The Effects of High Fuel Prices on Electricity Markets and Deregulatior

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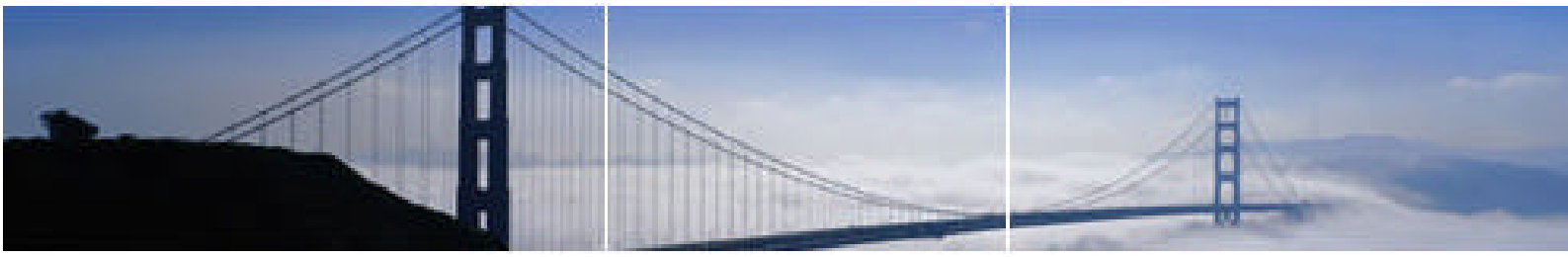

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Background – Fuel Markets

Effects on Electricity Prices

Effects on Electricity Deregulation

Fuel Markets

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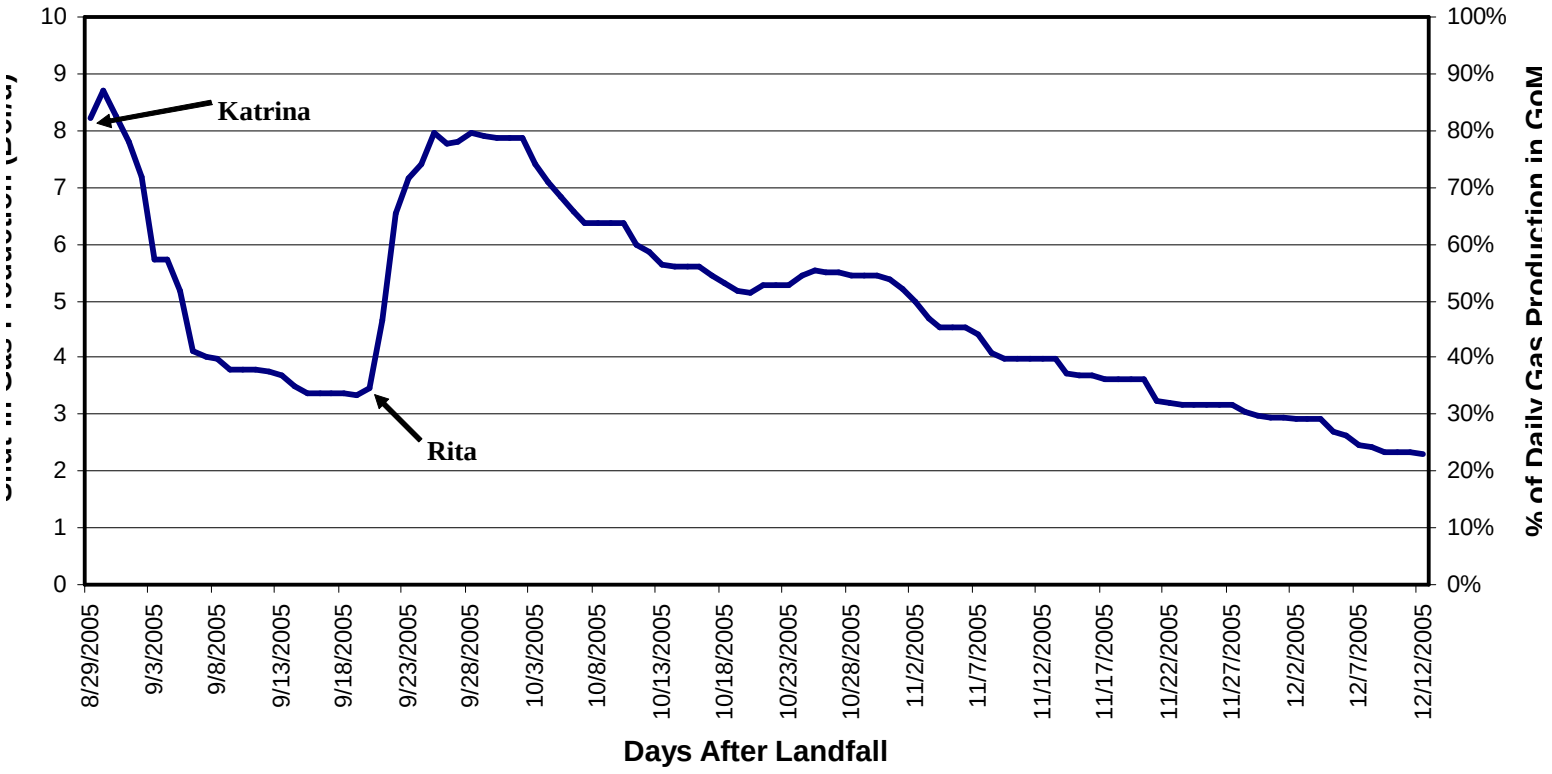
)05 Henry Hub Natural Gas Price Increase Likely to be 45 Percent over 2004, Which Itself was a Record

Year	Henry Hub Average (Nominal$/MMBtu)
1996	2.81
1997	2.48
1998	2.08
1999	2.29
2000	4.70
2001	3.70
2002	3.02
2003	5.46
2004	5.90
2005 YTD[1]	8.24

[1]Note" YTD December 15, 2005. 2005 final estimated to be $8.56/MMBtu
Source: Platts' Gas Daily.
2005 Estimate is 3.5 times higher than 1996-1999 average

