

Alaska Natural Gas Needs & Market Assessment

Update Presentation

Presented in Anchorage
on June 20, 2008

Alaska Legislature

Sectors Studied

◆ Industry

- LNG
- GTL
- Ammonia / Urea
- Other
- Petrochemicals
- Propane

} DRY GAS

} NGLs

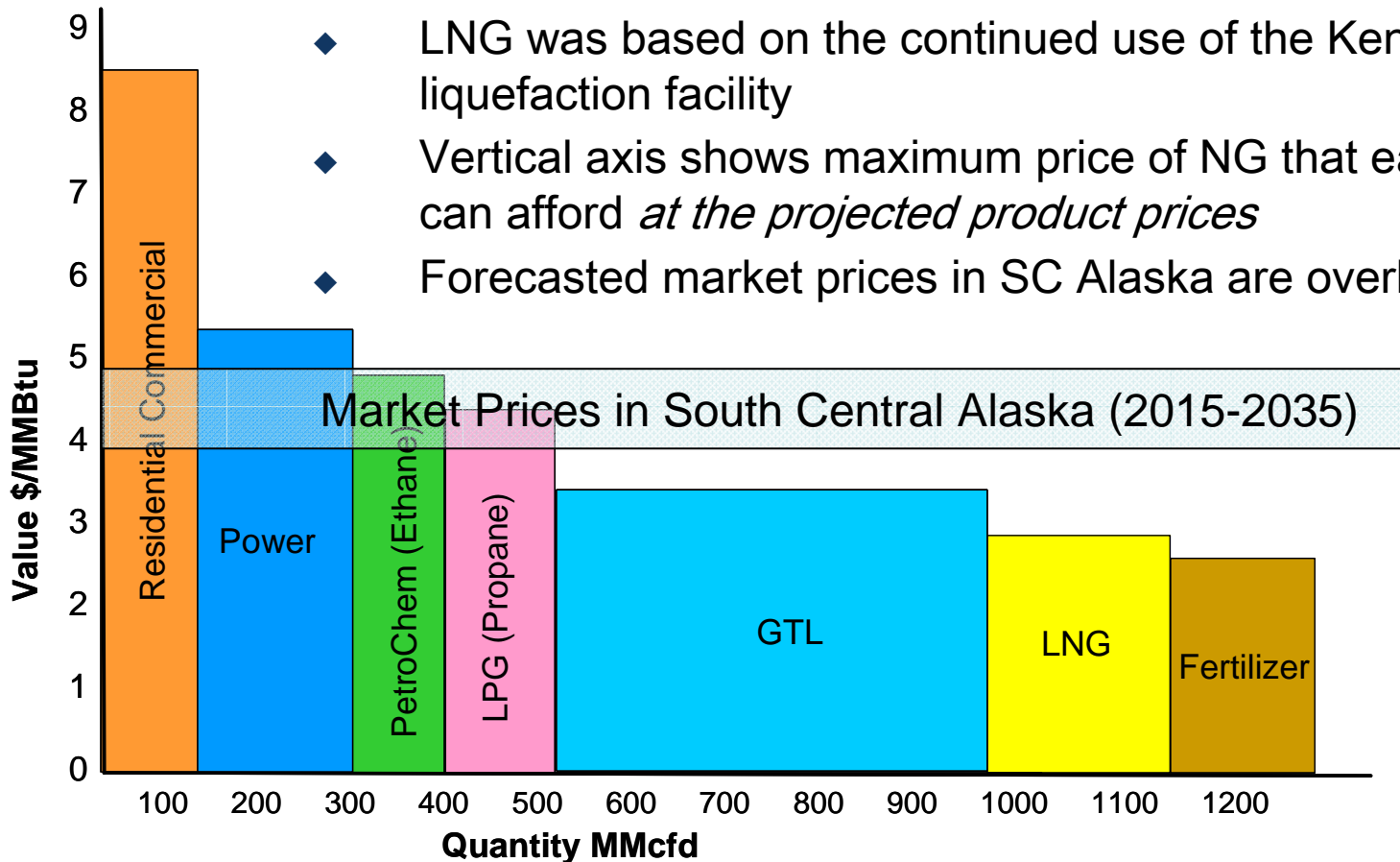
◆ Power Generation

} DRY GAS

◆ Residential / Commercial

2006 Study Findings: Base Price Scenario

- ◆ Horizontal axis shows potential NG demand for each industry based on world class-size facilities for LPG, petrochemical, and GTL
- ◆ LNG was based on the continued use of the Kenai liquefaction facility
- ◆ Vertical axis shows maximum price of NG that each industry can afford *at the projected product prices*
- ◆ Forecasted market prices in SC Alaska are overlaid

