



Alaska World Affairs Council Northrim Oil and Gas Speaker Series

*Natural Gas as The 21st Century Economic Game Changer:
Could Petrochemicals Help Alaska to Up Its Game*



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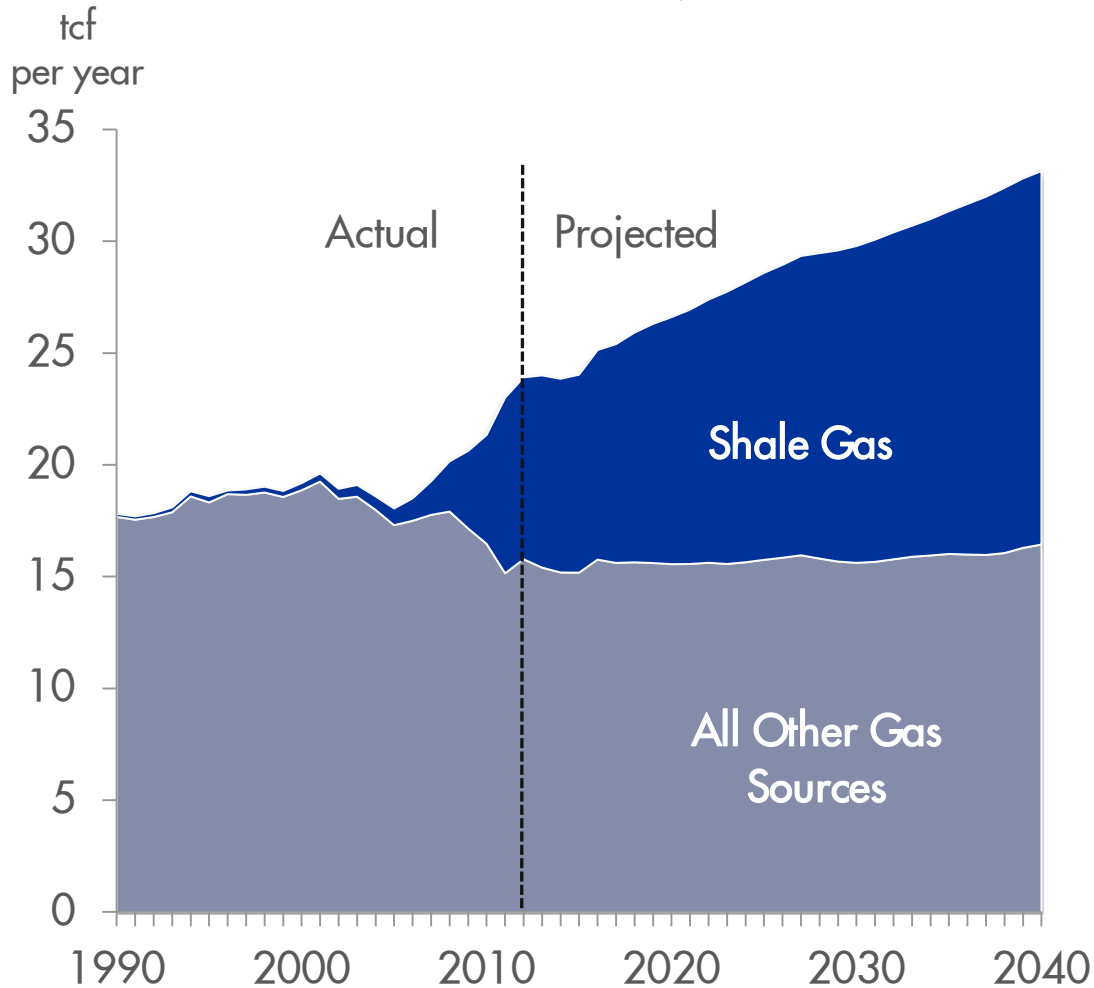
March 22, 2013

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- Reserves: Our use of the term “reserves” in this presentation means SEC proved oil and gas reserves.
- Resources: Our use of the term “resources” in this presentation includes quantities of oil and gas not yet classified as SEC proved oil and gas reserves. Resources are consistent with the Society of Petroleum Engineers 2P and 2C definitions.
- Organic: Our use of the term Organic in this presentation includes SEC proved oil and gas reserves excluding changes resulting from acquisitions, divestments and year-average pricing impact.
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Shale Gas Changes the Game

