

North American Natural Gas: Prospects for the Heating Season and Gas Supply Outlook

Northeast Energy and Commerce Association

October 14, 2004

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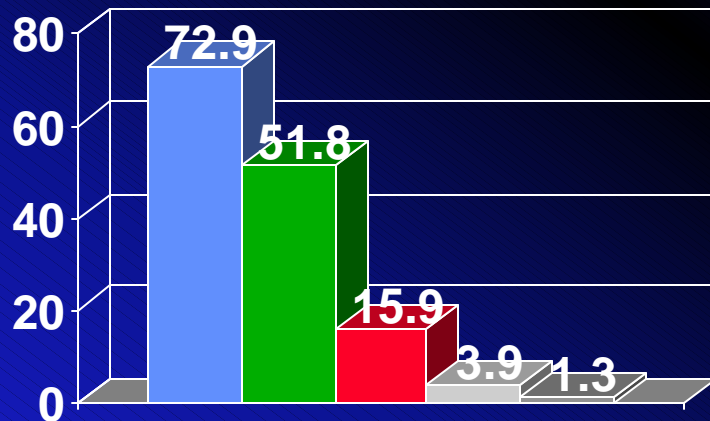
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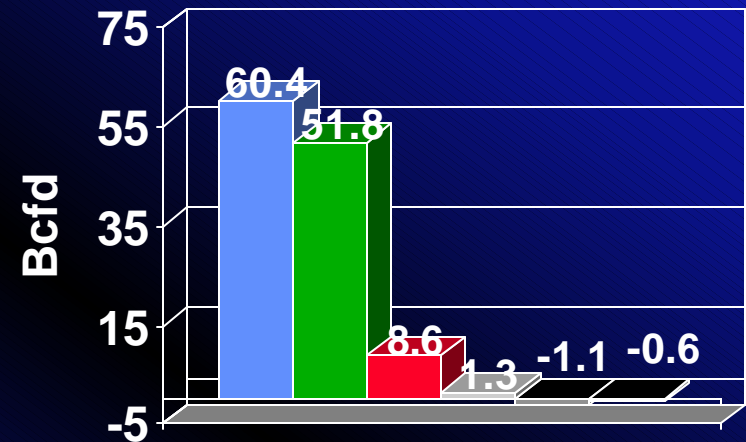
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In 2003, US and North American supply was 60.4 Bcfd and 72.9 Bcfd respectively. New England consumption is about 2.2 Bcfd.

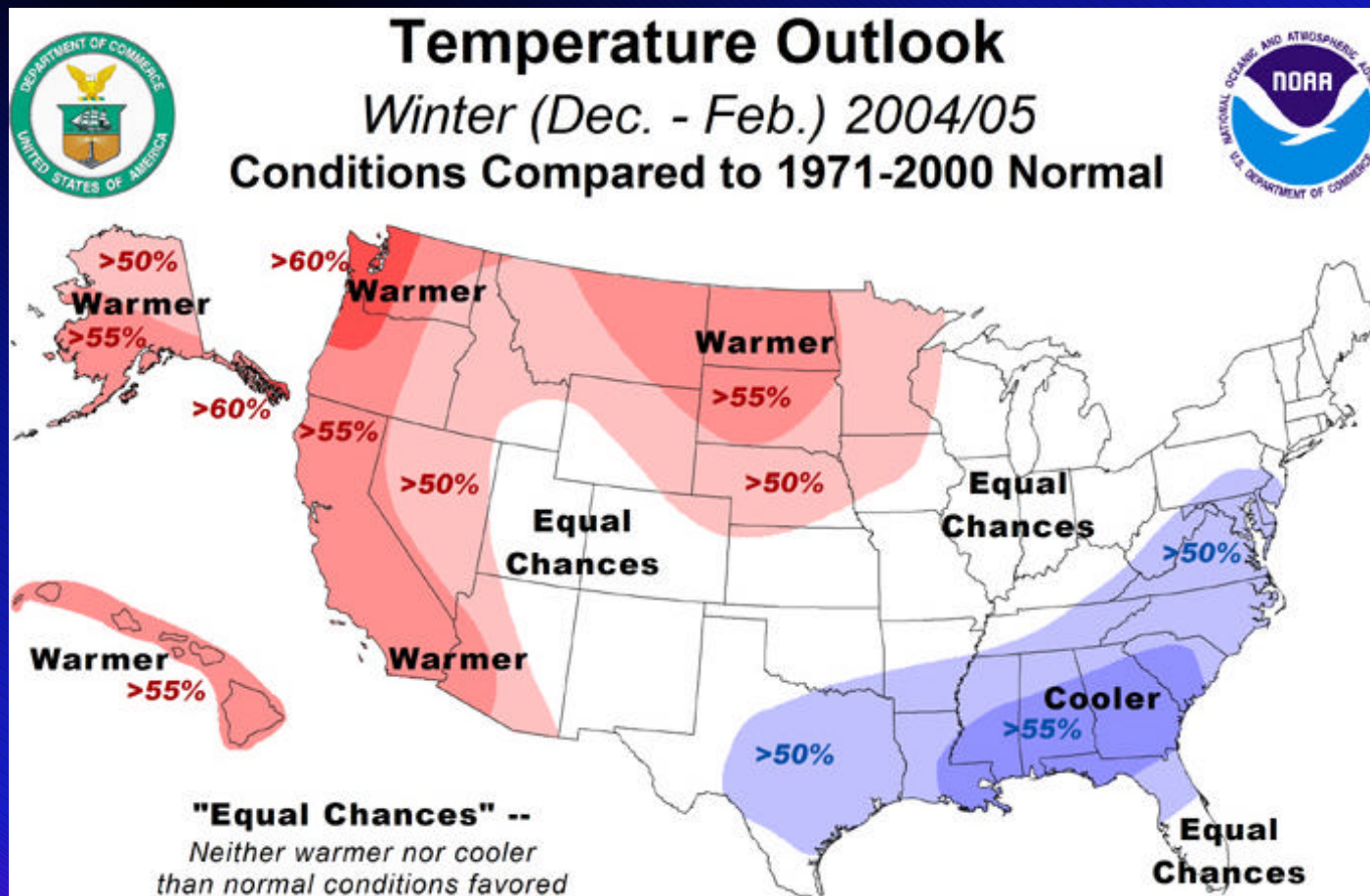
North American Supply
2003 (Bcfd)