ıut-In Gas Production in the Gulf Has Been Substantial – But Problem is Broader

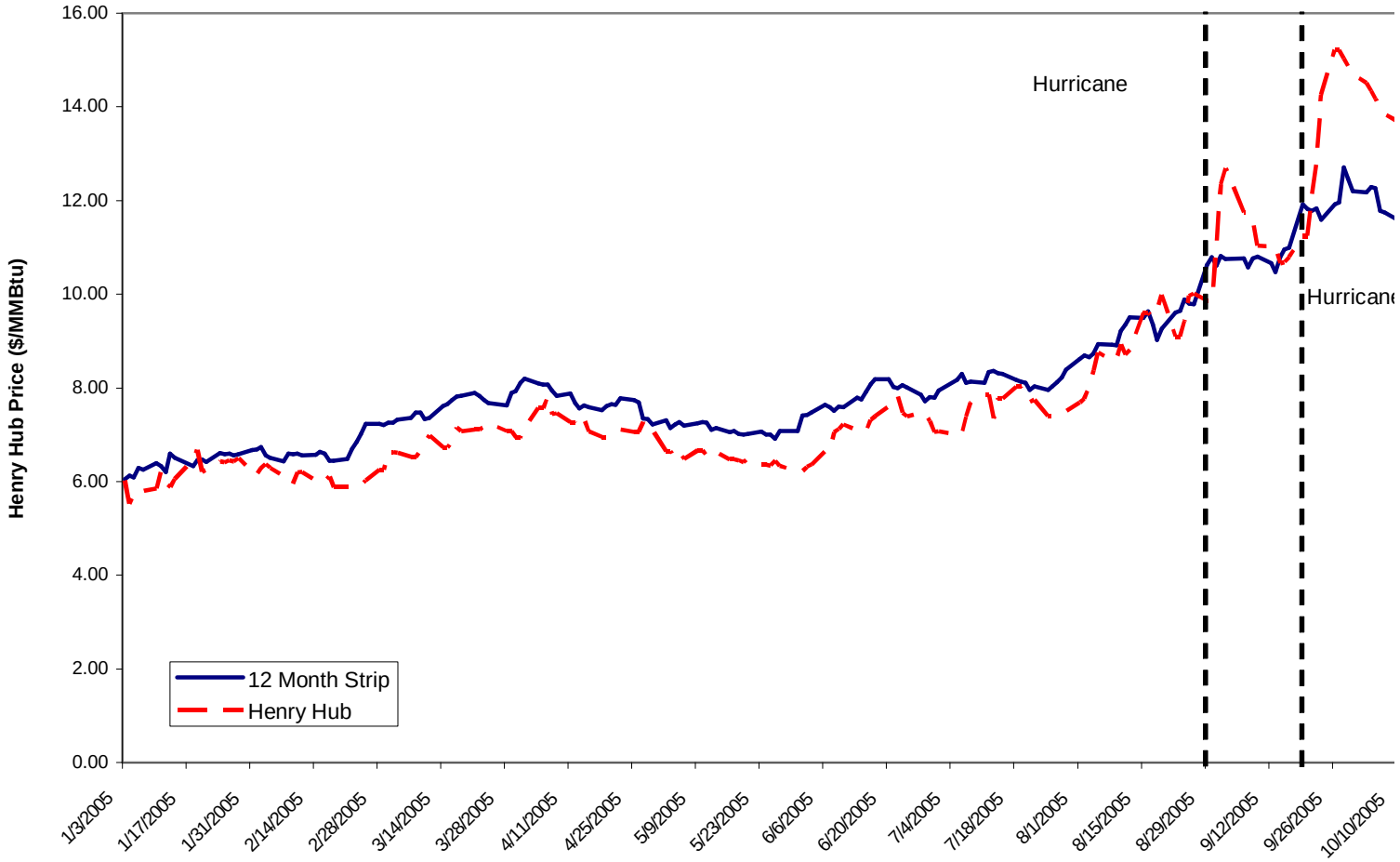


of December 12, 2005
rce: EIA

ırrent Futures are Backwardated, but Still High – ICF Forecasts Show Even Greater Backwardation

Year	12-Month Strip Average o Futures Traded on 12/14/2005
2006	12.03
2007	10.27
2008	8.91
2009	8.01
2010	7.35

enry Hub – Spot and 12 Month Strip Prices – Post-Hurricane Prices Even Higher Than YTD



Note:
1) Henry Hub spot price interpolated for days in which the market was closed.
2) The 12 month strips are the simple averages for the futures traded for the succeeding 12 months from the transaction date.
Source: Platts' Gas Daily & NYMEX

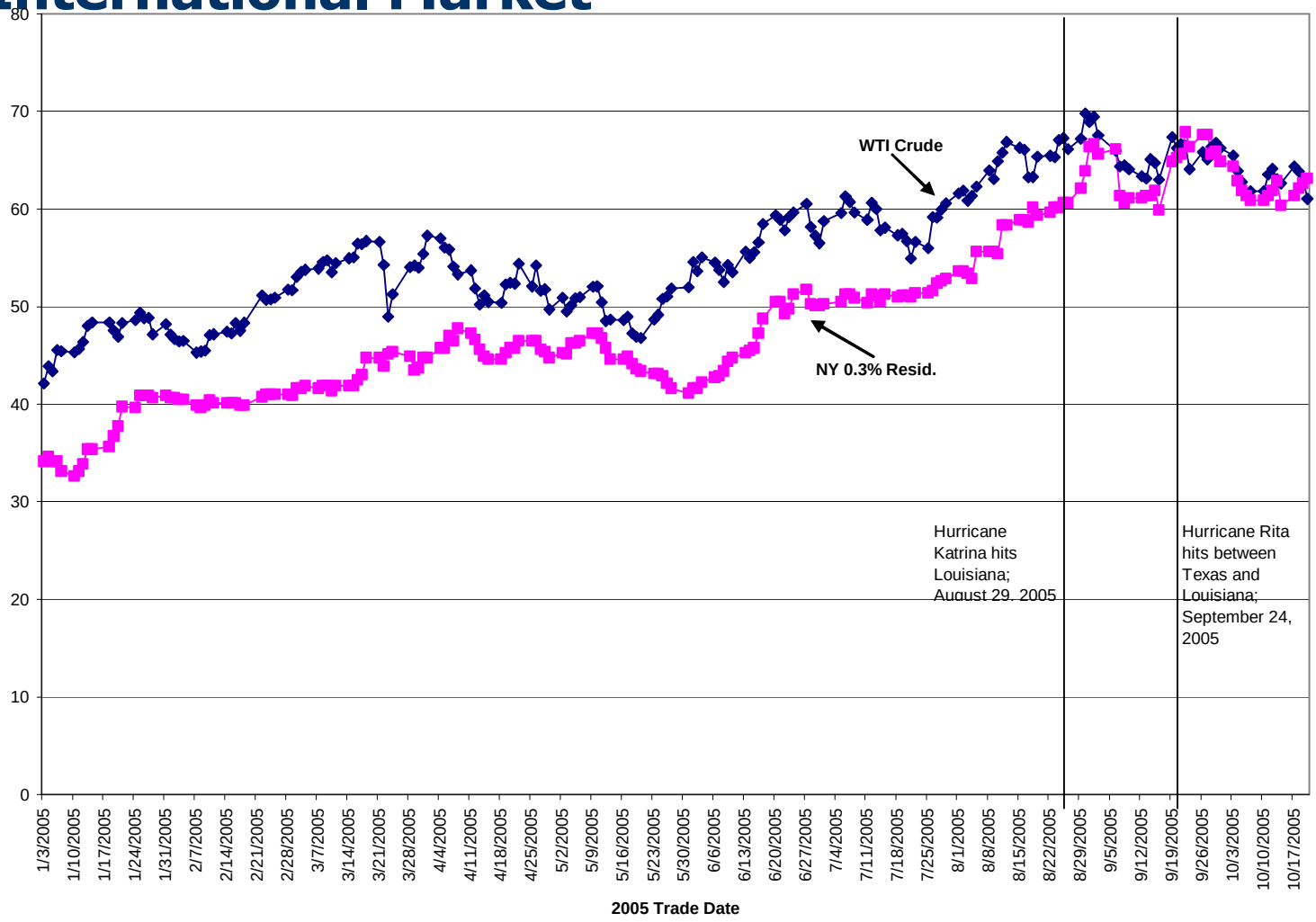
Y 0.3% Residual Fuel Oil Prices Show Increases of 43 Percent, but Less Hurricane Impact

Year	($/MMBtu)
	Total
1996	3.52
1997	3.09
1998	2.31
1999	2.86
2000	4.91
2001	4.03
2002	4.06
2003	5.20
2004	5.58
2005 YTD	7.99

