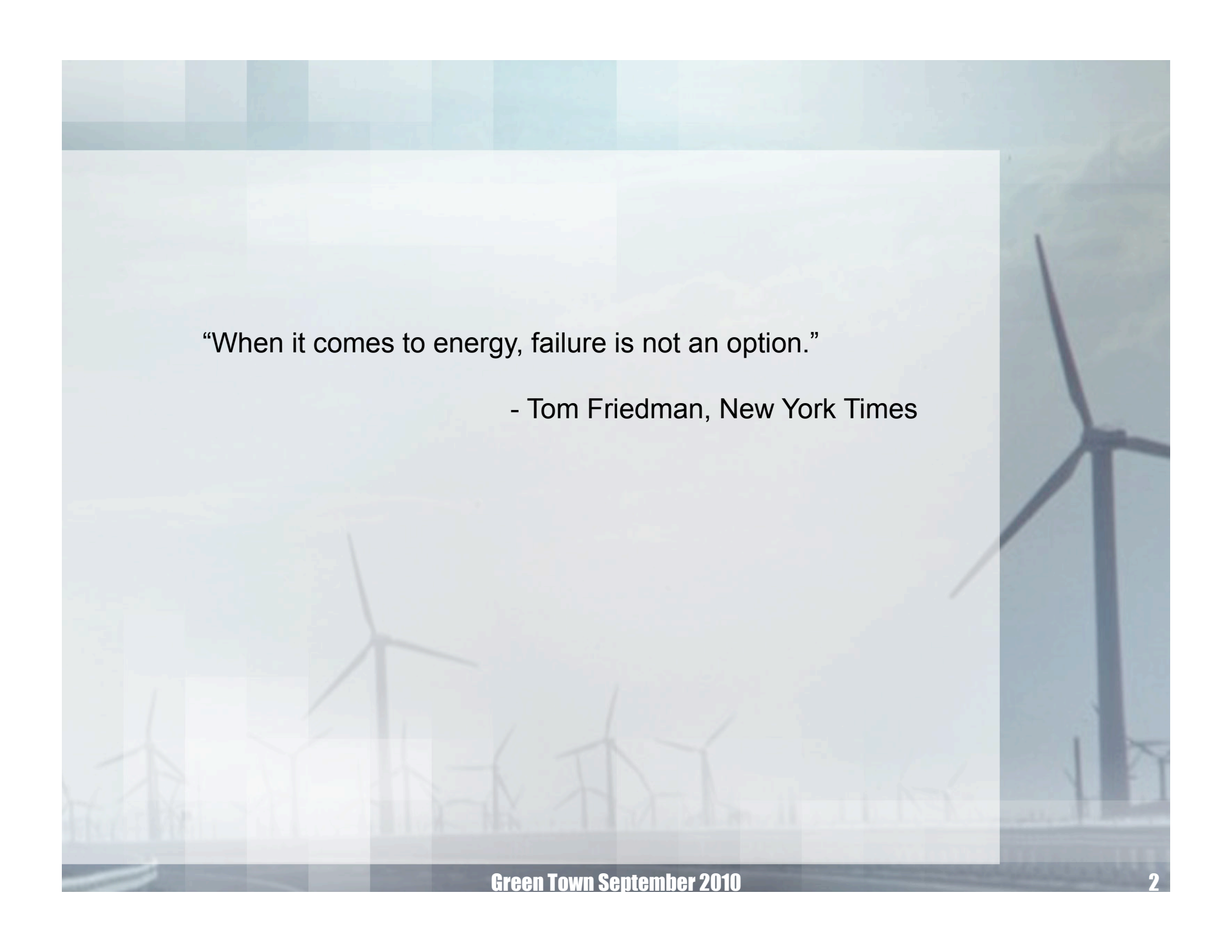




# **Energy – Balancing Our Portfolio**

**Green Town Grand Rapids 2010**

Greg Northrup, President  
