



# **Comparison of Projected Netbacks**

**4.5 bcf/d LNG Project**

**v.**

**4.5 bcf/d Pipeline Project**

# Projected Netbacks Under Alternative Projects

(Port Authority LNG Plant Costs -- \$470/mt)

## Oil Prices per Wood Mackenzie Estimates 4.5 bcf/d (LNG Project) v. 4.5 bcf/d (Pipeline Project) 2020 - 2044

	4.5 bcf/d LNG Project				4.5 bcf/d AECO Pipeline Delivery	
	High Price Asia Gas = 0.162 x Brent +\$1.00 (1)	Gas Strategies Asia Gas = 0.1485 x Brent +\$0.90 (2)	Port Authority Asia Gas = 0.8 x (Brent / 5.8) (3)	Low Price Asia Gas = 0.11 x Brent +\$1.30 (4)	8:1 Oil/Gas Price Ratio (5)	10:1 Oil/Gas Price Ratio (6)
Gas Sales Price (\$/MMBtu)	\$23.67	\$21.83	\$19.61	\$17.21	\$18.20	\$15.20
Delivery Costs (\$/MMBtu) (Including Losses)	(8.67)	(8.36)	(8.00)	(7.60)	(5.26)	(4.99)
Netback (\$/MMBtu)	\$15.00	\$13.46	\$11.61	\$9.61	\$12.94	\$10.22
Netback in \$2008 dollars (per MMBt)	\$7.33	\$6.56	\$5.63	\$4.66	\$6.31	\$4.96
	①	②	④	⑥	③	⑤
Total Netback Dollars						
In Nominal Dollars (\$Bn)	\$724.7	\$650.3	\$560.9	\$464.1	\$625.0	\$493.5
In \$2008 dollars (\$Bn)	353.9	316.9	271.8	225.2	304.6	239.5
NPV-10 (\$Bn)	65.3	58.2	49.0	40.7	55.9	43.3
	①	②	④	⑥	③	⑤

① ② ④ ⑥ = More Likely Price Scenario(s)

# Sensitivities

- **High Sustained Oil Prices**
- **Impact of Project Delay**

# Projected Netbacks Under Alternative Projects

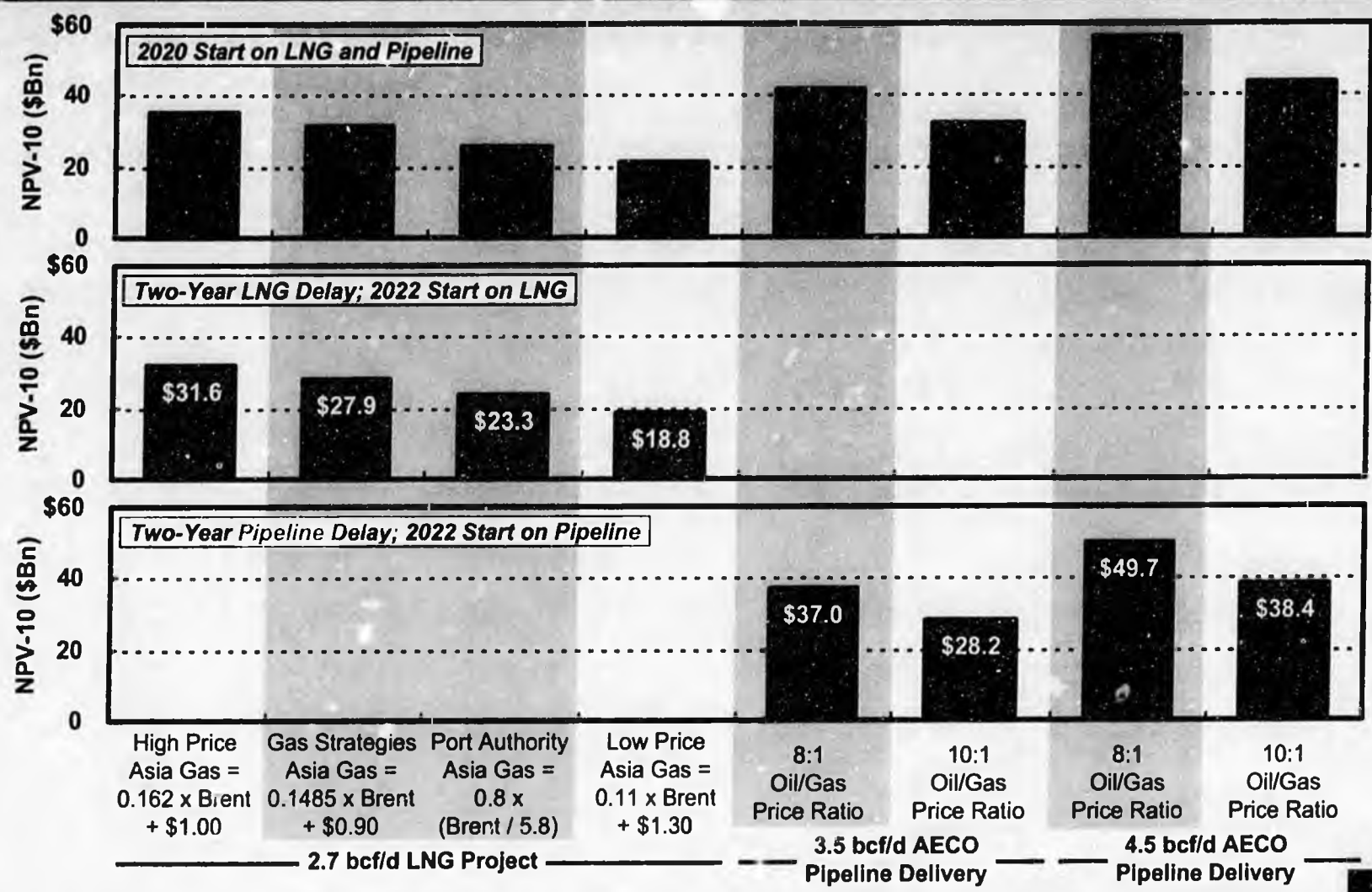
(High Price Case: Fixed \$120 Real WTI in \$2008)

Rank	Project	Pricing	GTP Inlet Netback (\$/MMBtu)
(1)	(2)	(3)	(4)
1	4.5 LNG	0.162 x Brent + \$1.00	\$25.86
2	2.7 LNG	0.162 x Brent + \$1.00	25.18
3	4.5 LNG	0.1485 x Brent + \$0.90	23.48
4	2.7 LNG	0.1485 x Brent + \$0.90	22.79
5	4.5 Pipeline	8:1 Oil/Gas	22.45
6	3.5 Pipeline	8:1 Oil/Gas	22.13
7	4.5 LNG	0.8 x (Brent / 5.8)	20.97
8	2.7 LNG	0.8 x (Brent / 5.8)	20.26
9	4.5 Pipeline	10:1 Oil/Gas	18.18
10	3.5 Pipeline	10:1 Oil/Gas	17.84
11	4.5 LNG	0.11 x Brent + \$1.30	17.24
12	2.7 LNG	0.11 x Brent + \$1.30	16.50

Rank	Project	Pricing	NPV-10 Total Netback (\$Billion)
(5)	(6)	(7)	(8)
1	4.5 LNG	0.162 x Brent + \$1.00	\$126.5
2	4.5 LNG	0.1485 x Brent + \$0.90	114.6
3	4.5 Pipeline	8:1 Oil/Gas	109.4
4	4.5 LNG	0.8 x (Brent / 5.8)	101.7
5	4.5 Pipeline	10:1 Oil/Gas	88.2
6	4.5 LNG	0.11 x Brent + \$1.30	83.8
7	3.5 Pipeline	8:1 Oil/Gas	83.7
8	2.7 LNG	0.162 x Brent + \$1.00	70.6
9	3.5 Pipeline	10:1 Oil/Gas	67.0
10	2.7 LNG	0.1485 x Brent + \$0.90	63.7
11	2.7 LNG	0.8 x (Brent / 5.8)	56.2
12	2.7 LNG	0.11 x Brent + \$1.30	45.8

Note: LNG plant costs of \$470/mmta per Port Authority.

# Impact of Potential Delays on Projects



**■ = More Likely Price Scenario(s)**



# LNG Export Issues

# LNG Export Issues

- **Yukon Pacific permit for export**
  - **Issued in 1989**
  - **14mmta (~1.9 bcf/d) to Japan, South Korea, Taiwan**
  - **25 years from 1<sup>st</sup> gas**
- **Project will require D.O.E. review**
  - **Different project**
  - **Time elapsed**
  - **Different circumstances (e.g., U.S. is net importer of gas)**
  - **Political**
- **Is recent Kenai decision comparable?**
  - **Smaller / shorter window**
  - **No perceived issues outside Alaska**
  - **Lengthy multi-year process for renewal**
- **Experience with oil**
  - **Initial ban on exports**
  - **1996 lifting of export ban, but too late to benefit Alaska**
  - **Still significant perception issue at Federal political level**

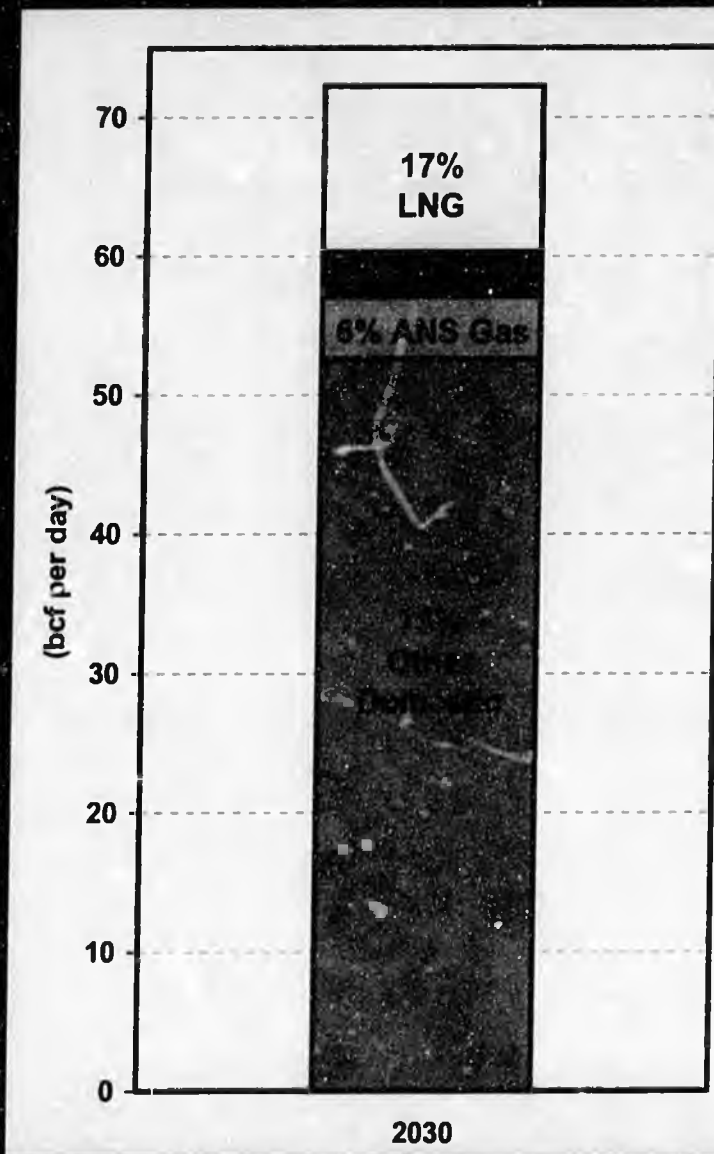


# LNG Export Issues

(cont'd)

- Exports must be “in public interest”
- Pros
  - Free trade
  - Efficiency (i.e., higher netbacks)
  - Balance of payments
  - More production for Lower-48
- Cons
  - Will lead to more LNG imports
  - Will lead to more high-cost Lower-48 production
  - Will lead to higher gas prices for U.S. consumers

## Will D.O.E. Find LNG Exports in the Public Interest?



- If ANS gas is exported, it will not be available for domestic markets.
- Requires “replacement” with more expensive domestic gas or LNG imports.
- Forecasts indicate that ANS supplies @ 4.5 Bcf/day will reduce U.S. gas price by ~ \$0.30/MMBtu.
- At projected US consumption of 70 bcf/d in 2030, this is ~ \$7.5 billion annually.

Source: EIA AEO 2007

# LNG Export Issues

(cont'd)

- **Chance of Federal intervention**
  - **Federal government assistance with permitting and loan guarantees in 2004 likely lead to tension re: potential of exports**
  - **National security concerns**
  - **Argument that consumers in Lower-48 would be hurt**
  - **Probably little Federal support for exports if Federal gas is involved**
- **Pipeline project must also apply for export permit**
  - **But, 2004 legislation specifically addresses export to Canada**

# Conclusions

## Conclusions

- **Gas prices in Asia are likely to maintain a premium over U.S. gas prices, though not at current levels**
- **U.S. prices will likely strengthen relative to Asian and European gas prices as U.S. domestic production becomes more expensive and LNG flows away from the U.S.**
- **LNG project would likely be viable under reasonable price scenarios, assuming gas can be exported**
  - **Economics of LNG delivery to U.S. West Coast would be worse than pipeline delivery under any reasonable set of assumptions**
- **Under the reasonable price scenarios, 2.7 bcf/d LNG project offers \$/MMBtu netbacks that are similar to pipeline netbacks**
  - **Difference in some cases is not large relative to potential estimation error**

# Conclusions

(cont'd)

- **However, larger volumes for pipeline deliveries produce higher overall values (NPV) for resource owners under more likely price scenarios**
  - **3.5 bcf/d pipeline > 2.7 bcf/d LNG by \$11Bn to \$16Bn**
  - **4.5 bcf/d pipeline > 2.7 bcf/d LNG by \$25Bn to \$30Bn**
- **LNG project would produce somewhat higher NPVs if in the long run:**
  - **Oil prices stay high**
  - **Gas/Oil price ratio in Asia stays strong**
  - **Gas/Oil price ratio in U.S. remains weak**
  - **LNG can be exported and project advances at some time earlier than the pipeline**

# Conclusions

(cont'd)

- **Gaining Federal permission to export LNG to Asia will likely be very difficult**
  - **D.O.E. permission**
  - **Potential Federal legislation**
- **Export via Y-line will face similar challenges**
- **Federal acceptance of exporting may be more favorable if majority of gas is already flowing to U.S. markets**
  - **But don't count on it**
  - **Oil experience along those lines was not particularly favorable**

# Conclusions

(cont'd)

- **Impact of potential delays**
  - **Delay in pipeline relative to LNG does not change results under more likely price scenarios**
- **Does the State have to choose between the two projects?**
  - **Market-based outcome is more favorable**
  - **Shippers can nominate to LNG project if they see it is more economic**
  - **Potential buyers of LNG can go “upstream” and negotiate to buy gas**
  - **Economics of LNG relative to pipeline not compelling enough to suggest that the State needs to “intervene” to make LNG happen at expense of pipeline**