US Supply 2003



Forecasts are for a normal to colder than normal winter. NOAA uses a 30 year normal which has about 5% more heating degree days (HDD) than a 15 year normal.



Gas weighted HDDs are projected to be 3.5% greater than last year. Heating season demand will be 1.7 Bcfd higher than last year. A 5% change in HDD will cause a 3% change in consumption (2.2 Bcfd or 330 Bcf)

Heating Season Gas Demand (Bcfd)

Sector	2004-05	2003-04	Change	%Change
Residential	25.2	24.5	0.7	3.0%
Commercial	13.7	13.4	0.4	2.8%
Industrial	21.1	20.8	0.3	1.6%
Electric Power	11.5	11.3	0.2	1.7%
Other	5.3	5.2	0.1	1.6%
Total Demand	75.8	74.4	1.7	2.3%

Because of hurricane Ivan, supply will be about the same level as last year and working gas storage should end the heating season at 940 Bcf versus 1058 Bcf last year.

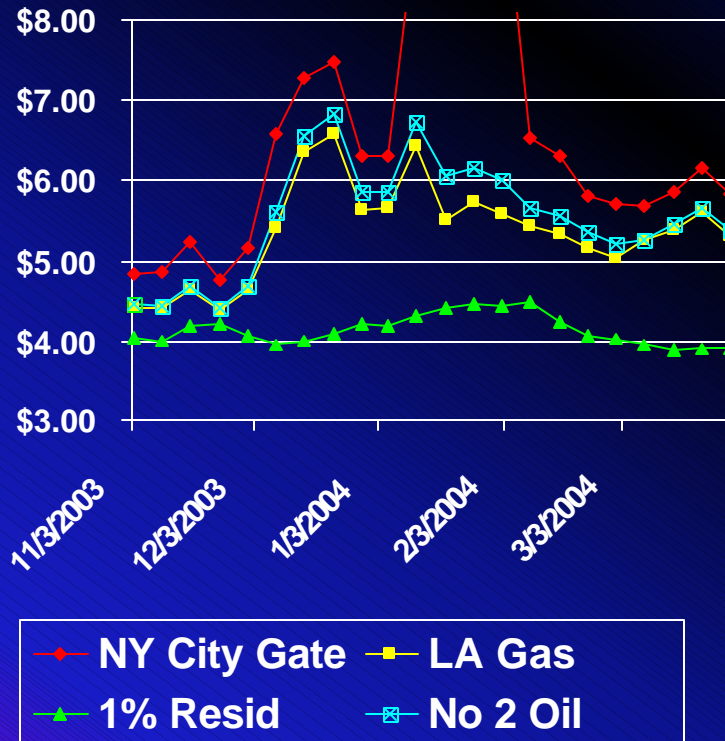
- **According to the MMS, the Offshore Gulf production loss is expected to be .8 Bcfd from hurricane Ivan at the end of October. .5 Bcfd of production is expected to be shut-in six months from now.**
- **Canadian imports will be up about .7 Bcfd (Storage is 100 Bcf higher than last year and production is up .3 to .4 Bcfd).**
- **Storage should end the non-heating season about 100 Bcf higher than last year, this will partially offset the tighter supply-demand balance.**

**Heating Season
Year over Year US Supply Change**

US Production	-.7 Bcfd
Canadian Imports	.7 Bcfd
LNG/Mexico	.1 Bcfd
Total	.1 Bcfd

Last year Henry Hub prices averaged about .70 cents less than distillate. Last week distillate prices were close to \$10 per MMBtu but prices should decline.