West Michigan Strategic Alliance

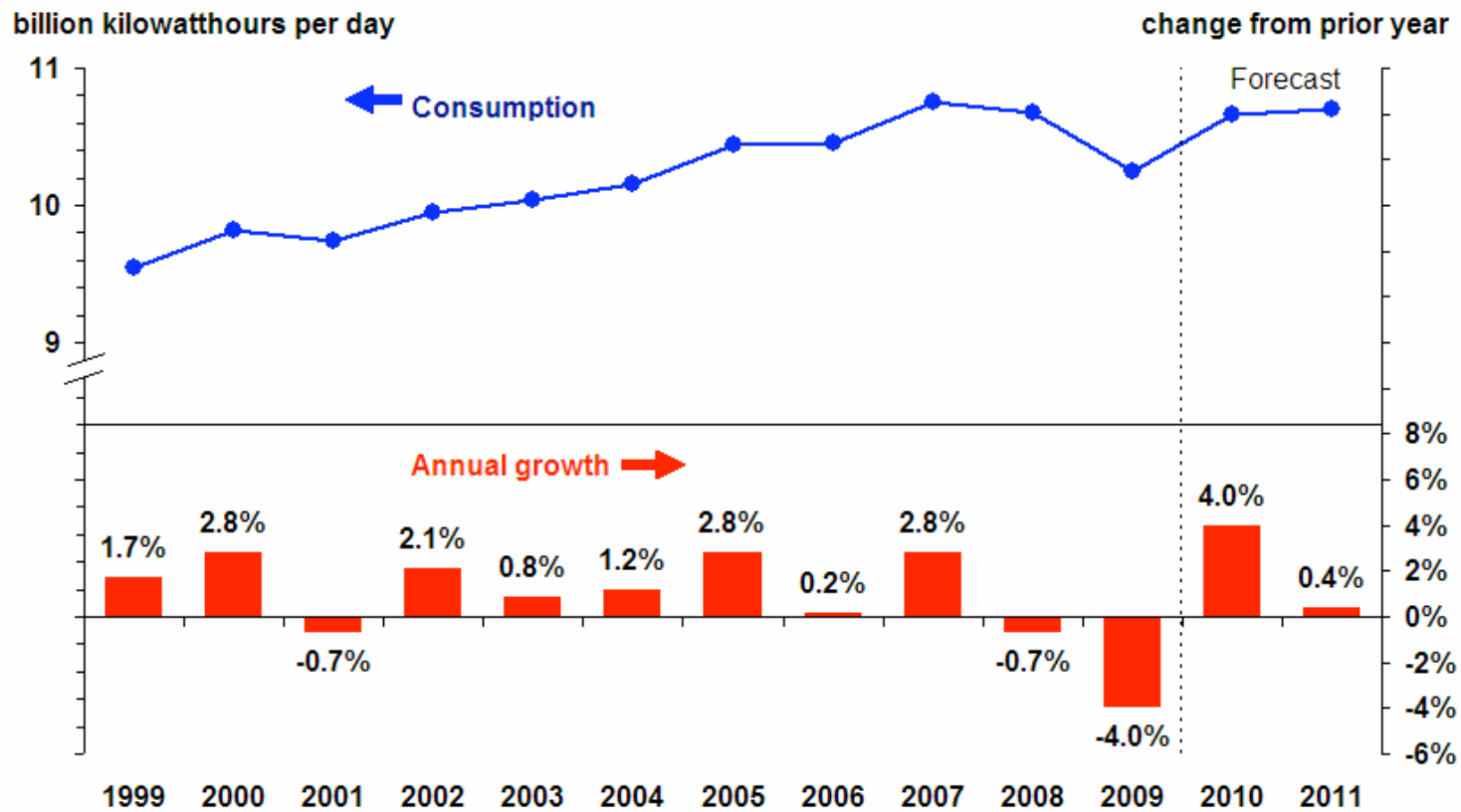


“When it comes to energy, failure is not an option.”