US Natural Gas Production, 1990 to 2040



LNG



Gas to transport



Gas to liquids

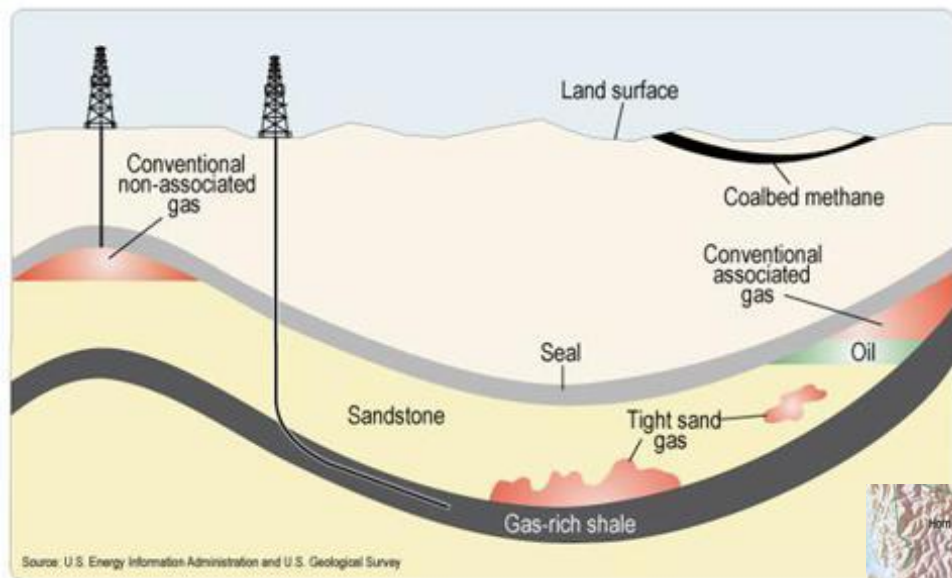


Gas to power



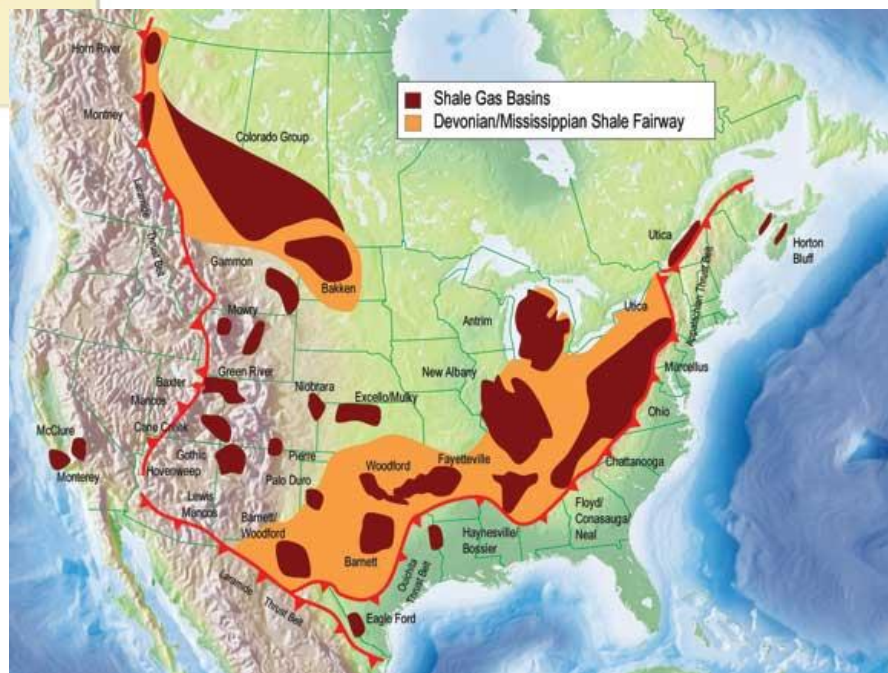
Gas to Chemicals

What is Shale Gas and Where is the NA Supply?



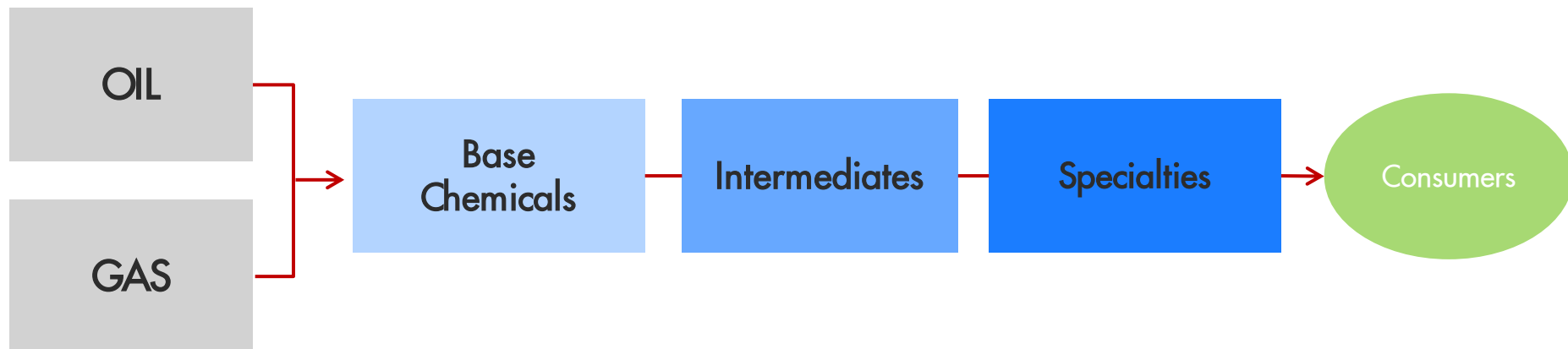
Innovations in technology make shale gas more readily available