# **Comparison of Netbacks from Potential LNG Project with ALCAN Pipeline Project**

**June 20, 2008**

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# Econ One Review

- **Analyzed economic assumptions & netback values associated with potential LNG and pipeline projects**
  - **Port Authority proposal**
  - **Other potential LNG configurations**
  - **TransCanada proposal**
- **Reviewed Port Authority proposal, assumptions and analysis**
- **Reviewed Administration analysis of LNG and pipeline netbacks**
- **Reviewed information from various LNG specialists and government agencies**

# Econ One Review

(cont'd)

- **Analyzed netback @ the inlet to GTP**
  - **\$ / MMBtu**
  - **Total value of netback**
    - **Nominal \$**
    - **Real (\$2008)**
    - **NPV-10**
- **Project that “maximizes” the netback creates highest value for resource owners**
  - **Producers**
  - **State**

# Project Netback Analyses

## LNG Exports to Asia

- 2.7 Bcf/d (Port Authority proposed)
- 4.5 Bcf/d (Little Susitna proposed)

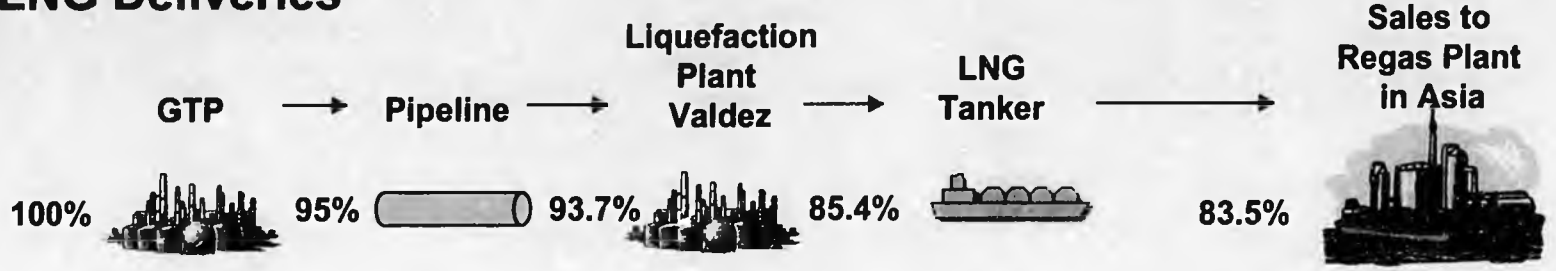
## Pipeline to Alberta

- 3.5 Bcf/d (TransCanada minimum volumes)
- 4.5 Bcf/d (TransCanada base volumes)

# **Overview of LNG v. Pipeline Delivery**

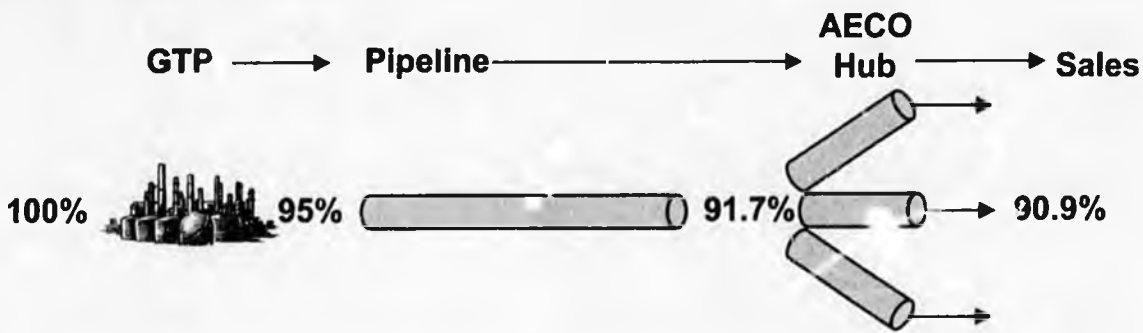
# LNG and Pipeline Delivery Chain

## LNG Deliveries



**Aggregate Loss:**  
16.5%

## Pipeline Deliveries

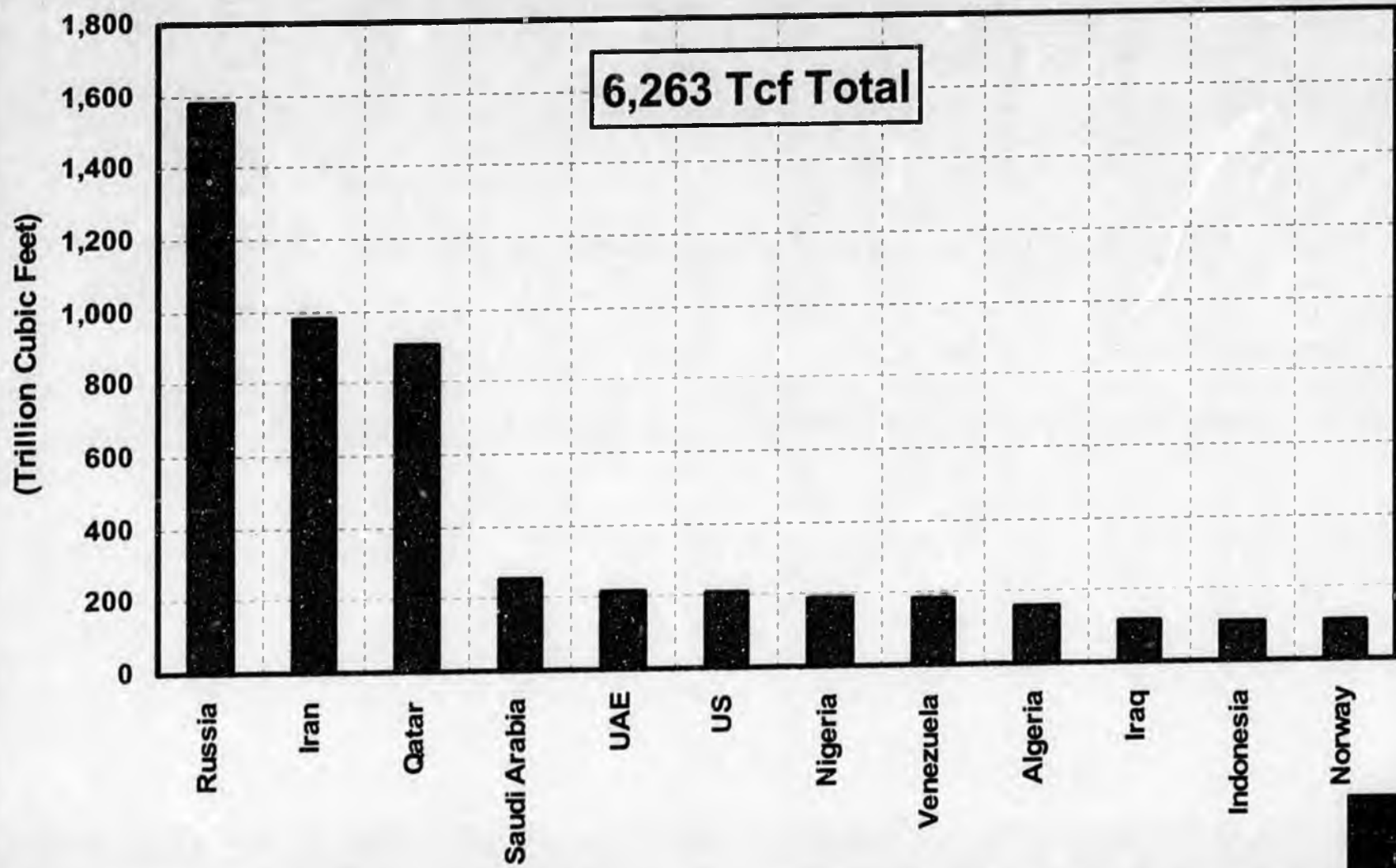


**Aggregate Loss:**  
9.1%



# Supply / Demand

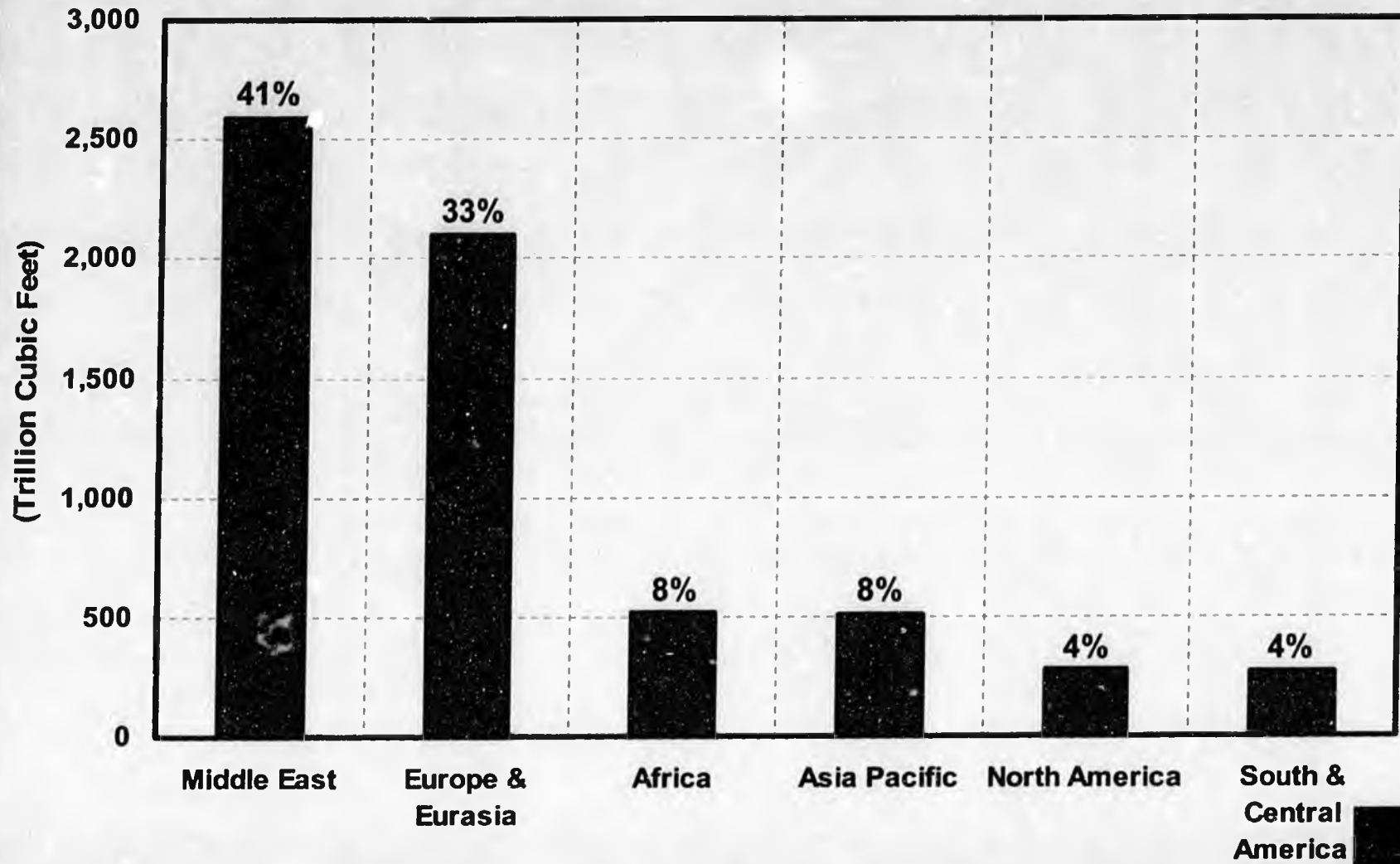
# Worldwide Proved Gas Reserves



Source: BP Statistical Review 2008;  
Represents 80% of known reserves in 2007.



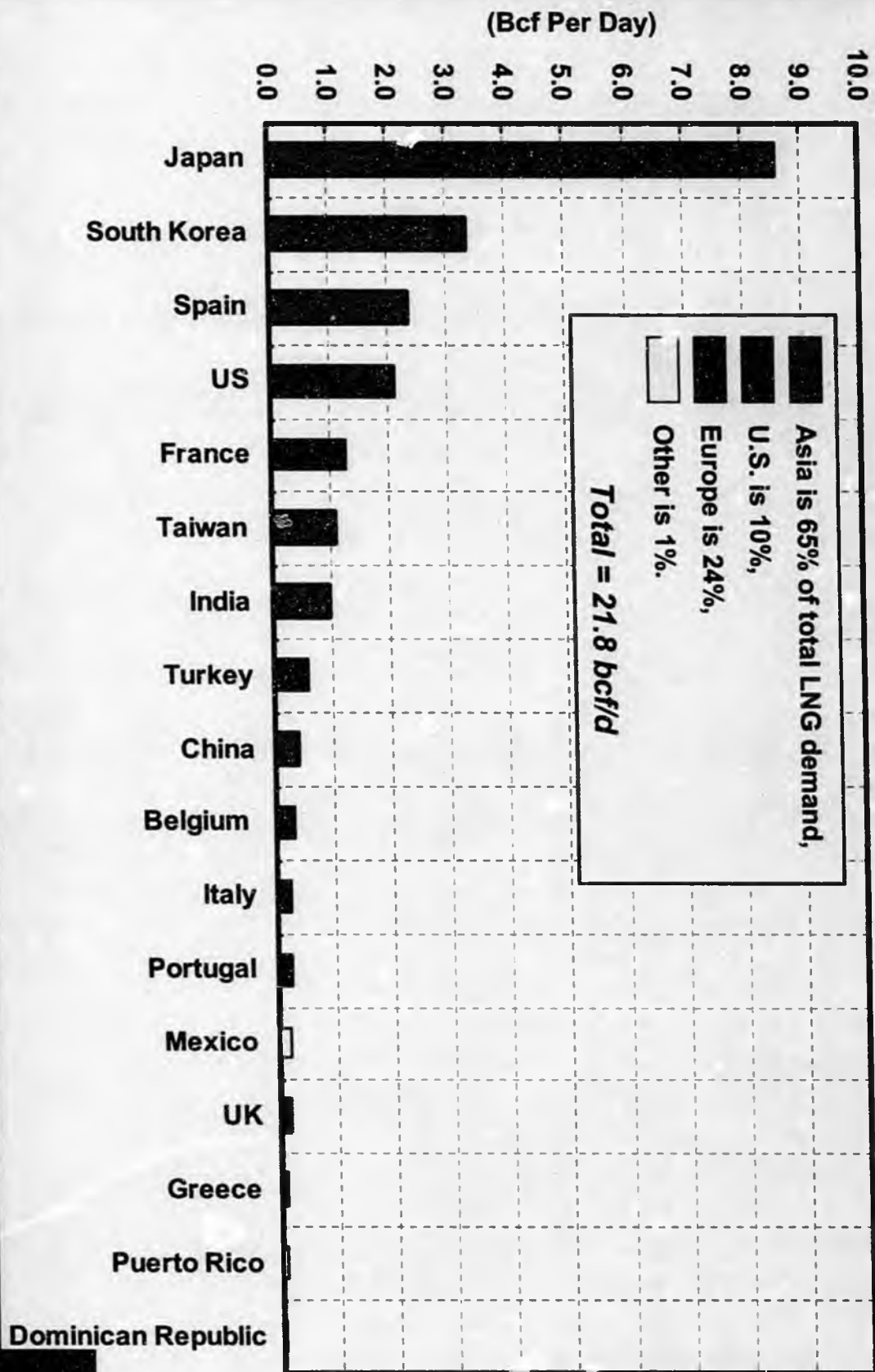
# Worldwide Proved Gas Reserves by Region



Source: BP Statistical Review 2008.