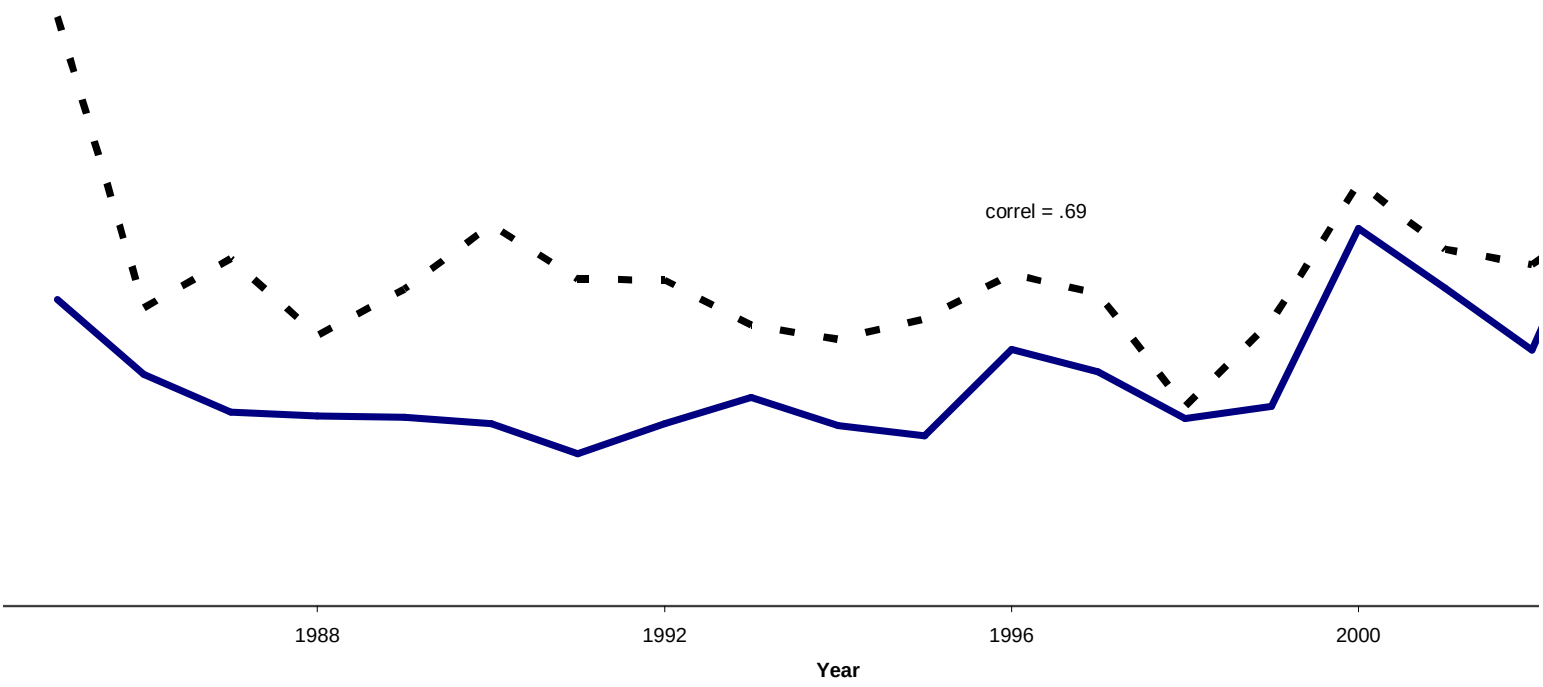
2005 YTD is through December 15, 2005. Year-to-date through October 31, 2005 was $7.87/MMBtu.
Source: Bloomberg

2005 YTD oil prices are 2.7 times 1996 – 1999 average.

il Prices 2005 YTD – Also High But Less Affected by Hurricanes Since Oil is an International Market



ıde Oil Prices and Natural Gas Prices Are Often Correlated 1970 – 2004, and Hence, the Problem with Gas is Partly an Oil Problem (2000$/MMBtu)



es: Arab Light FOB from Platt's Oilgram;
ıl Gas 1980-1988 is reported Wellhead price
:IA; Natural Gas 1989-2004 is Henry Hub
ed by Natural Gas Week

uel Price Increases are Especially Large for Oil and Gas Though Coal Costs have Also Increased

Fuel	YTD October 31, 2005 Average versus 2004 – Absolute Change ($/MMBtu)	YTD October 2005 Over 20 (%)
Natural Gas - Henry Hub	+1.97	+33
Residual Fuel Oil (0.3% Sulfur, New York)	+2.27	+41
Combined Coal and SO_2 Allowance Prices (Eastern Low Sulfur, Minemouth)	+0.63[2]	+26[1]

YTD 2005 versus same period 2004
10,400 Heat Rate

oal and SO_2 Allowance Prices Also Higher, But Still Well Below Oil and Gas

Fuel Cost Component	2004 YTD	2005 YTD[1]	Absolute Change	% Chang
Central Appalachia – 0.75% Sulfur ($/MMBtu)	2.21	2.59	+0.38	+17
SO_2 Allowance Prices ($/ton)	387	797	+410	+106
Combined ($/MWh)[2]	25.5	32	+6.5	+26

