Climate Policy and Potential Impacts on Manufacturing Competitiveness

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IECA's objective is to work with policy makers to implement policies that reduce greenhouse gas emissions without loss of manufacturing competitiveness

A Climate Policy Truth

ALL COSTS ARE PASSED ON TO HOMEOWNERS, FARMERS AND MANUFACTURERS

Key Mfg'ing Climate Policy Points-

1. Only sector with emissions at 1990 level
2. Greatest concern-coal to natural gas fuel switching by power sector- a crisis in the making
3. Should not give competitive advantage to foreign imports or subsidize them
4. EIA/EPA significantly understate cost of legislation

Better Policy- Sector Approach

- Tailor incentives/technology/fees and or mandates to the sector
- Provides a clear and targeted market signal
- Reduces ghgs more cost effectively
- Reduces indirect market distortions
- Reduces potential for manufacturing leaving the country

Who Are Energy Price Sensitive Industries?

Building Block Industries	Convert to	Commercial & Consumer Products
Chemicals	→	Food Production
Plastics	→	Detergents
Fertilizer	→	Automobiles
Glass / ceramics	→	Computers
Brick	→	Construction
Steel	→	Medical Supplies
Aluminum	→	Paint
Pulp and Paper	→	Pharmaceuticals
Cement	→	Cosmetics
Food Processing	→	Telecommunication

Industrial Products are Essential to Economic Growth

- The aerospace/defense industry uses steel, aluminum, plastics and chemicals.
- The air transport industry uses steel, aluminum, plastics and chemicals.
- The auto and truck industries use steel, aluminum, plastics, chemicals.
- The beverage industry uses aluminum, steel, paper, glass and plastic.
- The biotechnology industry uses chemicals.
- The commercial and home building construction industry uses brick, steel, aluminum, wood, cement and glass.
- The oil and gas industry uses steel, chemicals, cement.
- The chemical industry uses chemicals, steel, cement and glass.
- The computer industry uses plastics, chemicals, and glass.
- The electrical equipment industry uses steel.
- The electric and gas utility sector uses steel and cement.
- The food industry uses fertilizer, chemicals, plastics and paper.

Industrial Products are Essential to Economic Growth

- The home furnishing industry uses wood, glass, chemicals.
- The heavy construction industry uses steel and rubber.
- The home appliance industry uses steel, aluminum, glass and wood.
- The household products industry uses chemicals, plastic; paper, glass.
- The machinery industry uses steel, chemicals and plastics.
- The maritime industry uses steel.
- The packaging industry uses plastics, paper, aluminum and steel.
- The paper / forest products industry uses steel and chemicals.
- The refining industry uses steel, chemicals and cement.
- The pharmaceutical industry uses chemicals, glass and steel.
- Railroads use steel.
- The toiletries/cosmetics industry uses chemicals, plastics, paper, and glass.

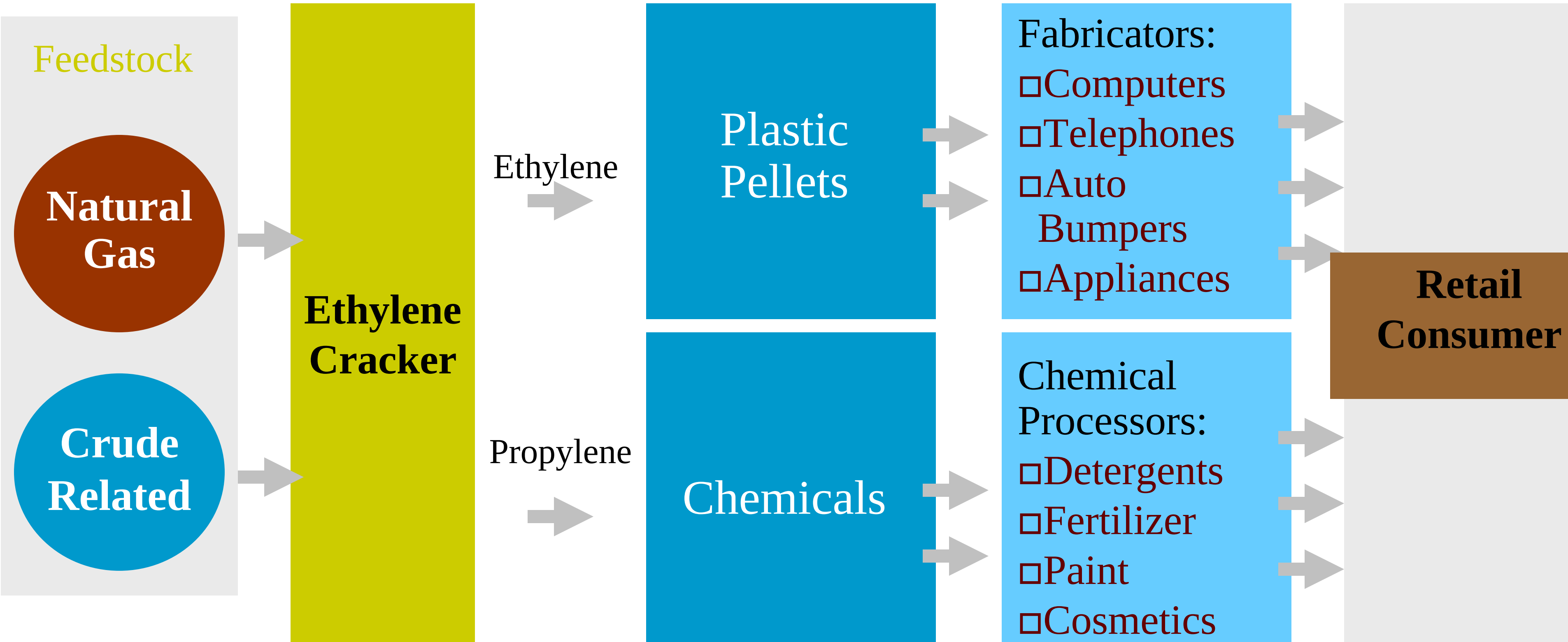
“The US economy cannot grow without using greater quantities of industrial products.”