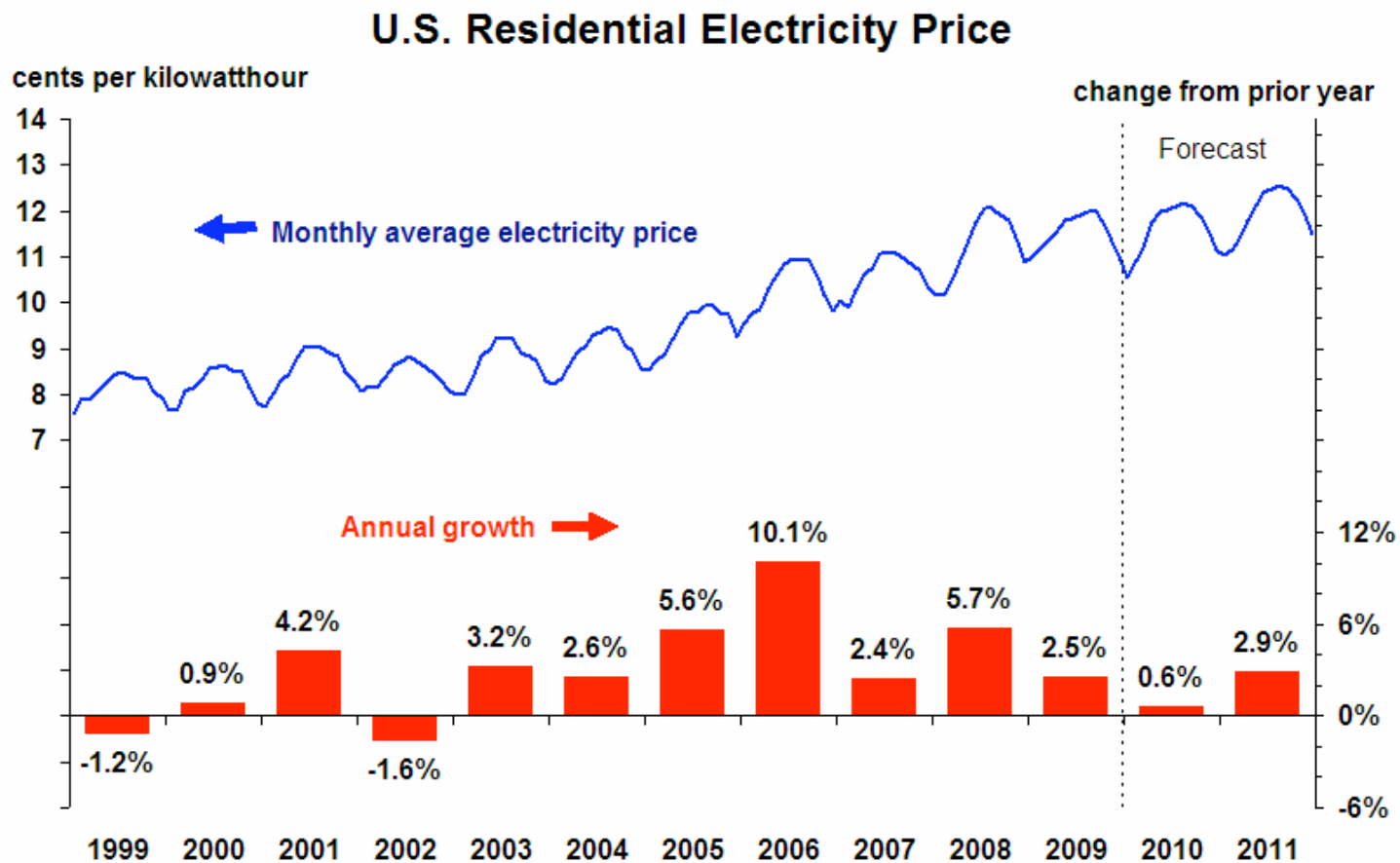
- Tom Friedman, New York Times

# Electricity Consumption

## U.S. Total Electricity Consumption

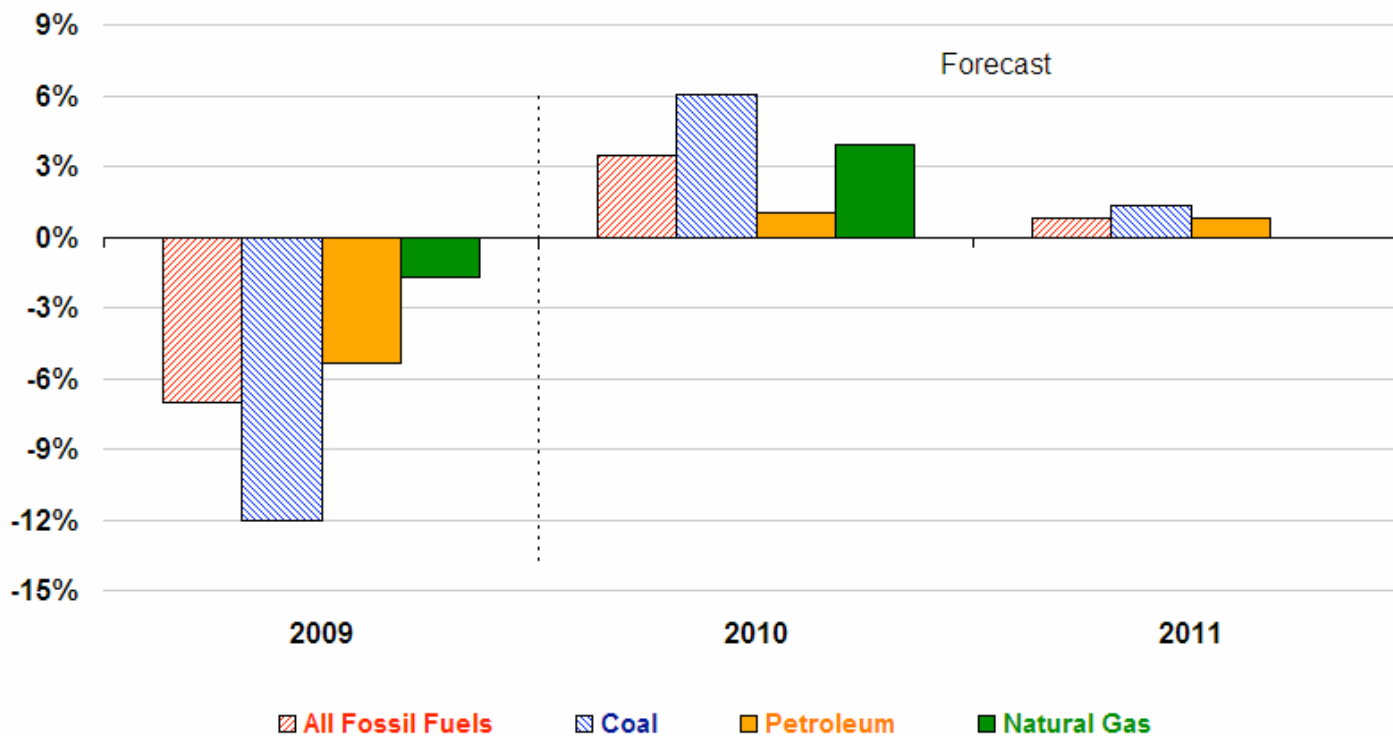