An abundance of shale gas basins exist in North America



Chemicals: Building Blocks for Modern Society

Raw Materials



Innovation and Technology → Adding Value to Hydrocarbons



Packaging



Carpet
Fiber



Detergents



Pipe

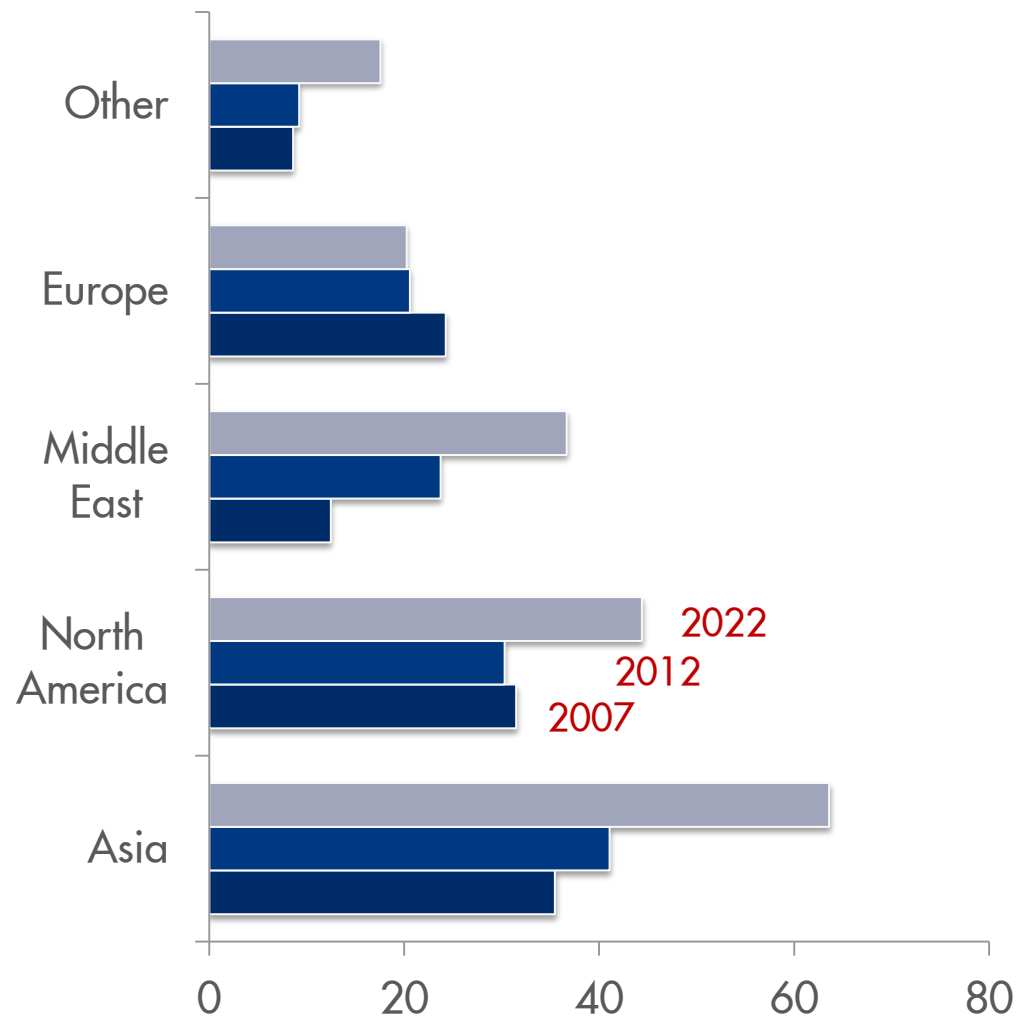
Petrochemicals is a Global Business

Key Players

- 1  BASF
- 2  ExxonMobil
- 3  Sabic
- 4  Dow Chemical
- 5  Sinopec
- 6  Royal Dutch Shell
- 7  DuPont
- 8  LyondellBassell
- 9  Mitsubishi Chemical
- 10  Ineos Holdings

Shell Chemical LP

Ethylene Production by Region (million metric tons)



Source: IHS

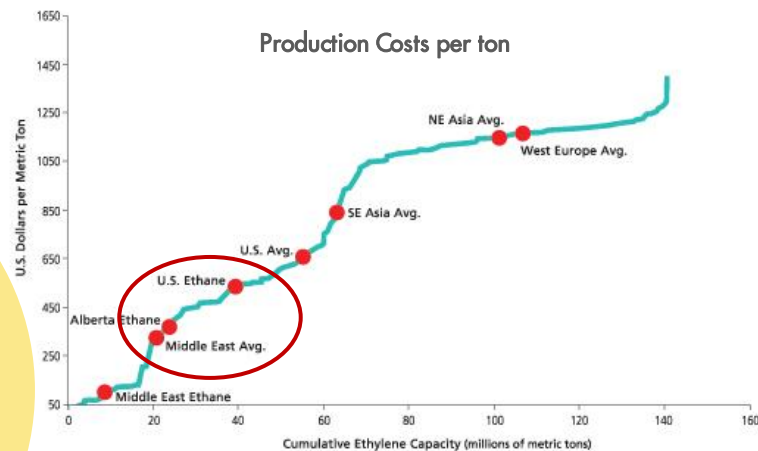
Three Keys to Success for Chemical Investments