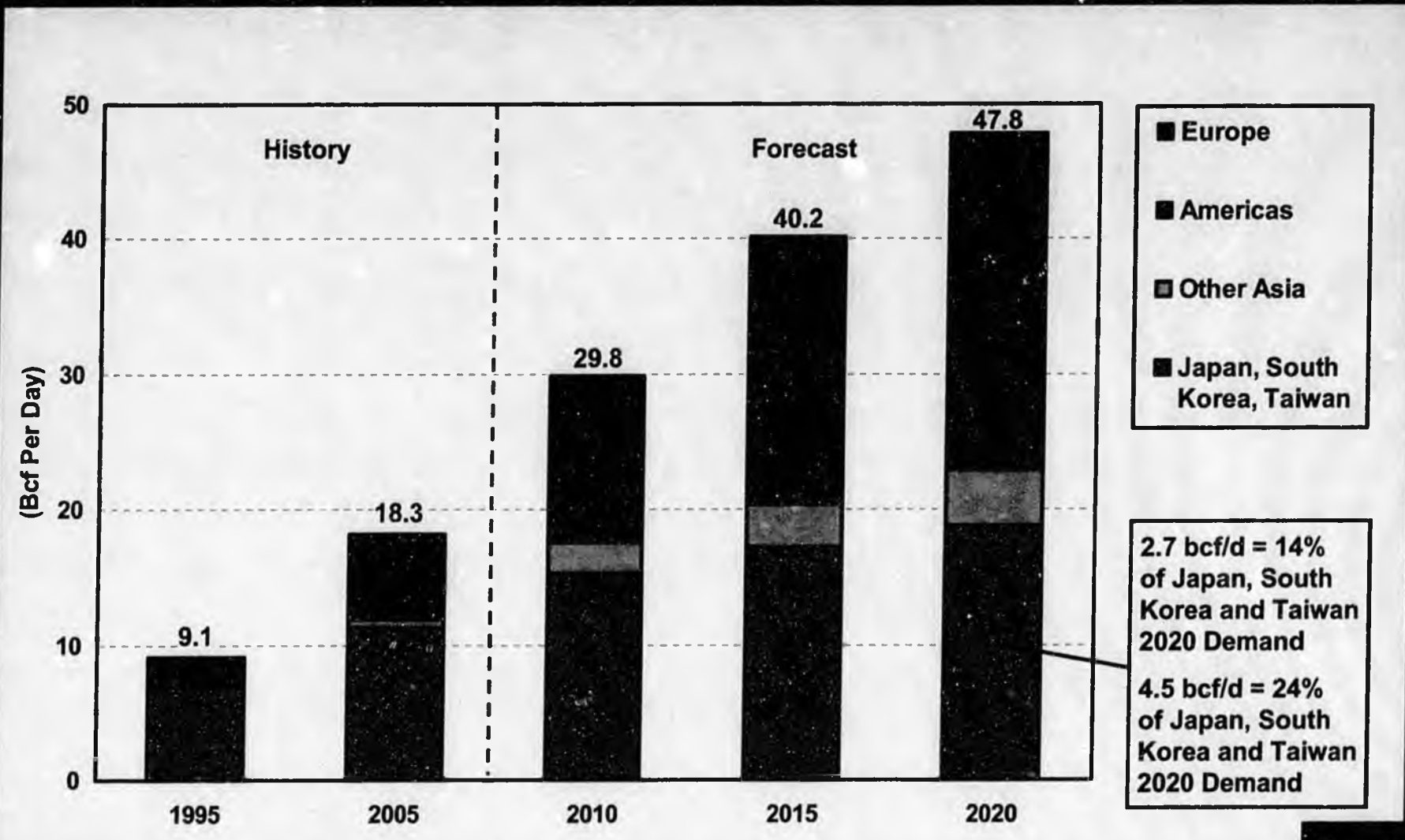
# Current Worldwide LNG Demand



Source: BP Statistical Review 2008.



# Projected LNG Demand by Region



Source: National Petroleum Council ;  
Jensen Associates, August 2007



# Liquefaction Plant Capacities by Region

(Pacific Trade)

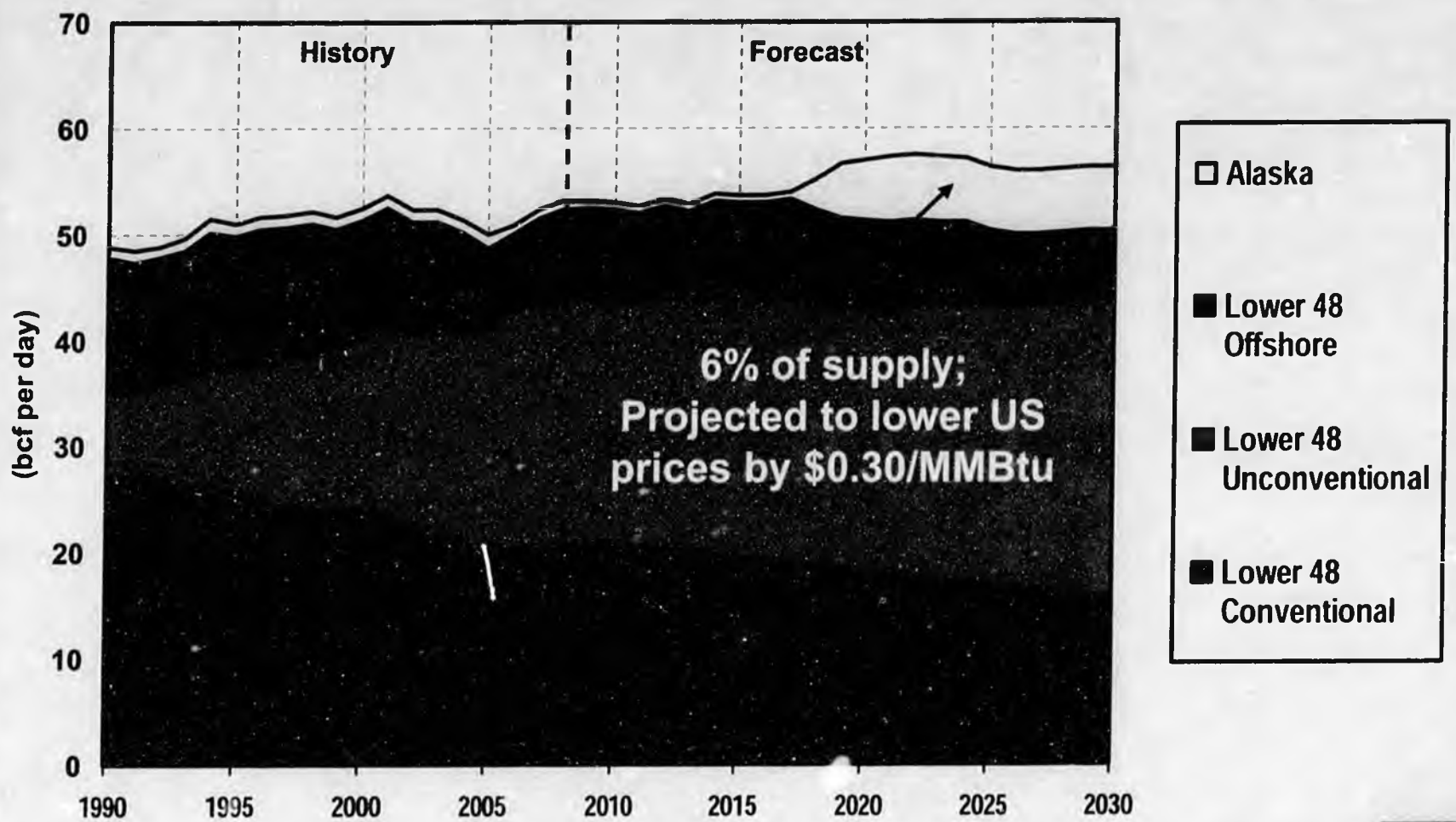
<b>Pacific Basin</b>	
<u>Category</u>	<u>Capacity</u>
	<b>(Bcf/Day)</b>
(1)	(2)
Operating	9.85
Under Construction	3.50
Under Consideration	6.24
<b>Total</b>	<b>19.59</b>

<b>Middle East</b>	
<u>Category</u>	<u>Capacity</u>
	<b>(Bcf/Day)</b>
(3)	(4)
Operating	6.06
Under Construction	6.84
Under Consideration	4.63
<b>Total</b>	<b>17.53</b>

Source: Facts Global Energy, "Evaluating Natural Gas Import Options for the State of Hawaii", April 2007.



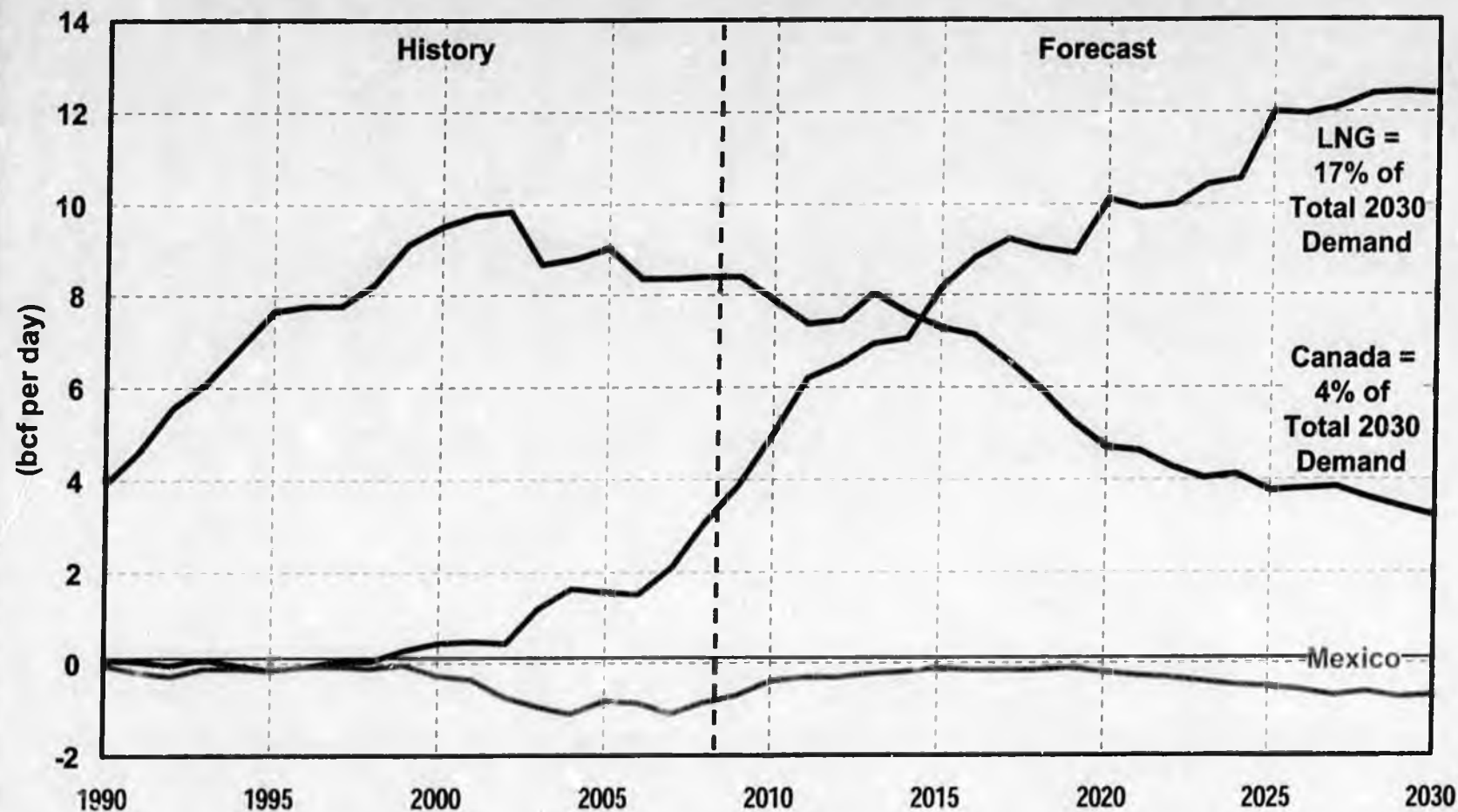
# U.S. Gas Production by Source (1990 - 2030)