January – October
10,400 Btu/kWh heat rate

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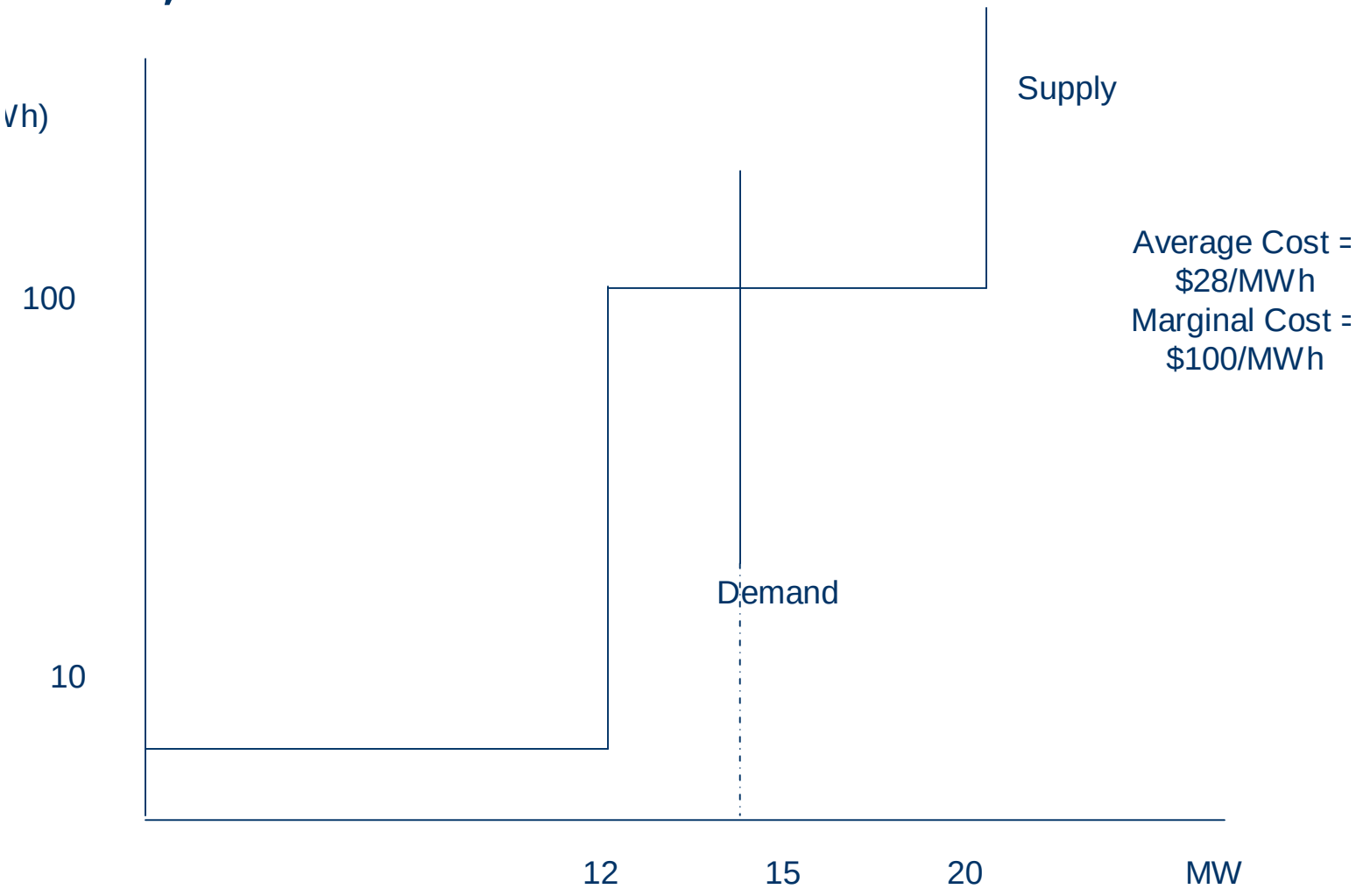
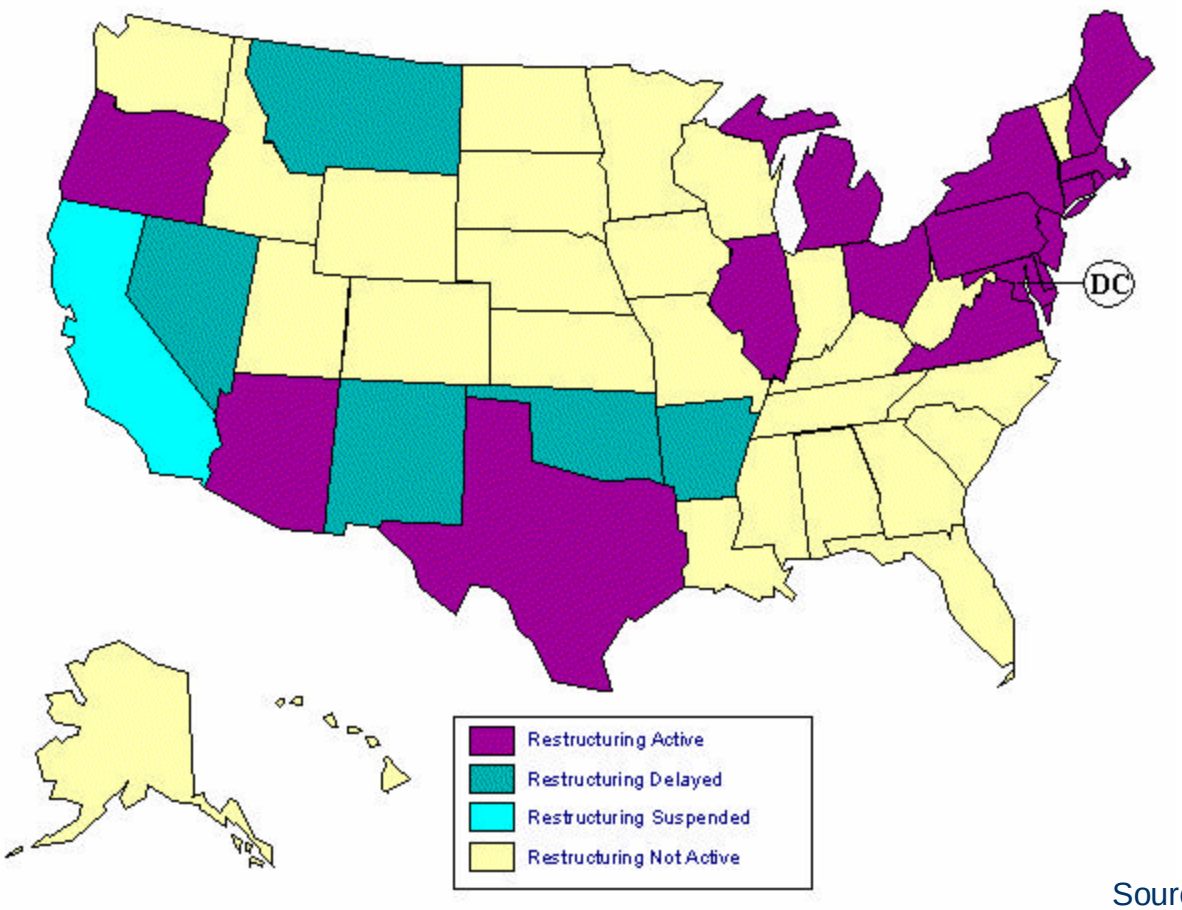
ectricity Price Impacts of Fuel Price Increases Vary by Region & Type of Market

Regulation	Wholesale		Retail	
	Low Oil Gas Region	High Oil Gas Region	Low Oil Gas Region	High O Gas Regi
Regulated	Low		Lowest	
Deregulated		Highest		High

eregulated Market Prices are Set Primarily on Marginal Costs; Regulated Prices on Average Costs; This Can Moderate Effect



:atus of Retail Deregulation – Northeast, and ERCOT Have Most Market Exposure to Oil and Gas Increases



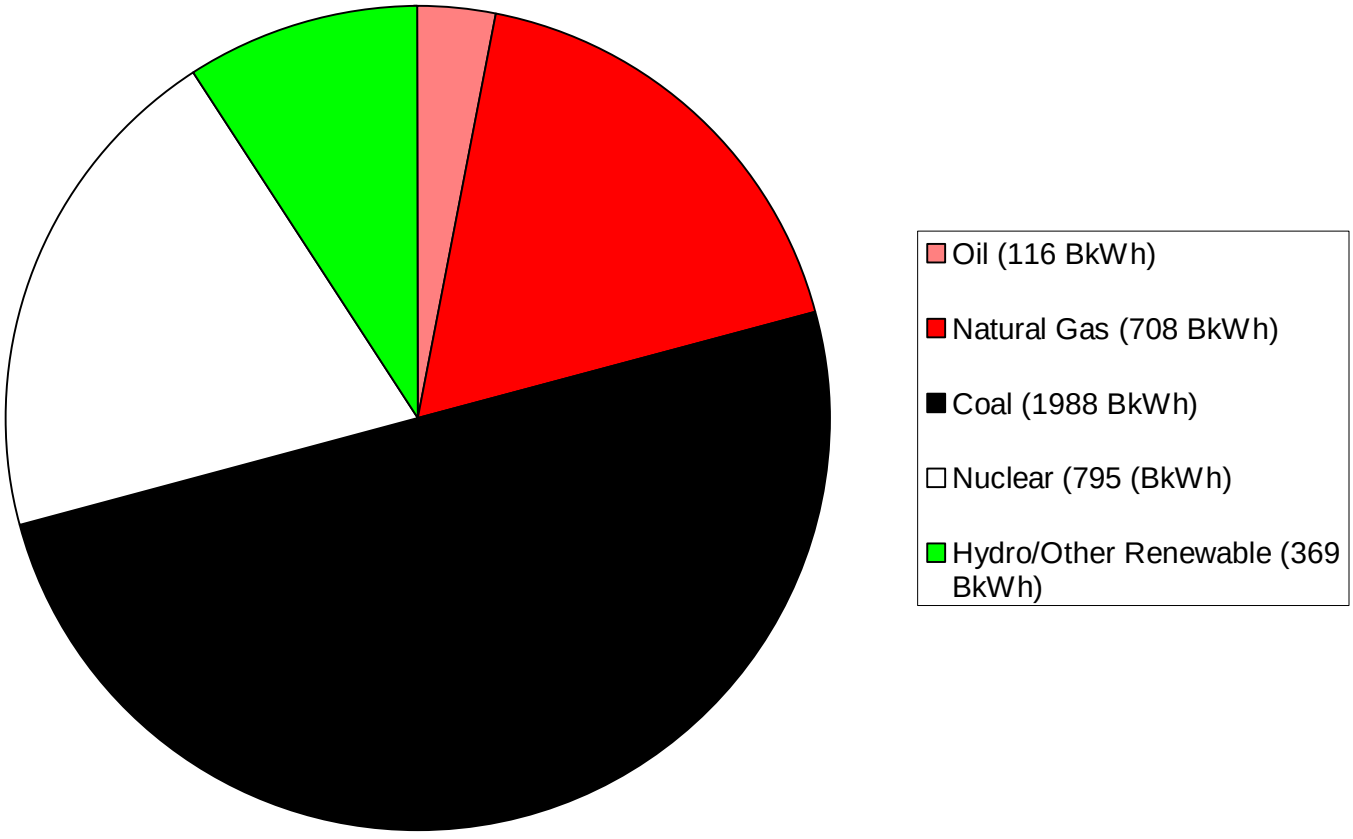
Source: EIA, as
February 2003

eneration Costs Only Part of Total End-User Bill – 2003 – This Also Moderates Effect

Cost Component	US Average	
	(2003 Cents/kWh)	Share of Total (%
Fuel	1.9	27
Non-Fuel	2.9	38
Total Generation	4.8	65
Transmission	0.5	7
Distribution	2.1	28
Total	7.4	100

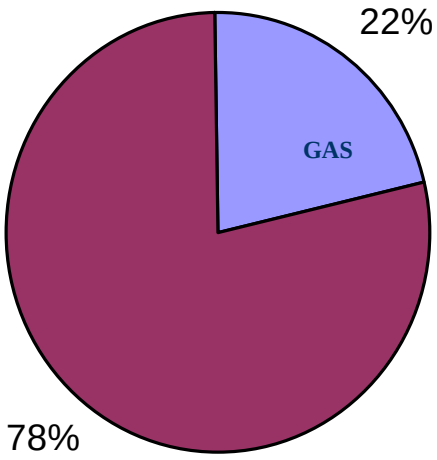
Source: Generation, transmission distribution, EIA. Generation fuel share ICF.