2003-04 Heating Season



- Peak distillate switching 2.0 to 2.5 Bcfd peak (1 Bcfd power, 1 to 1.5 Bcfd other sectors)
- Average distillate 1.1 – 2.0 Bcfd during heating season (.5 for power and .5 to 1 Bcfd industrial).
- Electric power residual peak 2.7 Bcfd and 1.8 Bcfd average
- Industrial residual .3 to .6 Bcfd (MECS – 1.5 Bcfd)

Oil prices and storage are key drivers of gas prices. With the same weather as last year, gas prices should average about \$.30 per MMBtu less than last WTI. (WTI \$50/bbl = 8.62 per MMBtu, WTI \$40/bbl = \$6.89 per MMBtu)

Heating Season Average \$/MMBtu

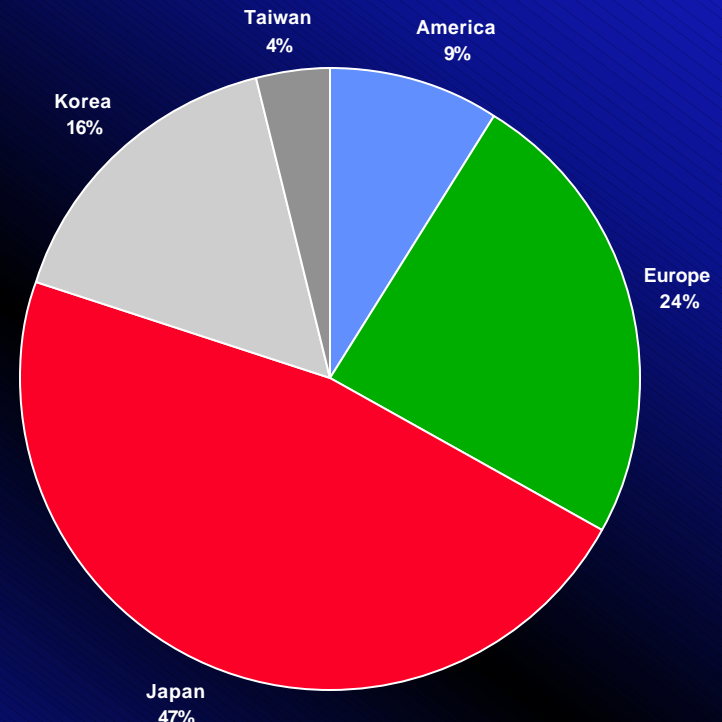
Record

	<u>00-01</u>	<u>01-02</u>	<u>02-03</u>	<u>03-04</u>	<u>Average</u>
HH-WTI	1.57	-1.15	0.33	-0.34	0.10
WTI	5.15	3.59	5.57	5.83	5.03
HH	6.72	2.44	5.90	5.49	5.14
March Storage (Bcf)	742	1518	730	1058	1012

The marginal cost of LNG is \$3.30 to \$3.80 per MMBtu and some supplies are economic at \$2.60 per MMBtu. However, liquefaction capacity will be a constraint on new supply and the US is a small player in the LNG market.

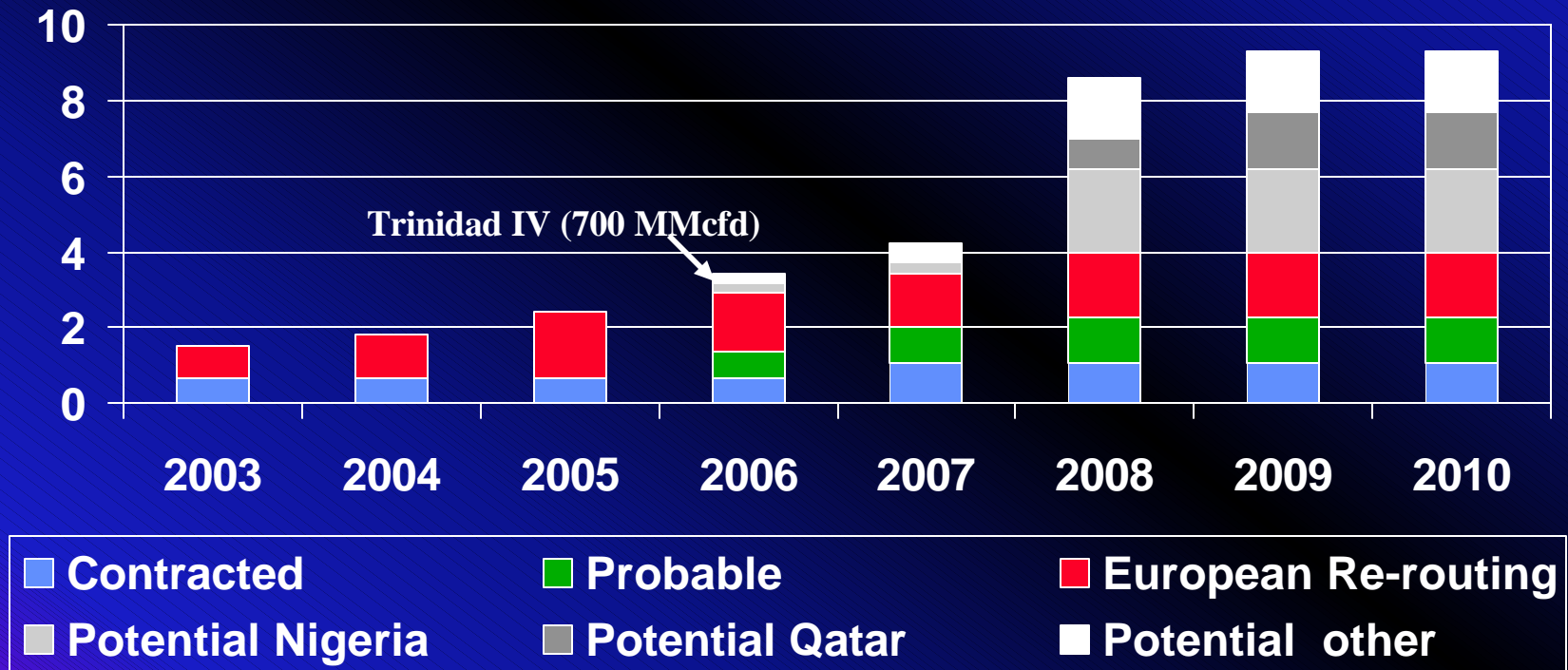
- Asia accounts for 2/3 of LNG imports.
- Current world wide liquefaction capacity is 16.3 Bcfd and proposed expansions would more than double capacity by 2010. How much of this capacity will actually be constructed? Politics, finance, construction costs, lack of materials and competition for engineering and construction resources will limit growth.
- World natural gas consumption is 155 Bcfd. Small changes in the world market can have a large impact on the availability of LNG.