Access to low cost raw materials

Access to growing markets

Competitive and stable investment climate



Case Studies

US Gulf Coast

- 95% of US capacity located in the Gulf Coast
- Ethane feedstock accounted for 65% of ethylene production in 2012, a 15% increase in 10 years

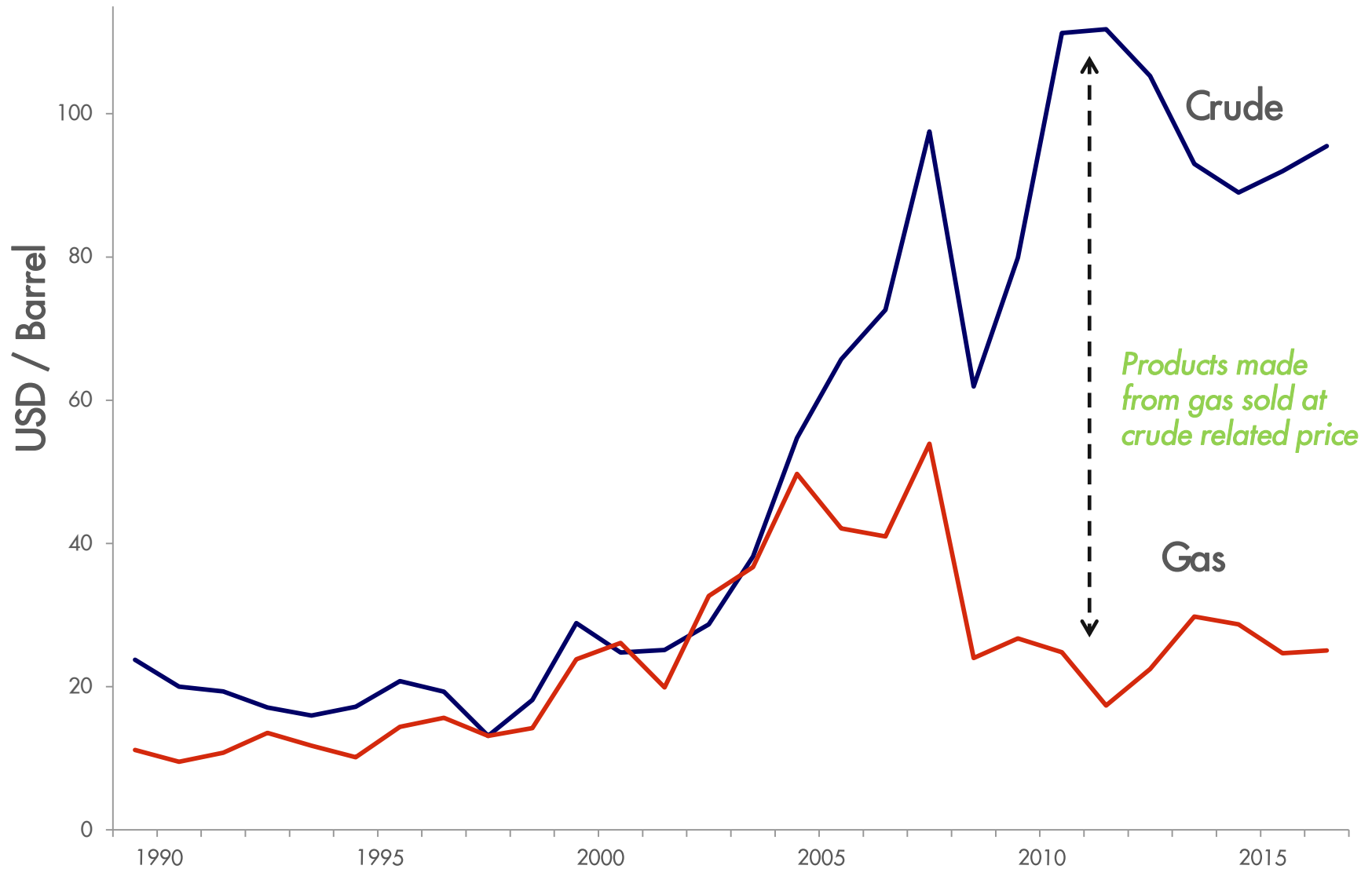
Middle East

- Middle East increased production from 2.5 to nearly 20 million metric tons from 1990 to 2010
- Production accounted for 18% of global production in 2012