“The only unanswered question…is whether they will be produced here or imported.”

Paul N. Cicio

Industrial Energy Consumers of America

When Plants Move Offshore, They Often Take Their Customers With Them Example



Moving the Ethylene Cracker offshore increases the potential for all downstream industries to move also.

Why Did These Industries Locate In The United States?

- Access to the customers, quality of workforce, stability of government, reliable and **globally competitive energy** resulted in long-term investment in the U.S.

Since 2000, only one has changed significantly ….natural gas and now electricity costs.

Relationship of High Natural Gas Prices to Lost Manufacturing Jobs

	2000	2001	2002	2003	2004	2005	2006	2007	%
Employment (MM)	17.2	16.4	15.2	14.5	14.3	14.2	14.1	13.9	-19.2%
Natural Gas Consumption (TCF)	8.1	7.3	7.5	7.2	7.2	6.7	6.6	6.8	-16%
Natural Gas Wholesale Price ($ per MCF)	4.50	5.20	4.00	5.90	6.50	8.60	7.90	6.85	+52%

The Industrial Sector is Unique

- Our products are part of the solution: insulation; double pane windows; energy efficient appliances; fuel efficient vehicles; fertilizer; technology to enable solar/wind……etc
- Already has a price signal- its called global competition. Energy is a significant cost of production. Competitiveness issues and cost savings is incentive enough
- Outstanding energy efficiency success story- total energy consumption since 1973 is .015% less and total production has more than doubled!

Key Point: Competition works: achieved without regulation

The Industrial Sector is Unique

- The only sector that requires globally competitive energy
- Compete globally and in an environment of unfair competition // Other countries subsidize energy and manufacturing
- Unlike other sectors…we re-locate plants to be competitive
- Mostly natural gas dependent as a fuel and feedstock
- Some processes (aluminum, steel, some chemicals) are very electricity intensive

The Industrial Sector is Unique

- Absolute GHG reductions are an exception…not a norm. Serving world markets means increased product production and increased energy use…thus the need for supply of low carbon energy
- Products compete with one another for markets (i.e. plastic, steel, paper, aluminum)
- Significant energy efficient co-generators of electricity and steam

Total Carbon Dioxide Emission

(Million Metric Tons of Carbon Dioxide)

	1990	2006	Difference
Residential	953.7	1253.8	+31.4%
Commercial	780.7	1050.6	+34.6%
Industrial	1683.6	1682.3	< 0%
Transportation	1566.8	1958.6	+25%
Electricity	1803.1	2375	+31.7%

Source: EIA

Greatest Concern

Coal to Natural Gas Fuel Switching by the Power Sector- A National Crisis in the Making

Driven by Climate Policy…ghg reduction targets in time frames without the availability of low carbon energy sources means natural gas is the default!!

Greatest Concern-Coal to Natural Gas Fuel Switching

- It raises the price of both natural gas and electricity for **all** consumers.
- Natural gas fired power is increasingly setting the marginal price for electricity
- For the next 10 years or so, there is no other short term low-carbon fuel other than natural gas

EU Cap & Trade

March 26, 2007

Senate Committee on Energy & Natural Resources

Hearing on European Union's Emissions Trading Scheme

- Answer by Garth Edwards: Shell Oil, Trading Manager – Environmental Products, London, England

- **“The bulk of emission reductions in the EU are made actually by coal to gas (natural gas) fuel switching in power stations. *And any price will start to change the dispatch of power* plants…and start change away from coal into gas (natural gas).**

Natural Gas Consumption by End Use

(Million Cubic Feet)

	2000	2001	2002	2003	2004	2005	2006	2007	Difference
Total Consumption	21.5	22.2	23.0	22.3	22.4	22.2	21.9	23.6	+9.8%
Residential	5.0	4.8	4.9	5.1	4.9	4.8	4.4	4.9	-2%
Commercial	3.2	3.0	3.1	3.2	3.1	3.1	2.9	3.1	-3%
Industrial	8.1	7.3	7.5	7.2	7.2	6.7	6.6	6.8	-16%
Electric Power	5.2	5.3	5.7	5.1	5.5	5.9	6.2	7.0	+35%

Source: EIA

Planned Nameplate Capacity Additions from New Generation (MW)

Energy Source	2006	2007	2008
Coal	602	1589	1056
Petroleum	269	78	168
Natural Gas	10657	16892	15050
Other gases	0	391	1160
Nuclear	0	0	0
Hydro	8	3	4
Other Renewable	3027	2454	695
Total	14573	21407	18133

Source: EIA

Existing Electricity Generation Capacity 2005 (MW)- Would Consume 22 TCF

Energy Source	Nameplate Capacity
Coal	335,892
Petroleum	64,845
Natural Gas	436,991
Other Gases	2,293
Nuclear	105,585
Hydro	77,354
Other Renewable	23,553
Pumped Storage	19,569
Other	928
Total	1,067,010

Source: EIA

Electric Power Research Institute

"Even though natural gas is used to produce only 20 percent of the electricity, it accounts for 55% of the electric industry's entire fuel expense ($50B out of $91B)."

Nothing in any of the proposed climate legislation would prevent coal to natural gas fuel switching

Electric utilities have alternatives such as coal, nuclear and renewable energy – homeowners, farmers and mfg’ers do not.

<u>Either increase natural gas supply or reduce consumption by the power sector!</u>

Natural Gas Fired Power Generation Impacts on All Consumers

A single 500 MW rankine cycle power plant (10,000 Btu/kwh) will use the equivalent natural gas volume used to fuel 842,308 homes each year.

Natural Gas Supply is Fragile

- Reserve production capacity is almost non-existent!
- Inventory levels are good. Worry about hot summers / cold winters / hurricanes
- Supply is flat since year 2000 despite record well completions
- Canadian imports are up 1.4% since 2001
- Gulf of Mexico in decline until last year
- Alaska Natural Gas Pipeline – 2018 at earliest
- LNG- Unreliable.

