Monetizing U.S. Coal/Petcoke: The Gasification Opportunity

Rice University Energy Forum

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Gasification Technologies Council

- **Gasification Industry Overview**
- **The Coal Moratorium & the Dash to Natural Gas for Power Generation**
- **The Gasification Response**
- **Public Policy Response?**

Industry Growth

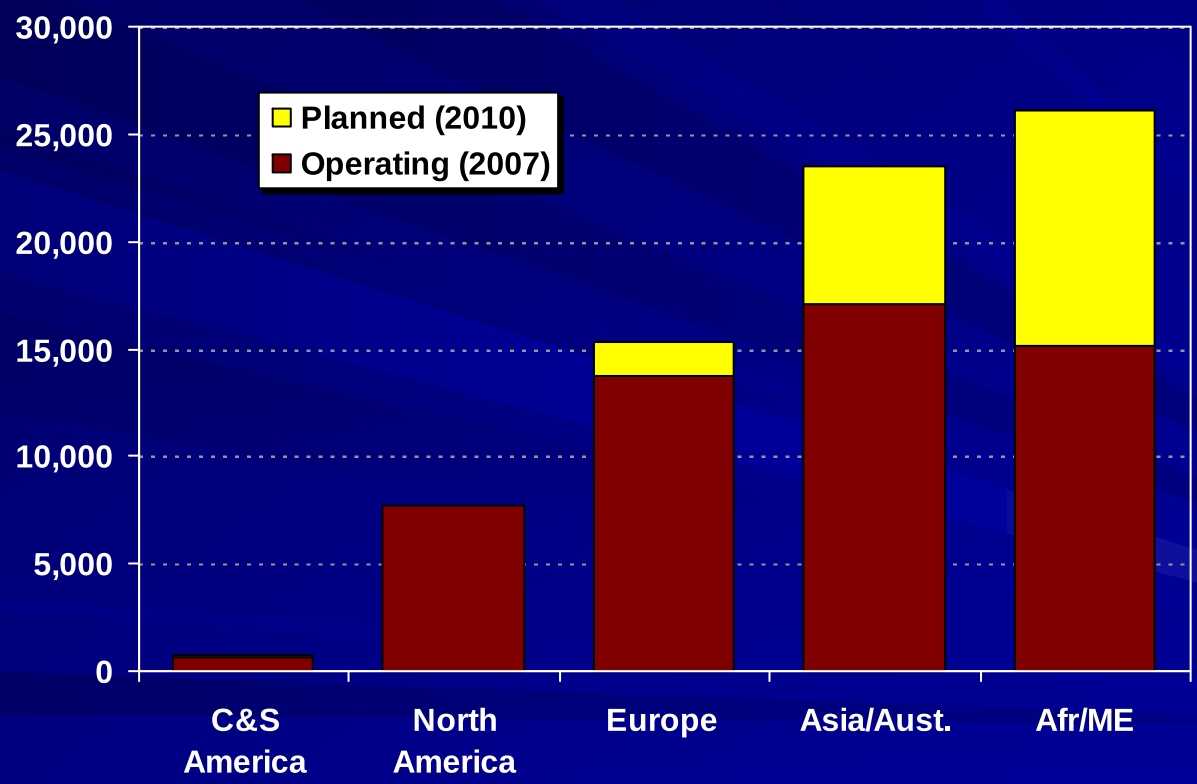
Operating Plant Statistics 2004 vs. 2007

2004	2007
• **117** operating plants	• **142** Operating Plants
• **385** gasifiers	• **420** Gasifiers
• Capacity~**45,000** MWth	• Capacity~**56,000** MWth
• Feeds – Coal **49%,** Pet. Resid. **36%**	• Feeds – Coal **55%,** Pet. Resid. **32%**
• Products – Chemicals **37%,** F-T **36%,** Power **19%**	• Products – Chemicals **44%,** F-T **30%,** Power **18%**

http://www.gasification.org

Geographical Distribution of World Gasification Capacity

(MW_{th} Equivalent)



