PACE GLOBAL®

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AABE 35th Annual Conference

Dash to Gas Panel Discussion


PACE
GLOBAL®
DISCOVER
THE POWER OF
INTEGRATION
Pace Global is a leading energy consulting and management company. We combine deep industry knowledge with commercial, technical, financial, and regulatory expertise to help organizations maximize value and manage risk in today's complex energy and environmental markets. For more than 35 years and in over 60 countries, we have worked closely with our clients to define strategies and implement solutions. We offer a unique, integrated perspective our clients have come to trust. Some call this synergy. We call it the Power of Integration.


Shale Gas Development has
Transformed the U.S. Energy Outlook
Where is this Leading Us:
• As a nation?
• As an industry?
• As a global market participant?

Energy sources and uses have always evolved at the intersection of technology and cost, creating new risks and opportunities for both suppliers and consumers.

The structure and composition of energy demand is largely shaped by three interrelated trends:

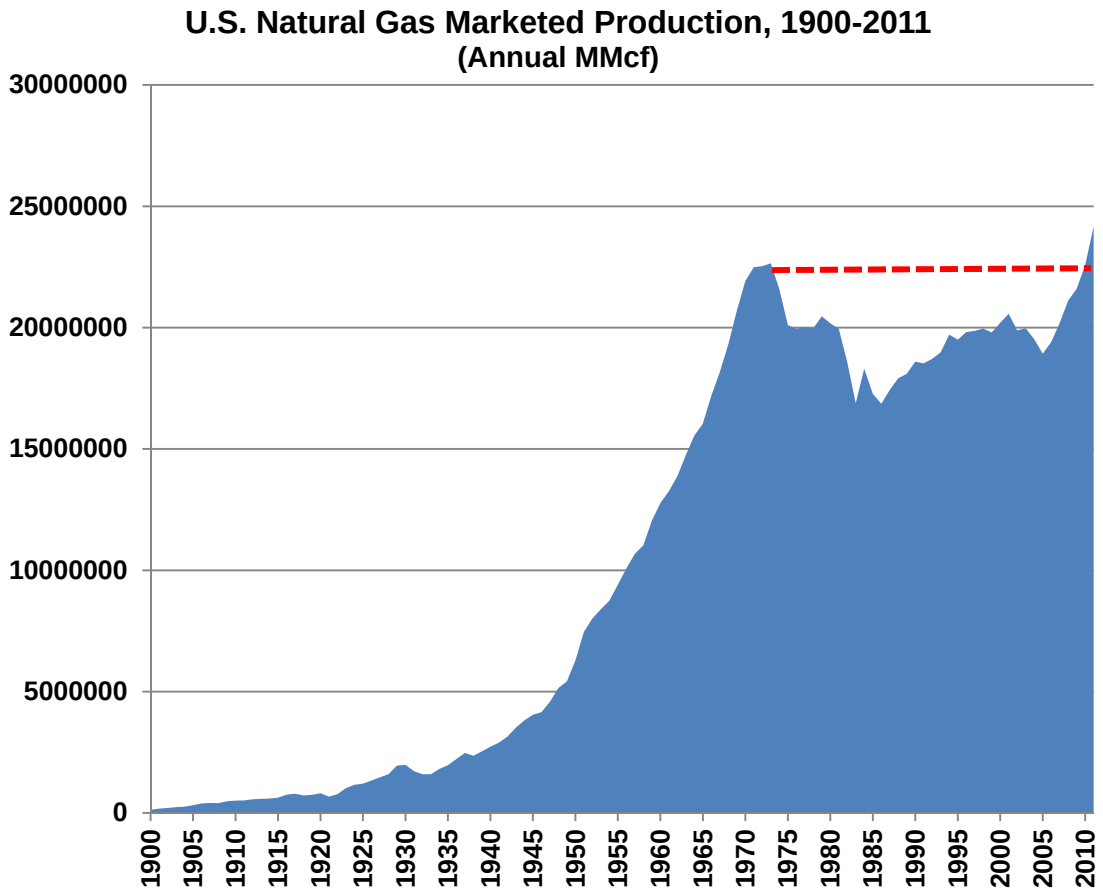
Urbanization of Emerging Markets

Fuel Use Demand Growth

Environmental Management & Competitive Regulation

Shale Gas has Renewed Prospects for U.S. Natural Gas Industry

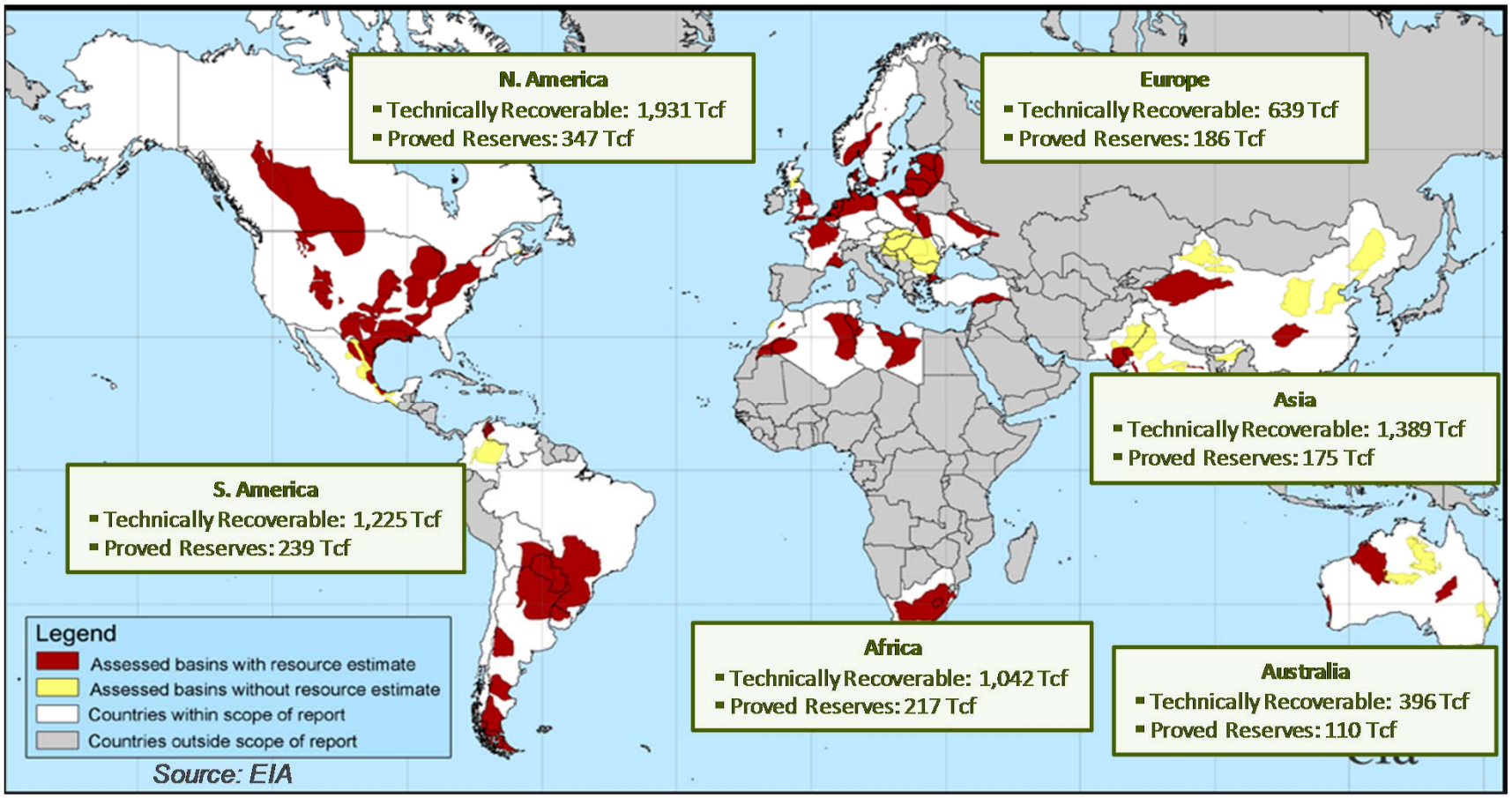
Forty years after the U.S. thought it had reached peak natural gas production, an all-time production record was hit in 2011, spurred by the shale gas boom.