Natural Gas Production

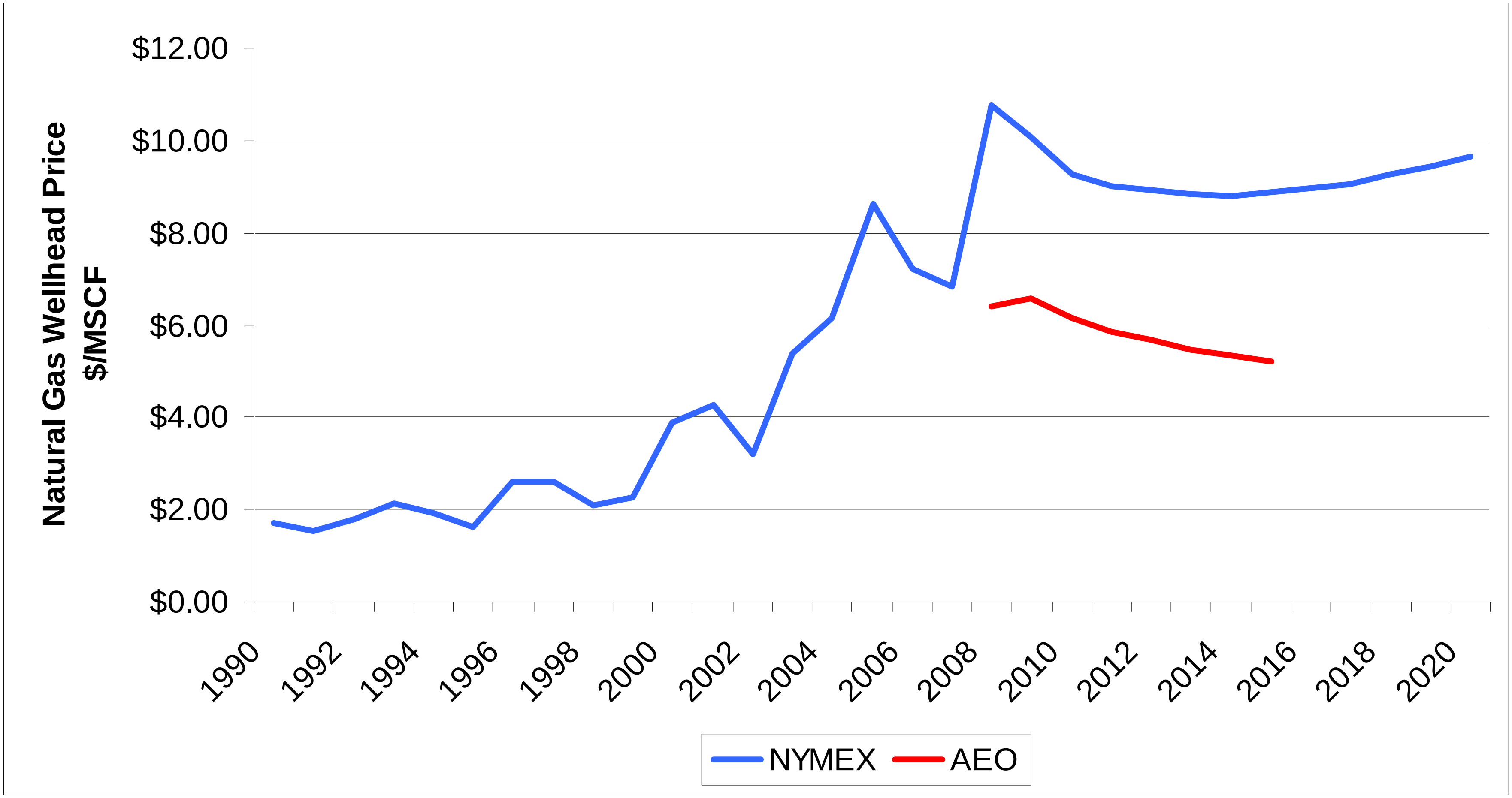
(Volumes in Trillion Cubic Feet)

	2000	2001	2002	2003	2004	2005	2006	2007	Difference
Dry Production	**19.2**	**19.6**	**18.9**	**19.1**	**18.6**	**18.1**	**18.5**	**19.3**	**0%**

Source: EIA

Natural Gas Prices – NYMEX vs. AEO 2008

(NYMEX Prices mmBTU)



