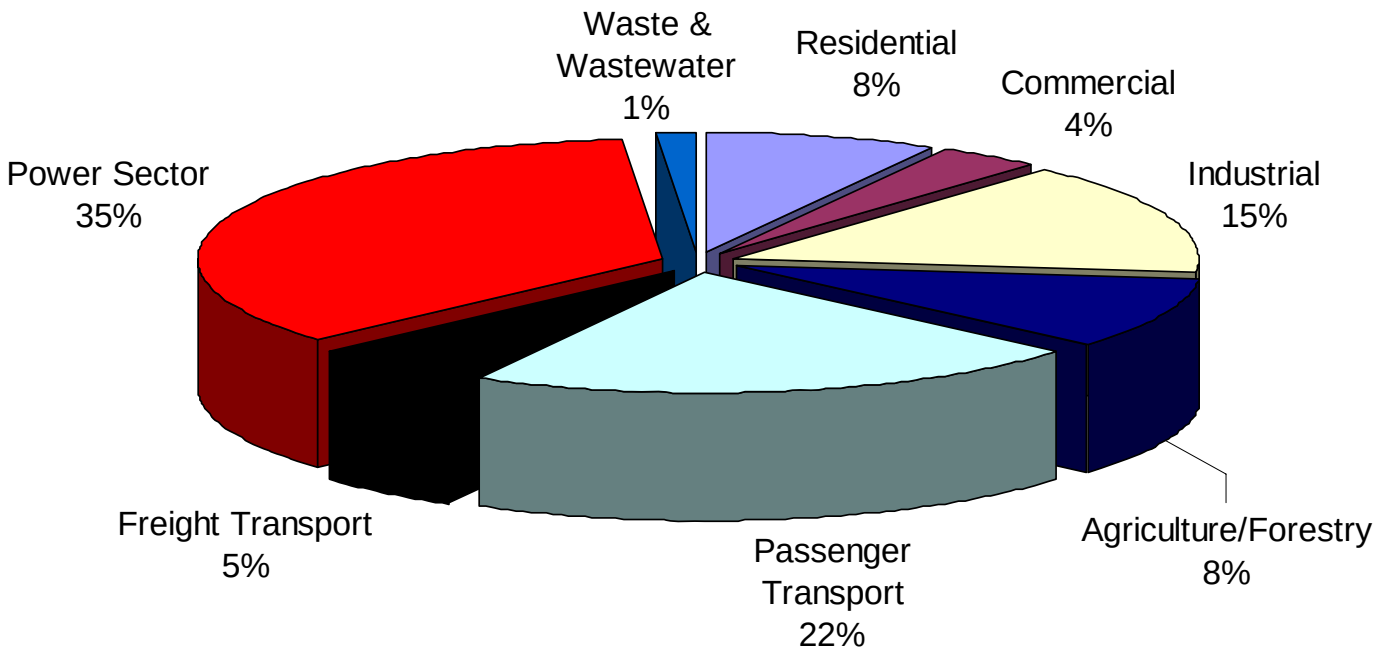


Change in GHG Emissions 2005-2020



Illinois GHG Emissions in 2020

Percentage of Total GHG Emissions: 2020



Questions?