S. Oil & Gas Electricity Generation is Limited – 2004 – 21% and Mostly Gas – This Moderates Effects

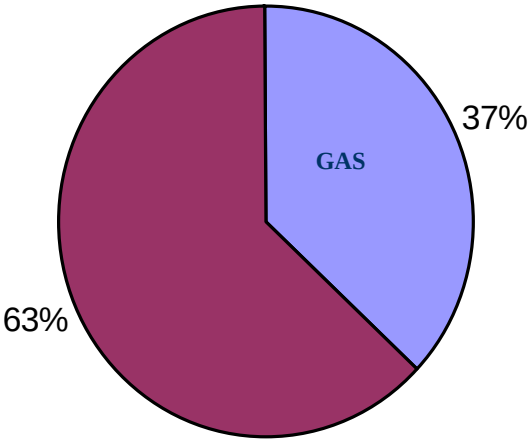


EIA; Electric Power Sector Plus Commercial and Industrial, Cogen

raction of US Gas Fired Capacity Has Significantly Increased Since 1998



Before 1998



Today

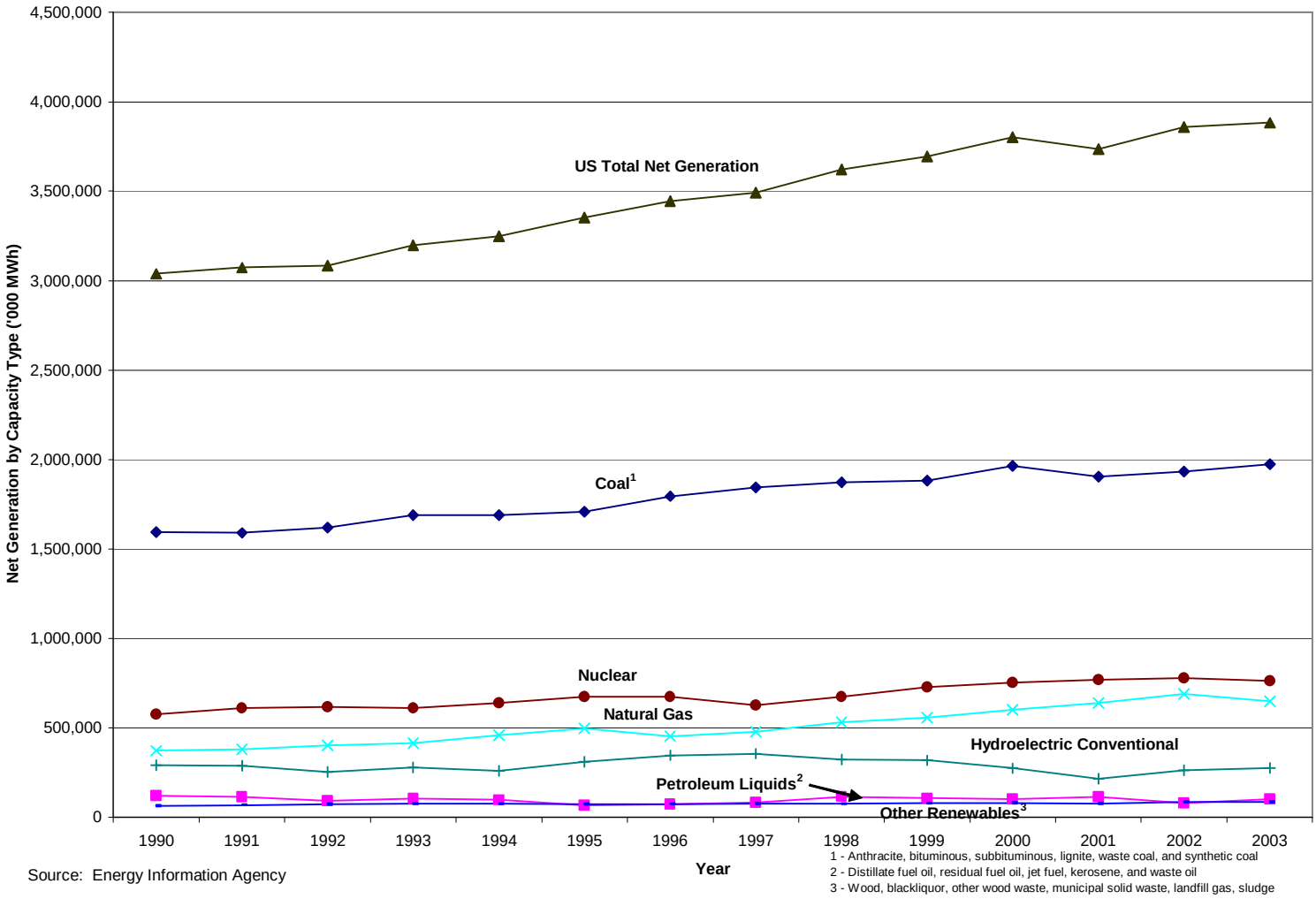
ource: NERC ES&D 2005, Capacity with Gas as Primary Fuel

nce 1990 Gas Share of Total Generation Has Increased (%)

riod	Coal	Nuclear	Natural & Other Gasses	Hydroelectric Conventional	Petroleum Liquids & Coke	Other Renewable s1	Total
90	53	19	13	10	4	2	100
91	52	20	13	9	4	2	100
92	53	20	14	8	3	2	100
93	53	19	13	9	4	2	100
94	52	20	15	8	3	2	100
95	51	20	15	9	2	2	100
96	52	20	14	10	2	2	100
97	53	18	14	10	3	2	100
98	52	19	15	9	4	2	100
99	51	20	16	9	3	2	100
00	52	20	16	7	3	2	100
01	51	21	17	6	3	2	100
02	50	20	18	7	2	2	100
03	51	20	17	7	3	2	100