**Nymex Prices as of 4/17/08*

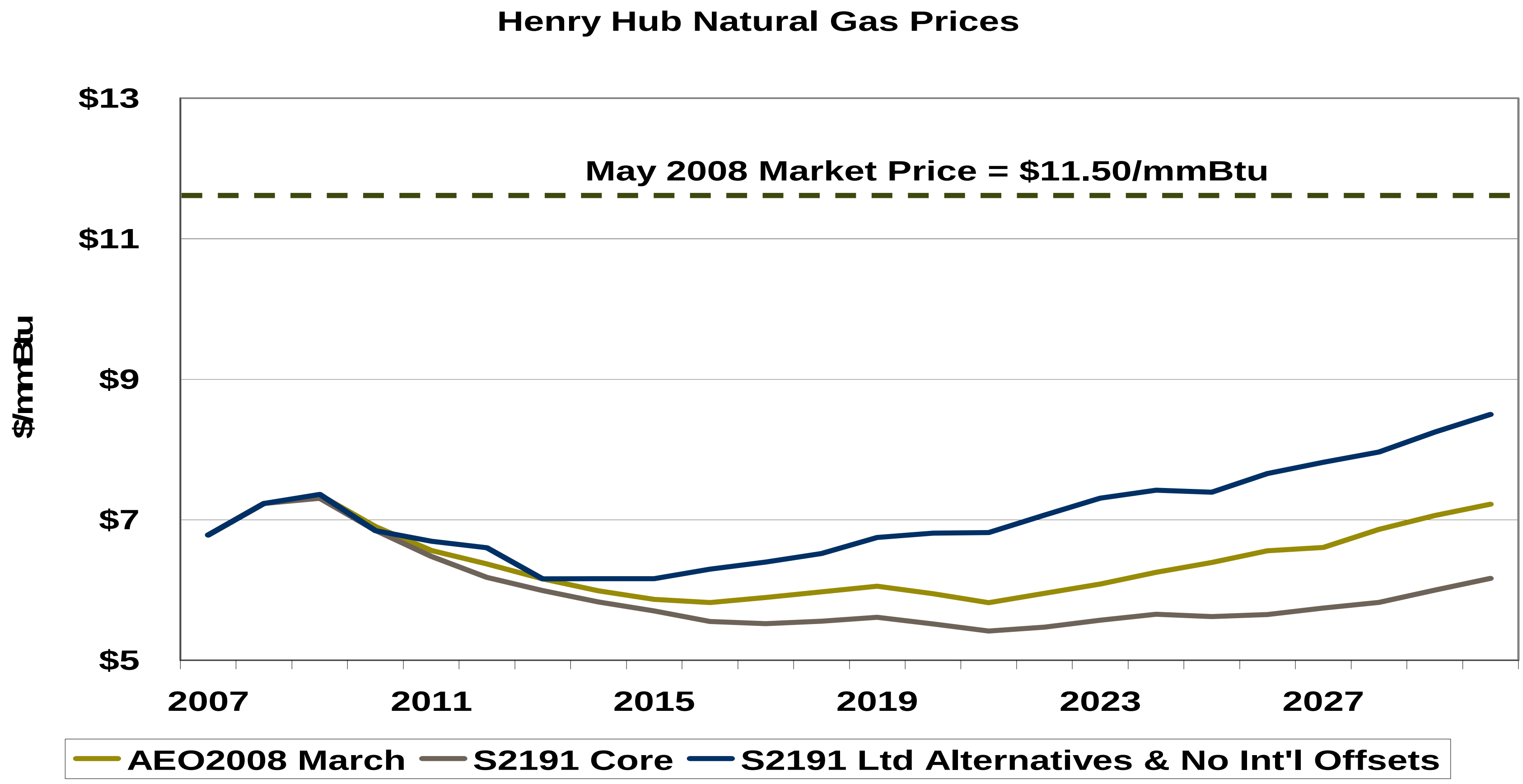
Climate Policy – S. 2191 - Imports of Energy Intensive Products Issue

- Climate policy should not give competitive advantage to foreign imports or subsidize them
- The AEP/IBEW provision will NOT provide a level playing field with energy intensive imports
- Not a single manufacturing company supports this provision

US manufacturing is already under siege by energy intensive imports

- Analyzed sixteen energy intensive product categories under the “Industrial Supplies and Materials” of the U.S. Census Bureau
- Imports from 2000 to 2003 were about unchanged while imports from 2003 to 2007 rose a staggering 78.3%. Imports rose from $87.3 billion in 2003 to $155.7 billion in 2007.
- Timing is consistent with rise in US natural gas price

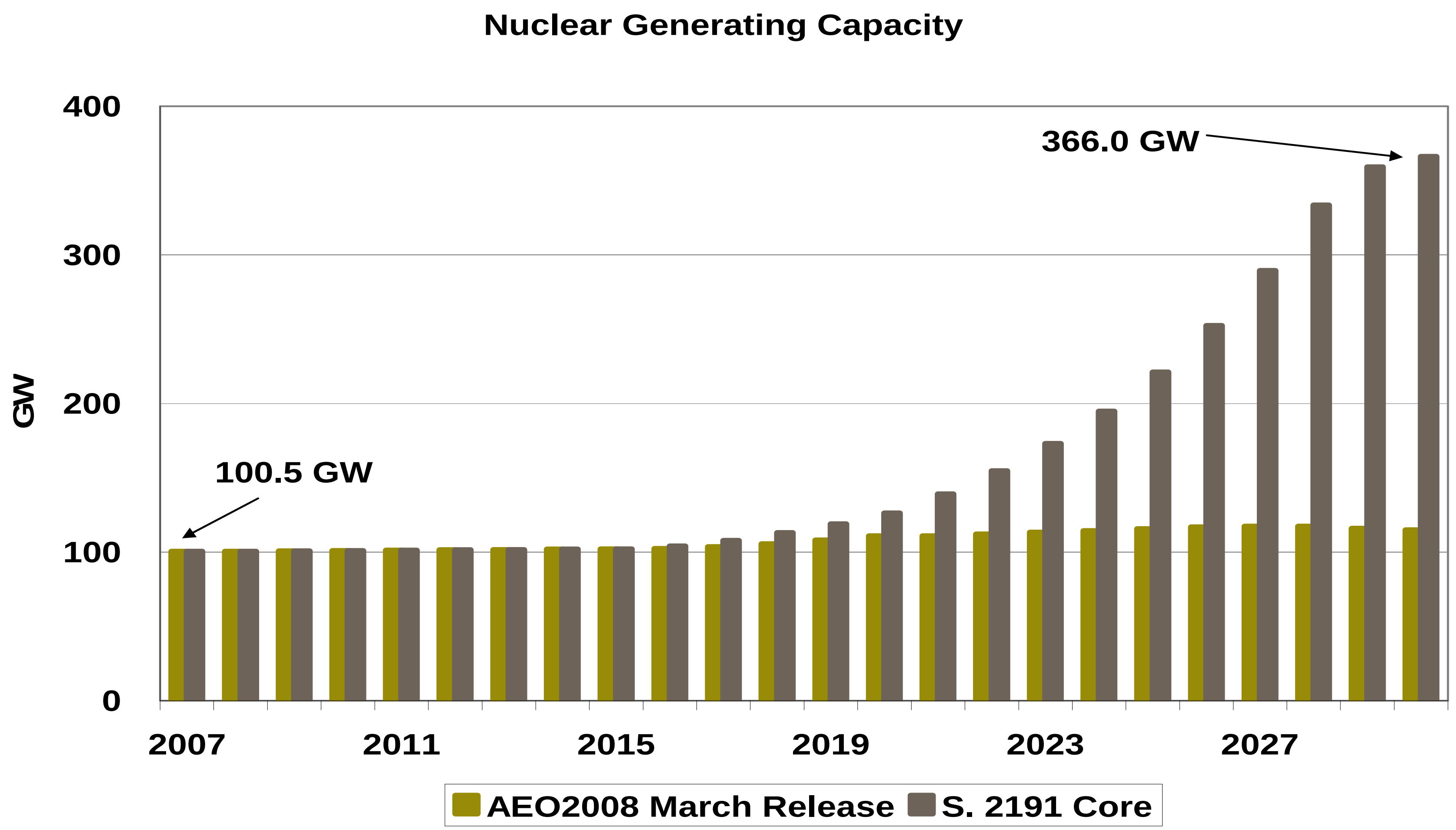
EIA Underestimates Cost of S. 2191- Natural Gas Price Assumptions Are Too Low