# Residential Electricity Price



# Carbon Dioxide Emissions

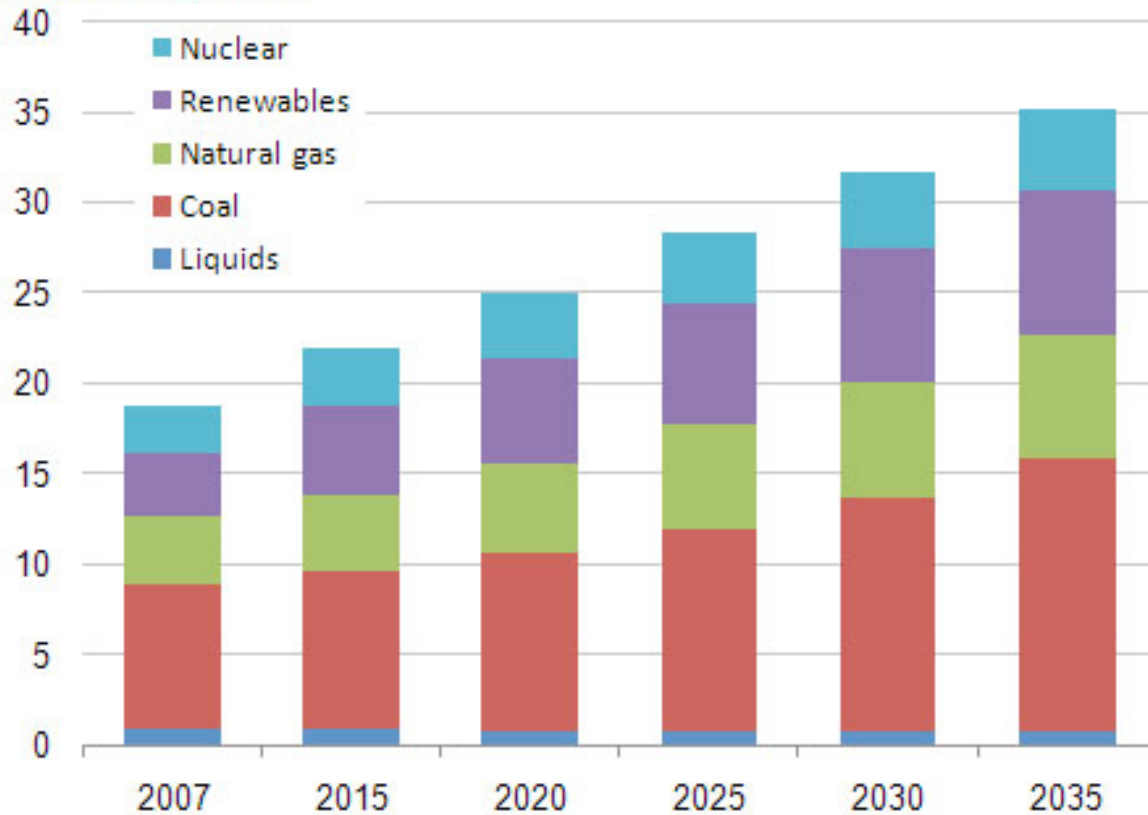
## U.S. Carbon Dioxide Emissions Growth (change from previous year)