Share of 2003 World LNG Imports
(16.3 Bcfd)



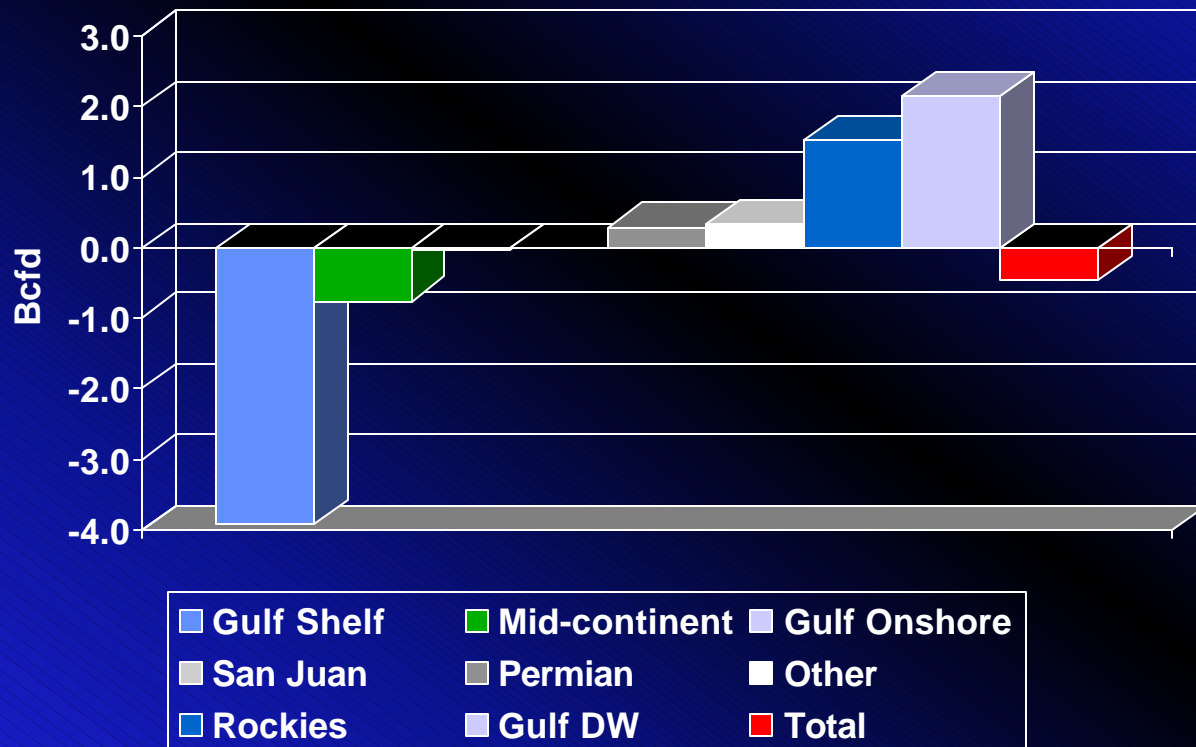
Until 2008 much of North American supply will depend upon re-routing from Europe and after that increased supplies depend on potential projects. Estimates for 2010 range from 4.5 Bcfd to 9 Bcfd.

North American LNG Imports (Bcfd)



Growth in the Deepwater and the Rockies has been more than offset by declines on the shelf and other areas.

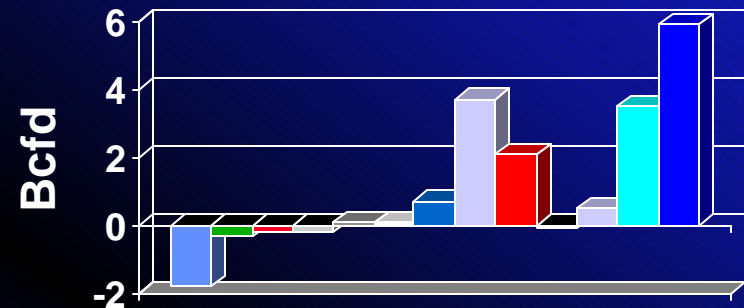
Change in US gas Production 1998 - 2003



Incremental supply will come from LNG, the Rockies, Deepwater and the Deep Shelf.