EIA Under Estimates Natural Gas Prices by a Trillion Dollars

Year	$/mmBtu NYMEX	$/mmBtu AEO2008	$/mmBtu Difference	Tcf Consumption	Additional Cost ($billion)
2008	11.65	7.23	4.42	23.12	$ 102.2
2009	10.75	7.35	3.40	23.31	$ 79.3
2010	9.90	6.90	3.00	23.25	$ 69.7
2011	9.60	6.56	3.04	23.37	$ 71.0
2012	9.50	6.37	3.13	23.54	$ 73.7
2013	9.40	6.16	3.24	23.35	$ 75.7
2014	9.35	5.99	3.36	23.42	$ 78.8
2015	9.30	5.87	3.43	23.66	$ 81.3
2016	9.42	5.82	3.60	23.83	$ 85.8
2017	9.55	5.89	3.66	23.78	$ 87.0
2018	9.75	5.97	3.78	23.61	$ 89.2
2019	9.90	6.05	3.85	23.42	$ 90.1
2020	10.24	5.95	4.29	23.33	$ 100.1
					$ 1,083.7 Total

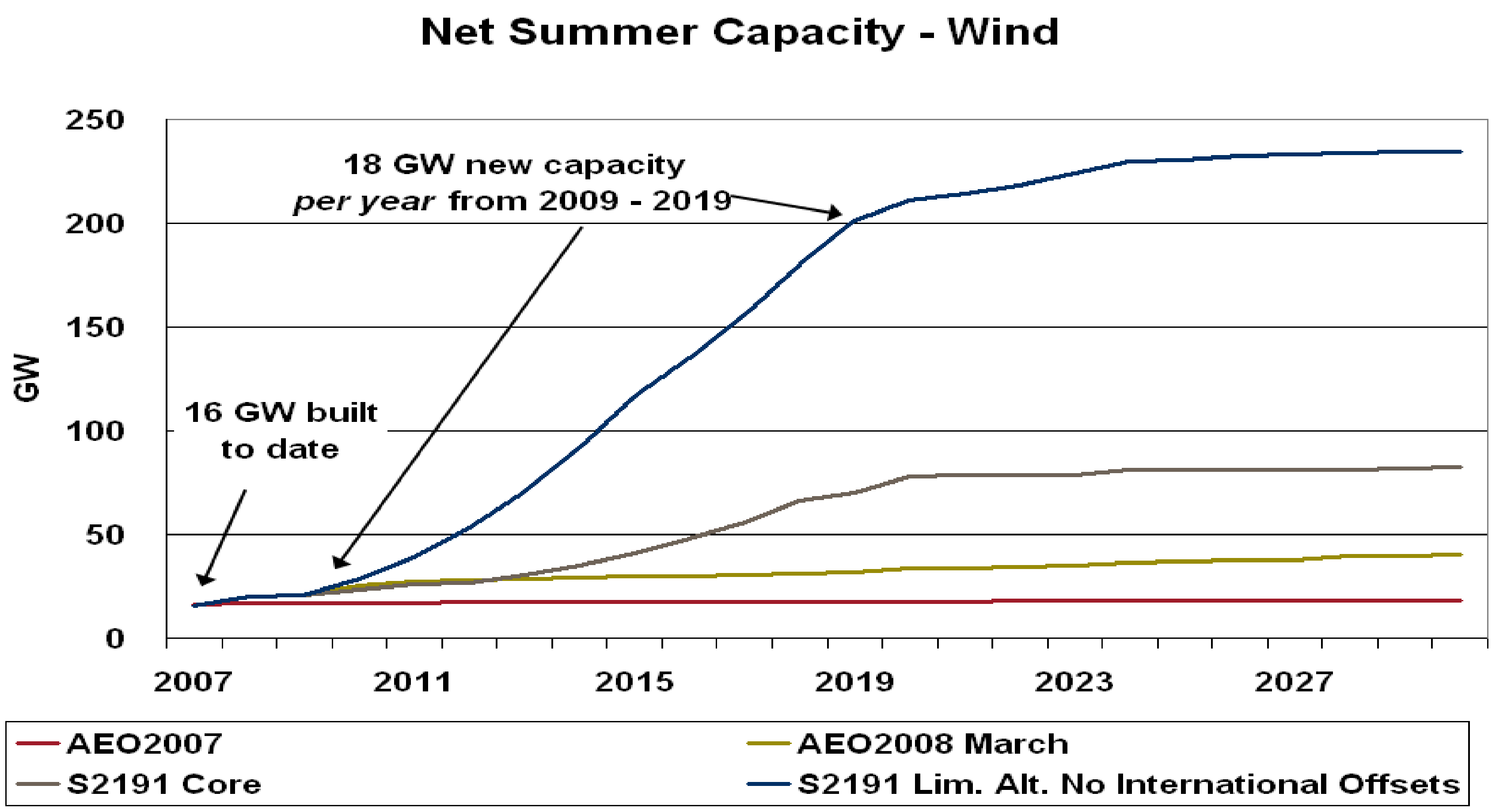
EIA Overestimates New Nuclear Capacity Builds by 533%



Nuclear Energy Institute

- Forecasts that potentially 35 new nuclear plants will be built by 2030.
- Each plant is estimated to produce 1.2 gigawatts of electricity
- Each take 36 months to build
- Total capacity by 2030 = 42 gigawatts