Source: EIA AEO 2007



# U.S. Net Natural Gas Imports (1990 - 2030)



Source: EIA AEO 2007

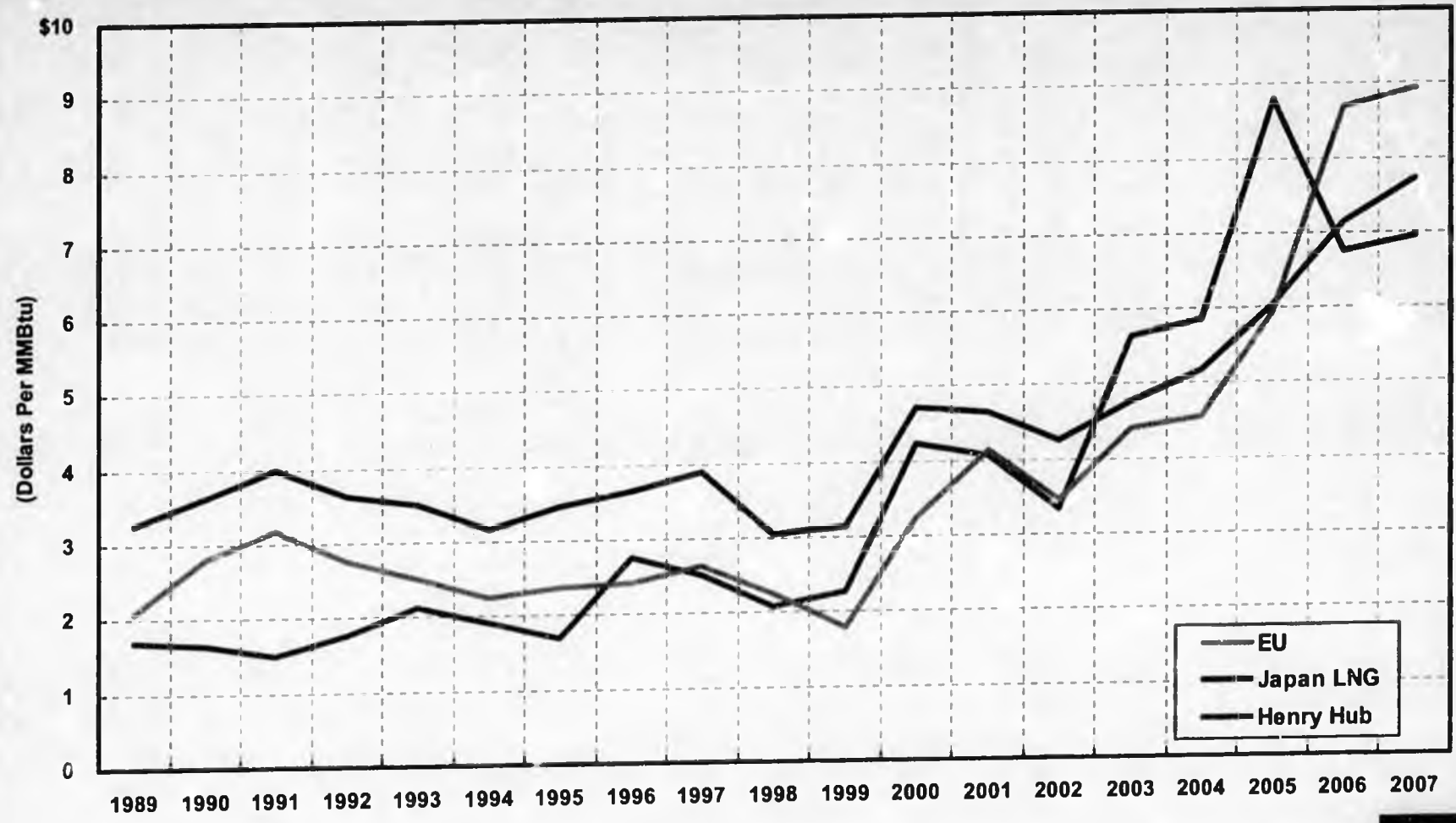


# Historical Pricing

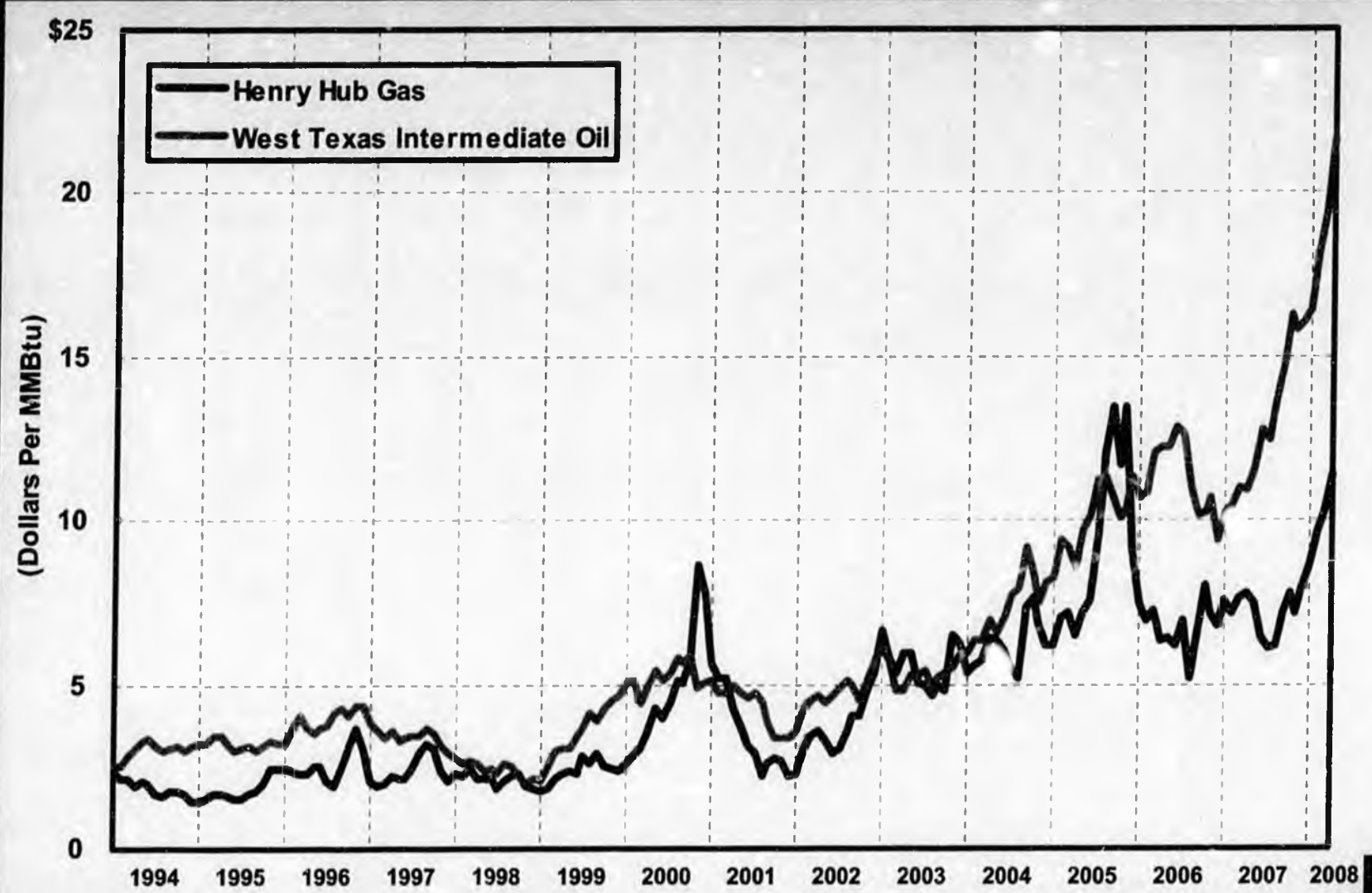
ACON  
ONE

# Historical Gas Prices

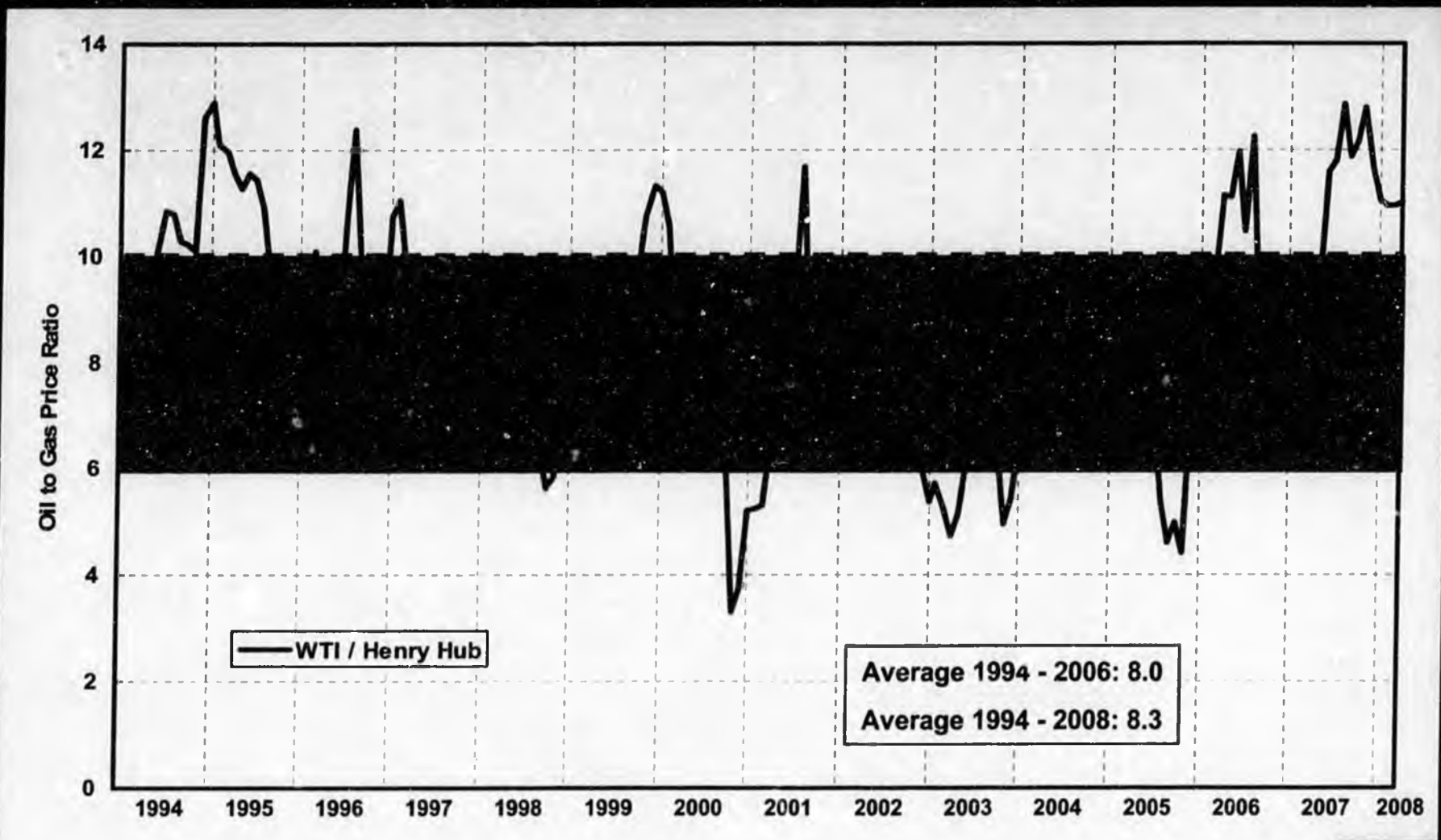
(U.S., Japan and Europe)



# U.S. Natural Gas and Crude Oil Prices (1994 - 2008)



# Historical Relationship Between Oil and Gas Prices in the U.S.



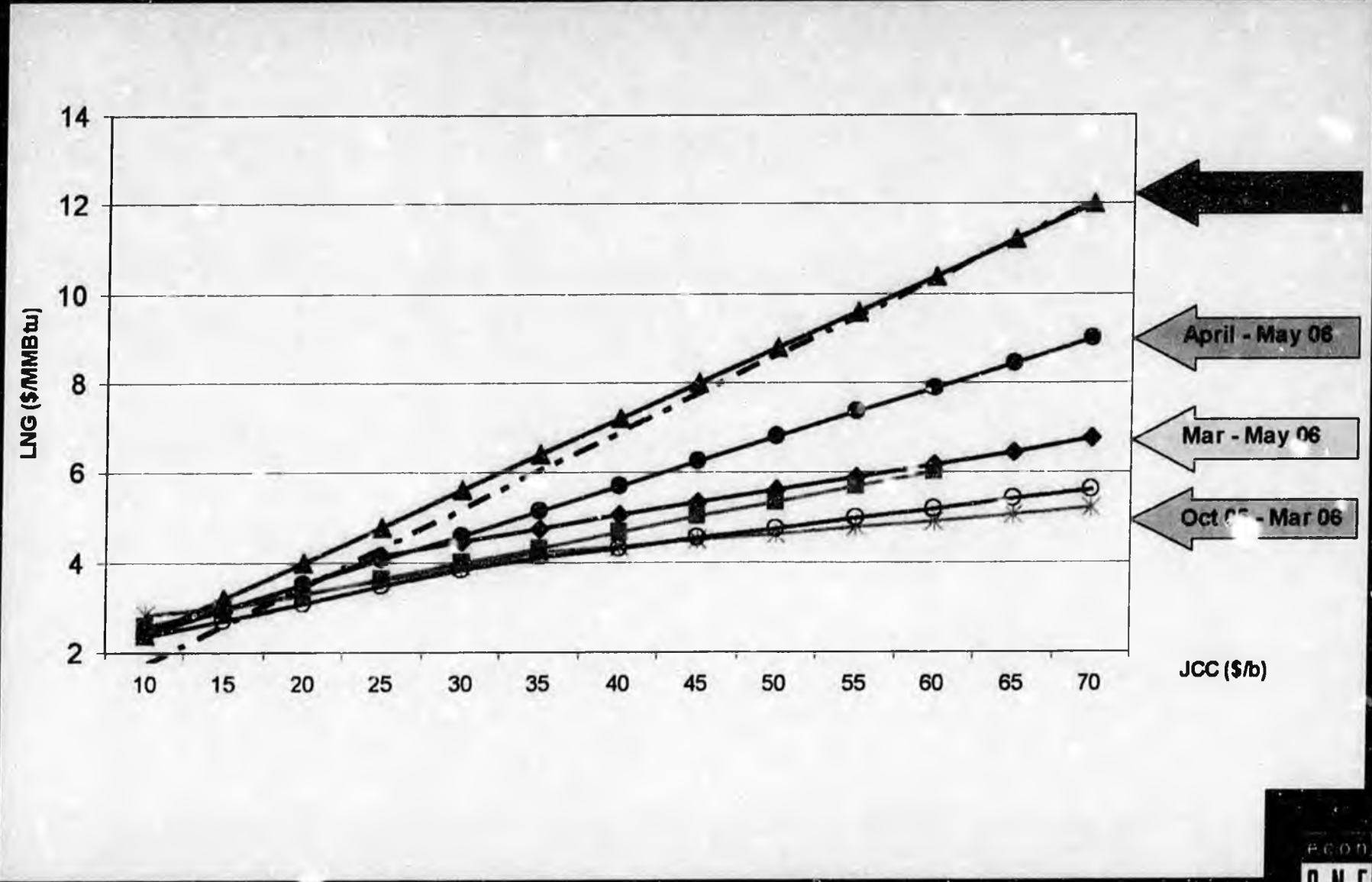
# Japanese Crude Oil and Gas Prices

(2000 - 2008)



# Evolution of LNG Pricing in Asia

(Relationship of Gas to Oil Prices Seen in Recent Contracts)