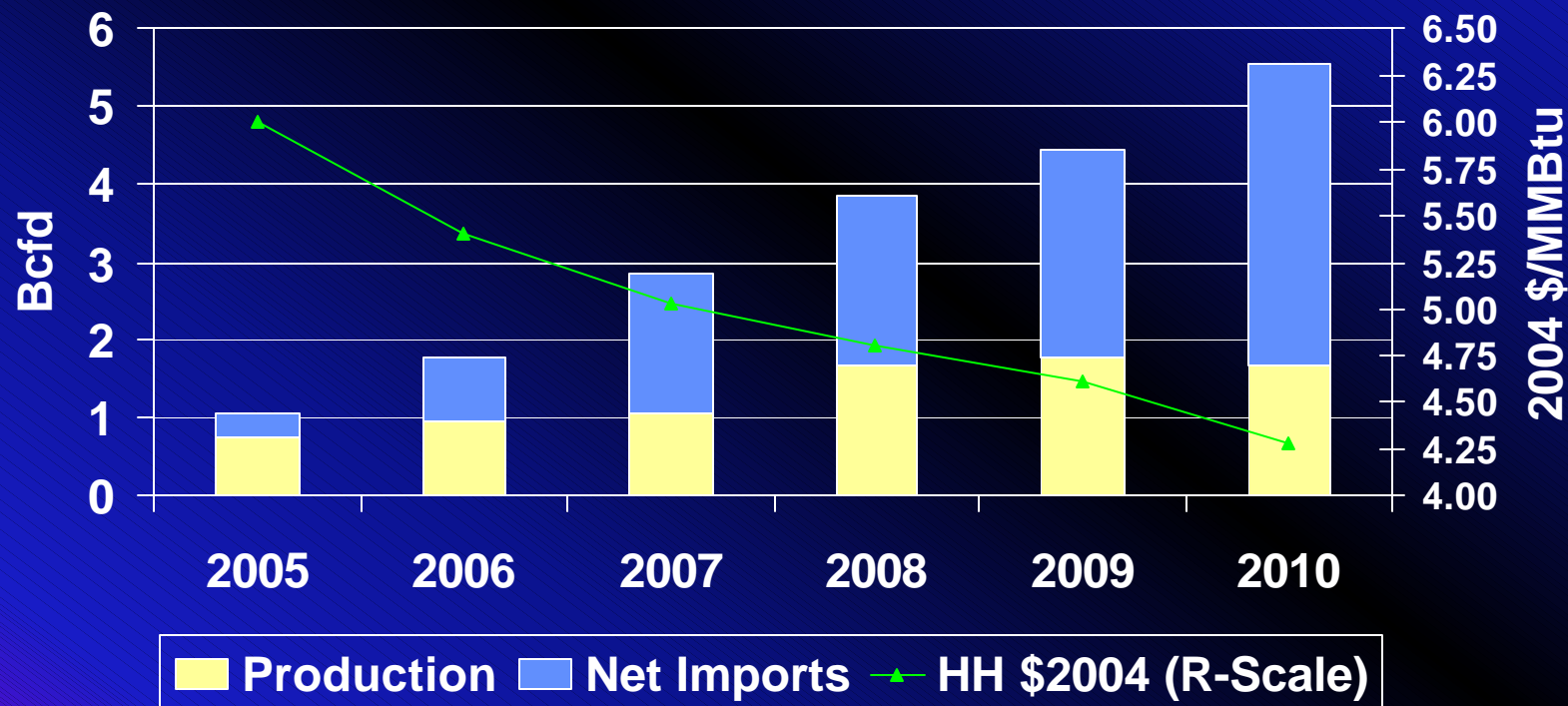
- **LNG projections range from 4.2 Bcfd to 10 Bcfd. SEER reference is 5.5 Bcfd.**
- **Rockies growth expected to be about 4 Bcfd with a downside 1.5 Bcfd up side 1 Bcfd. The key driver is litigation by environmentalist and the speed at which permits are issued.**
- **Deep and ultra deep shelf has great potential but it remains to be seen how much will be realized.**
- **Deepwater activity has slowed and after 2007 it will become difficult to offset declines.**

Change in Gas Supply 2004-10



Significant supply will not come on until 2007 or 2008. Supply limits demand growth to 1.6% per year. This will require high prices to ration supply.