http://www.gasification.org

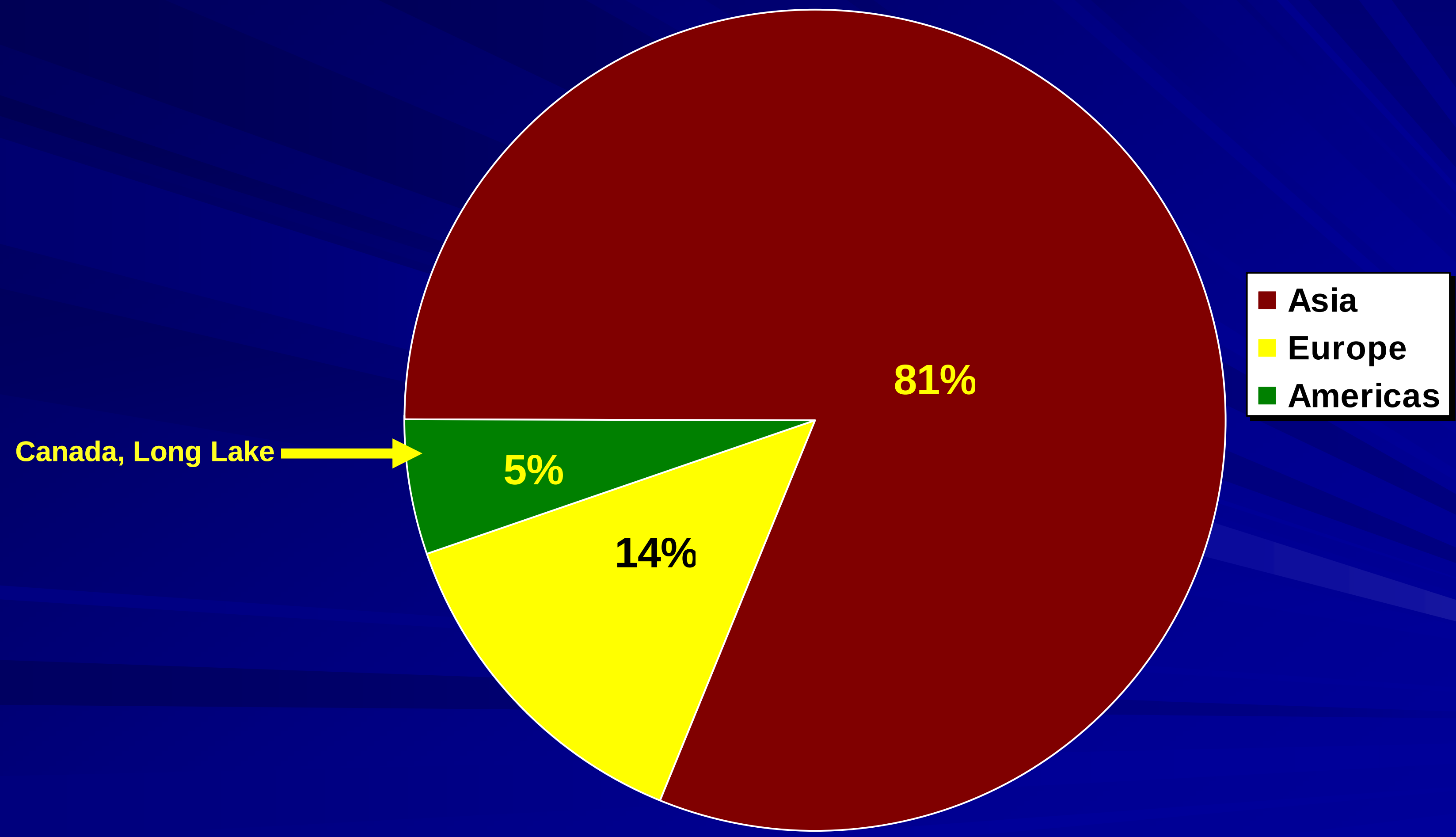
Where's the Growth?

http://www.gasification.org

Shares of Growth in World Gasification Capacity

2004-2010

(without Pearl GTL)



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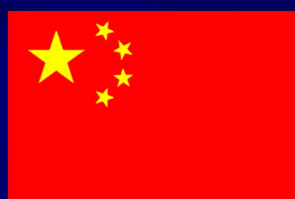
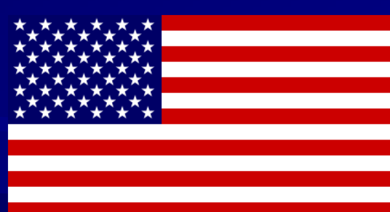
2004-2010 Gasification Scoreboard

(Plant Startups)

	China	29
	U.S.	0

http://www.gasification.org

The Coal Moratorium
&
The Dash to Gas

http://www.gasification.org

Factors Affecting Gasification in U.S.