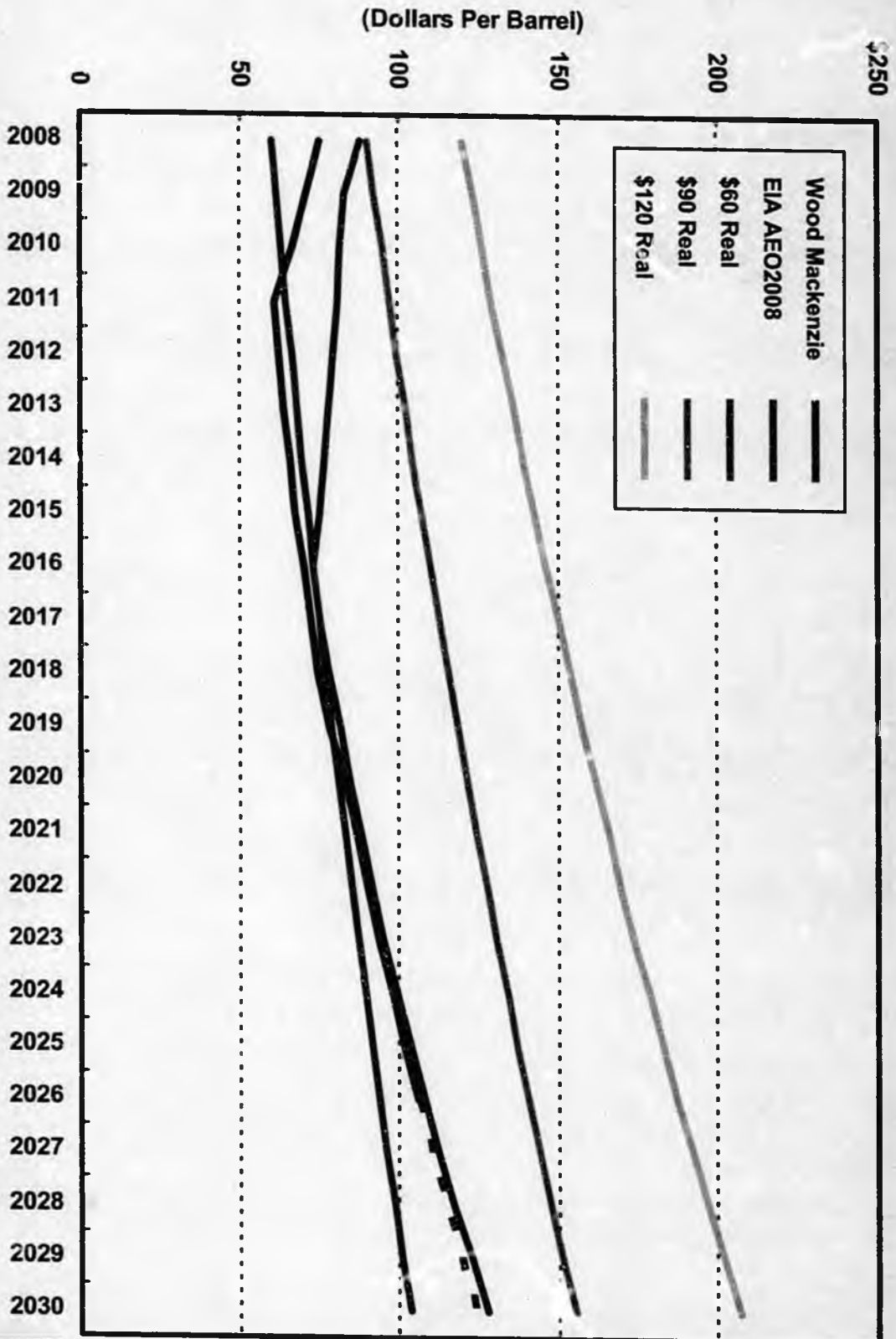


Source: Facts Global Energy, "Evaluating Natural Gas Import Options for the State of Hawaii", April 2007.



# Oil and Gas Price Forecasts

# Oil Prices Used in Analyses

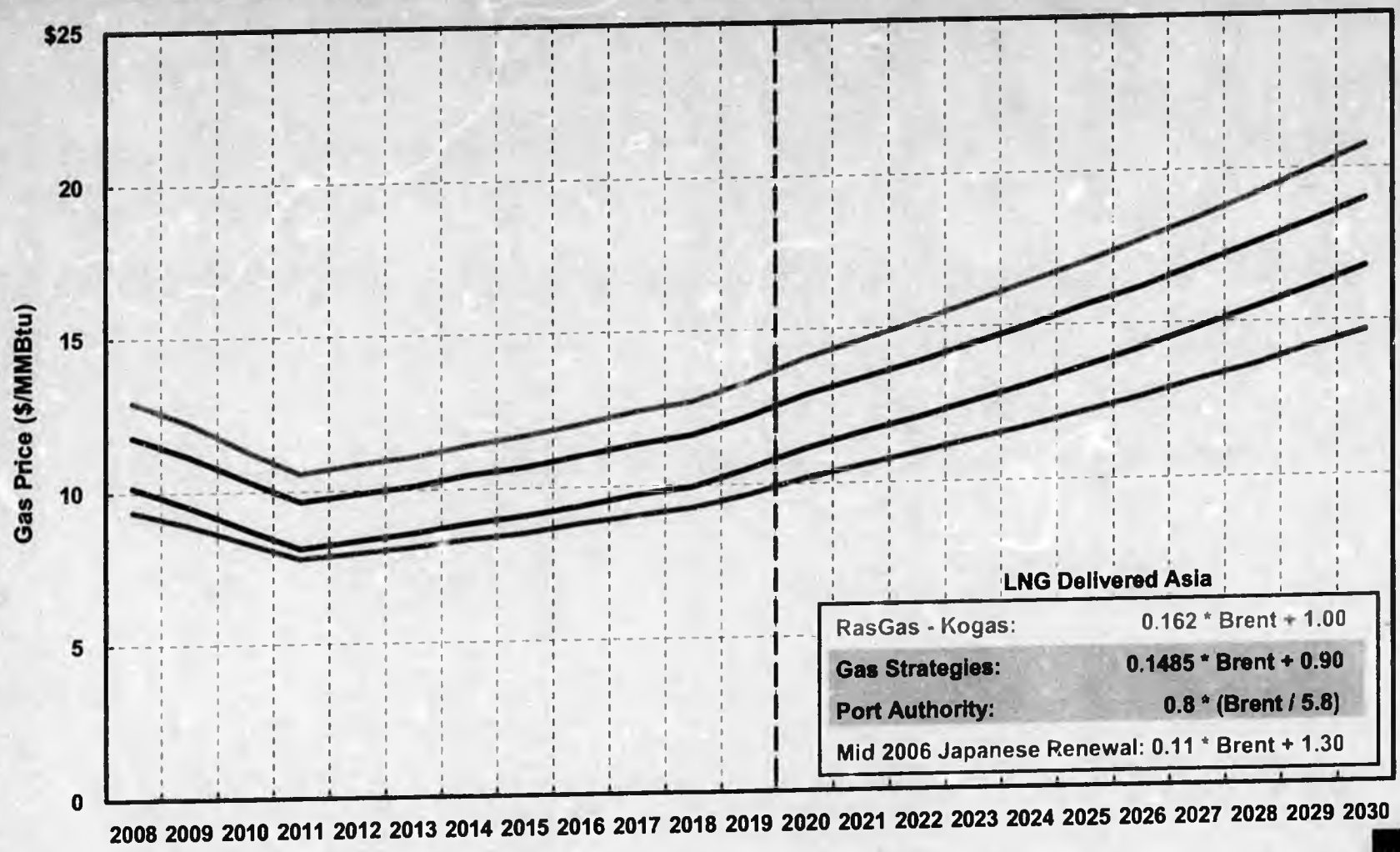


Note: 2.5% annual price inflation.

## Prospects for Asian LNG Prices

- **There is a wide range of prices depending on contract vintage**
- **Recent contracts have reflected stronger links to oil**
- **Many contracts are on a provisional basis as previously (low-priced) formulas have expired or are not applicable at current oil price levels**
- **Relatively high priced opportunities in Asia will attract gas supplies to that region**
  - **Increasingly competitive among suppliers**
  - **Opportunities for buyers**
  - **Price will be dependent on the supply situation at the time of contracts**

# Gas Price Forecasts Used in Analyses (Using Wood Mackenzie Oil Price Forecast)



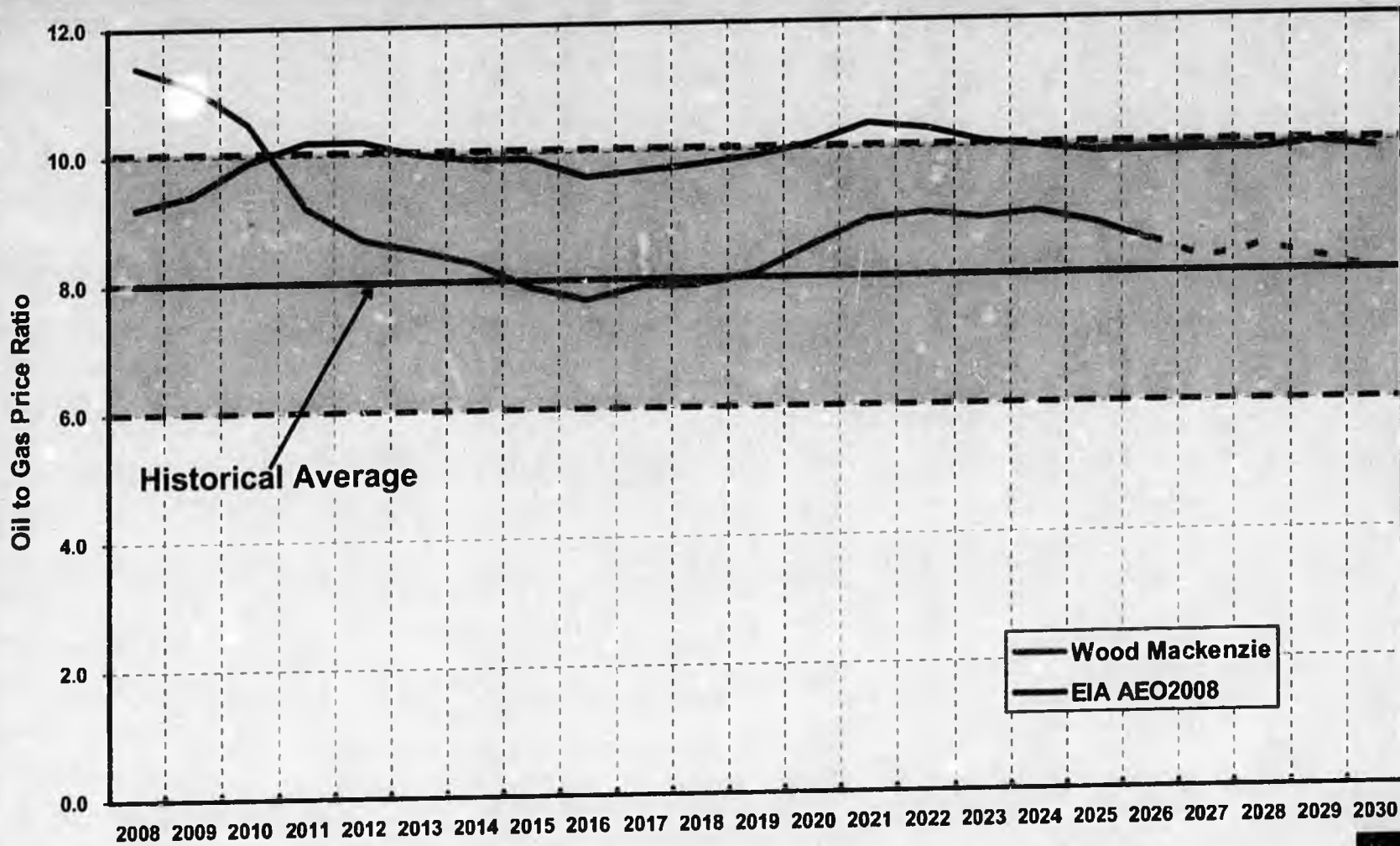
 = More Likely Price Scenarios



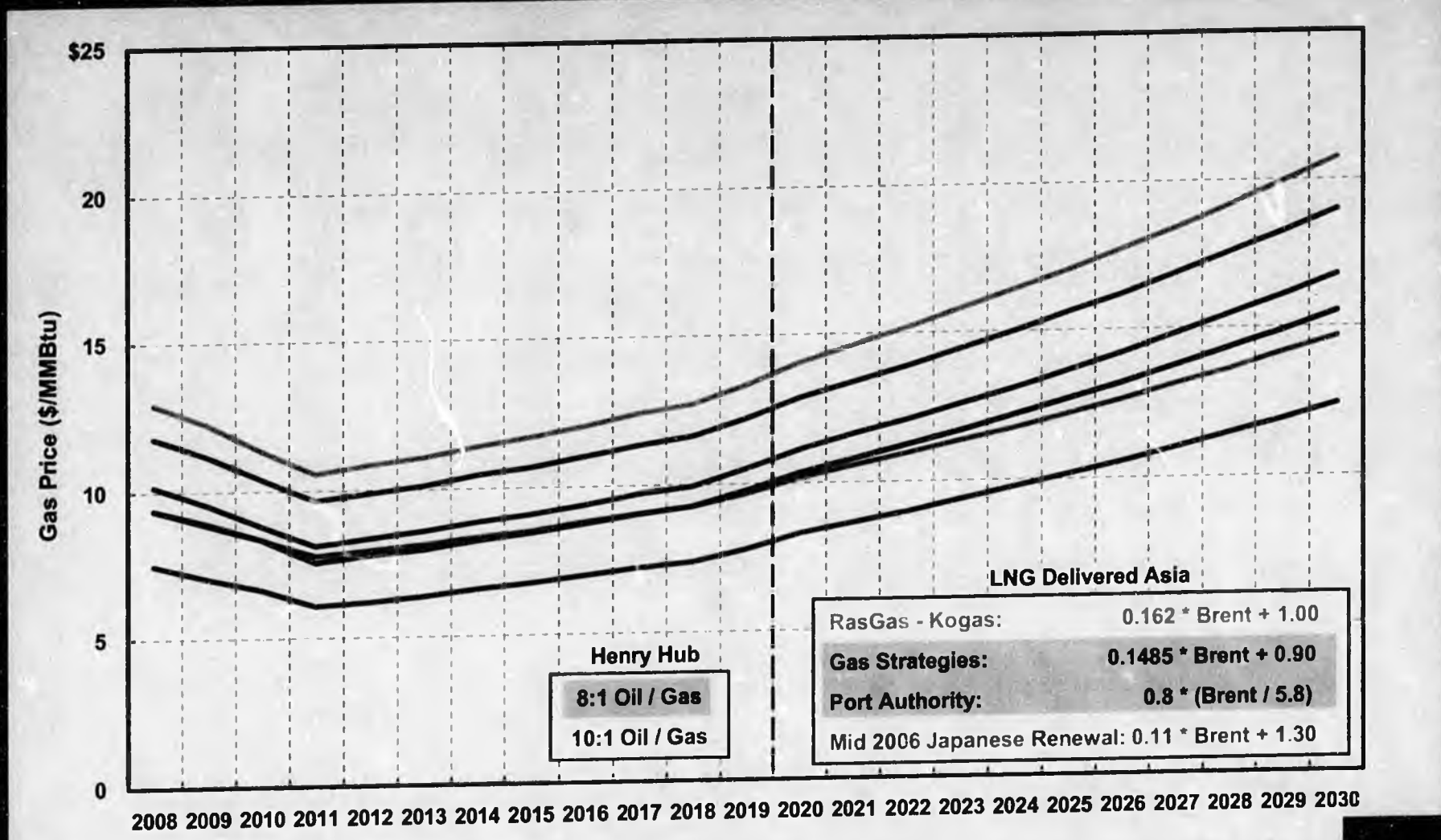
## Prospects for U.S. Gas Prices

- **Historically, gas has been priced between 1/6 & 1/10 the value of oil, with the long run average near 1/8**
- **The recent run-up in oil prices & relatively abundant domestic production of natural gas have kept that relationship above historical levels**
- **Many see the oil/gas relationship returning to more historical levels (i.e. convergence) as:**
  - **Domestic supplies decline & become more costly to produce**
  - **LNG imports are drawn to higher priced regions (e.g. Asia)**
  - **Greenhouse/carbon emission concerns put coal out of favor & put natural gas in favor as the fuel of choice for electricity generation**