EIA- Wind Energy Increases



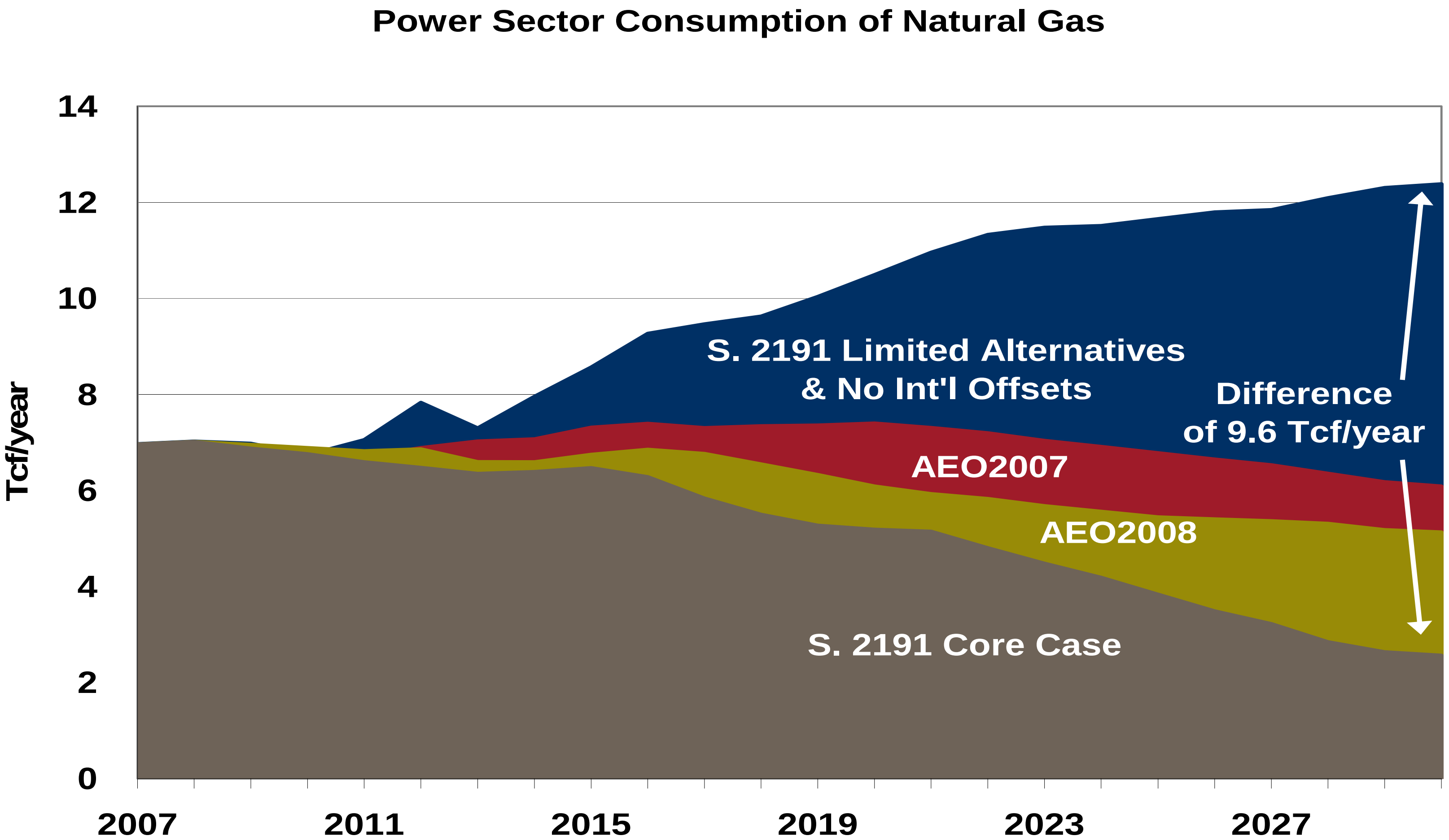
EIA's "Limited Alternatives/No International Offsets" Case

- Predicts the contribution from renewable energy resources explodes – non-hydro renewable resources reach 1.184 million GWhrs by 2030 (more than 26 % of projected U.S. electricity demand in that year vs. 2.0 % in 2007).

EIA – Wind Energy Forecast

- Wind is expected to grow from 38,000 GWhrs last year to just under 1 million
- GWhrs by 2030 (26-fold increase)
- Of this total, 260,000 GWhrs – or a little over 1/4th of the total, is projected to come from off-shore wind farms, a resource that does not yet exist in the U.S. market.

EIA- 9.6 TCF Margin of Error!