US Supply Increment from 2004

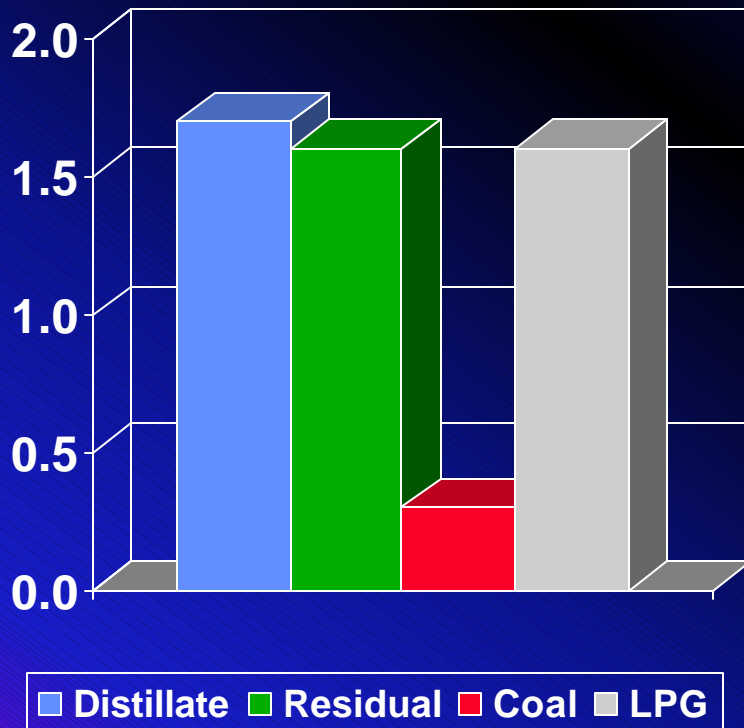


Projected wellhead prices range from \$3.44 to \$4.25 per MMBtu with a wide range of assumptions about supply and consumption.

2015 Forecast (Bcfd)									
	AEO	GII	EEA	NPC Reactive Path	NPC Balanced Future	EVA	PIRA	SEER	Average
Wellhead	4.19	3.62	4.25	NA	NA	3.44	3.74	4.13	3.77
Wellhead (\$2003/MMBtu)	4.15	3.59	4.21			3.41	3.71	4.02	3.73
Production	59.2	57.0	59.9	59.0	58.0	59.3	49.0	54.6	56.9
Net Imports	17.1	19.2	18.5	14.0	14.0	26.5	23.5	18.9	18.9
Pipeline	9.1	8.3	10.0	10.7	7.2	5.3	13.1	7.4	9.1
LNG	8.8	9.2	10.1	6.9	8.7	13.4	13.0	11.5	10.2
Supply	76.3	76.2	78.4	73.0	72.1	85.9	72.5	73.5	75.8
Consumption	76.8	76.4	77.6	73.1	72.1	85.2	72.8	74.0	75.7
Residential	15.6	14.8	16.0	15.8	15.0	15.3	13.9	15.2	15.3
Commercial	9.9	9.2	10.9	10.3	10.4	10.3	9.3	9.8	10.1
Industrial	24.3	23.4	21.1	19.8	20.3	21.0	17.9	21.1	21.3
Electricity generators	20.9	23.6	24.4	21.3	20.5	32.1	25.7	21.8	23.1
Other	6.1	5.4	5.3	5.9	5.8	6.5	6.0	6.0	5.8

The information on industrial fuel switching capability is very limited.

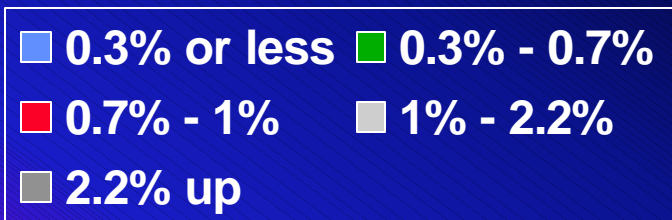
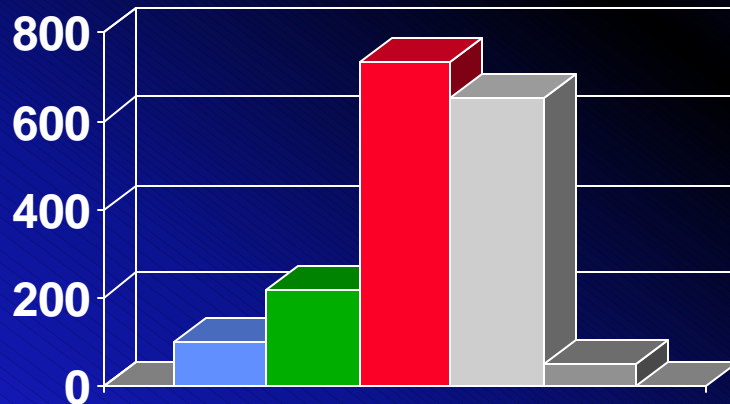
MECS Fuel Switching Capability



- The 1998 MECS study switching capability is much higher than actual switching.
- Annual residual fuel oil consumption in the industrial sector is only about .5 Bcfd.
- A Department of Commerce study indicated about 500 Bcf per year of boiler switching capability during 1994-98.
- NPC study suggests boiler switching capability of approximately 200 Bcf per year or less.

Electric power fuel switching is complex. It depends upon the season, dispatch, residual sulfur content, and location. Peak switching to resid 2.7 Bcfd, average 1.8 Bcfd during winter. (Distillate 1 Bcfd peak, .6 Bcfd during winter).

