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Taking on the world's toughest energy challenges.™



Unconventional Gas

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EBC – Energy Committee
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This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1 of ExxonMobil's latest report on Form 10-K). This material is not to be reproduced without the permission of Exxon Mobil Corporation.

Conventional vs Unconventional Production

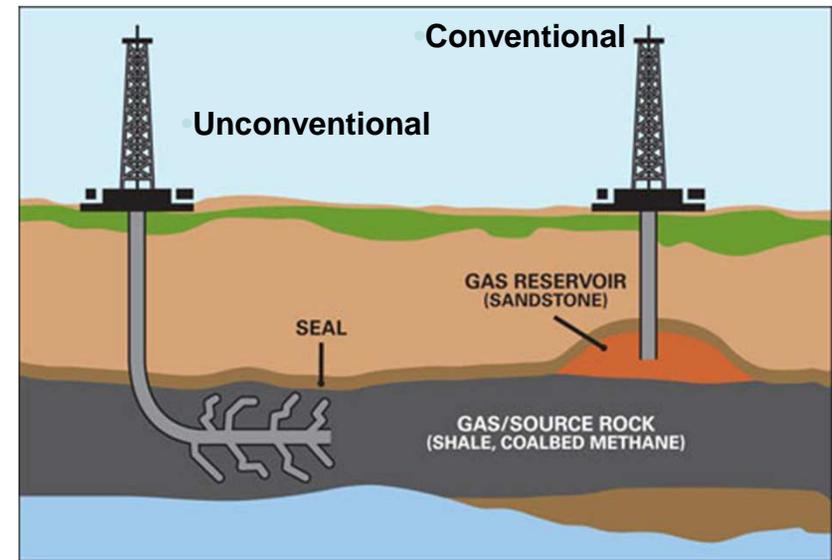


- **Conventional Reservoirs :**

- Produce volumes without any special recovery process
- High to medium permeability
- Vertical wells typically on wide spacing

- **Unconventional Reservoirs:**

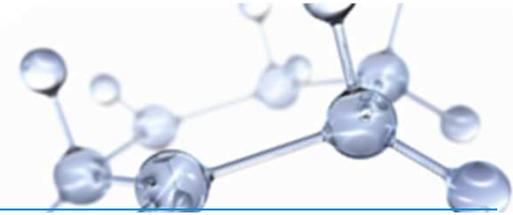
- Require major stimulation treatments and / or special processes
- Very low permeability
- Requires many, often complex wells



Conventional deposits need (1) a source rock, (2) a reservoir rock, (3) a trap, and (4) a seal