Thank You

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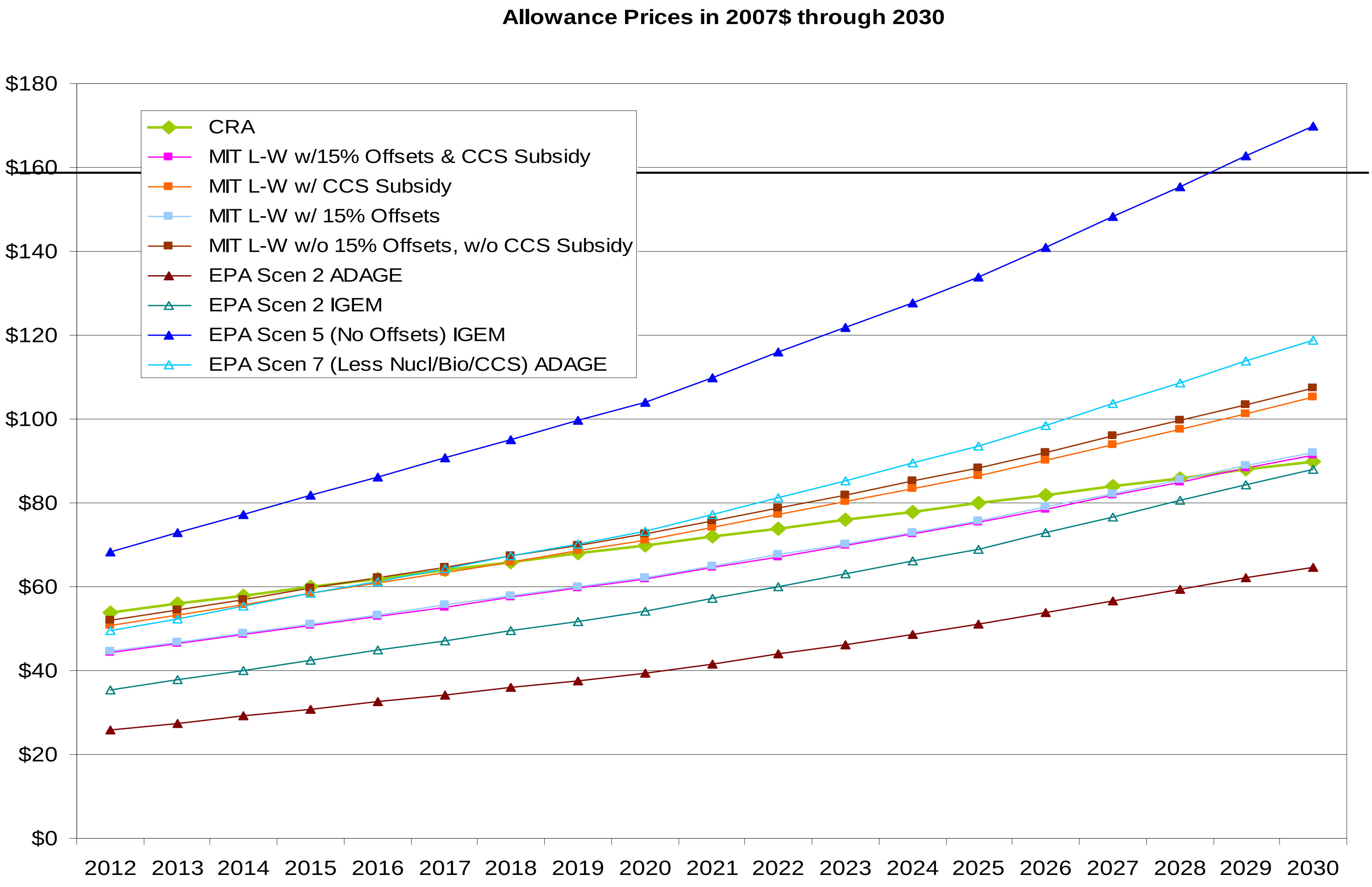

Allowance Prices in 2007$ through 2030
CRA
MIT L-W w/15% Offsets & CCS Subsidy
MIT L-W w/ CCS Subsidy
MIT L-W w/ 15% Offsets
MIT L-W w/o 15% Offsets, w/o CCS Subsidy
EPA Scen 2 ADAGE
EPA Scen 2 IGEM
EPA Scen 5 (No Offsets) IGEM
EPA Scen 7 (Less Nucl/Bio/CCS) ADAGE
$180
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$50 Per Ton Carbon Price Impact on Natural Gas

- 4/17/08 NYMEX Price = $10.75 per mm Btu

- Plus $50/ ton carbon allowance= $2.74 per mmBtu*

Total cost= $13.49 per mmBtu; a 25% increase

*EIA

Industrial Sector Energy Consumption

(Trillion Btus)

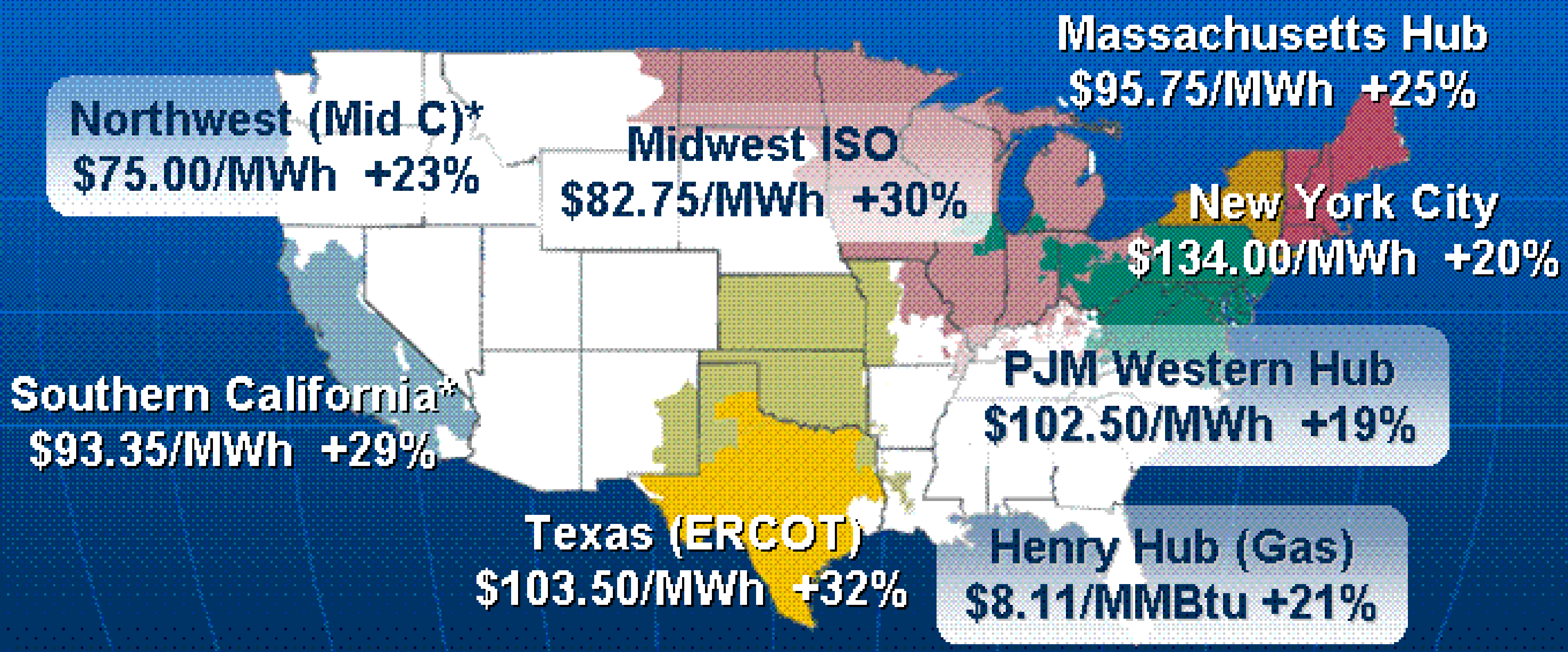
Year	Coal	Natural Gas	Renewable
1975	3667	8532	1096
2000	2256	9500	1828
2006	1938	7969	1640
75 vs. 06	-47%	-6.6%	+49.6%