# Ratio of Forecasted U.S. Oil and Gas Prices



# Gas Price Forecasts Used in Analyses (Using Wood Mackenzie Oil Price Forecast)



Henry Hub  
 8:1 Oil / Gas  
 10:1 Oil / Gas

LNG Delivered Asia  
 RasGas - Kogas:  $0.162 * \text{Brent} + 1.00$   
 Gas Strategies:  $0.1485 * \text{Brent} + 0.90$   
 Port Authority:  $0.8 * (\text{Brent} / 5.8)$   
 Mid 2006 Japanese Renewal:  $0.11 * \text{Brent} + 1.30$

= More Likely Price Scenario(s)

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# **Assumptions Used in Comparative Netback Analyses**



# Comparison of Capital Costs for LNG Project

(2.7 bcf/d LNG Project)

	<b>Port Authority (Bechtel)</b>	<b>Administration (Westney)</b>
<b>GTP</b>	<b>\$3.4Bn</b>	<b>\$5.0Bn</b>
<b>Pipeline</b>	<b>\$13.1Bn</b>	<b>\$11.5Bn</b>
<b>Total GTP/Pipeline</b>	<b>\$16.5Bn</b>	<b>\$16.5Bn</b>
<b>LNG Plant</b>	<b>\$7.9Bn (\$470/mmta)</b>	<b>\$12.7Bn (\$755/mmta)</b>
<b>Grand Total</b>	<b>\$24.4Bn</b>	<b>\$29.2Bn</b>

# Capital Costs Used in Netback Analyses

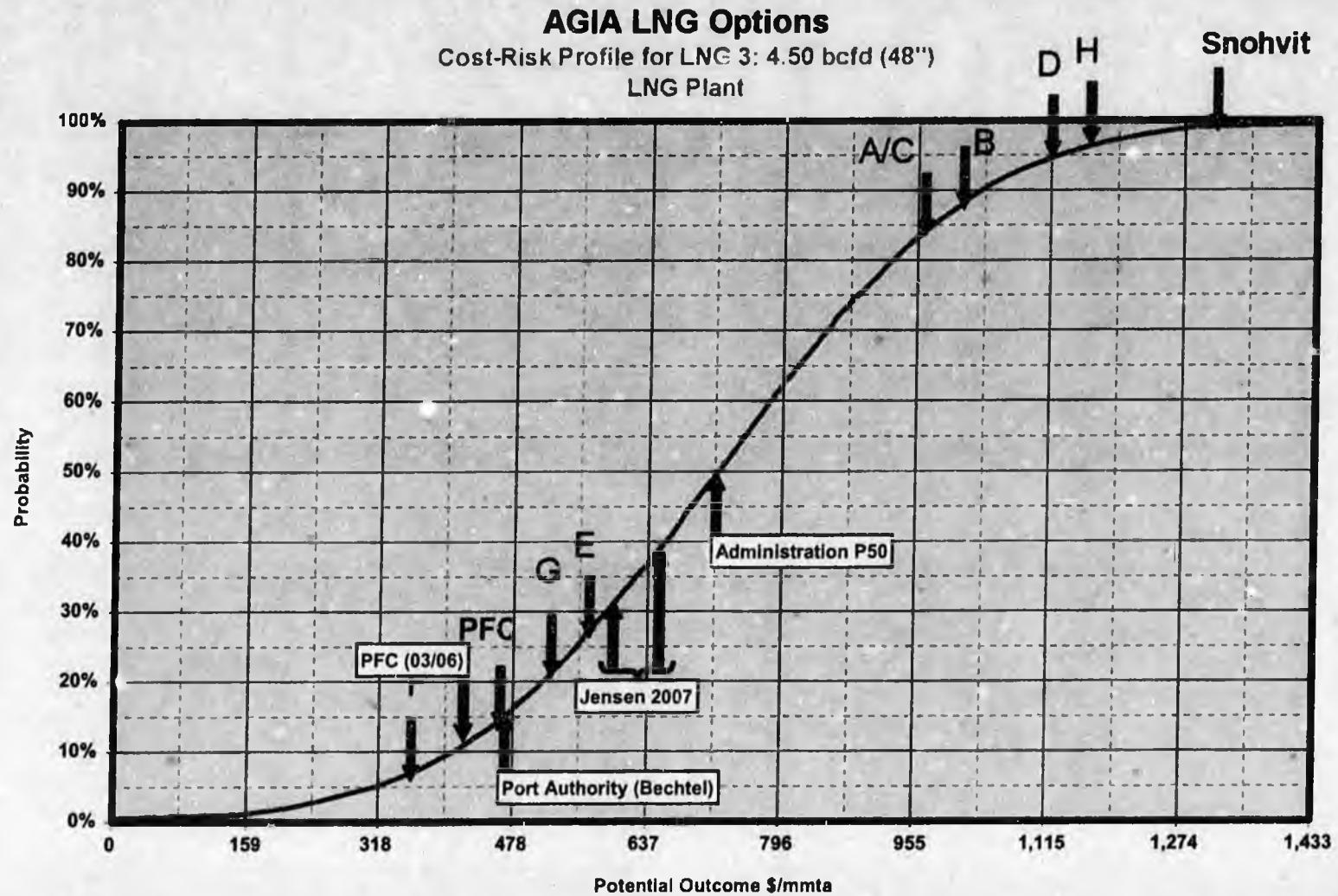
	LNG Project		Pipeline Project	
	2.7 bcf/d	4.5 bcf/d	3.5 bcf/d	4.5 bcf/d
(Billion \$2007)				
	(1)	(2)	(3)	(4)
<b>GTP</b>	\$5.0	\$8.3	\$6.5	\$8.3
<b>Pipeline</b>				
Alaska	11.5	12.6	10.2	10.9
Canada	-	-	11.6	12.6
<b>Total Pipeline</b>	<b>\$11.5</b>	<b>\$12.6</b>	<b>\$21.7</b>	<b>\$23.5</b>
<b>LNG Plant (Bechtel)</b>	7.9	13.7*	-	-
<b>LNG Plant (Westney)</b>	12.7	21.1	-	-
<b>Total (Bechtel LNG)</b>	<b>\$24.4</b>	<b>\$34.6*</b>	<b>\$28.2</b>	<b>\$31.8</b>
<b>Total (Westney LNG)</b>	<b>\$29.2</b>	<b>\$42.0</b>	<b>\$28.2</b>	<b>\$31.8</b>

\* Based on \$470/mt.



# LNG Plant Costs

# LNG Plant Costs Per Administration (Westney) (\$2007 per mmta)

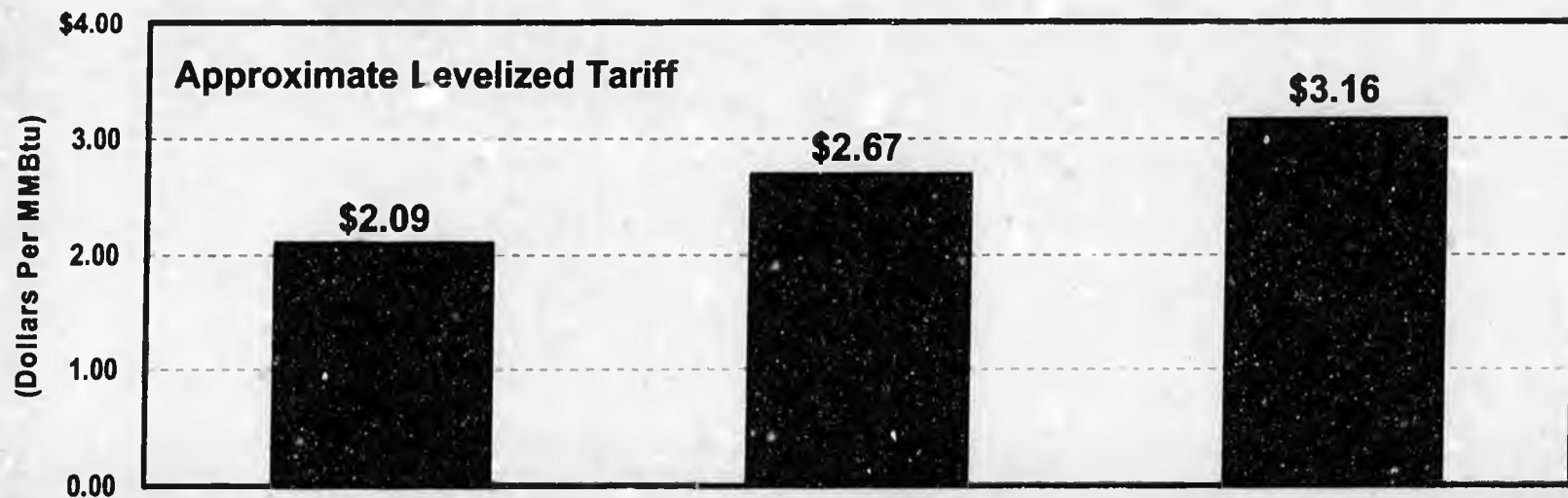
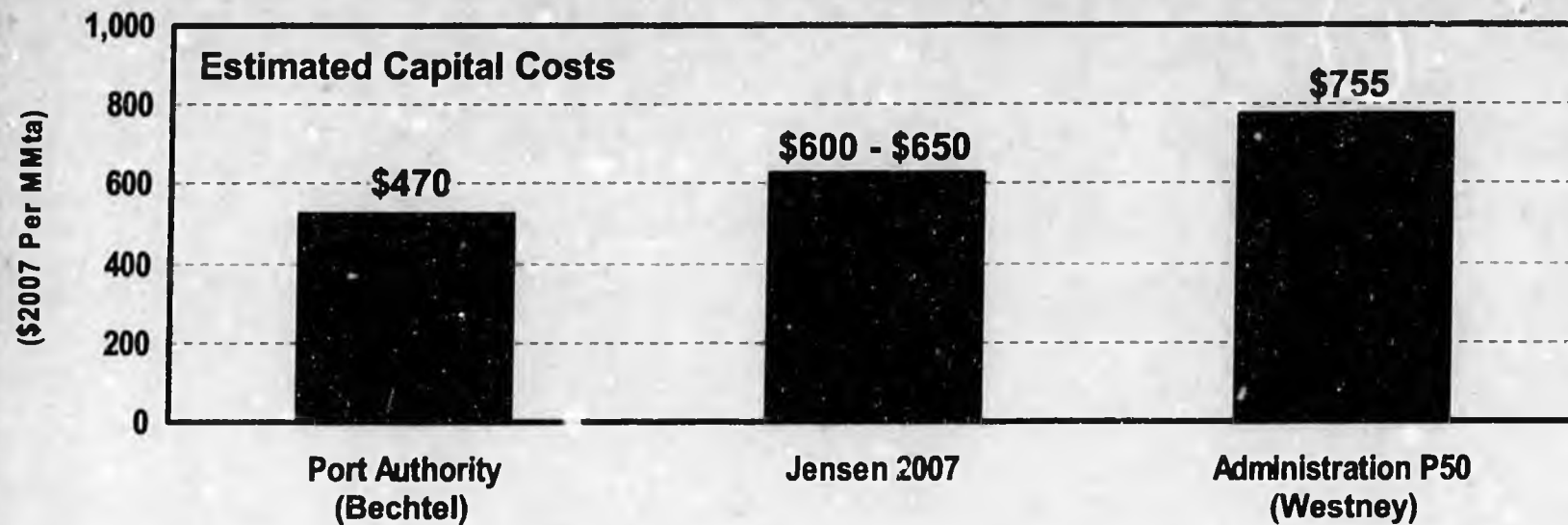


Source: AGIA Analysis Technical Team, "LNG Project Costs/Schedule", June 9, 2008.