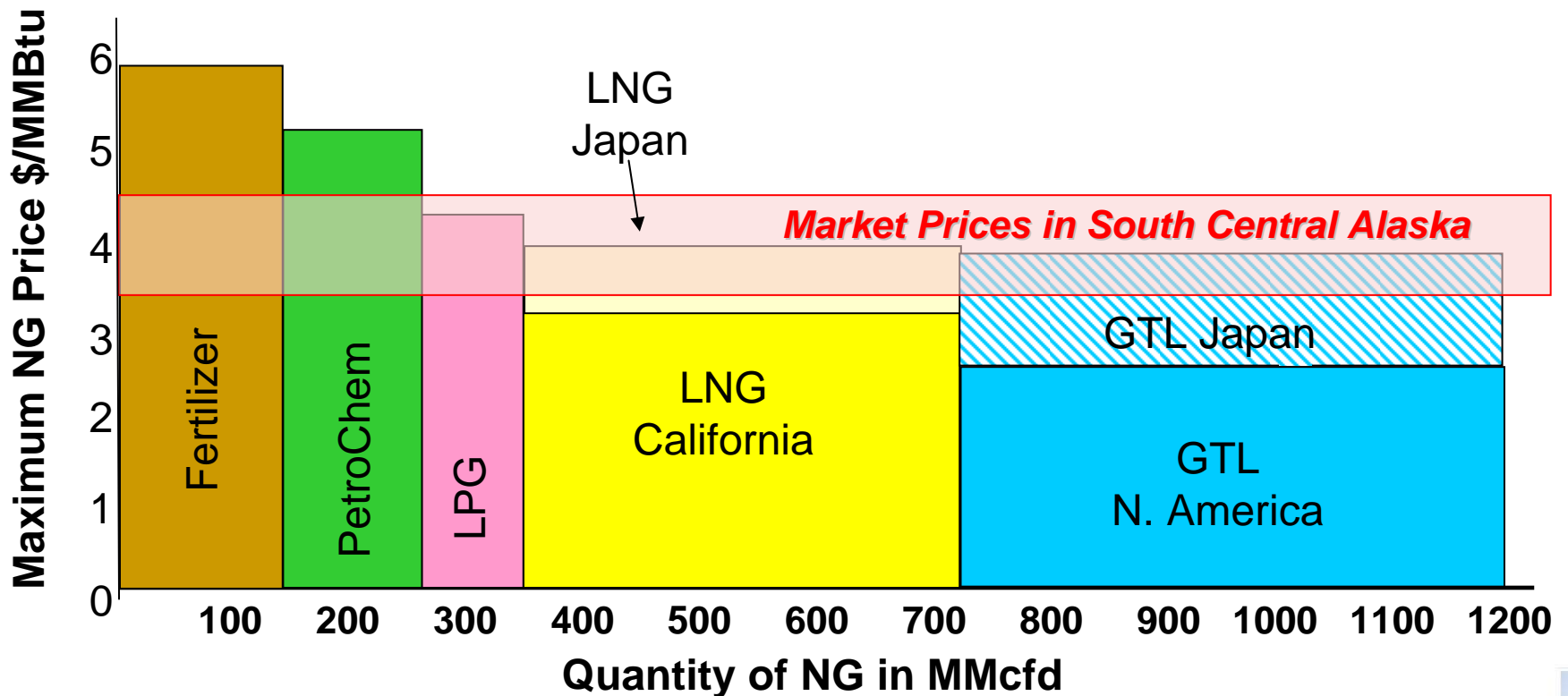


Average Product Price (2015 – 2030)

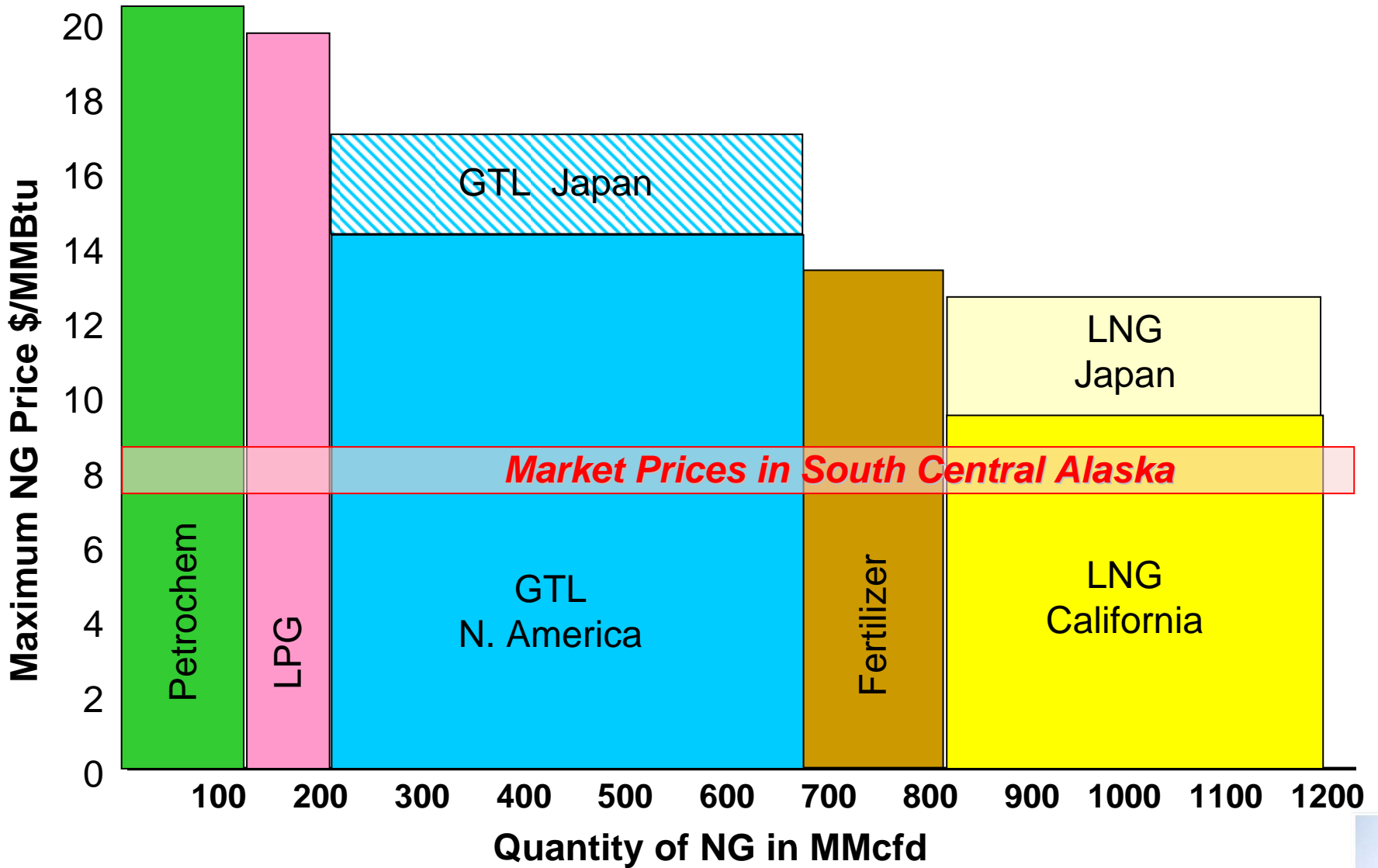
PRODUCT	2006 Report	<u>2008 Update</u>	
		Low Case	High Case
LNG, California (\$/MMBtu)	\$5.07	\$6.09	\$13.17
LNG, Japan (\$/MMBtu)	\$6.10	\$7.05	\$16.74
Diesel (\$/MMBtu)	\$9.46	\$11.47	\$33.08
LPG (\$/ton)	\$383	\$453	\$1,305
Ammonia (\$/ton)	\$224	\$322	\$676
Polyethylene (\$/ton)	\$1,065	\$1,097	\$2,081