# World Electric Generation

Figure 6. World net electricity generation by fuel

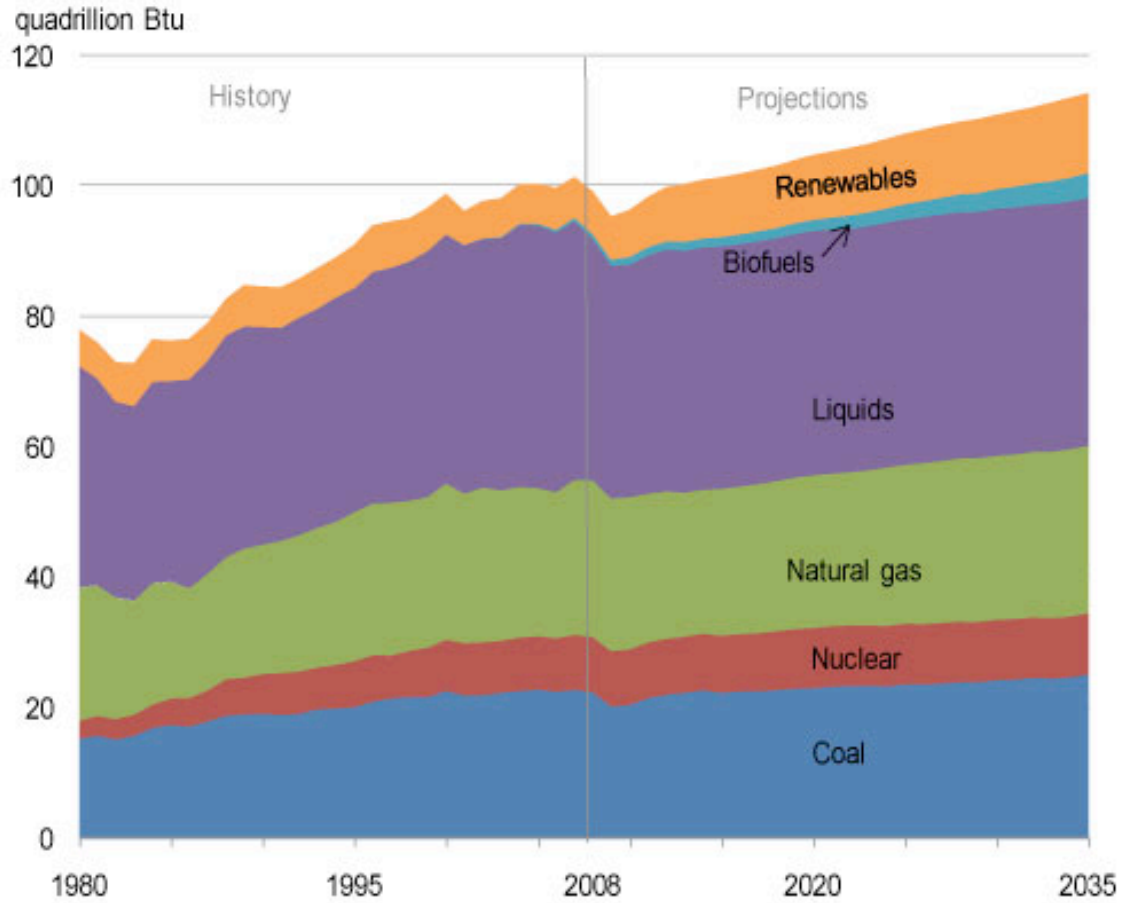
trillion kilowatthours



Source: US Energy Information Administration

# US Energy Usage by Fuel

Figure 41. Primary energy use by fuel, 1980-2035



Source: US Energy Information Administration

# Typical Alternative Energy Pricing

Energy Source	Typical Installation Size	Cost per Kilowatt Peak and Per Kilowatt Hour*
Solar Energy (Photovoltaics)	1-100 kilowatts	\$6 -10,000 per kWp or 20-40 cents per kWh
Micro turbines	30-300 kilowatts	\$1,000 to \$1,500 per installed kWp or 10 to 15 cents per kWh
Fuel Cells	1-200 kilowatts	\$3-4,000 per kWp or 10-15 cents per kWh
Wind Turbines	10 kilowatt - 2 Megawatt	\$1,500 - 3,000 kWp or 5-10 cents per kWh
Internal Combustion Engines	50 kilowatt to 5 Megawatt	\$400 - \$900 per kWp
Central Power Generation	500 - 3,000 Megawatt	\$500 - 1,000 per kWp or 3-5 cents per kWh

\*Source: [www.solarbuzz.com](http://www.solarbuzz.com)

# Energy Trends

- Energy pricing in Michigan has increased on average over 13% per year 2002 to 2008