Source: U.S. Energy Information Agency, Pace Global

Global Magnitude of Shale Gas Requires New Thinking

While most of the world's proven conventional gas reserves are concentrated in MENA, Russia and Central Asia, large shale basins exist in or near major natural gas export markets in Europe and Asia as well as North America.

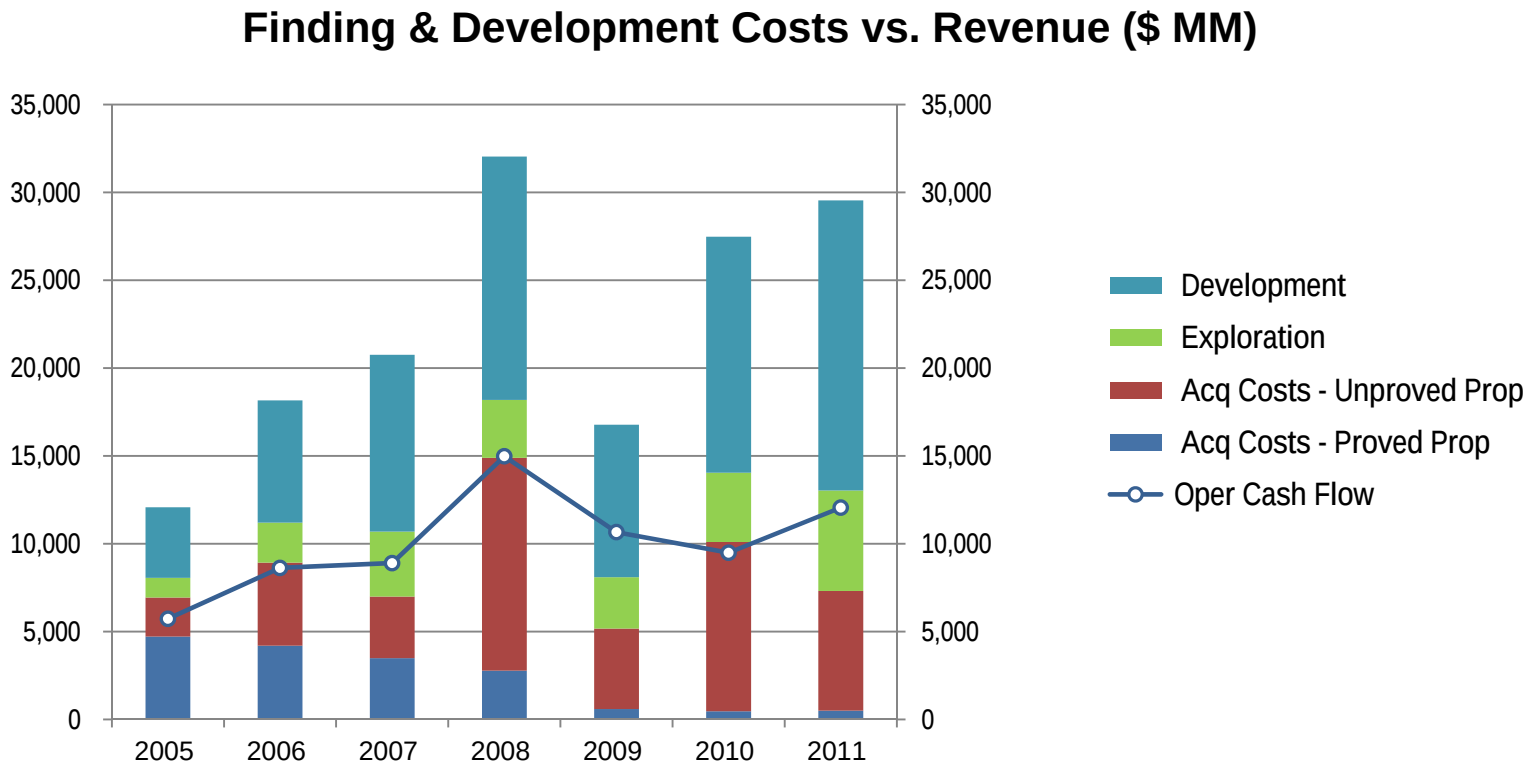


Pace Global and Shale

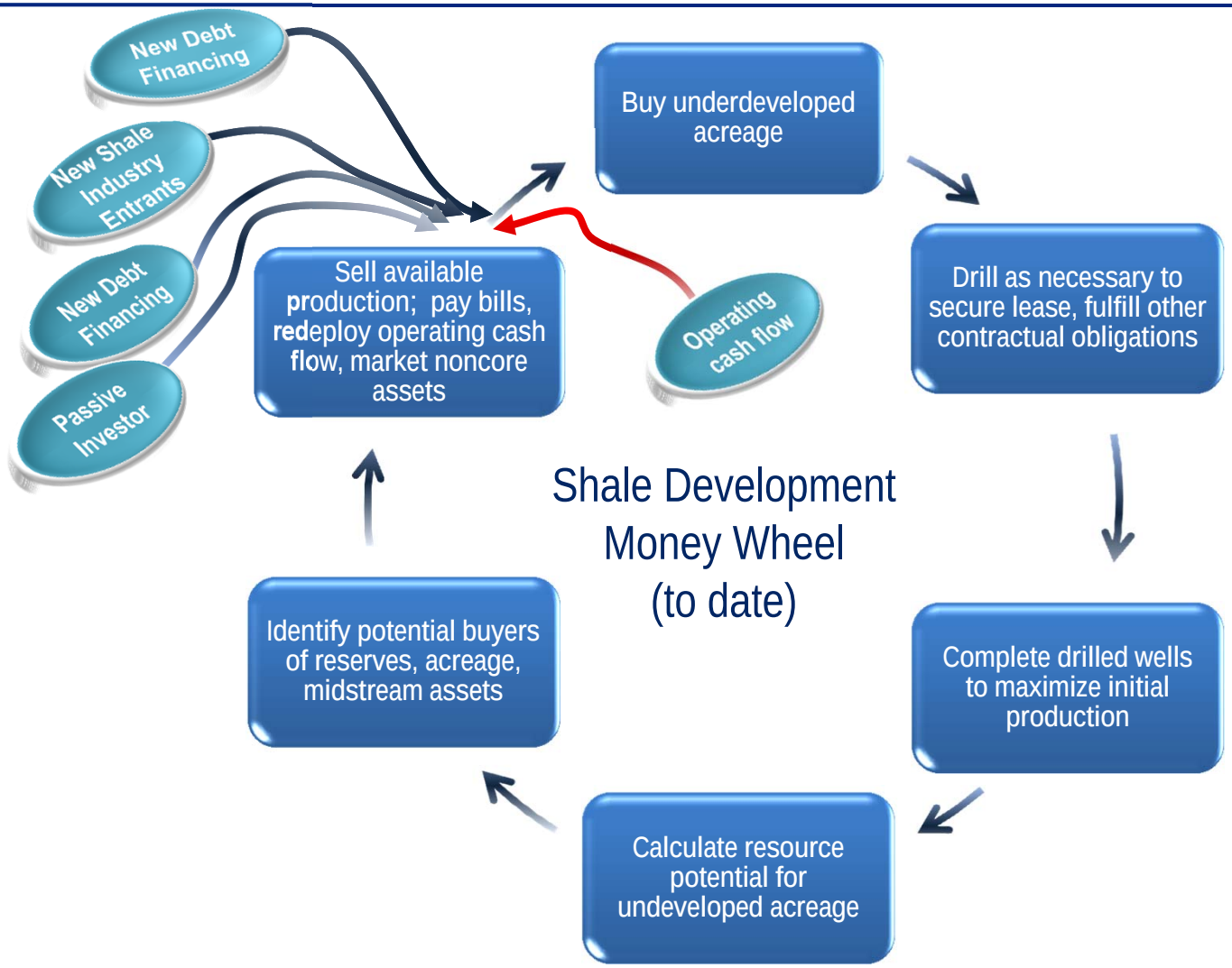
- Pace Global sees three questions that are currently driving the industry:
  1. Are current prices adequate for sustainable shale production?
  2. How will this affect the U.S. trade balance in the industry?
  3. What regulatory or environmental impacts are present and forthcoming and how will they affect the overall development of the industry?
- Based on the implications from the above three questions, we analyze economic, operational and strategic trends and issues facing a core group of ten U.S. E&P companies that are heavily focused in shale.