Netback Price Findings: Low Case

- ◆ Horizontal axis shows potential NG demand, by industry, for new world-class size petrochemical, LPG, and GTL facilities
- ◆ LNG and fertilizer are based on upgrades and continued use of Kenai facilities
- ◆ Vertical axis is the maximum price of NG each industry can afford
- ◆ Low forecast NG prices in SC Alaska are overlaid (horizontal band)



Netback Price Findings: High Case

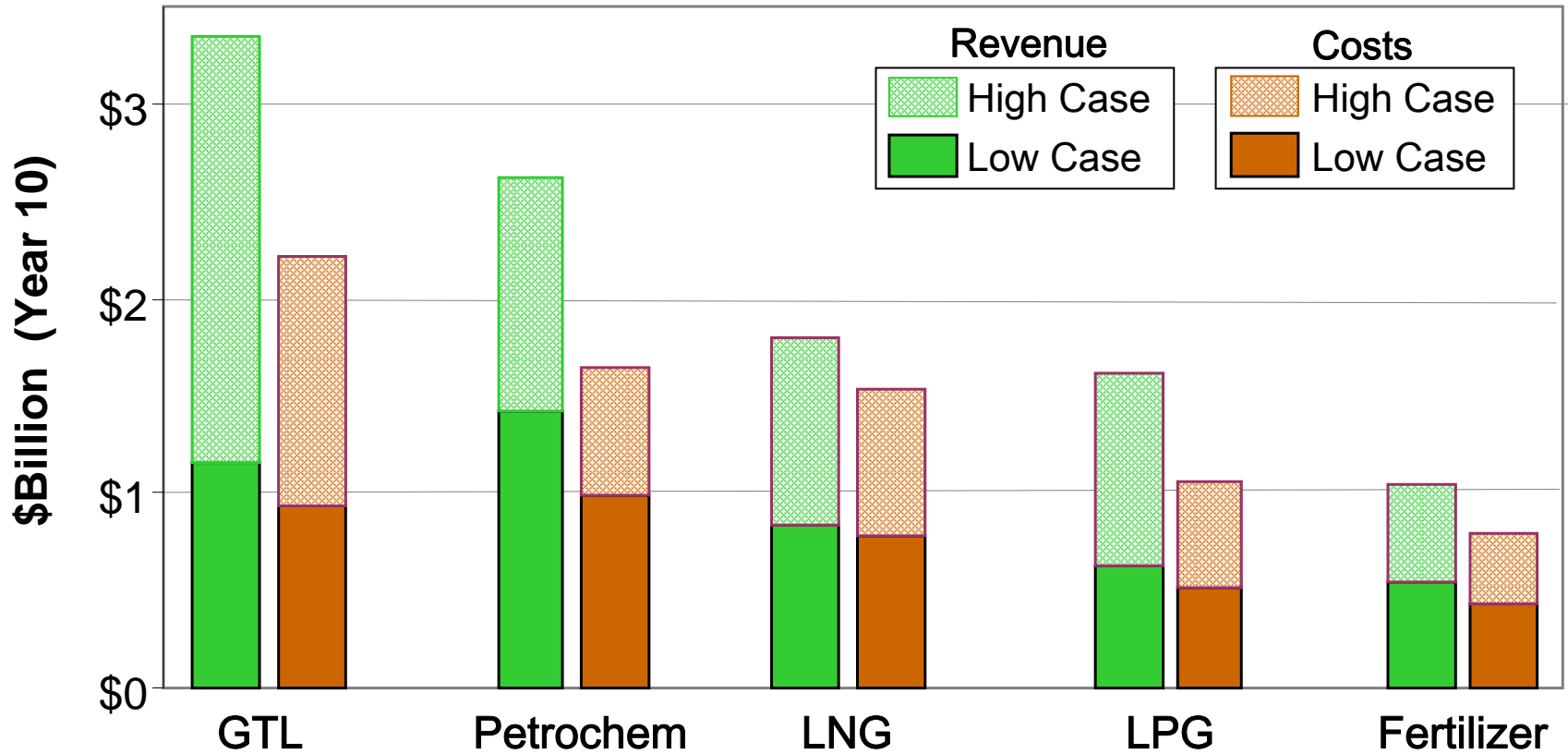


Capital Costs

Estimated Capital Costs By Industry

INDUSTRY	\$ Millions
LPG	\$844
GTL	\$3,112
LNG	\$880
Ammonia	\$257
Petrochemicals	\$2,993
Total	\$8,086

Revenue and Cost Estimates, Year 10



Companies that may be interested . . .