- Environmental concerns - Co2 emissions/carbon caps will dramatically drive up electric power cost
- Alternative and renewable technologies are achieving cost parity with traditional generation
- A national RPS and additional commitment in Michigan will result in increasing renewable installations
- Distribute power provides for some independence

# Communities of the Future



- Complete a comprehensive evaluation of assets and opportunities
- Review prior recommendations or studies
- Identify potential public/private partners
- Develop a set of project ready proposals
- Initiate implementation of a comprehensive action plan(s)
- Measure performance

# Summary

- Stable, reliable and inexpensive energy has been a competitive advantage.
- Our national and state energy supply models are changing.
- Global implications will have significantly greater impact on future supply and pricing.
- Achieving a balanced portfolio is critical for long-term success.



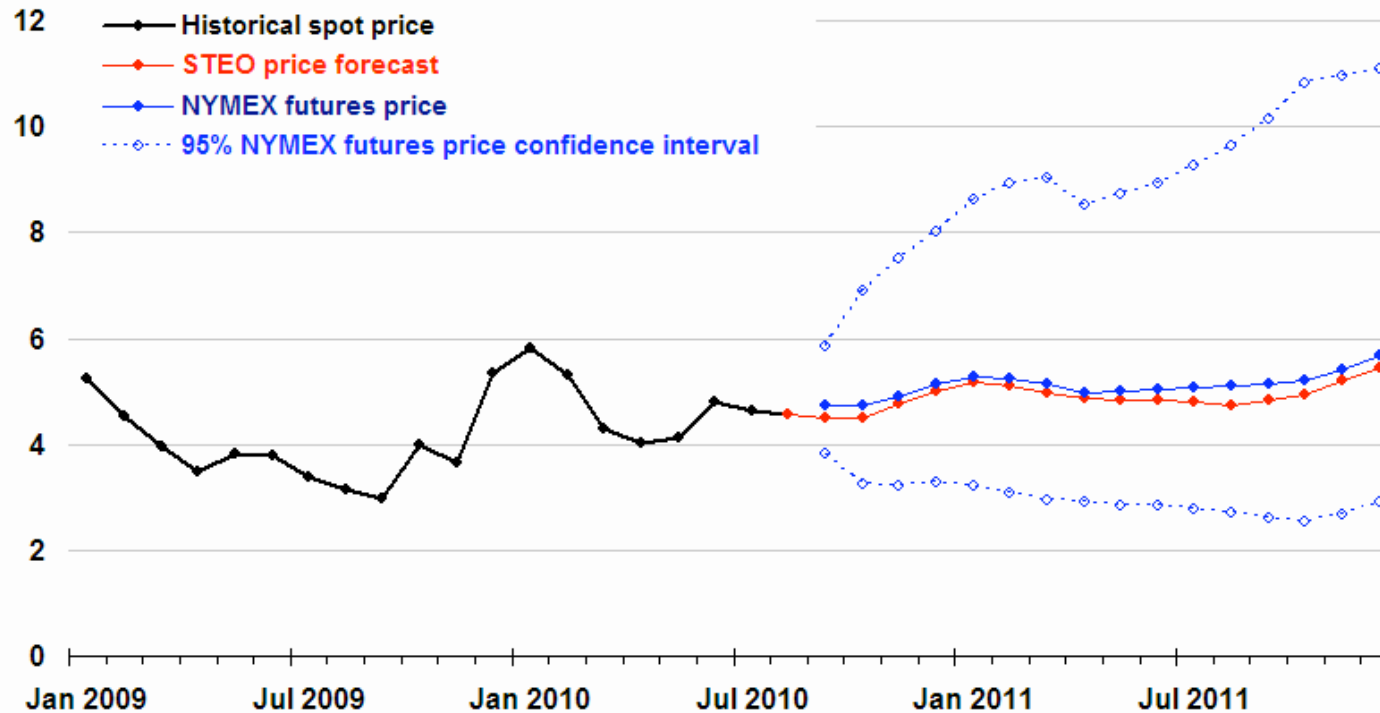
Thanks for you attention and interest!