China

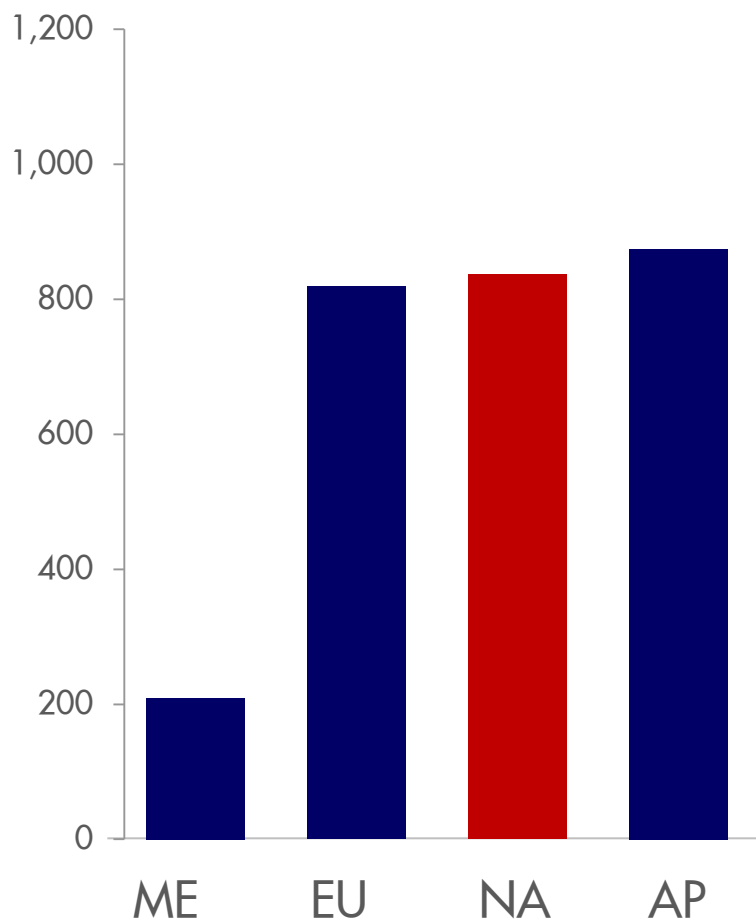
- Production increased by 5X in 10 years
- Capacity expansions continue to be announced in the area