Source: EIA

Coal to natural gas fuel switching by the power sector

- Increased power sector demand drives up natural gas and electricity prices for ALL consumers.
- Power sector natural gas demand up 35% since 2000 while natural gas production is flat: Residential -2%; Commercial –3%; Industrial -16%
- Proposed 2008 power plants- Natural gas 15,050 MW; Coal 1,056 MW
- Fuel switching happened under the EU ETS and had nothing to do with the over supply of allowances

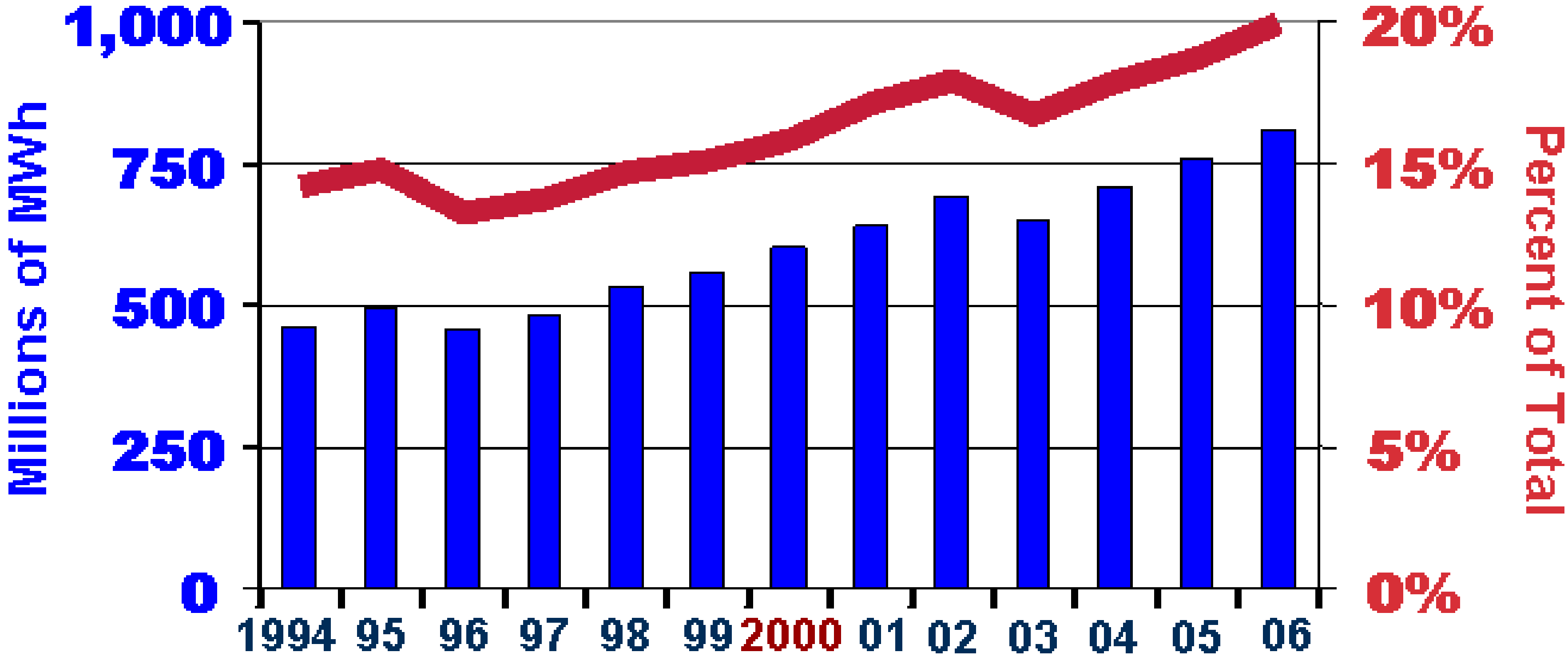
Summer 2007 Forward Prices Now Higher Than 2006 Actual Prices



* Western prices are for 3rd quarter.

Sources: Platts for forward electricity prices for July and August 2007, NYMEX and ICE for gas. All prices effective 5/11.

Natural Gas Grows as Generation Fuel in Size and Share



Source: Energy Information Administration

Electricity Retail Prices

(cents per kwh, including taxes)

	2000	2001	2002	2003	2004	2005	2006	%
Residential	**8.24**	**8.58**	**8.44**	**8.72**	**8.95**	**9.45**	**10.40**	**+26%**
Commercial	**7.43**	**7.92**	**7.89**	**8.03**	**8.17**	**8.67**	**9.36**	**+26%**
Industrial	**4.64**	**5.05**	**4.88**	**5.11**	**5.25**	**5.73**	**6.09**	**+31%**

Source: EIA

Natural Gas Prices – (May, 2008 $11.00)

(Dollars per Thousand Cubic Feet)

	2000	2001	2002	2003	2004	2005	2006	Difference
Residential	7.8	9.6	7.9	9.6	10.8	12.8	13.8	+77%
Commercial	6.6	8.4	6.6	8.4	9.4	11.6	12.0	+82%
Industrial	4.5	5.2	4.0	5.9	6.5	8.6	7.9	+76%
Electric Power	4.4	4.6	3.7	5.6	6.1	8.5	7.1	+61%

Source: EIA