Short List of companies that may be interested in developing Alaskan Industry . . .

LNG	LPG	Petochem	GTL	Fertilizer
Conoco-Phillips Exxon-Mobil BP	BP Conoco-Phillips AmeriGas	Dow Exxon-Mobil Shell DuPont	Shell BP Sasol	Agrium

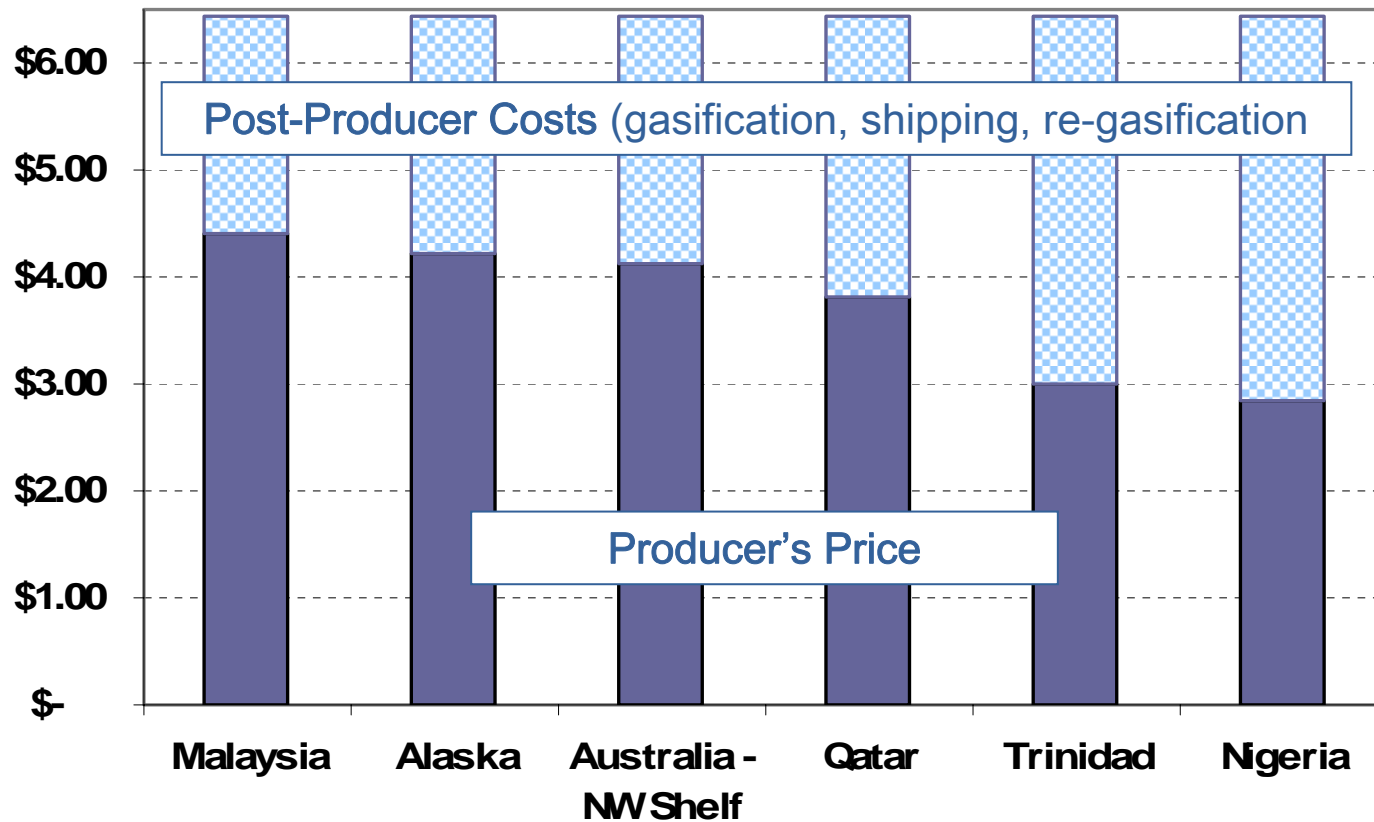
Summary Findings

Based on the assumptions in this analysis . . .

- ◆ Recent increases in NG and product prices improves the feasibility of NG-intensive industries in Alaska
- ◆ All assessed industries appear feasible under the applied high price scenario
- ◆ Under the low price scenario, LNG and GTL industries may need contracts in premium markets (e.g., Japan) for feasibility
- ◆ The greatest uncertainty is associated with GTL due to the combination of evolving market, costs, and technology