Gas Decouples from Crude as Shale Production Grows

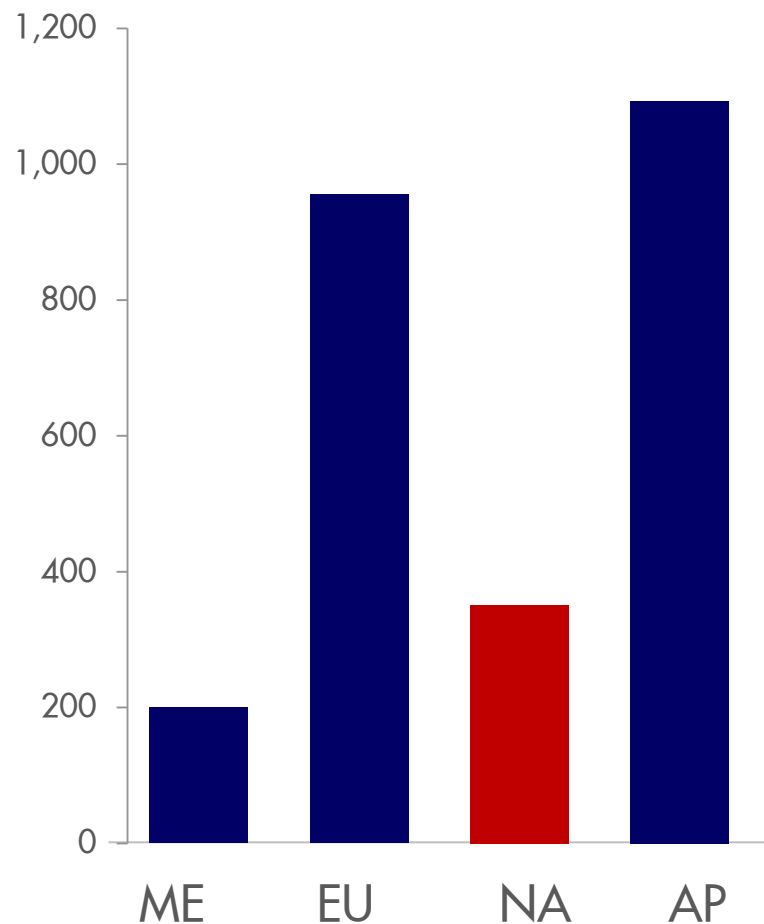


North America Becomes More Competitive Globally

2007 Production Costs

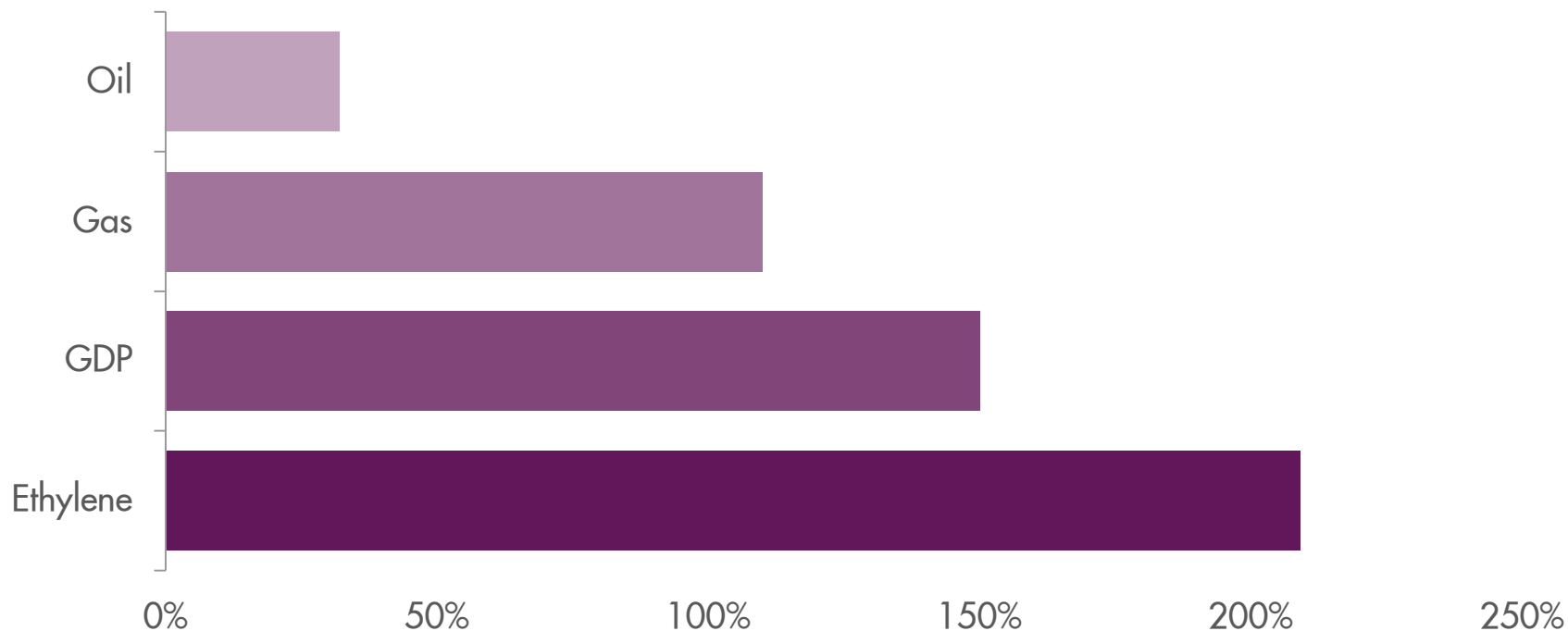


2013 Projected Production Costs

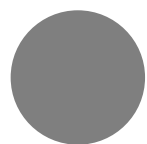


Chemicals Demand Grows Faster than GDP, Gas and Oil

Global demand change
since 1980



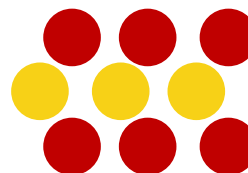
Building blocks for modern society



Ethane



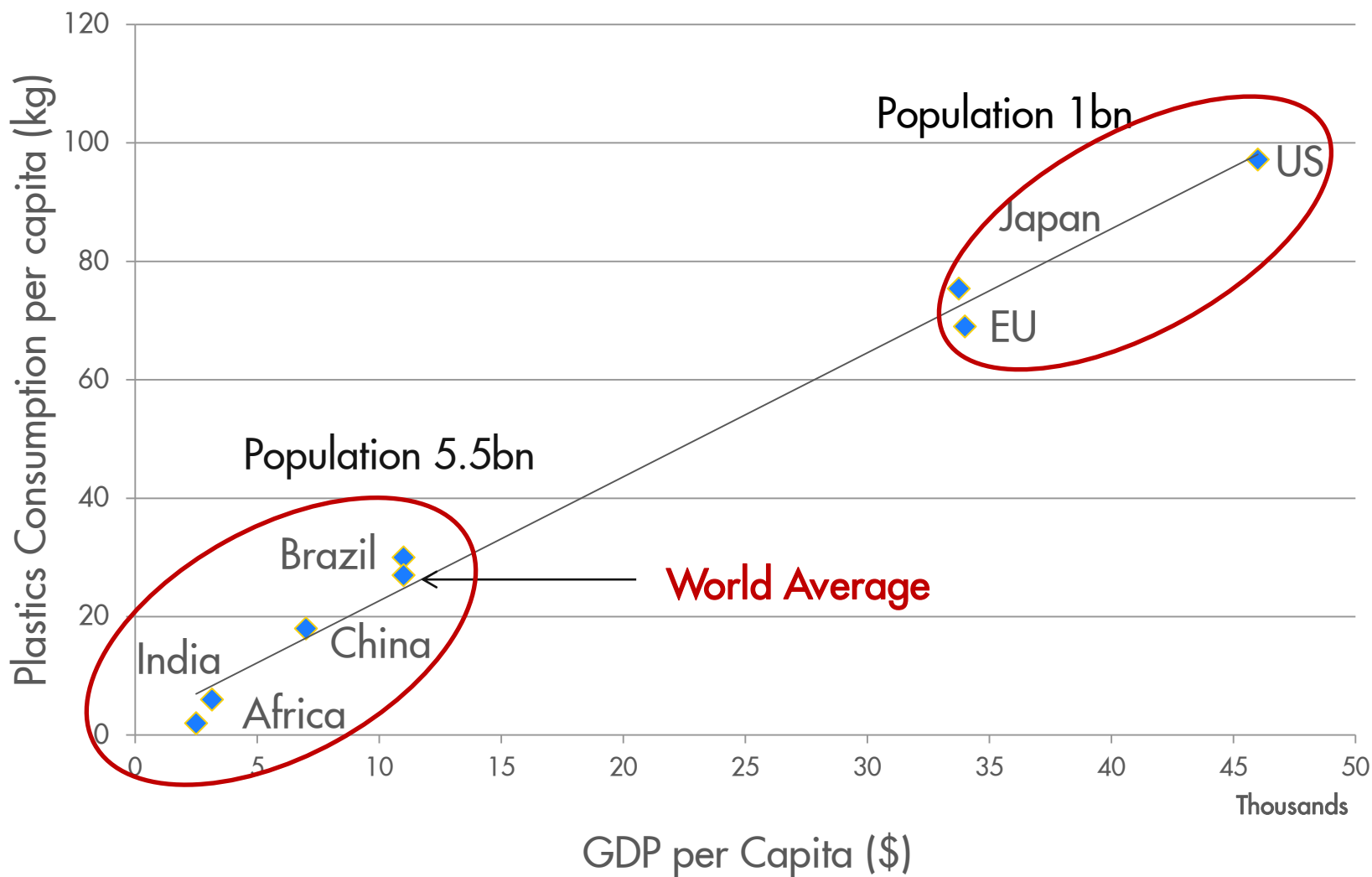
Ethylene



Polyethylene

Developing Economies Drive Chemicals Growth

Significant scope for more plastic consumption with increased wealth

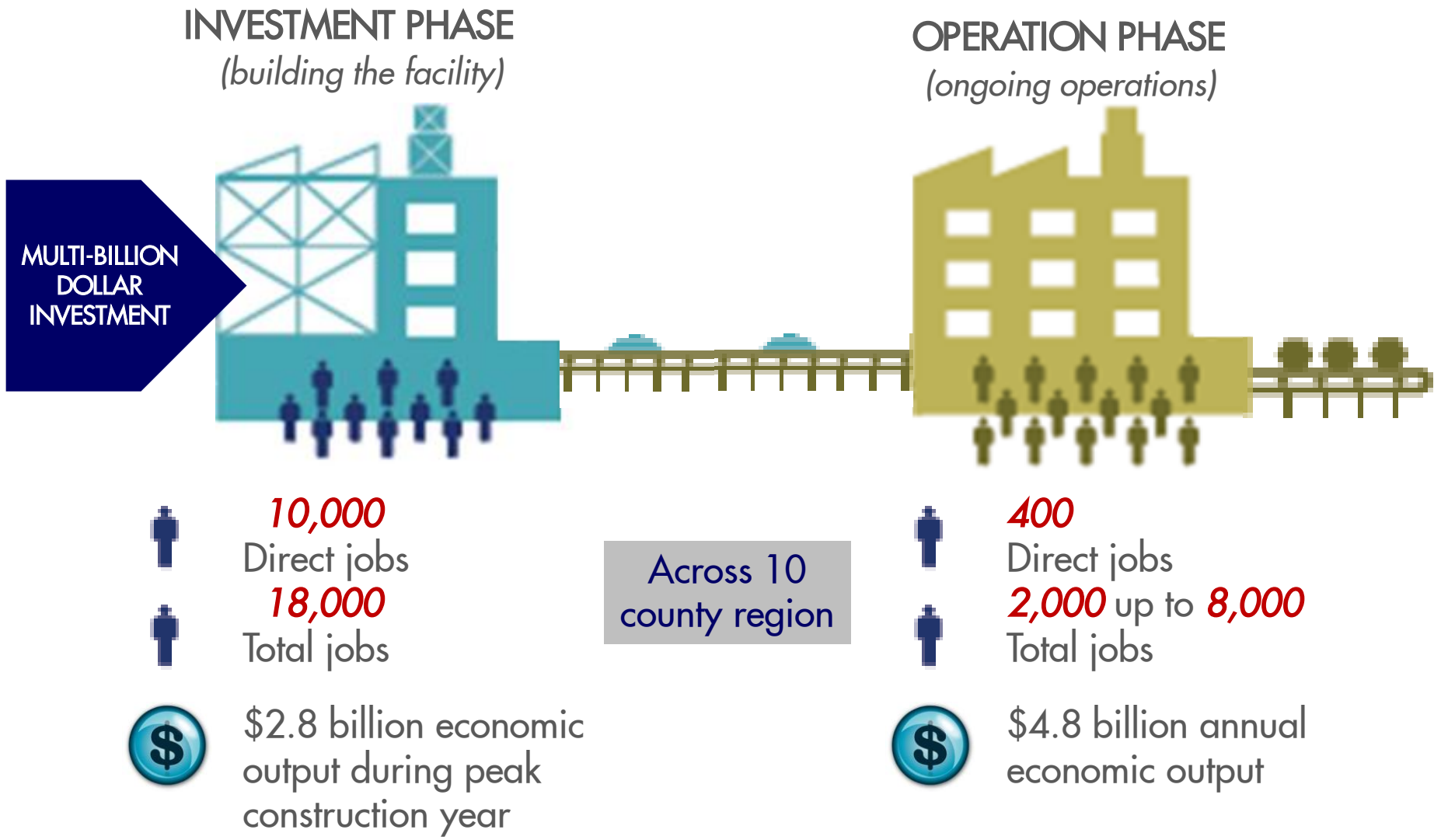