Shale Tale to Date: F&D Costs Exceed Operating Cash Flow

Pace Global's ongoing survey of ten heavily gas-weighted shale developers (>70% shale gas) indicates that operating cash flow has averaged roughly half of finding & development costs (excludes production costs, overheads, etc.) for the past seven years.



The Shale Tale to Date: Lots of Money In, Not Much Out



Gas Market Equilibrium Could Evolve Over Time or Occur Abruptly

Gradual Supply Reduction

- Continued low prices reduces drilling capital inflows
- Continued wide oil/gas price ratio, currently 10:1, sustains industry shift to shale oil development

Rapid Supply Reduction

- Severe governmental restrictions on shale development

Gradual Demand Increase

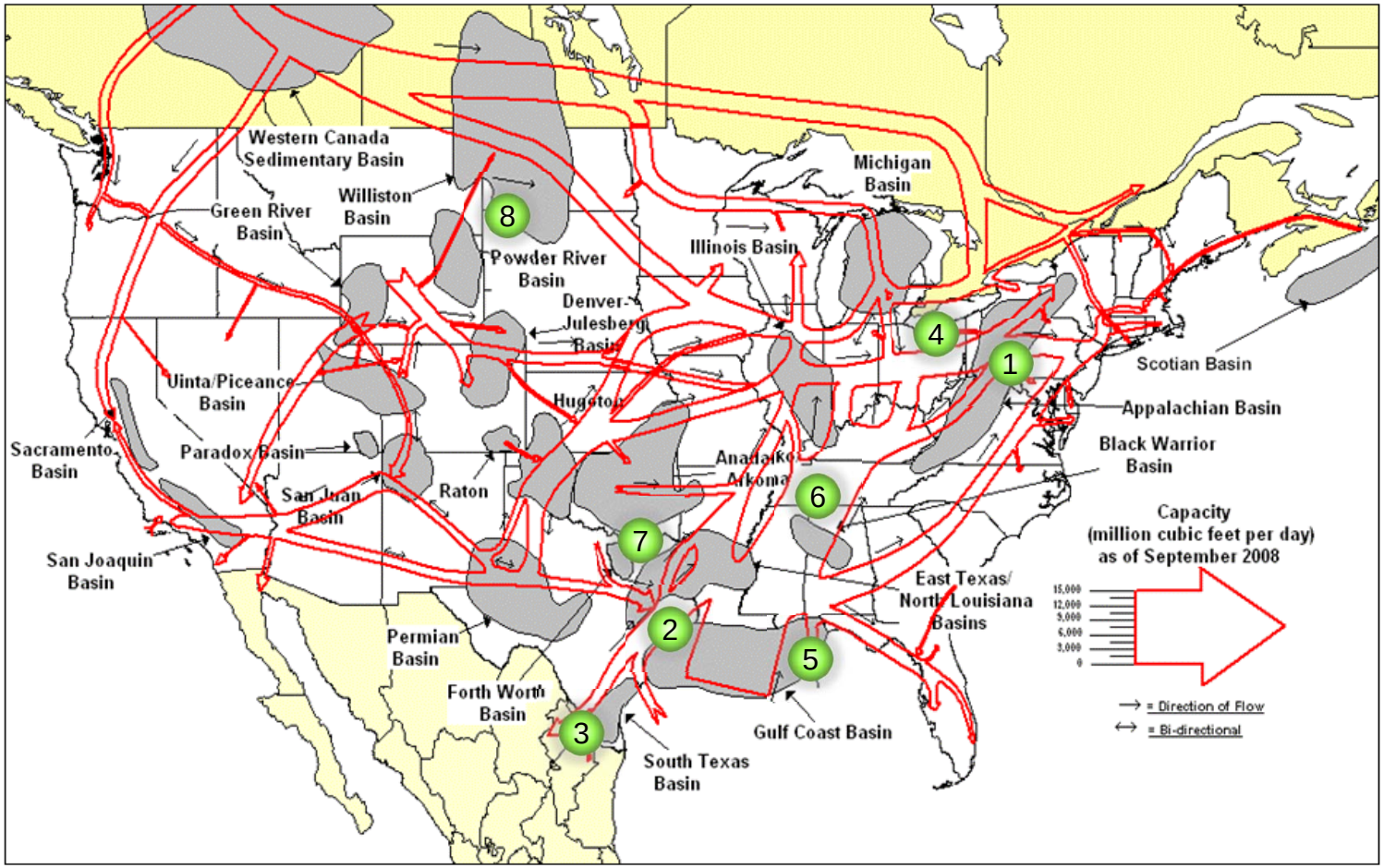
- Growing gas-fired power generation and dispatch rates
- Growing transportation fuel demand

Rapid Demand Increase

- Price-induced coal-to-gas fuel switching could more than double power sector demand with existing CCGT generating capacity