- Opposition to Coal Includes IGCC
- Carbon Regulation is the Catalyst
- Path of Least Resistance – Natural Gas
- Natural Demand & Gas Prices
- Natural Gas Dependent Industries & Consumers Impacted
- Gasification a Competitive Alternative

EIA Forecast Off the Mark?

U.S. Non-Nuclear Energy Demand

For Power Generation

(Quadrillion Btu's)

	2009	2020	Δ
Coal	20.44	22.01	8%
Natural Gas	6.79	6.73	-1%
Renewables	4.06	5.79	43%
Total	31.10	34.23	10%

2009 EIA Annual Energy Outlook

U.S. Gasification Direction

In a carbon constrained world, growing demand for gasification in face of rising NG & oil demand & prices and concerns over energy imports. Key product sectors:

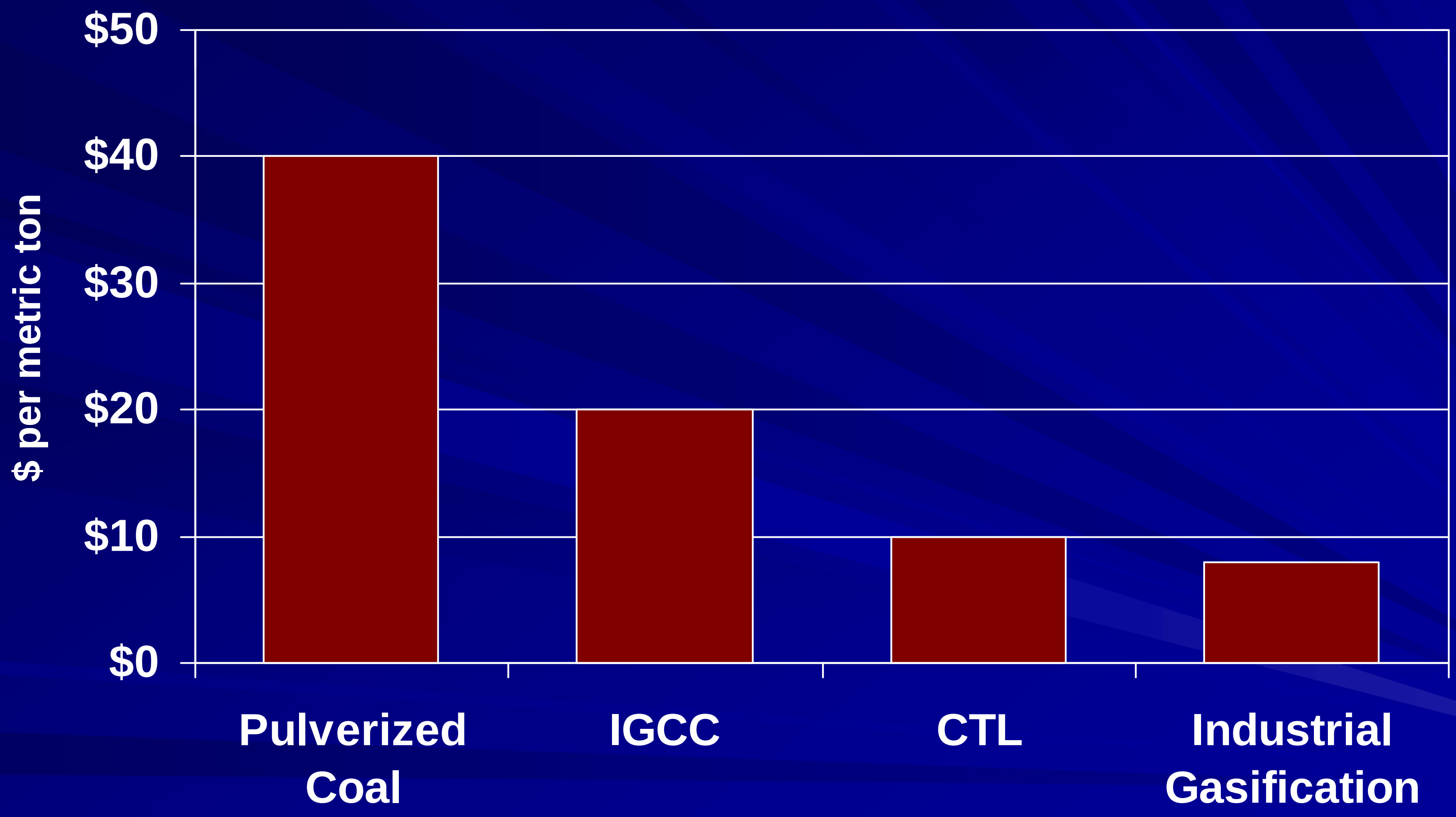
- **Chemicals, Fertilizers,**
- **Refinery Polygen (H_2/Electricity/Fuels),**
- **Fuels & SNG**