ostly wood, MSW, geothermal

il and Gas Generation Grew in Absolute Terms by One Third – 1990 - 2003



Source: Energy Information Agency

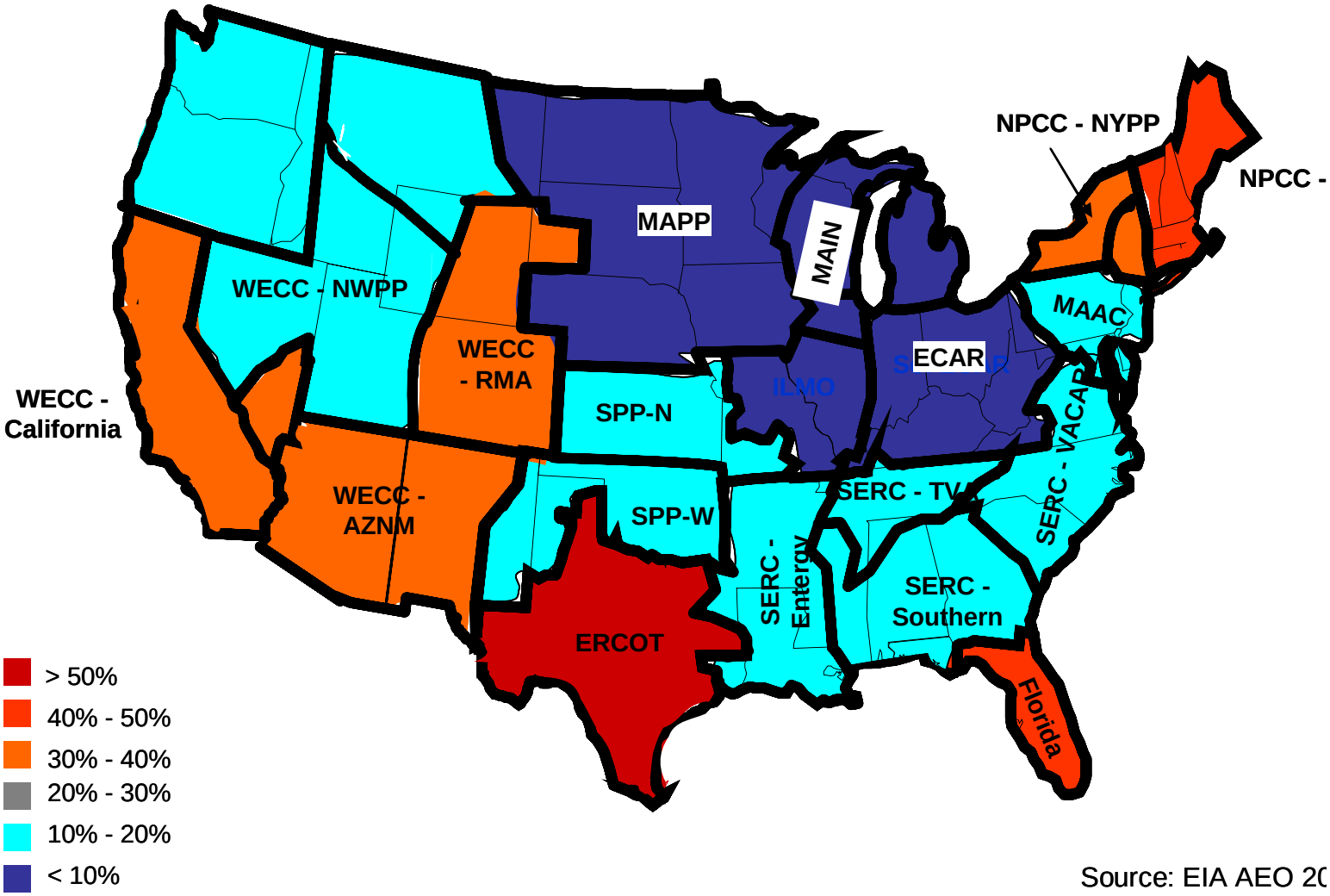
1 - Anthracite, bituminous, subbituminous, lignite, waste coal, and synthetic coal
2 - Distillate fuel oil, residual fuel oil, jet fuel, kerosene, and waste oil
3 - Wood, blackliquor, other wood waste, municipal solid waste, landfill gas, sludge

il & Gas Generation – Heavily Concentrated on U.S. Coasts – Problems Geographically Concentrated

Region	Oil & Gas Share – 2004 (%)
Texas[1]	52
New England	44
Florida[2]	42
California	39
New York State	35
AZ-NM/Rockies	30
U.S. Average	19
SPP[3]	16
Mid-Atlantic[4]	13
Southeast	11
Pacific Northwest	10
MidWest[5]	7
MidWest[6]	6
MidWest[7]	2

[1]ERCOT
[2]FRCC
[3]Southwest Power Pool
[4]MAAC
[5]ECAR
[6]MAIN
[7]MAPP
Source: EIA, 2004

il and Gas Use Heavily Concentrated on U.S. Coasts



Source: EIA AEO 2(

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edging Mitigates Affects of Fuel Price Volatility

Both deregulated and regulated markets are characterize by hedging. Most coal supply is not spot, though most g and oil supply is short-term (i.e., less than one year).

Many deregulated power markets with default supply for non-switched customers have multi-year supply arrangements:

- Pennsylvania – Fixed prices through 2009
- Illinois – Fixed prices through end-2006
- New Jersey – Regular auctions for up to three years
- Ohio – Three year 2005 – 2008 stabilization plans

These hedges further mitigate effects of higher fuel price on retail rates.

etail Price Increases Will Vary – Average US Closest to Low End of Estimated Range

Parameter	Low Electricity Price Increase	High Electricity Pric Increase
gulation	Regulated	Deregulated
dging	None	None
el Share of Total ctricity Production Costs)	25	50[1]
and Gas on Margin (%)	NA	100
erage Fuel Price Increase	20%	NA
rginal Fuel Price Increase	NA	50[2]
tail Power Price Increase	5	25

as region may have fuel costs as share of total generation above average.
nticipates higher increases than year-to-date.

Wholesale Power Prices – December 15, 2005 - $/MWh – On-Peak

Region - EAST	Price
Mass Hub	127.25
NY Zone-G	128.00
NY Zone J	135.00
NY Zone A	105.00
Ontario	118.50
PJM West	123.71
Dominion Hub	111.00
VACAR	112.50
Southern, into	111.50
Florida	125.00
TVA, into	15.00

Wholesale Power Prices – December 15, 2005 - $/MWh – On-Peak

Region – CENTRAL	Price
Michigan Hub	90.35
AD Hub	91.65
Cinergy Hub	85.50
Illinois Hub	84.30
NI Hub	95.15
Minnesota Hub	82.70
MAPP, South	114.00
SPP, North	112.00
Entergy, into	113.65
ERCOT	95.25
ERCOT, North	105.43
ERCOT, Houston	102.94
ERCOT, West	106.00
ERCOT, South	95.42

Wholesale Power Prices – December 15, 2005 - $/MWh – On-Peak

Region – WEST	Price
COB	132.29
Mid-C	128.42
Palo Verde	113.26
Mead	121.73
Mona	128.25
Four Corners	119.52
NP-15	131.65
SP-15	131.20

Wholesale Power Price Increases versus Fuel Increases – YTD October 15, 2005

Item	% Change
Wholesale Power On-Peak – U.S. Average	+43
Wholesale Power Off-Peak – U.S. Average	+38
Natural Gas Henry Hub	+33
Residual Fuel Oil 0.3%	+41
Coal Cost	+26

ot Wholesale Market Price Increase Track
Spot Fuel Price Increases – YTD October 15

Annual Spot Wholesale Power Prices ($/MWH)