# Natural Gas Prices

## Henry Hub Natural Gas Price

dollars per million btu



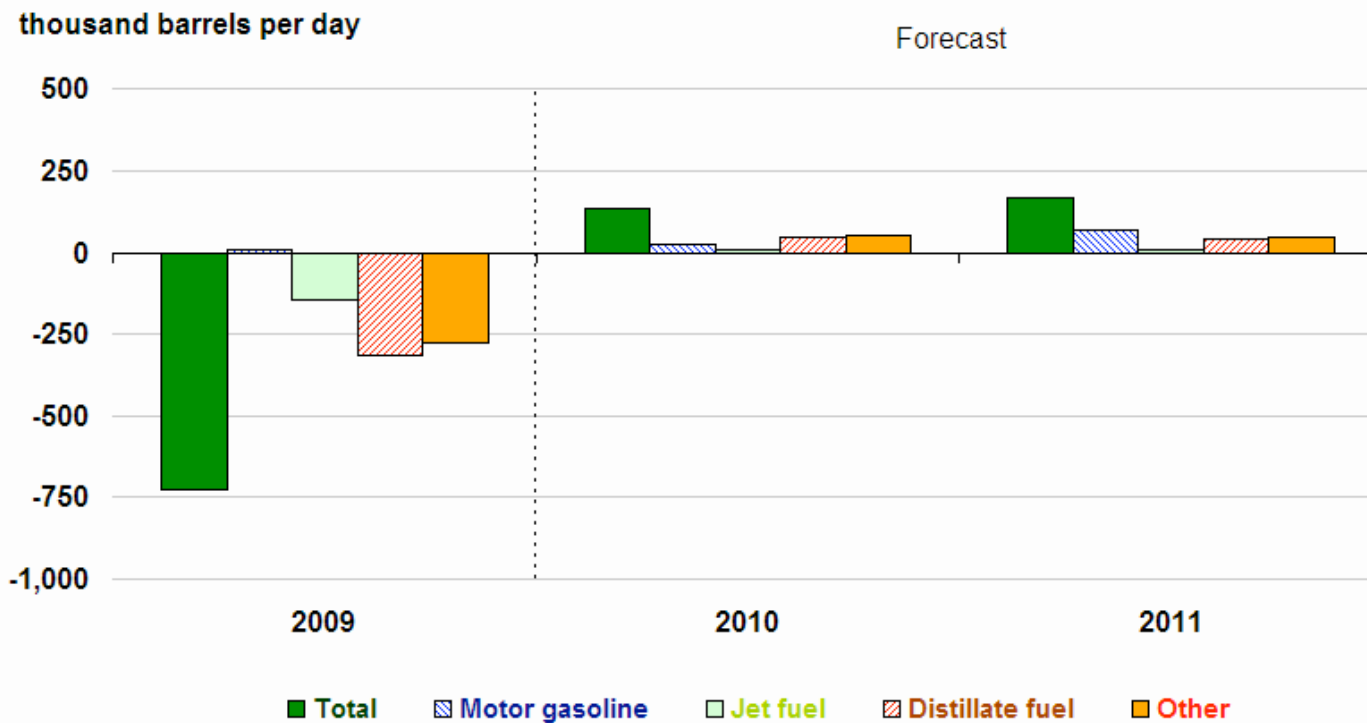
Note: Confidence interval derived from options market information for the 5 trading days ending August 5, 2010  
Intervals not calculated for months with sparse trading in "near-the-money" options contracts