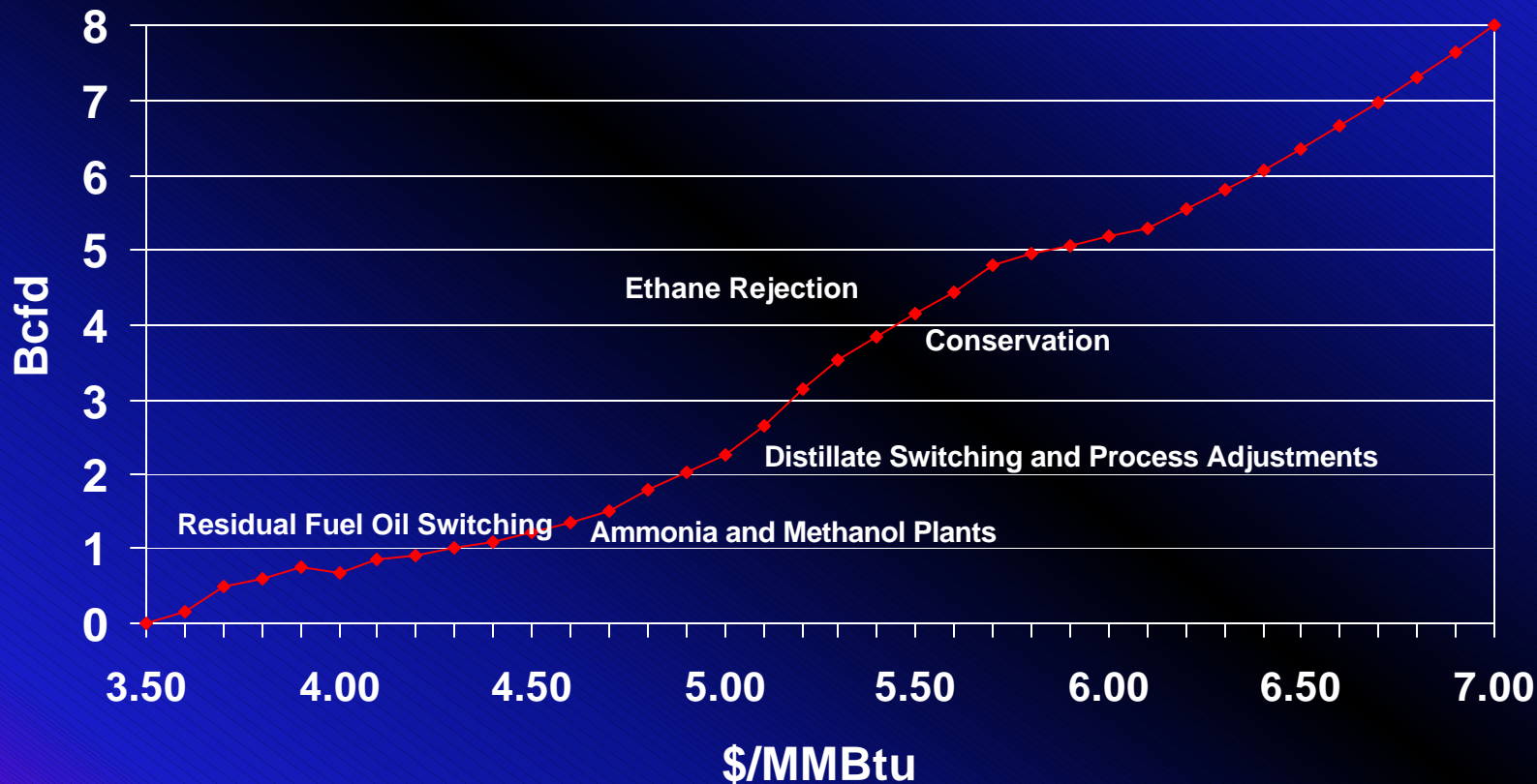
Electric Power Residual Fuel Oil (MMcfd)



Northeast Fuel Switching Prices

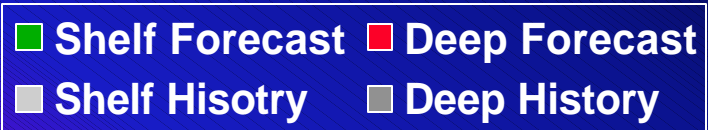
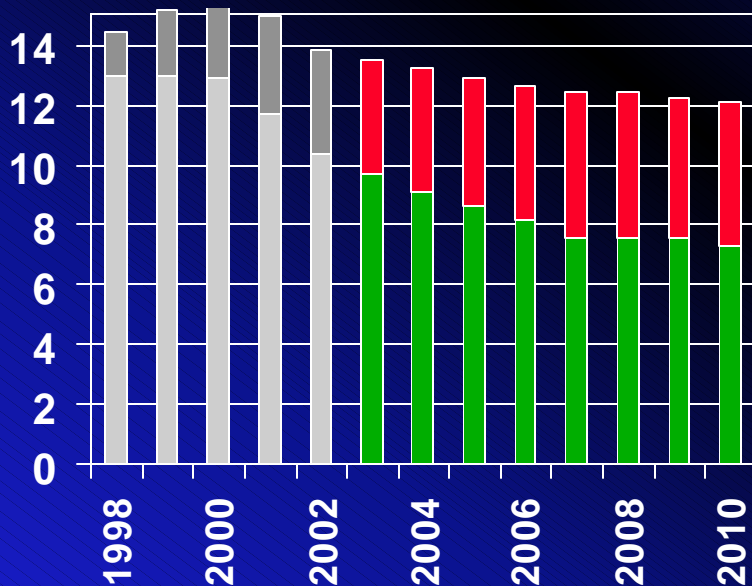
	\$/MMBtu	
	<u>SEP</u>	<u>JAN</u>
WTI = \$30/ bbl		
1% Resid NY	3.65	3.65
Taxes & Shipping	0.45	0.45
Delivered NY	4.10	4.10
Basis	0.30	1.00
Henry Hub (Steam)	3.80	<u>3.10</u>
Henry Hub (CC)	<u>5.32</u>	4.34