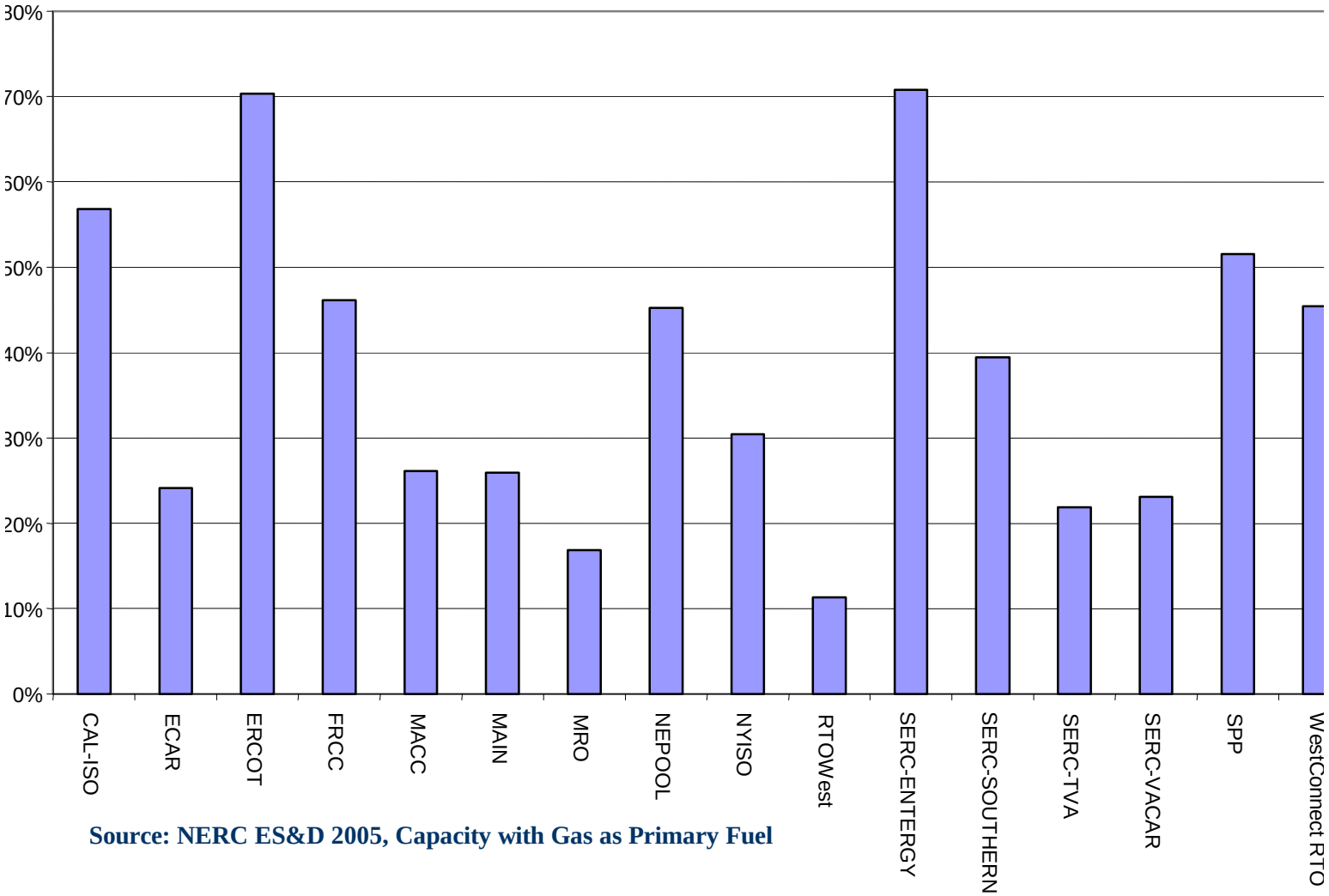
ket Name	2004 YTD		2005 YTD		Delta ($/MWH)		Delta (%)		Source
	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak	
ERCOT	49	32	75	47	26	15	54%	48%	MW Daily
IEPOOL	61	47	82	63	21	16	34%	34%	ISO-NE
FRCC	58	29	83	40	24	12	42%	41%	MW Daily
CALISO	50	38	70	48	20	10	40%	25%	MW Daily
NYISO	64	47	96	71	31	24	49%	52%	NYISO
SPP	44	21	65	33	20	12	46%	55%	MW Daily
Mid-Atlantic	52	35	74	44	22	9	42%	26%	PJM
C-ENTERGY	45	23	68	36	22	13	48%	54%	MW Daily
Mid-C	41	38	58	47	17	9	41%	23%	MW Daily
alo Verde	46	34	65	44	18	11	39%	32%	MW Daily
ur Corners	47	34	66	44	20	10	42%	30%	MW Daily
ERC-TVA	43	22	64	30	21	8	48%	37%	MW Daily
RC-VACAR	48	25	70	36	22	11	46%	45%	MW Daily
C-Southern	48	26	68	36	19	9	40%	36%	MW Daily
MRO	45	19	62	27	16	8	36%	41%	MW Daily
nal Average	**50**	**31**	**71**	**43**	**21**	**12**	**43%**	**38%**	-

ISO includes NP-15 and SP-15

Mid-Atlantic includes PJM-East, PJM-West, and PJM-South

) includes MAPP and Minnesota Hub

S Gas-Fired Capacity – NERC Regions



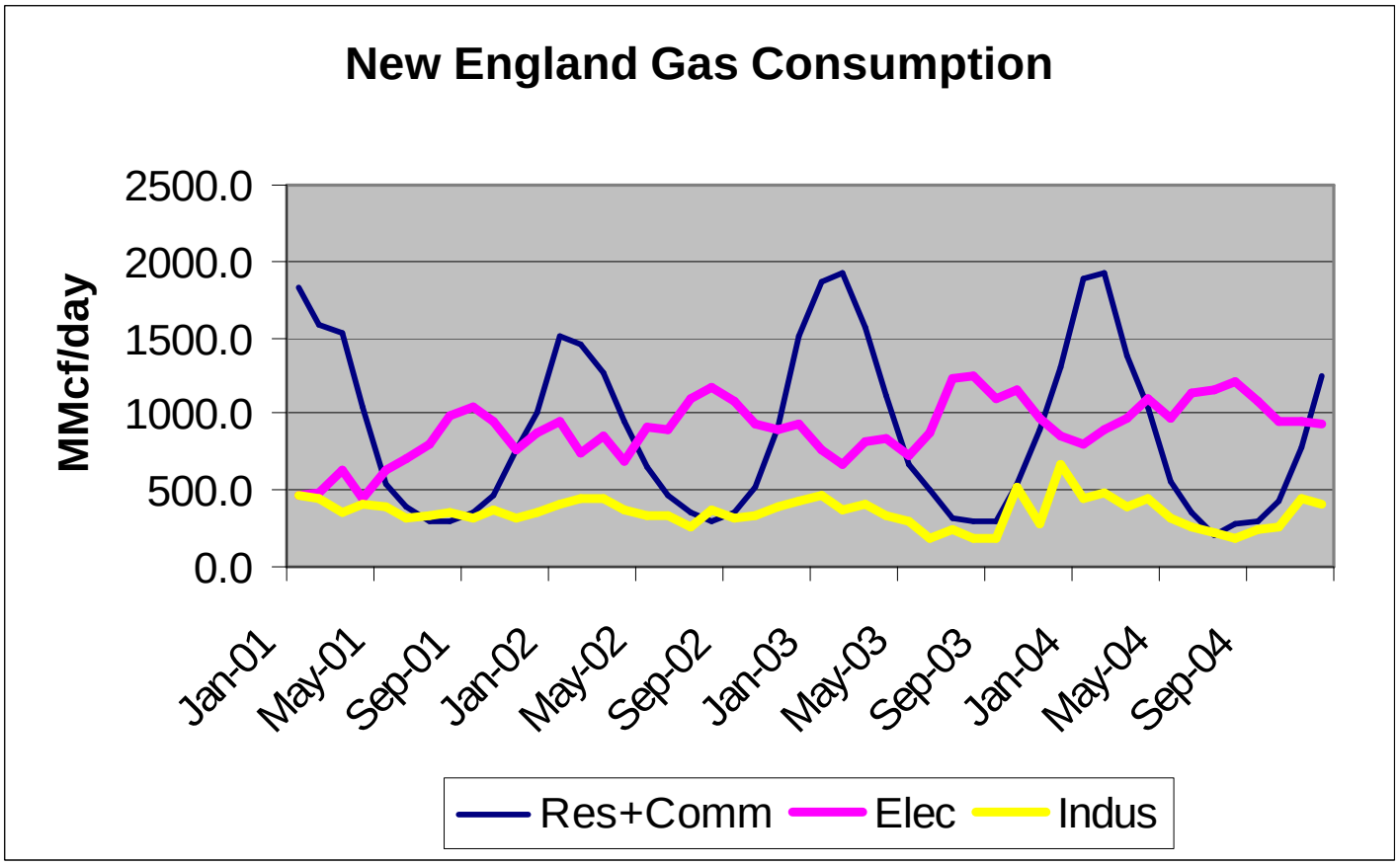
Source: NERC ES&D 2005, Capacity with Gas as Primary Fuel

eneration Capacity Fired by Natural Gas Only - MW

Region	Capacity Gas Only	Total Capacity	% Capacity Fired by Only
CAL-ISO	26,256	60,460	43%
SERC-ENTERGY	16,606	46,491	36%
ERCOT	33,119	82,608	40%
SPP	23,731	51,775	46%
WestConnect RTO	19,827	36,483	54%
SERC-SOUTHERN	20,759	64,495	32%
NEPOOL	8,904	31,673	28%
MAIN	12,961	40,321	32%
ECAR	25,039	79,318	32%
FRCC	7,982	51,819	15%
MACC	9,269	43,976	21%
NYISO	3,564	39,741	9%
SERC-TVA	4,210	39,065	11%
RTOWest	5,643	62,286	9%
SERC-VACAR	5,187	45,852	11%
MRO	2,027	35,384	6%
US Total	**225,083**	**811,746**	**28%**

urce: NERC ES&D - 2005

ew England Demand has Increased and Electric Gas Consumption is Concentrated in Winter