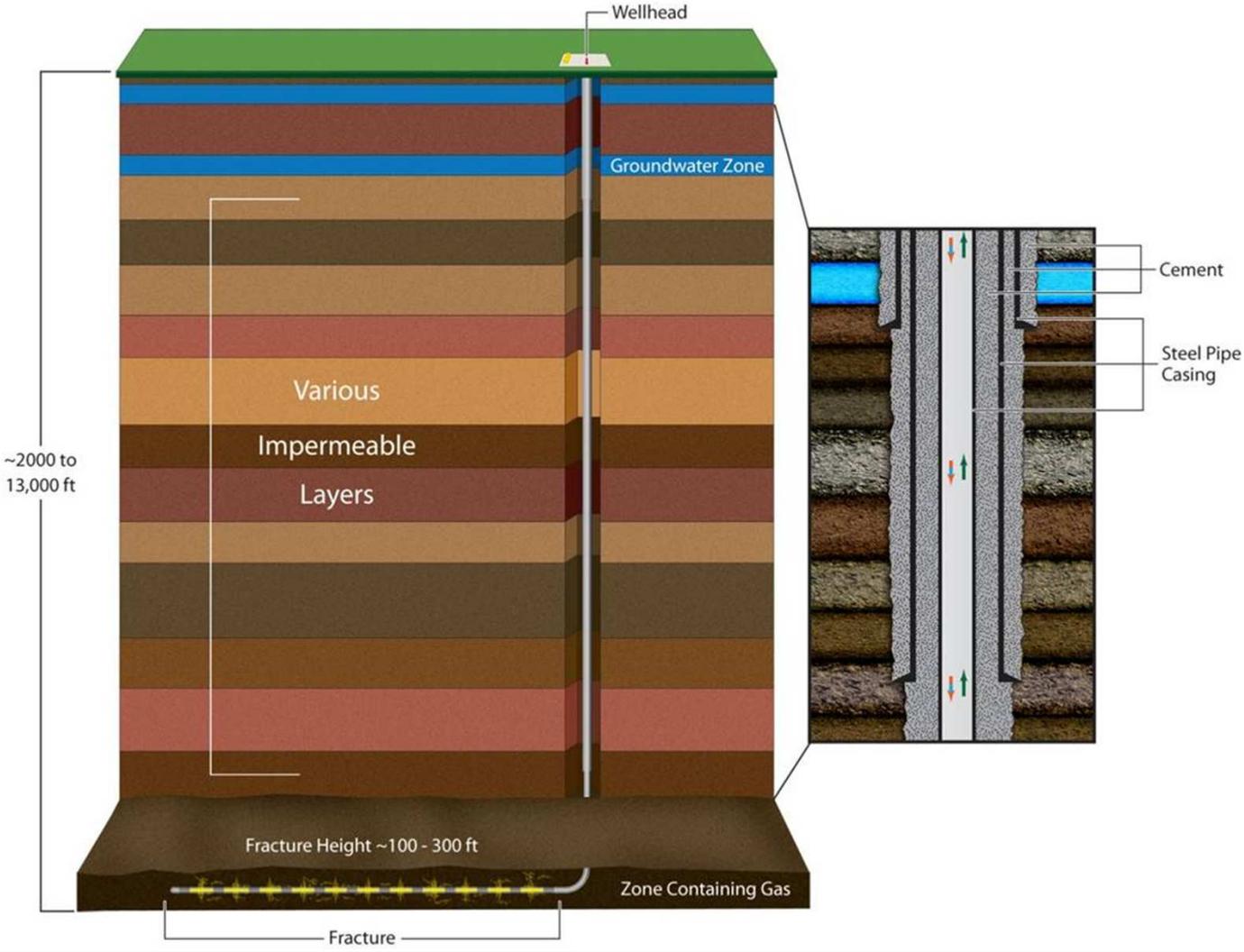
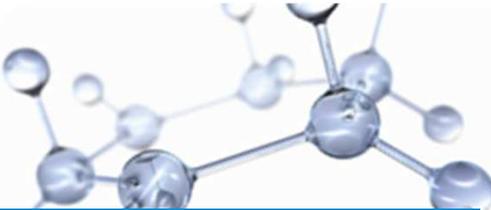
In Unconventional deposits, the source rock, reservoir rock, trap and seal are all the same

Hydraulic Fracturing



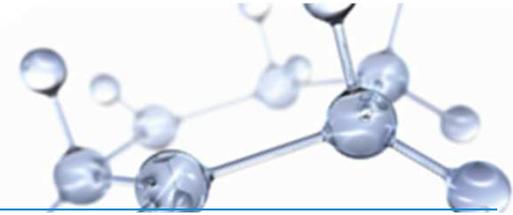
- **Hydraulic fracturing (“fracking”) is not new technology**
 - Technology has been in use since the 1940’s
 - More than 1.2 million wells drilled using technology
 - What’s “new” is combination of several established technologies
 - Horizontal drilling, Fracking, Multi-zone stimulation
- **Hydraulic fracturing fluids are 98 – 99.5% water and sand**
 - Fluid additives are used to make the process more effective and safer by:
 - Reducing friction
 - Thickening water to carry sand into the fractured rock
 - Protecting the fractured rock formation
 - Preventing the growth of bacteria in the well bore
 - Mitigating against pipeline corrosion

Hydraulic Fracturing (Cont.)