Source: Short-Term Energy Outlook, August 2010; Reuters News Service; and CME Group

# Liquid Fuels Consumption

**U.S. Liquid Fuels Consumption Growth  
(change from previous year)**



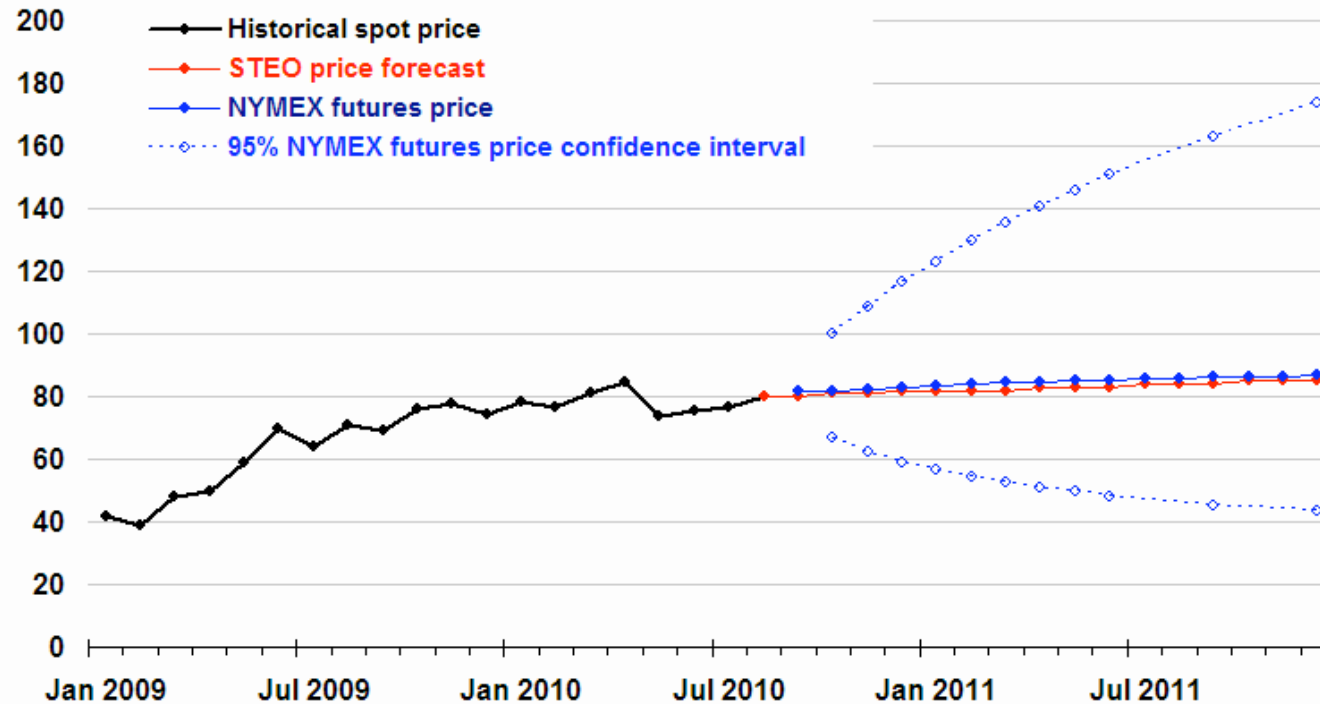
*Note: Percent change labels refer to total petroleum products growth*

Source: Short-Term Energy Outlook, August 2010

# Crude Oil Prices

## West Texas Intermediate (WTI) Crude Oil Price

dollars per barrel



Note: Confidence interval derived from options market information for the 5 trading days ending August 5, 2010  
Intervals not calculated for months with sparse trading in "near-the-money" options contracts



Source: Short-Term Energy Outlook, August 2010; Reuters News Service; and CME Group

# Natural Gas Consumption

## U.S. Total Natural Gas Consumption