Source: EIA

isk Analysis – NEPOOL Winter Peak Operable Capacity Analysis

	(MW)	Pre-Katrina Winter 05/06 Outlook	Katrina Impact on Winter 05/06 Outlook - 90% pipeline capacity with LDC buyback	Katrina Impa on Winter 05 Outlook - All only units out service
A	Total Capacity	32,940*	32,940*	32,940*
B	Gas-Only Fired Unit Outages	5,700**	7,800	8,700
C	Other Unit Outages	1,700	1,700	1,700
D	Net Available Resources (A-B-C)	25,540	23,440	22,540
E	Peak Load - Winter	23,740	24,140***	24,140***
F	Spinning Reserve Requirements	1,700	1,700	1,700
	Operable Capacity Margin (D-E-F)	**100**	**-2,400**	**-3,300**

Source NEPOOL-ISO

Includes 900 MW of ICAP Sales to NY (Currently 640 MW scheduled)

**** Assumes only 3,000 MW of the 8,700 MW of gas-only generation are available (have firm transportation contracts)***

***** Assumes an increase of 400 MW due to the increase in electric heating season***

Deregulation

.S. Transmission Will Going From the Industry with the Lowest Price Discovery to Highest in the World as Deregulation Progresses

Date	Event	LMP SMD Penetration (%)	Approximate # of Nodes with LMP	Hours per Year	Total LM Prices (millior
1998, 1999	PJM, NY	4	2,000	8,760	18
March 2003	NE	15	7,500	8,760	66
May, October 2004	AEP, ComEd	20	10,000	8,760	88
January, April 1, May 1, 2005	Dominion, Duquesne, MISO	35	17,500	8,760	153
End-2006	California	40	20,000	8,760	175
End-2006	ERCOT	45	22,500	8,760	197
2008	SPP	50	25,000	8,760	219
2010	Total US	100	50,000[1]	8,760	438

Eastern Interconnect is 31,000 alone

ffect of High Prices on Distribution of LMP/Transmission Access Appears Positive

Entergy WPP

SPP – Oklahoma NOPR

Cost Benefits of Efficient Markets

[CAP and the Need for Scarcity Payments to Ensure Reliability

NEPOOL

CalISO

PJM

MISO

Others

nancial Effects on Deregulated Companies

- Hugely positive for owners of infra-marginal assets in deregulated area – new strong business lobby.
- Creates need for large companies able to risk coal and nuclear investments
- Hurting gas only companies and facilitating consolidation

ffects on Retail Deregulation Less Clear But Toothpaste is Out-of-Tube in Many Places

Live Issues

- Illinois
- Ohio
- Pennsylvania

Tougher Issues

- New England
- Texas
- New York
- New Jersey

ıture Investment Requirements

Previous Energy Crisis

- Fuel Use Act 1978 – 1987
- Very Large Coal and Nuclear Expansion

Current

- Greater Interest in Coal and Nuclear – Magnitude of New Builds Unclear
- Renewables Clearly Benefiting

iting Regulatory Issues

Many Coastal Areas Difficult to Site New Baseload Plants

- California
- Northeast

CO_2 Also Complicating Matters

ɔmestic and International Action Drive Increasingly Costly CO_2 Regulation

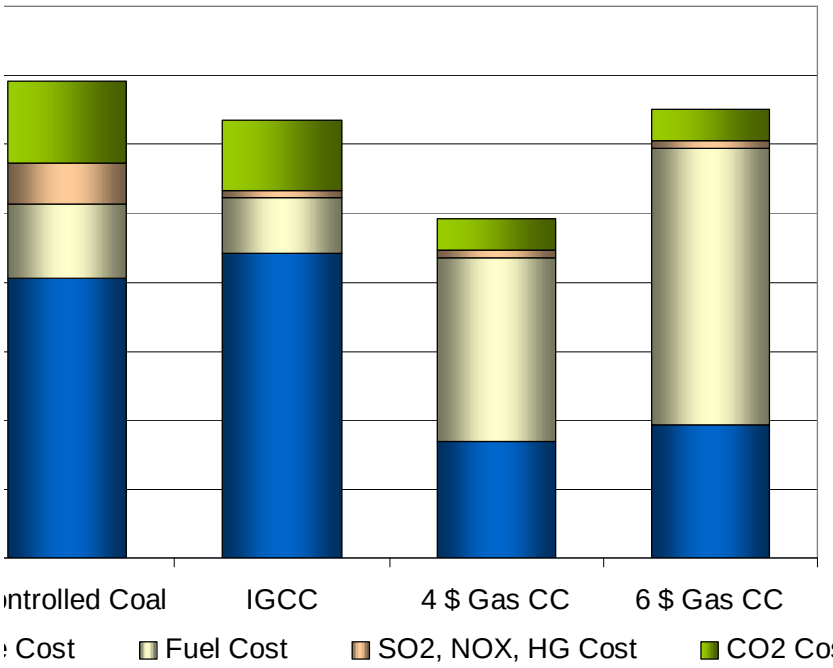
While no federal CO_2 regulation is currently in place in the U.S., increasir pressure from the grassroots and state government levels, as well as implementation of CO_2 policies in foreign countries, is likely to result in future federal CO_2 regulation.

- Massachusetts and New Hampshire have already promulgated CO_2 regulation the state level.
- The Regional Greenhouse Gas initiative (RGGI) is examining a regional CO_2 ca and trade program over 9 states in the Northeast.
- Canada and Europe are moving ahead with programs aimed at participating i the Kyoto Protocol process – CO_2 Allowance Prices at $30/ton.

A range of domestic CO_2 policy proposals exist, including those endorsed Senator Bingaman (National Commission on Energy Policy), Senator Carp Senators McCain and Lieberman and combinations of those proposals.

r Regulations Also Impact The Relative Competitiveness of New Generation Options

Components Of New Generation Options



ludes capital, fixed O&M, and variable O&M.

ti-pollutant policy resulting in $30,000/LB Hg, $1,000/ton SO_2, $2,500 $12/ton CO_2 allowance prices. Uncontrolled Coal category is added for nparison. All new coal fired capacity in the US must be equipped with full ıctions controls.

- Even with pollution control equipm installed, coal plants have higher e rates, and therefore higher emissic allowance costs, than natural gas
- If future natural gas prices were tc $4.00 per MMBtu, a new coal plan have higher all in costs than a new combined cycle unit, even without accounting for the costs of existinc NO_X, and mercury (HG) regulation
- But, if future natural gas prices we remain high, above $6.00 per MMI new coal plant would be more eco than a new gas-fired combined cyc even with the cost of existing air regulations.
- However, a relatively mild CO_2 pro ($12/Ton) could make a new conv coal plant less economic than a ne combined cycle unit with $6.00 ga
- A new IGCC plant could potentially out a new combined cycle plant wi $6.00 gas, even with a mild CO_2 p in place.

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