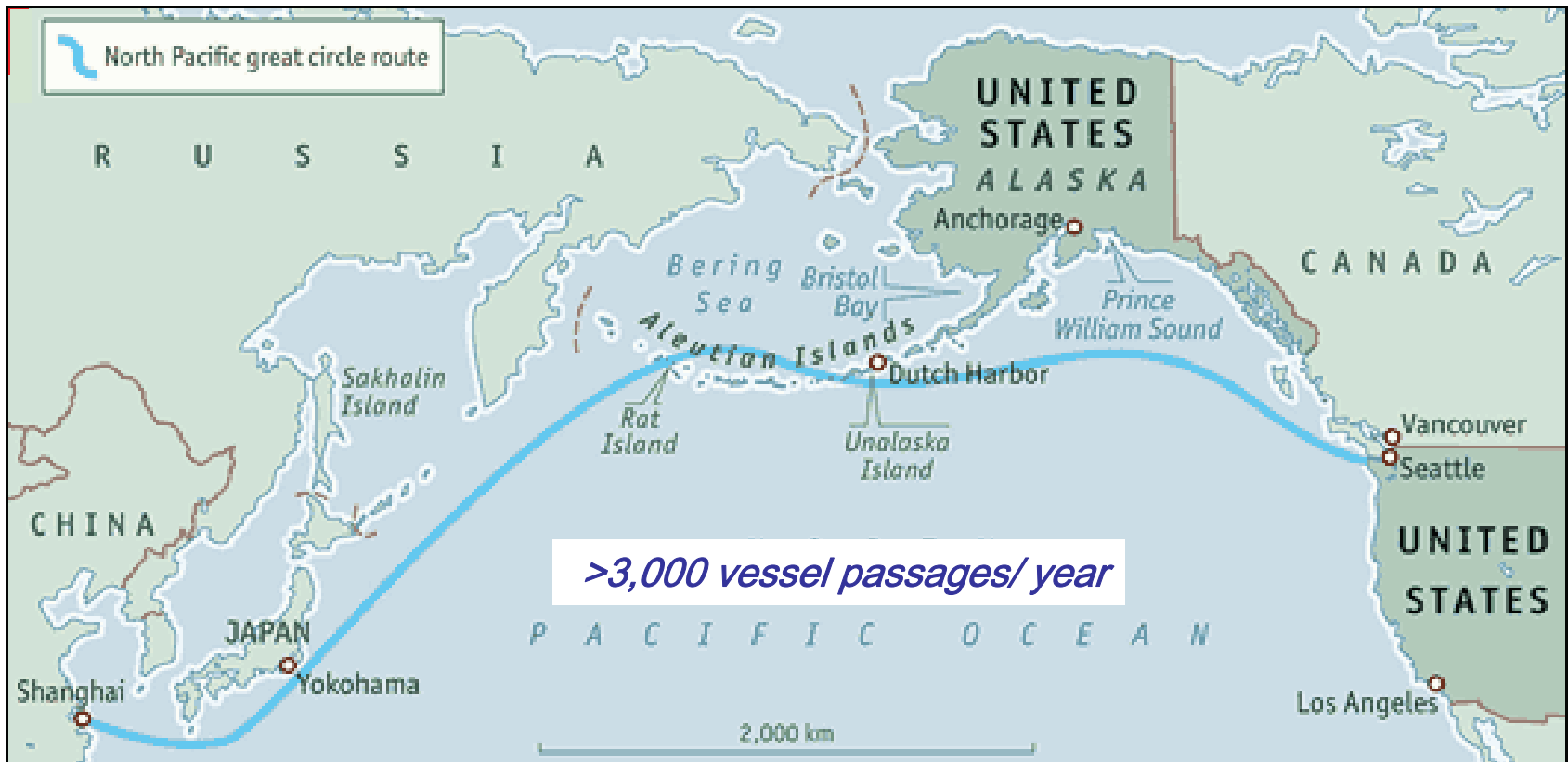
Competing NG Suppliers

Producer Price and Post-Producer Costs for Various Suppliers to Sell to Japan at \$6.44/MMBtu



Shipping and the Great Circle

Shortest distance between East Asia and the NW American Coast



Potential for backhaul shipping (i.e., reduced rates negotiated for return trips that would otherwise not have had cargo) depends on the surplus of imports versus exports for the required vessel type.