# Range of LNG Liquefaction Costs and Tariffs

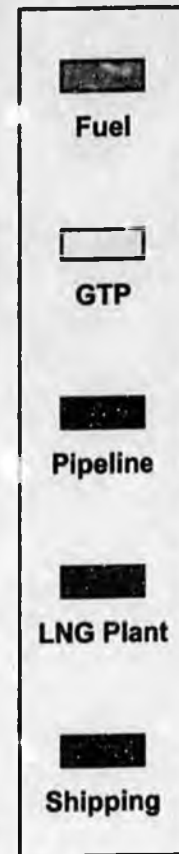
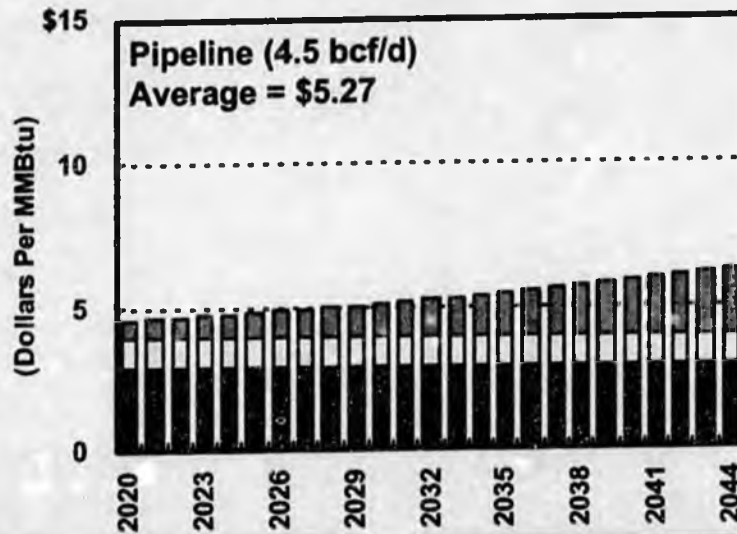
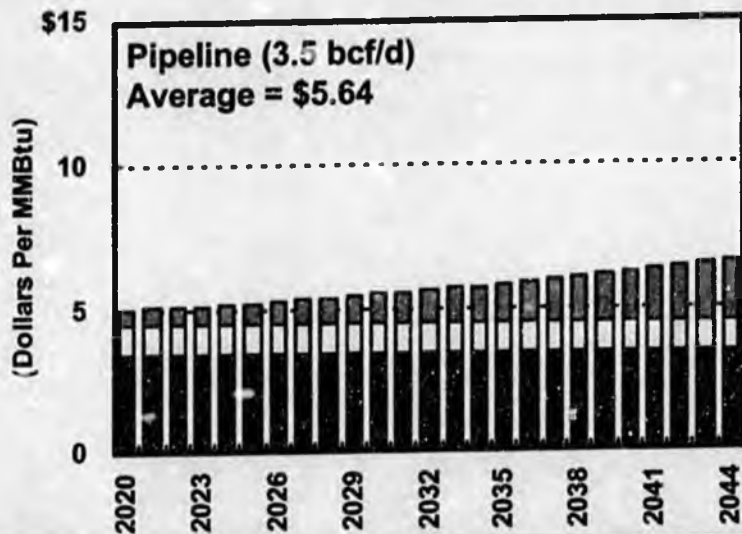
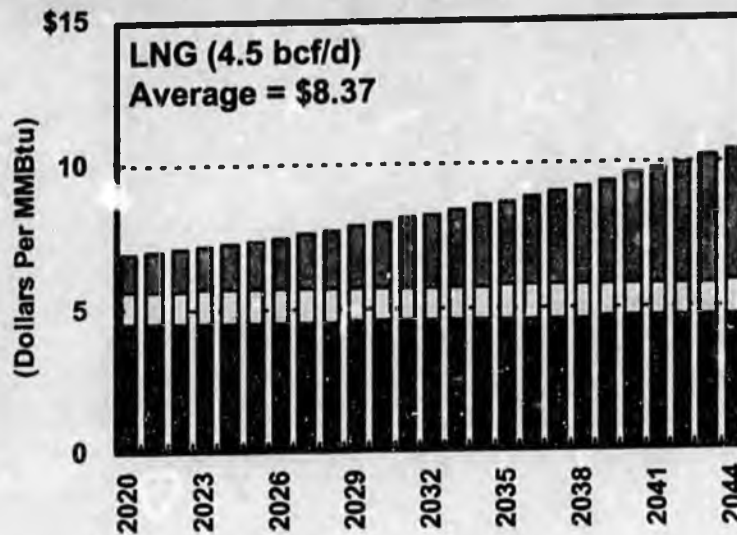
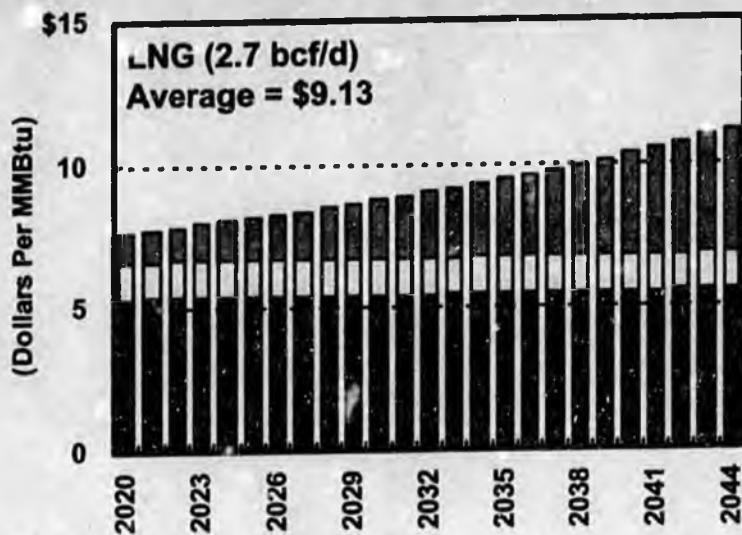
(2.7 bcf/d LNG Project)



# Comparison of Netback Elements

# Comparison of Potential Costs

## LNG Project v. Pipeline Project 2020 - 2044

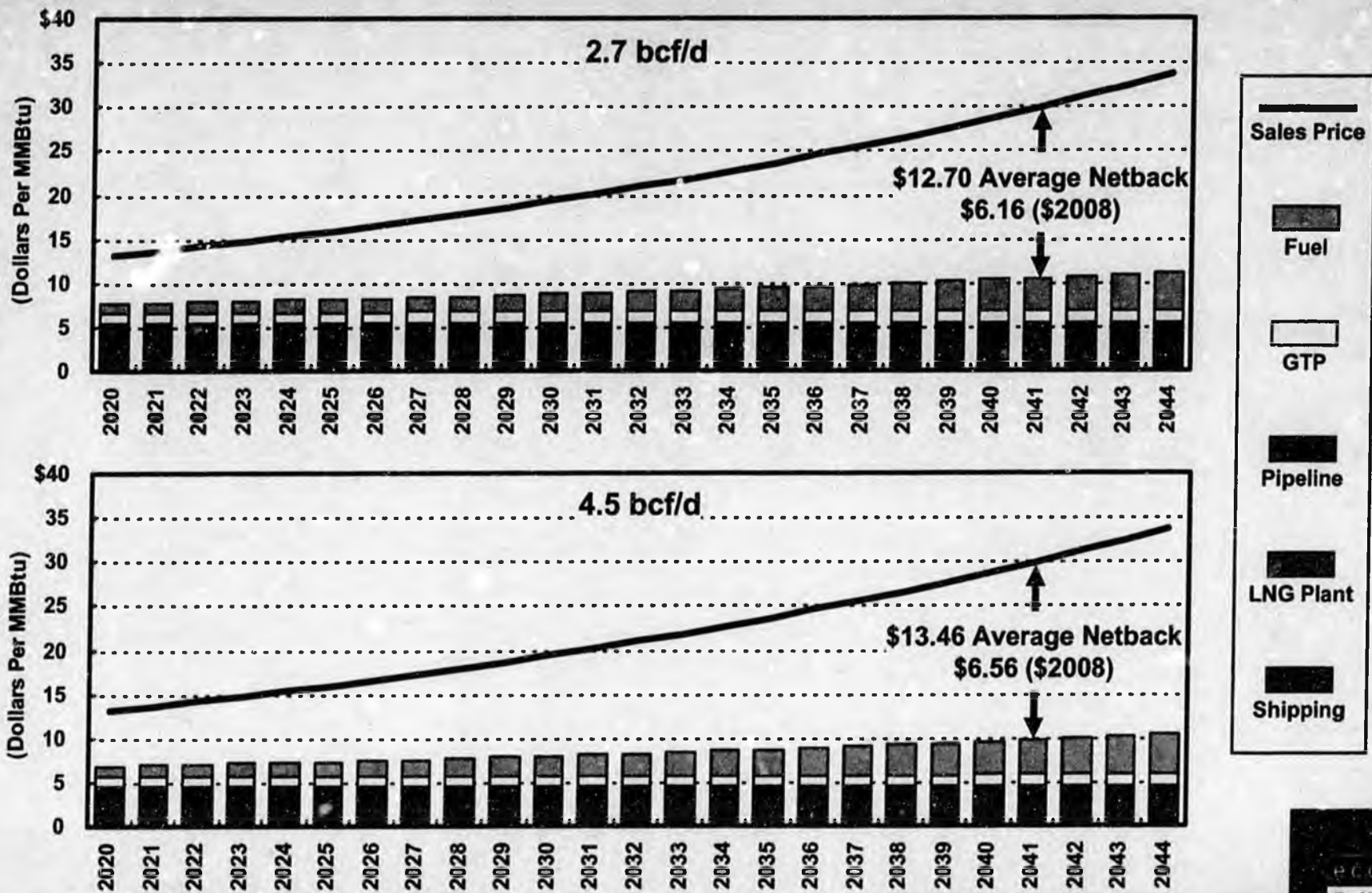


Note: Oil Prices per Wood Mackenzie forecasts with 8:1 Oil/Gas Price Ratio;  
LNG Plant cost of \$470/mmta per Port Authority application;  
Asia Gas Price = 0.1485 x JCC + \$0.90 (Gas Strategies)

# Potential Netbacks

# Potential Netbacks for LNG Delivery to Asia

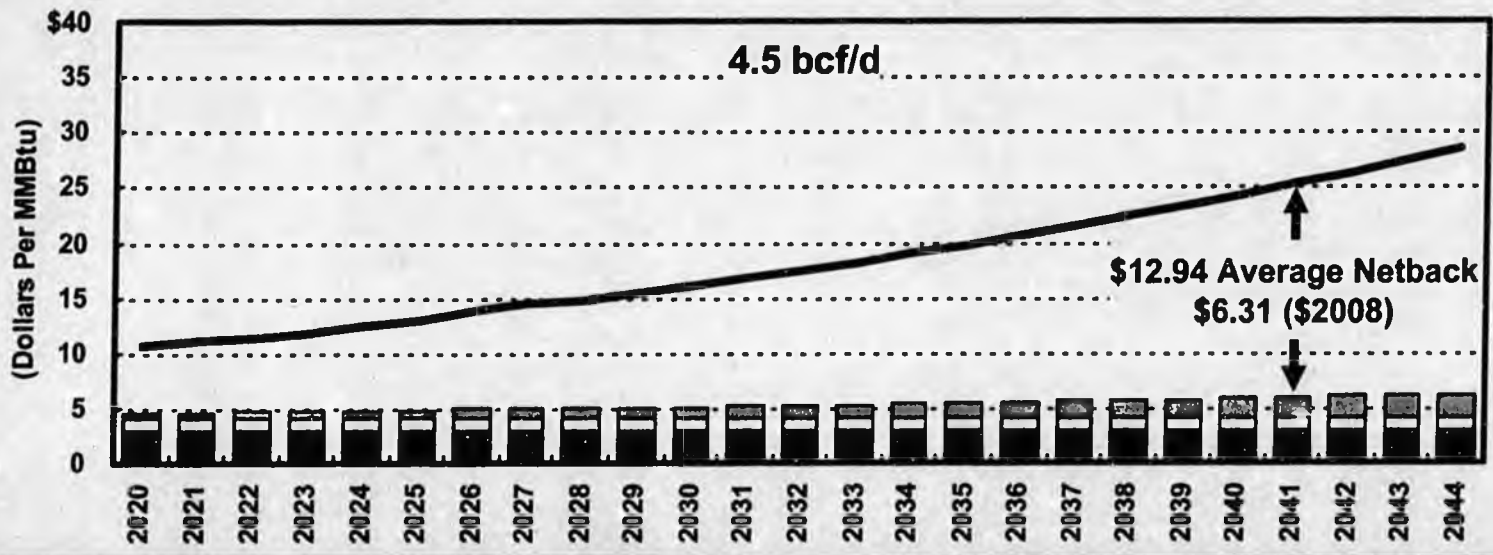
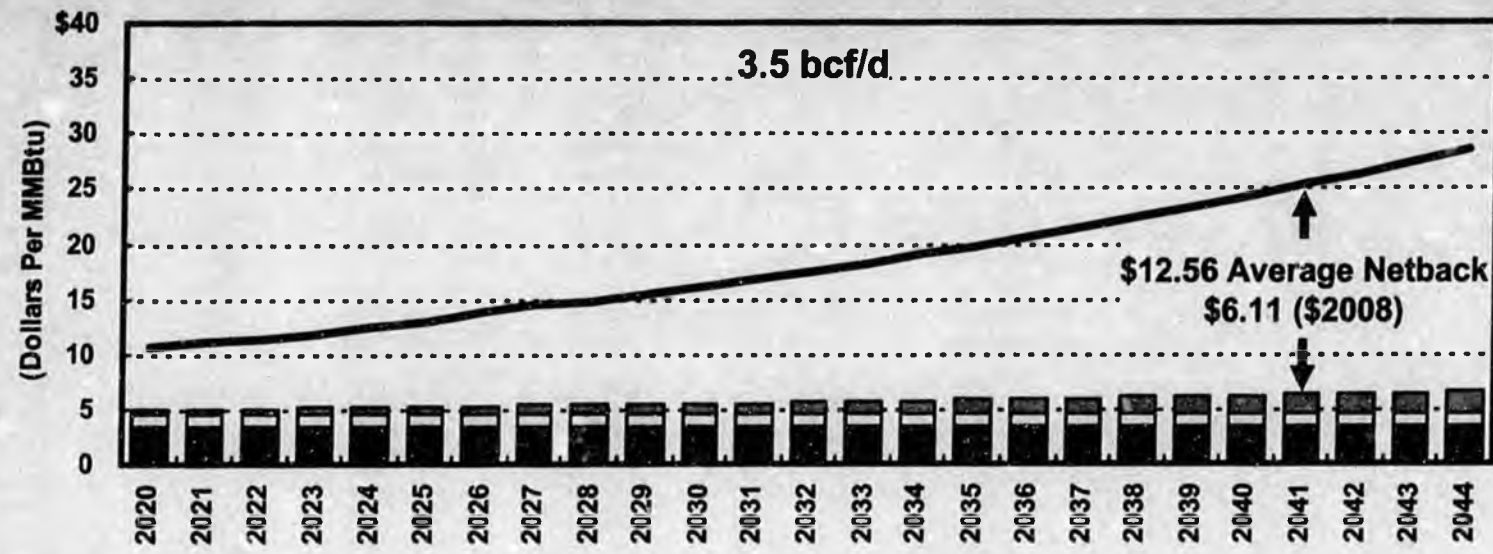
(Gas Strategies: Asia Gas Price = 0.1485 x Brent + \$0.90)



Note: Oil Prices per Wood Mackenzie forecasts;  
 LNG Plant cost of \$470/mmta per Port Authority application.

# Potential Netbacks for AECO Pipeline Delivery

(8:1 WTI Oil/Henry Hub Gas Price Ratio)



Note: Oil Prices per Wood Mackenzie forecasts.