So where is all of this leading us?

Unprecedented Change in Midstream Infrastructure



Legend

1. Marcellus
2. Barnet
3. Eagle Ford
4. Utica
5. Haynesville
6. Fayetteville
7. Woodford
8. Bakken

Source: EIA

$205 billion for new gas infrastructure alone plus additional requirements for crude oil and gas liquids transport and management (INGAA)

What does this mean for the power industry?

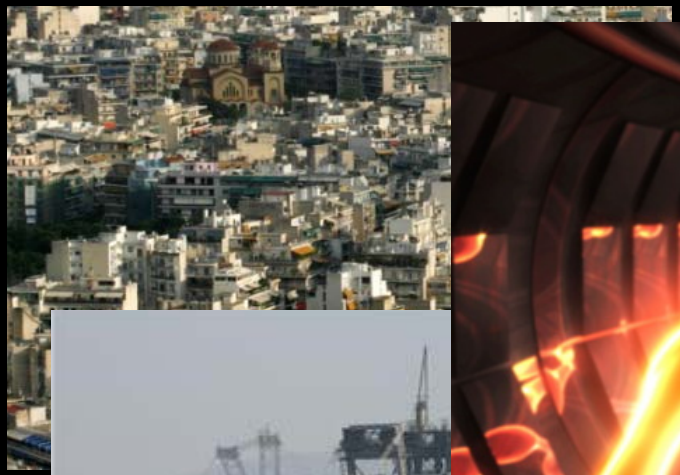
- Filling the Gap – Natural gas is the fuel of choice to address both power needs and environmental issues.
- Decommissioning Coal – Up to 50–80 gigawatts by 2020.
- Mandating Renewables – 73 gigawatts of RPS currently mandated by 202.5
- Blowing in the Wind – Continued growth of unpredictable generation sources like wind currently with over 34 gigawatts of installed capacity and an average capacity factor of 30%.
- Nuclear Winter – No new construction on the horizon. Re-licensing of current plants uncertain.