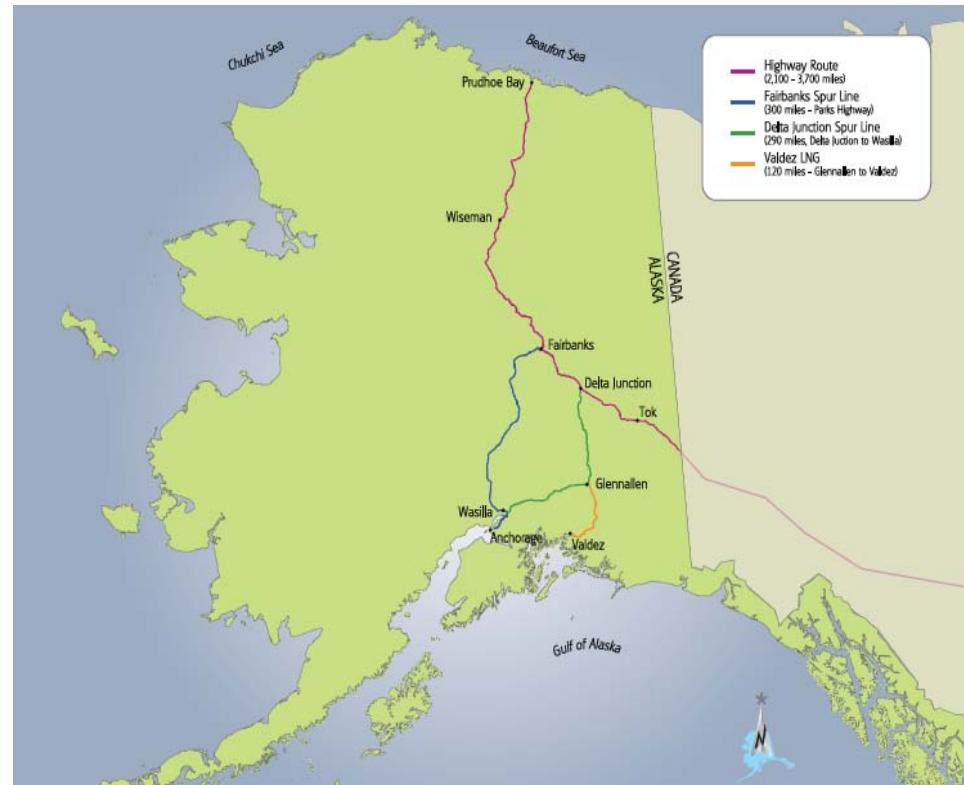
Agenda

1. Background
2. Study Assumptions & Methodology
3. Study Conclusions
4. Study Update
5. Summary

2006 Study: Overall Objectives

- ◆ The 2006 spur pipeline feasibility study evaluated:
 - Level of sustainable dry gas & NGL demand in SC Alaska
 - Residential
 - Commercial
 - Industry
 - Power
 - Maximum feasible price of natural gas (NG) by sector in SC Alaska
 - Spur pipeline size, costs, and market storage requirements.
 - Cook inlet gas supply

- ◆ This assessment updates the industrial sector analysis



2006 Study: Advisory Group

- Assisted DOE and SAIC in understanding and framing the issues
- Assisted in obtaining current and complete data
- Provided critical review of approach, analysis, and results.

Organization/Member
Alaska Industrial Development and Export Authority: Ron Miller, Executive Director
Alaska Natural Gas Development Authority: Harold Heinze, CEO
Anchorage ML&P: James Posey, General Manager
ASRC Constructors, Inc.: Marvin Swink
Chugach Electric Association: Lee Thibert, GM - Distribution Division / Bradley Evans, GM – Generation and Transmission Division
ENSTAR Natural Gas: Tony Izzo, President
Fairbanks Natural Gas, LLC: Dan Britton, President
Kenai Peninsula Borough: Bill Popp, Oil, Gas and Mining Liaison

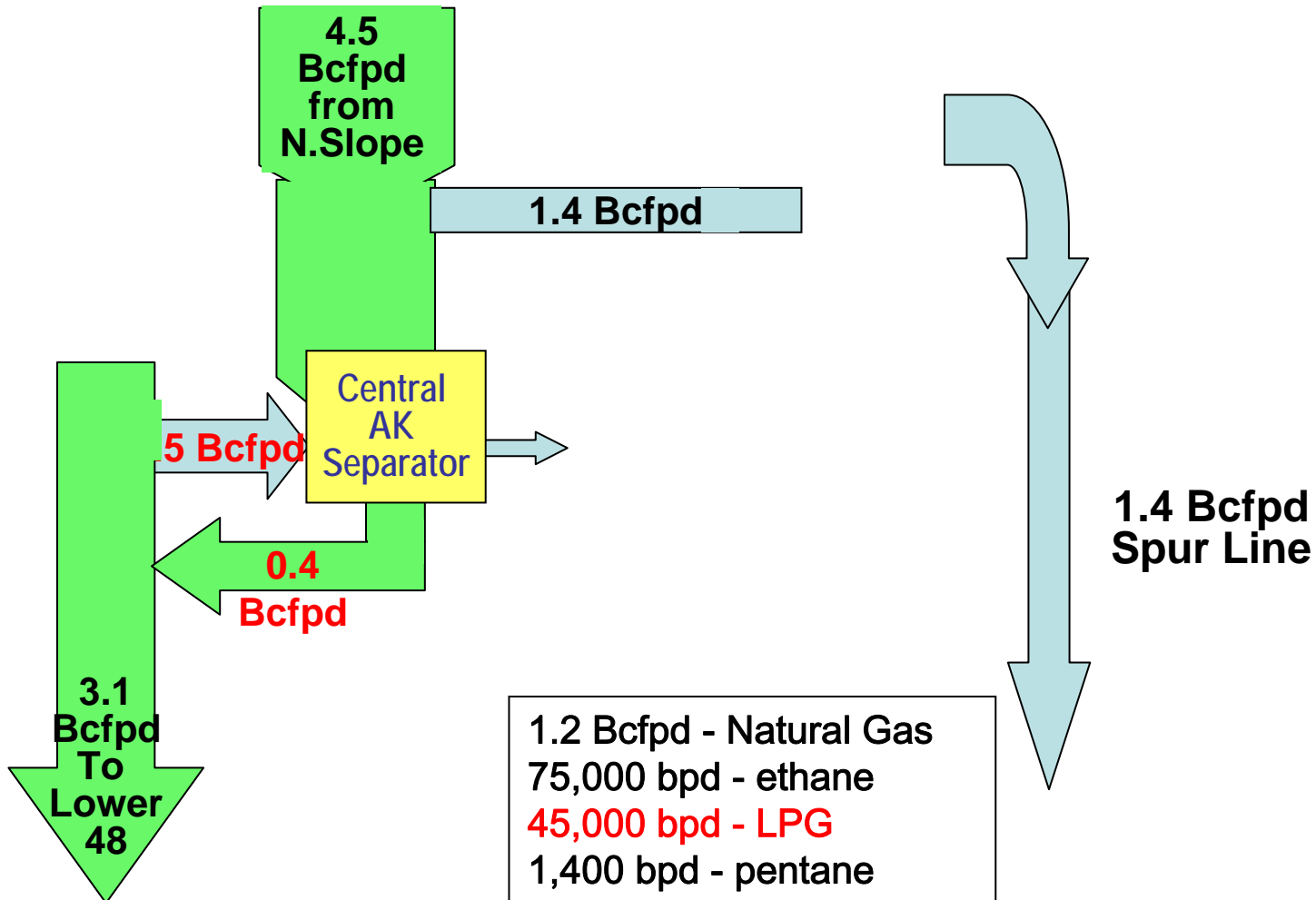
2006 Study Methodology

- (1) **A Bottom-up Approach** to determine sustainable NG demand
 - Current Uses
 - New Uses (Blue Sky)

- (2) **Integrated Market Analysis** to show the impact of an integrated Lower 48 NG and global product markets on the development of SC Alaska's NG market
 - Competitiveness with Lower 48 markets.
 - Competitiveness with global product markets.