Benefits of Gasification Products

- Use Domestic Resources
- Long Term Competitive Output
- Lower Cost CCS Option
- “No planned gasification based U.S. project is without a CCS element”

http://www.gasification.org

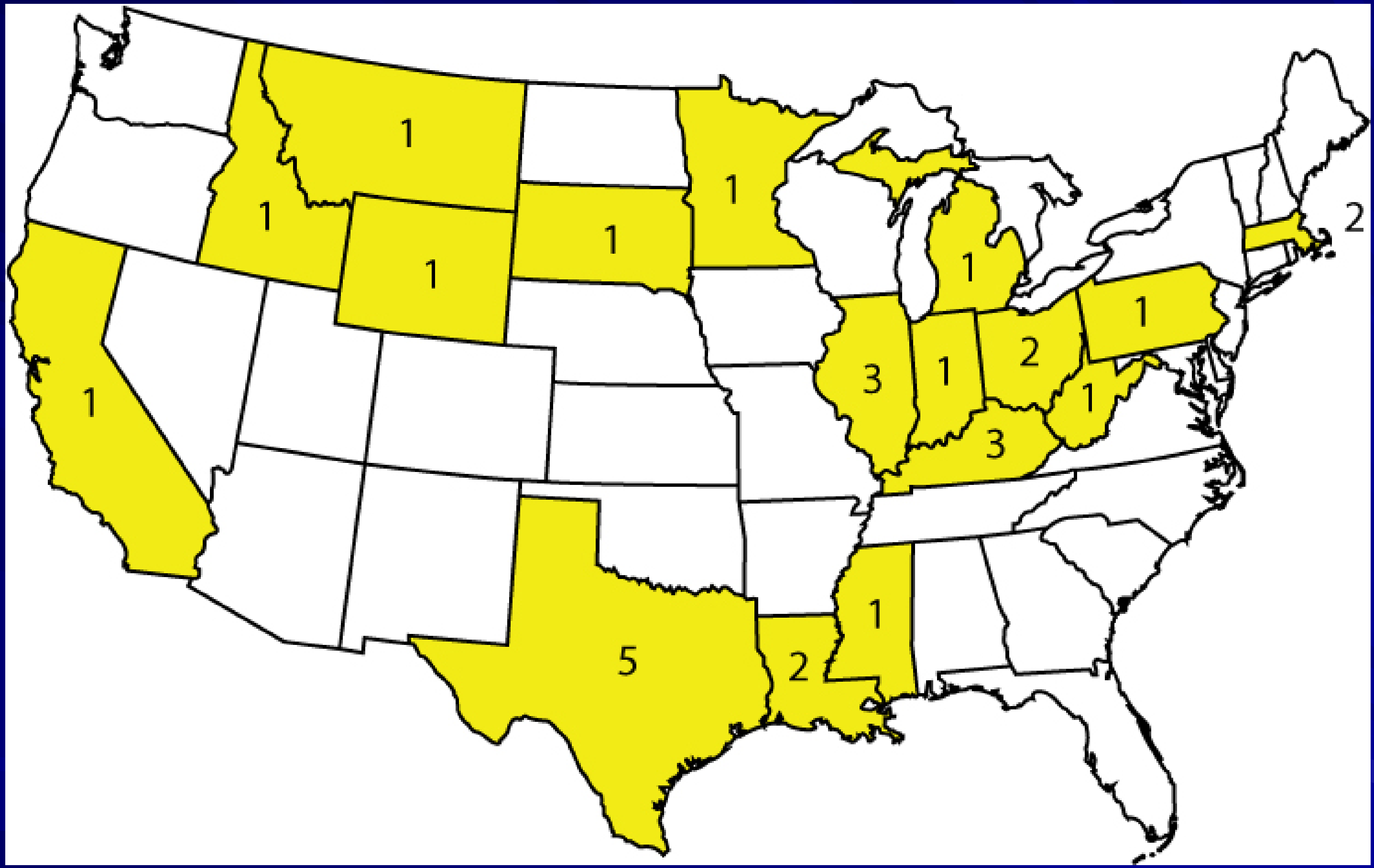
Carbon Capture & Compression Costs



Sources: MIT, Eastman Chemical

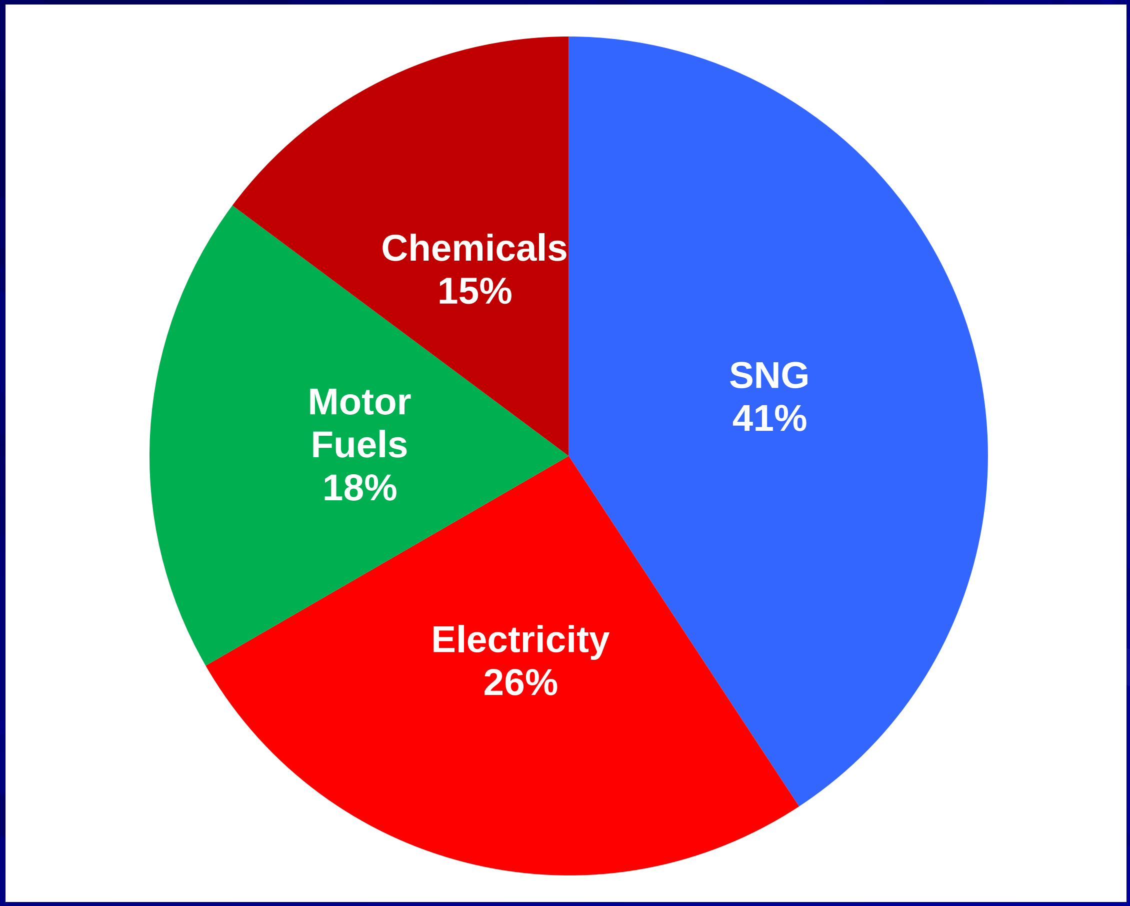
http://www.gasification.org

Proposed U.S. Gasification Plants



Source: Gasification Technologies Council

Product Shares for Proposed U.S. Gasification Plants



Source: Gasification Technologies Council

Public Policy Arena:
What is Needed?

- Public sector financial and policy support a necessity
- Construction & operation of <u>commercial scale</u> gasification manufacturing plants (IGCC, CTL, SNG) with CCS using a variety of feedstocks;
- Incentives that recognize and reward the ability of “industrial gasification” to offer large scale, near term opportunities for CCS at lower costs;
- A uniform <u>national</u> policy framework addressing regulation of CO_2 emissions and CCS, incentives, liability limitations and insurance for early adopters; and
- Cease fire in the zero sum energy war

Key Unknowns

Length & Depth of Economic Downturn

Direction of National Carbon Policy

Timing of Carbon Regulation

Questions? Comments?

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