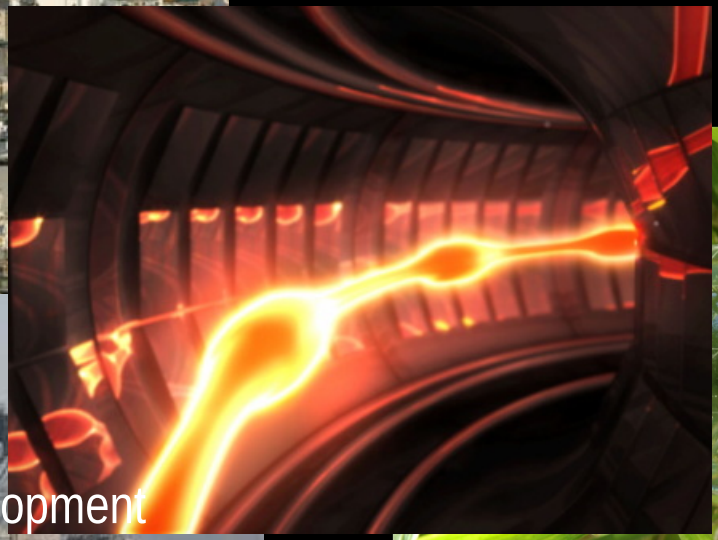
So what does this mean for national security?

- Home Grown – 98% of natural gas used in the U.S. was produced in North America… offsetting the need to import oil
- Sustainable and Secure – U.S. has many decades worth of supply.
- Domestic Transportation Fuel Substitute – There are only 112,000 NGV's in the U.S. vs. 13 million worldwide (<1% of total). 10% diesel-to-NG conversion reduces oil import requirements by over 200 million barrels per year. Additional opportunities in bunkering.
- Growth Engine – 10% diesel conversion to NG results in +660 Bcf/year natural gas demand = NEW INFRASTRUCTURE REQUIREMENTS.
- Low Cost – Natural gas costs are materially lower (at least a 30-40% discount) than gasoline and diesel.

What Does This Mean for All of Us Here Today?

More opportunities to lead
and grow our companies
and create new industries

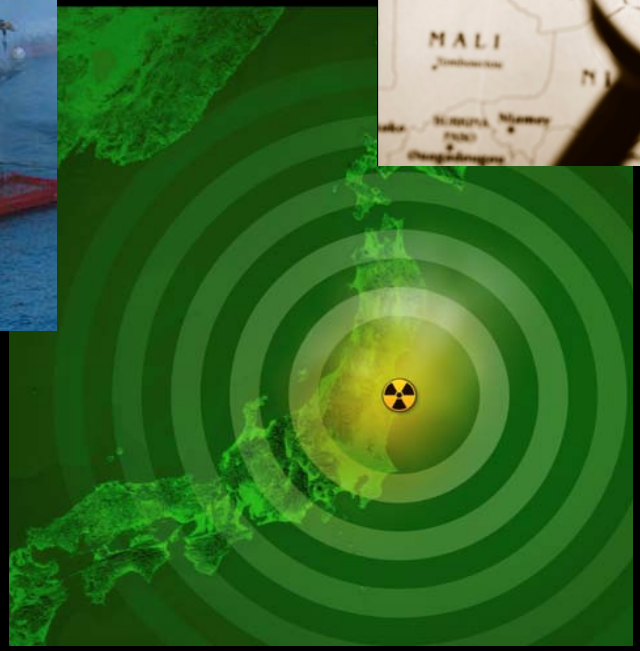




Resource Development

Prudent Environmental
Management

One major caveat: expect the unexpected, and plan accordingly



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