- (3) **In summary** – Current and potential users of NG (and NG liquids)?
What products? In what Quantity? At what price?

Gas Composition Effects on Spur Volumes (Includes 0.3 Bcf for non-industrial demand)



2008 Updated Assumptions

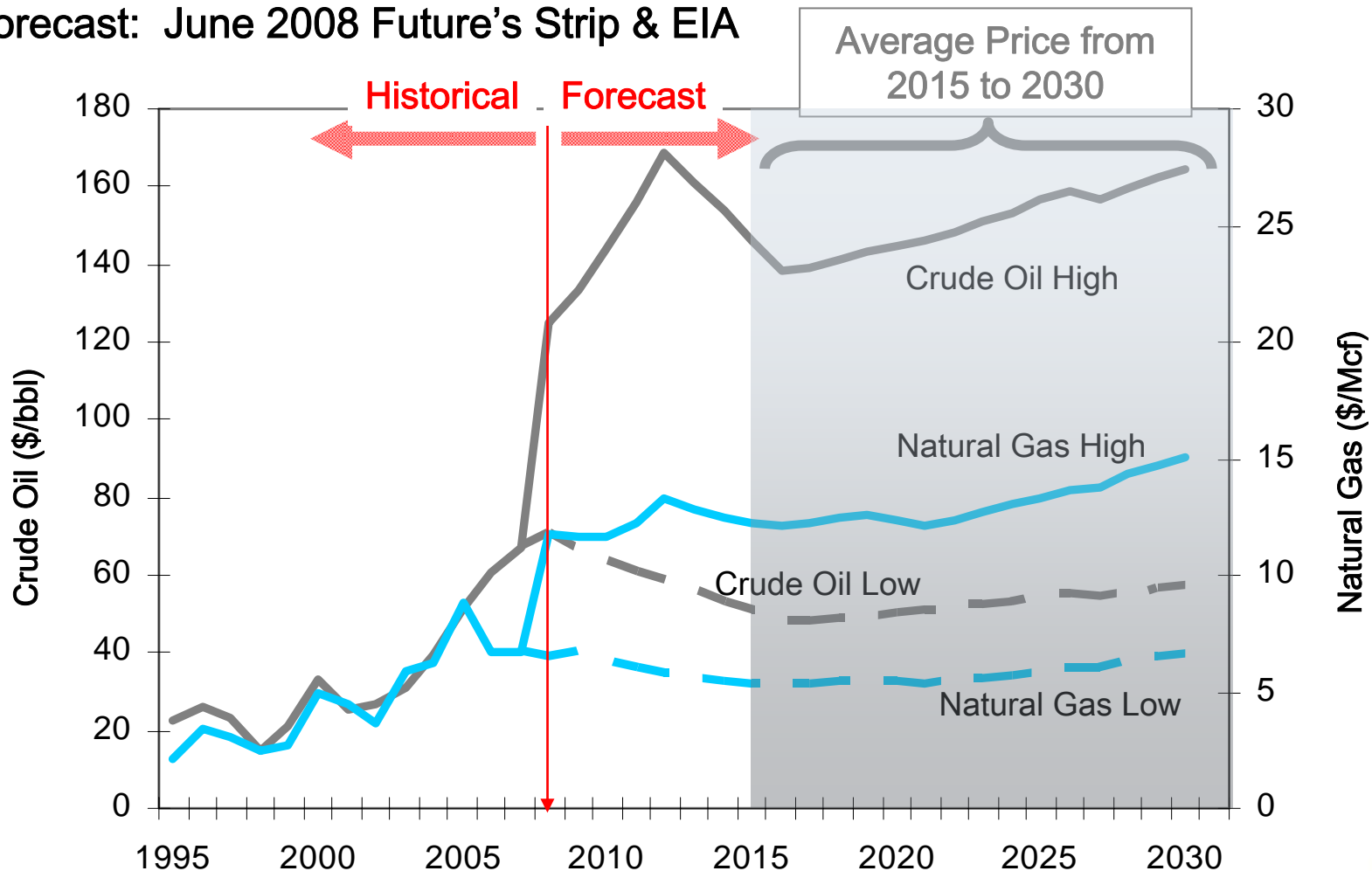
- ◆ Industry assumptions updated in 2007\$
 - Capital costs
 - Operating costs
 - Product prices
 - NG feedstock prices
 - NG composition

- ◆ Two price scenarios
 - Low Case
 - High Case
 - Both scenarios assume a rich NG stream