# **Comparison of Projected Netbacks**

**2.7 bcf/d LNG Project**

**v.**

**3.5 bcf/d Pipeline Project**

# Projected Netbacks Under Alternative Projects

(Port Authority LNG Plant Costs -- \$470/mt)

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Gas Sales Price (\$/MMBtu)	\$23.67	\$21.83	\$19.61	\$17.21	\$18.20	\$15.20
Delivery Costs (\$/MMBtu) (Including Losses)	(9.42)	(9.13)	(8.77)	(8.39)	(5.64)	(5.38)
Netback (\$/MMBtu)	\$14.25	\$12.70	\$10.84	\$8.82	\$12.56	\$9.82
Netback in \$2008 dollars (per MMBt)	\$6.93	\$6.16	\$5.22	\$4.25	\$6.11	\$4.75
	①	②	④	⑥	③	⑤
Total Netback Dollars						
In Nominal Dollars (\$Bn)	\$305.2	\$353.1	\$301.3	\$245.2	\$472.0	\$369.1
In \$2008 dollars (\$Bn)	192.7	171.3	145.1	118.1	229.5	178.5
NPV-10 (\$Bn)	35.1	31.0	25.6	20.9	41.8	31.9
	②	④	⑤	⑥	①	③

■ = More Likely Price Scenario(s)

# **Comparison of Projected Netbacks**

**2.7 bcf/d LNG Project**

**v.**

**4.5 bcf/d Pipeline Project**

# Projected Netbacks Under Alternative Projects

(Port Authority LNG Plant Costs -- \$470/mt)

## Oil Prices per Wood Mackenzie Estimates 2.7 bcf/d (LNG Project) v. 4.5 bcf/d (Pipeline Project) 2020 - 2044

	2.7 bcf/d LNG Project				4.5 bcf/d AECO Pipeline Delivery	
	High Price Asia Gas = 0.162 x Brent +\$1.00 (1)	Gas Strategies Asia Gas = 0.1485 x Brent +\$0.90 (2)	Port Authority Asia Gas = 0.8 x (Brent / 5.8) (3)	Low Price Asia Gas = 0.11 x Brent +\$1.30 (4)	8:1 Oil/Gas Price Ratio (5)	10:1 Oil/Gas Price Ratio (6)
Gas Sales Price (\$/MMBtu)	\$23.67	\$21.83	\$19.61	\$17.21	\$18.20	\$15.20
Delivery Costs (\$/MMBtu) (Including Losses)	(9.42)	(9.13)	(8.77)	(8.39)	(5.26)	(4.99)
Netback (\$/MMBtu)	\$14.25	\$12.70	\$10.84	\$8.82	\$12.94	\$10.22
Netback in \$2008 dollars (per MMBtu)	\$6.93 ①	\$6.16 ③	\$5.22 ④	\$4.25 ⑥	\$6.31 ②	\$4.96 ⑤
Total Netback Dollars						
In Nominal Dollars (\$Bn)	\$396.2	\$353.1	\$301.3	\$245.2	\$625.0	\$493.5
In \$2008 dollars (\$Bn)	192.7	171.3	145.1	118.1	304.6	239.5
NPV-10 (\$Bn)	35.1 ③	31.0 ④	25.6 ⑤	20.9 ⑥	55.9 ①	43.3 ②

■ = More Likely Price Scenario(s)

# **Comparison of Projected Netbacks**

**4.5 bcf/d LNG Project**

**v.**

**4.5 bcf/d Pipeline Project**

# Projected Netbacks Under Alternative Projects

(Port Authority LNG Plant Costs -- \$470/mt)

## Oil Prices per Wood Mackenzie Estimates 4.5 bcf/d (LNG Project) v. 4.5 bcf/d (Pipeline Project) 2020 - 2044

	4.5 bcf/d LNG Project				4.5 bcf/d AECO Pipeline Delivery	
	High Price Asia Gas = 0.162 x Brent +\$1.00 (1)	Gas Strategies Asia Gas = 0.1485 x Brent +\$0.90 (2)	Port Authority Asia Gas = 0.8 x (Brent / 5.8) (3)	Low Price Asia Gas = 0.11 x Brent +\$1.30 (4)	8:1 Oil/Gas Price Ratio (5)	10:1 Oil/Gas Price Ratio (6)
Gas Sales Price (\$/MMBtu)	\$23.67	\$21.83	\$19.61	\$17.21	\$18.20	\$15.20
Delivery Costs (\$/MMBtu) (Including Losses)	(8.67)	(8.36)	(8.00)	(7.60)	(5.26)	(4.99)
Netback (\$/MMBtu)	\$15.00	\$13.46	\$11.61	\$9.61	\$12.94	\$10.22
Netback in \$2008 dollars (per MMBt)	\$7.33 ①	\$6.56 ②	\$5.63 ④	\$4.66 ⑥	\$6.31 ③	\$4.96 ⑤
Total Netback Dollars						
In Nominal Dollars (\$Bn)	\$724.7	\$650.3	\$560.9	\$464.1	\$625.0	\$493.5
In \$2008 dollars (\$Bn)	353.9	316.9	271.8	225.2	304.6	239.5
NPV-10 (\$Bn)	65.3 ①	58.2 ②	49.0 ④	40.7 ⑥	55.9 ③	43.3 ⑤

**① ② ④ ⑥ ③ ⑤**  
= More Likely Price Scenario(s)

# Sensitivities

- **High Sustained Oil Prices**
- **Impact of Project Delay**

# Projected Netbacks Under Alternative Projects

(High Price Case: Fixed \$120 Real WTI in \$2008)

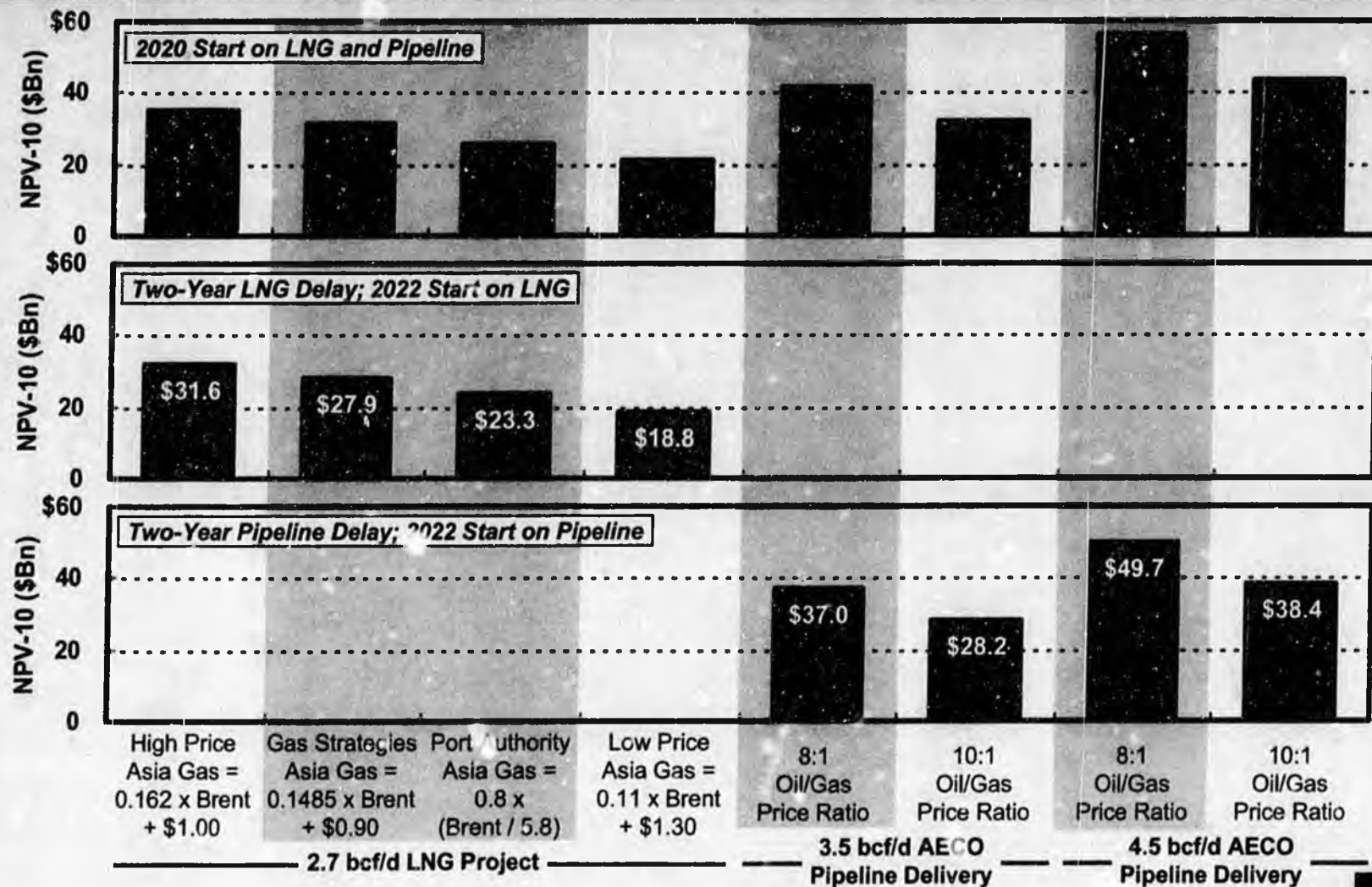
Rank	Project	Pricing	GTP Inlet Netback (\$/MMBtu)
(1)	(2)	(3)	(4)
1	4.5 LNG	0.162 x Brent + \$1.00	\$25.86
2	2.7 LNG	0.162 x Brent + \$1.00	25.18
3	4.5 LNG	0.1485 x Brent + \$0.90	23.48
4	2.7 LNG	0.1485 x Brent + \$0.90	22.79
5	4.5 Pipeline	8:1 Oil/Gas	22.45
6	3.5 Pipeline	8:1 Oil/Gas	22.13
7	4.5 LNG	0.8 x (Brent / 5.8)	20.97
8	2.7 LNG	0.8 x (Brent / 5.8)	20.26
9	4.5 Pipeline	10:1 Oil/Gas	18.18
10	3.5 Pipeline	10:1 Oil/Gas	17.84
11	4.5 LNG	0.11 x Brent + \$1.30	17.24
12	2.7 LNG	0.11 x Brent + \$1.30	16.50

Rank	Project	Pricing	NPV-10 Total Netback (\$Billion)
(5)	(6)	(7)	(8)
1	4.5 LNG	0.162 x Brent + \$1.00	\$126.5
2	4.5 LNG	0.1485 x Brent + \$0.90	114.6
3	4.5 Pipeline	8:1 Oil/Gas	109.4
4	4.5 LNG	0.8 x (Brent / 5.8)	101.7
5	4.5 Pipeline	10:1 Oil/Gas	88.2
6	4.5 LNG	0.11 x Brent + \$1.30	83.8
7	3.5 Pipeline	8:1 Oil/Gas	83.7
8	2.7 LNG	0.162 x Brent + \$1.00	70.6
9	3.5 Pipeline	10:1 Oil/Gas	67.0
10	2.7 LNG	0.1485 x Brent + \$0.90	63.7
11	2.7 LNG	0.8 x (Brent / 5.8)	56.2
12	2.7 LNG	0.11 x Brent + \$1.30	45.8

Note: LNG plant costs of \$470/mmta per Port Authority.



# Impact of Potential Delays on Projects



= More Likely Price Scenario(s)

END

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**LNG Export Issues**

# LNG Export Issues

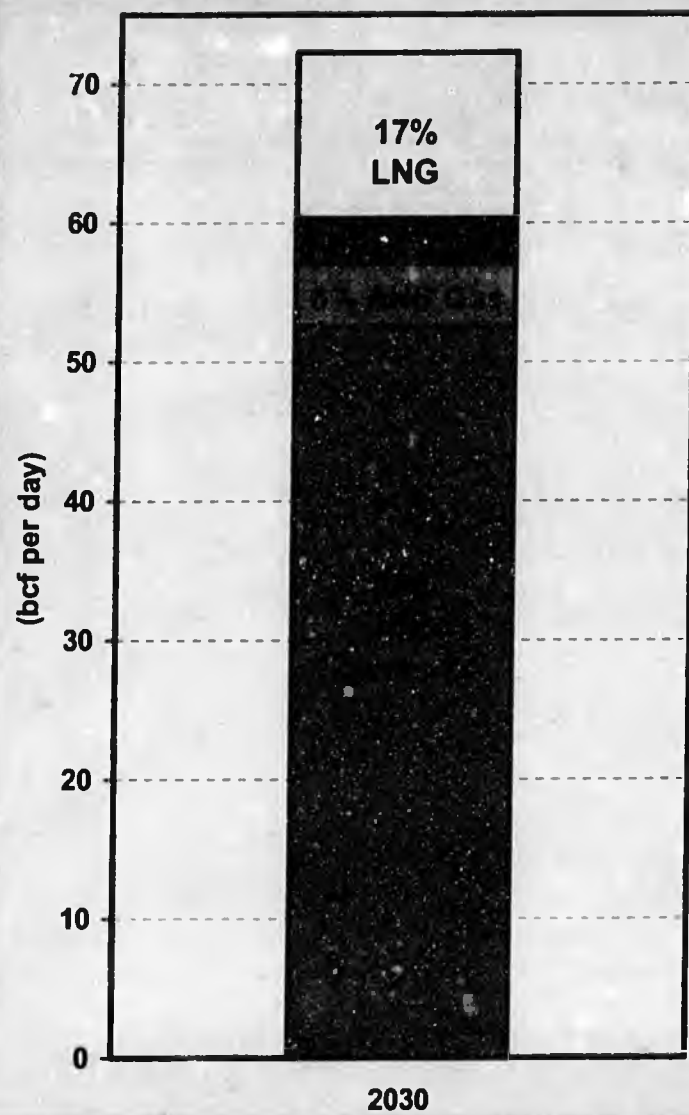
- **Yukon Pacific permit for export**
  - **Issued in 1989**
  - **14mmta (~1.9 bcf/d) to Japan, South Korea, Taiwan**
  - **25 years from 1<sup>st</sup> gas**
- **Project will require D.O.E. review**
  - **Different project**
  - **Time elapsed**
  - **Different circumstances (e.g., U.S. is net importer of gas)**
  - **Political**
- **Is recent Kenai decision comparable?**
  - **Smaller / shorter window**
  - **No perceived issues outside Alaska**
  - **Lengthy multi-year process for renewal**
- **Experience with oil**
  - **Initial ban on exports**
  - **1996 lifting of export ban, but too late to benefit Alaska**
  - **Still significant perception issue at Federal political level**

# LNG Export Issues

(cont'd)

- **Exports must be “in public interest”**
- **Pros**
  - **Free trade**
  - **Efficiency (i.e., higher netbacks)**
  - **Balance of payments**
  - **More production for Lower-48**
- **Cons**
  - **Will lead to more LNG imports**
  - **Will lead to more high-cost Lower-48 production**
  - **Will lead to higher gas prices for U.S. consumers**

# Will D.O.E. Find LNG Exports in the Public Interest?



- If ANS gas is exported, it will not be available for domestic markets.
- Requires “replacement” with more expensive domestic gas or LNG imports.
- Forecasts indicate that ANS supplies @ 4.5 Bcf/day will reduce U.S. gas price by ~ \$0.30/MMBtu.
- At projected US consumption of 70 bcf/d in 2030, this is ~ \$7.5 billion annually.

# LNG Export Issues

(cont'd)

- **Chance of Federal intervention**
  - **Federal government assistance with permitting and loan guarantees in 2004 likely lead to tension re: potential of exports**
  - **National security concerns**
  - **Argument that consumers in Lower-48 would be hurt**
  - **Probably little Federal support for exports if Federal gas is involved**
- **Pipeline project must also apply for export permit**
  - **But, 2004 legislation specifically addresses export to Canada**

# Conclusions

## Conclusions

- **Gas prices in Asia are likely to maintain a premium over U.S. gas prices, though not at current levels**
- **U.S. prices will likely strengthen relative to Asian and European gas prices as U.S. domestic production becomes more expensive and LNG flows away from the U.S.**
- **LNG project would likely be viable under reasonable price scenarios, assuming gas can be exported**
  - **Economics of LNG delivery to U.S. West Coast would be worse than pipeline delivery under any reasonable set of assumptions**
- **Under the reasonable price scenarios, 2.7 bcf/d LNG project offers \$/MMBtu netbacks that are similar to pipeline netbacks**
  - **Difference in some cases is not large relative to potential estimation error**