Competitive and Stable Investment Climate

- *Think long term*
- *Competitive fiscal policies*
- *Strong community support*
- *Predictable regulatory framework*
- *Proactive economic development strategy*
- *Project execution capability*
 - *Infrastructure*
 - *Land*
 - *Skilled labor*



Economic Impact of Chemicals Investment



Scope and Scale of a Petrochemical Complex

Construction



Steam and Utilities



Furnace



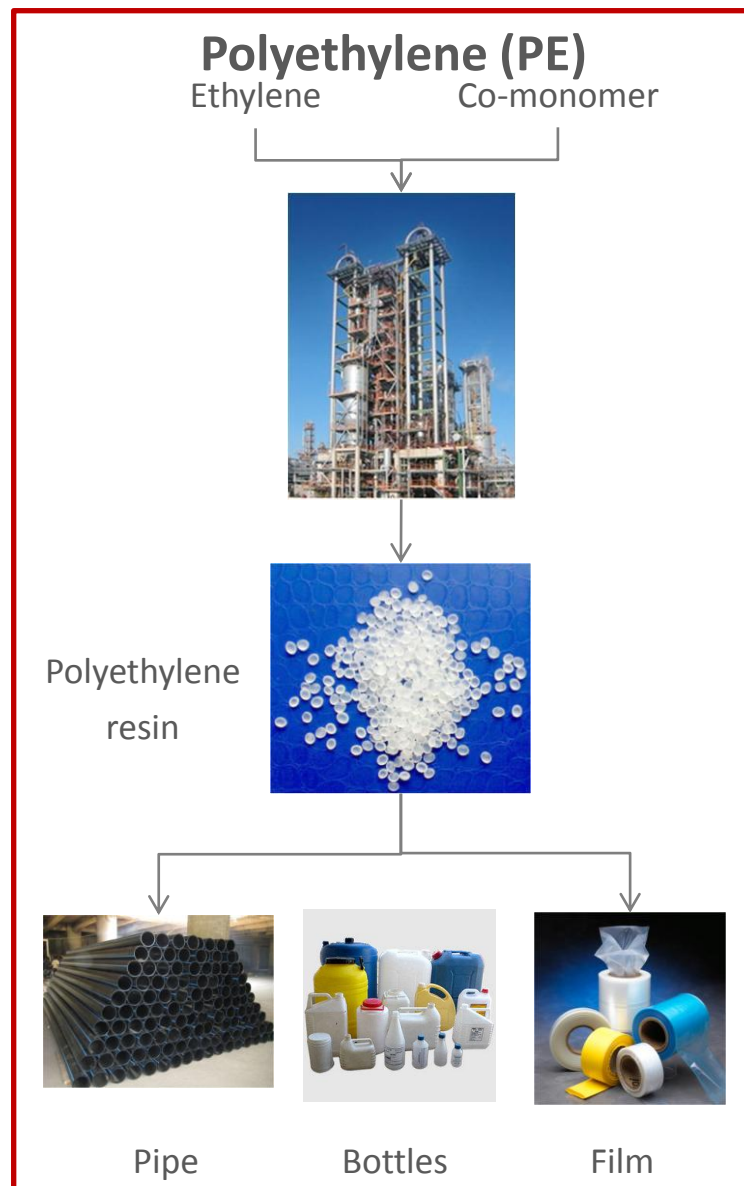
Shell's Facility in Singapore



Chemical Investment Opportunities in Appalachia



- Advantaged feed
- Close proximity to end-use industries
- Strong local/regional support
- Benefits local economy



Summary: Big Opportunities for Chemicals in North America

- Abundant supplies of natural gas boosts prospects for NA Chemicals
- Chemicals Industry is responding to take advantage of low cost raw materials with new investments
- Many new units announced for the Gulf Coast but other locations are becoming attractive as gas production expands
- Growing Chemicals exports will flow to Asia and South America

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- <http://www.shell.us/products-services/solutions-for-businesses/chemicals.html>
- <http://www.shell.us/aboutshell/projects-locations/alaska.html>
- Shell Media Line – 713-241-4544
- 2012 Annual Report and 2012 Sustainability Report available through www.shell.com