NG and Crude Oil Prices: Historical and High and Low Forecasts

Low Forecast: EIA, Annual Energy Outlook 2008

High Forecast: June 2008 Future's Strip & EIA



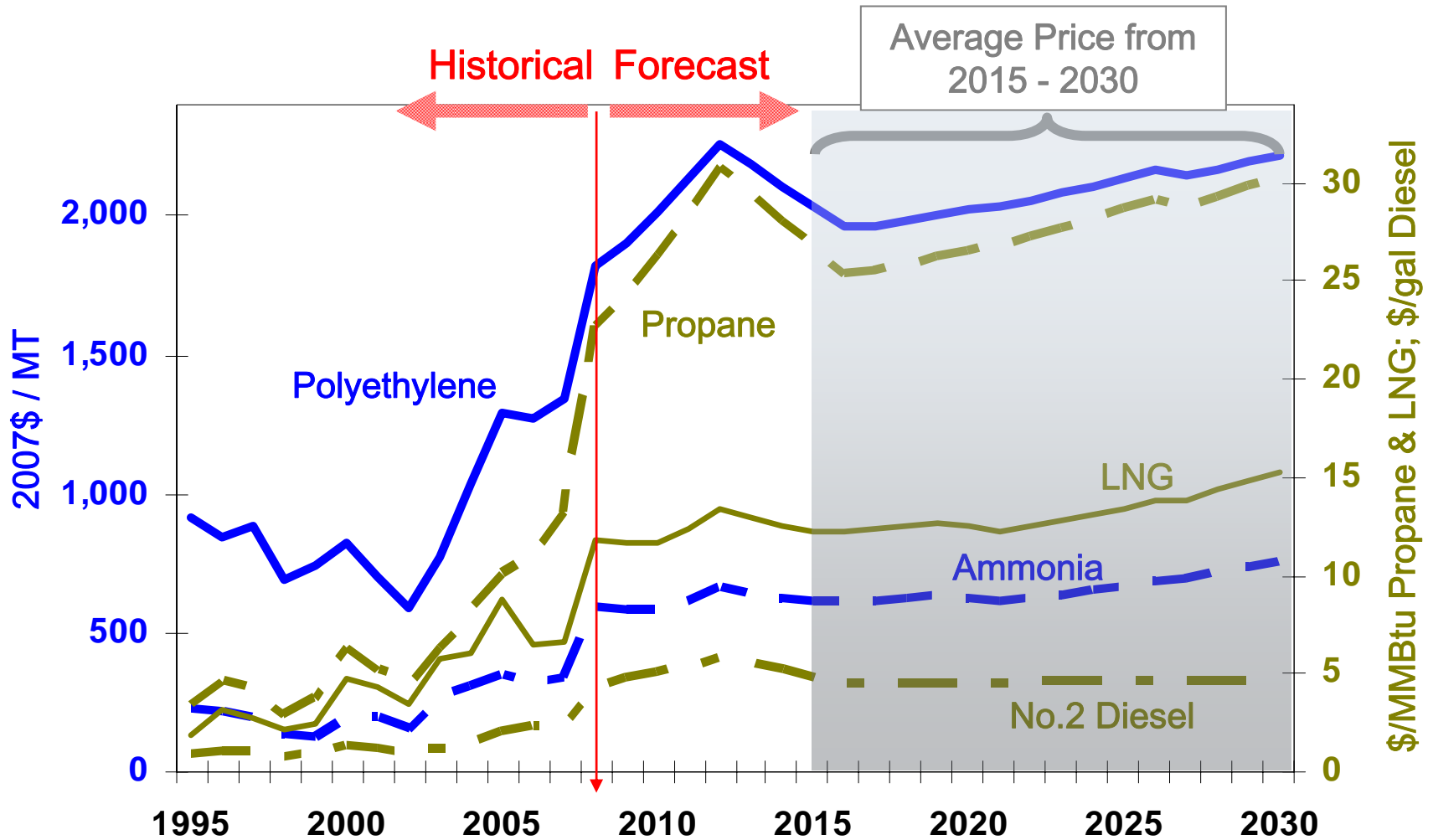
Average Forecast Fuel Price (2015 – 2030)

Industry feasibility assessment based on economic feasibility when fuel prices are the average forecast price from 2015 to 2030, \pm \$0.50

LOCATION	2006 Report	2008 Update Low Case	2008 Update High Case
Henry Hub (\$/MMBtu)	\$5.60	\$6.44	\$13.52
SC Alaska (\$ /MMBtu)	\$4.81	\$3.93	\$10.41
World Oil Price (\$ /bbl)	\$47.83	\$52.26	\$150.69

Product Price Forecast: 15-Year Average

Prices for Polyethylene, Propane, LNG, Ammonia, and Diesel



Markets for Products

Markets with the highest projected demand growth and highest prices were modeled.

PRODUCTS	MODELED MARKETS
❑ LNG	Japan, British Colombia, US / Mexico West Coast, China, Korea
❑ GTL (Diesel)	US West Coast, BC, Japan
❑ Ammonia	US West Coast, China, Japan
❑ Petrochemicals	US Gulf, Korea, China
❑ LPG	US West Coast, China, Japan

Industrial Capacity and NG Requirements

INDUSTRY	CAPACITY		NG DEMAND (MMcfd)	
	2006 Study	2008 Update	2006 Study	2008 Update
GTL	62,000 bpd low sulfur diesel	50,000 bpd low sulfur diesel	480	390
LNG	1.7 MMTPA	3.0 MMTPA	212	375
Fertilizer	1.25 MMTPA ammonia 1 MMTPA Urea	1.25 MMTPA ammonia 1 MMTPA Urea	145	145
LPG	63,000 bpd propane & butane	50,000 bpd	116 NG equivalent	78 NG equivalent
Petro-chemical	1.27 MMTPA ethylene	1.27 MMTPA ethylene	120 NG equivalent	120 NG equivalent

2008 Update

(2007\$)