Demand loss versus Henry Hub Price (WTI=25\$/barrel)

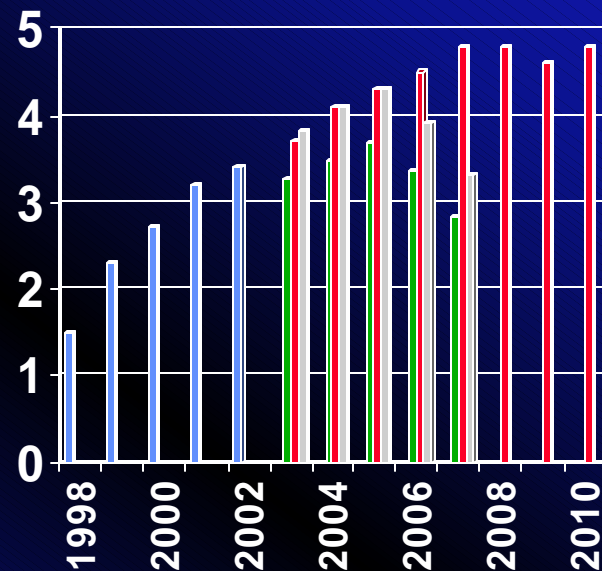


Declines on the shelf are expected to offset growth in the deepwater. The deepwater is still immature, so there is a great deal of uncertainty about the prospects. 2003 deepwater new field wildcats were about 30% of 2002 finds (BOE).

Offshore Production (Bcfd)



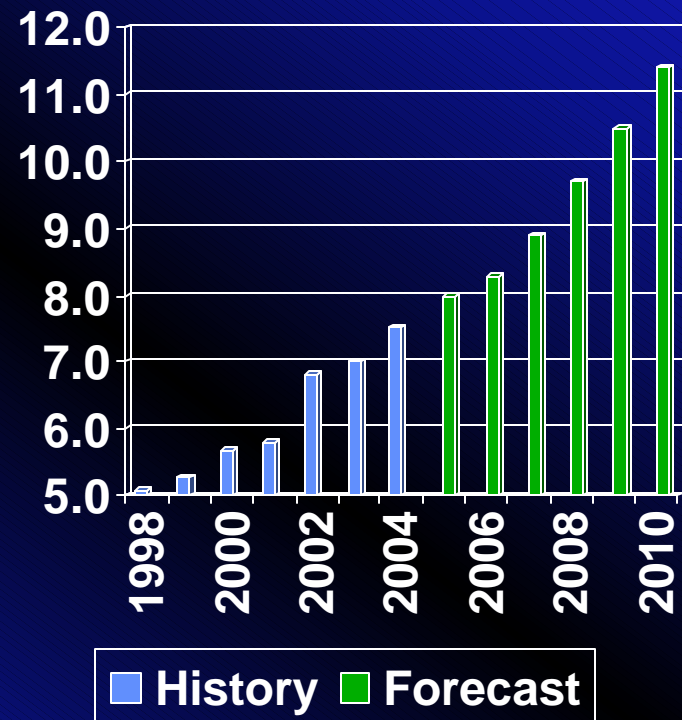
Deep Water Production (Bcfd)



Expected growth from the Rockies is 1.5 to 5 Bcfd by 2010 but environmental concerns disappointing production results could limit Rockies production.

- Environmental reviews and a slow down in the issuance of federal drilling permits are expected to keep Wyoming annual production growth to 3% per year for the next three years versus 7% in recent years.
- The duration of peak production in Wyoming wells was much shorter, and subsequent well declines much faster than anticipated.
- Big George coals require substantial de-watering.
- Cheyenne Pipeline will add 730 Bcfd in August 2005 with ultimate capacity of 1.7 Bcfd.

Rockies Production (Bcfd)



Deep Shelf could maintain shelf production. Ultra deep, 30,000 feet, offers additional potential. In late 2003, the MMS increased recoverable reserve estimates by 150%.

- **Initial potential recoverable reserves estimates were 5 to 20 Tcf with a mean of 10.5 Tcf but the potential has been raised to 55 Tcf.**
- **Wells can be brought on quickly – Timbalier Block 204 was discovered in 2000 and reached peak production of 350 MMcfd in 2002.**
- **Mean size of wells is 30 MMcfd.**
- **Finding cost \$1.67 per MMBtu (El Paso)**
- **There is potential for ultra deep play (25,000 feet) but there are imaging problems and the first two wells were dry holes.**

Deep Shelf (Bcfd)