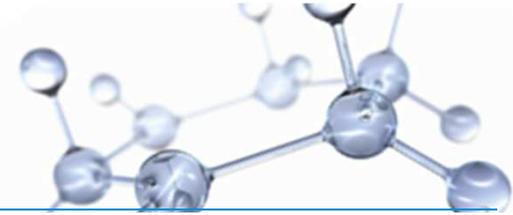
Water use

- Shale gas is one of the most water-efficient sources of energy
 - Coal: 2-4 times more water per unit of energy (BTU)
 - Ethanol production: 1,000 times more per unit of energy
- Produced water is often used in later stages to minimize impact on local supply
- A typical well requires 10,000-20,000 cubic meters of water, equivalent to:
 - 3-6 Olympic-sized swimming pools
- Water is only required for a short time during the drilling and completion process and does not represent a long-term water commitment
- Proper water management and disposal is critical, and is a standard practice in the O&G industry

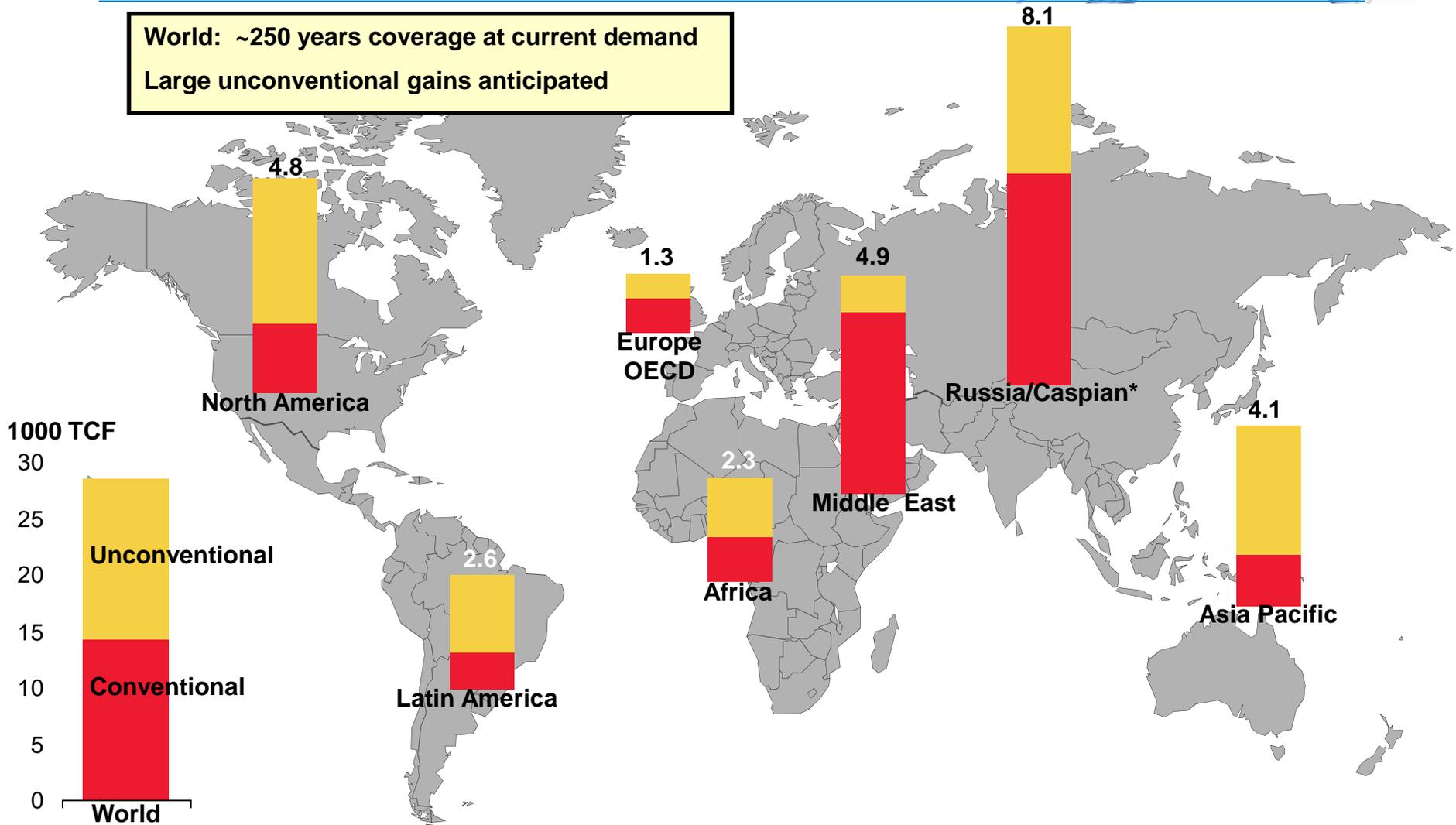


Damme 2, Germany

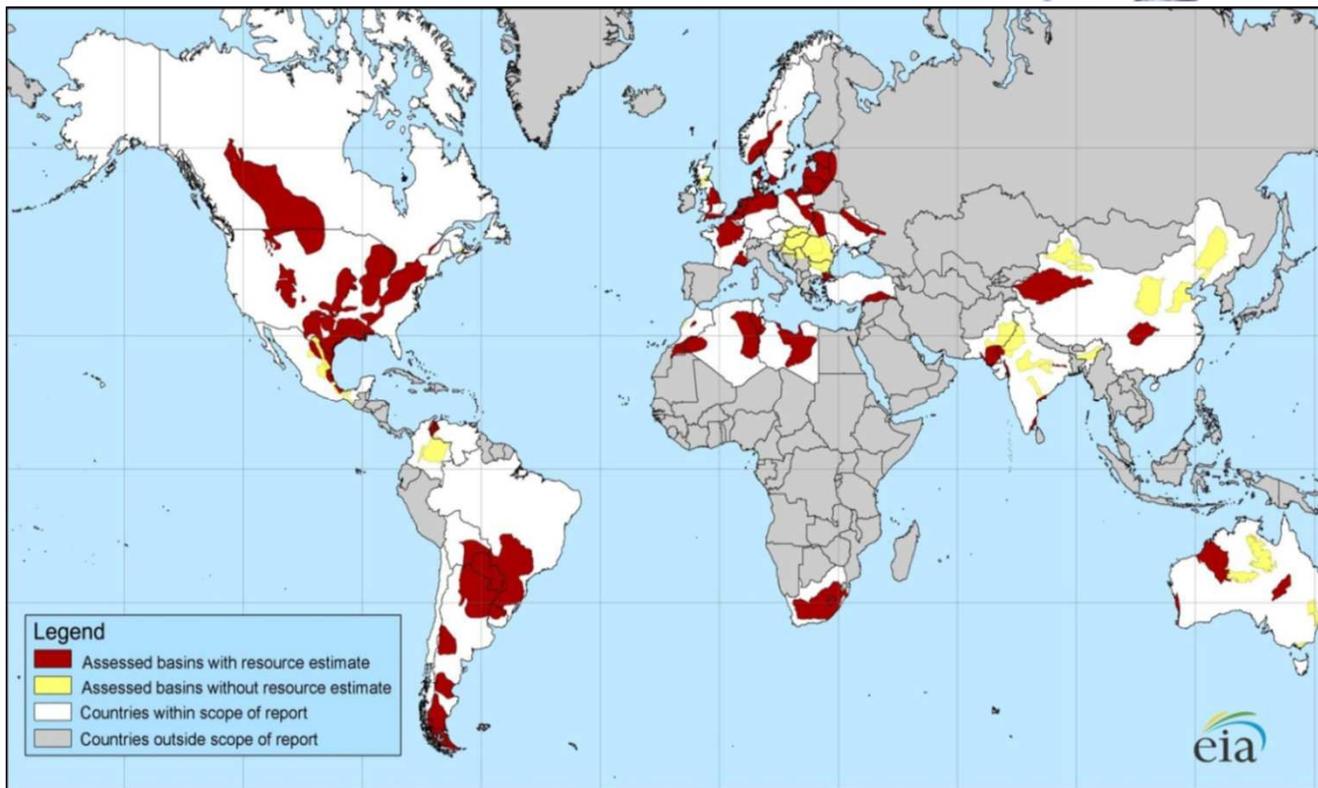
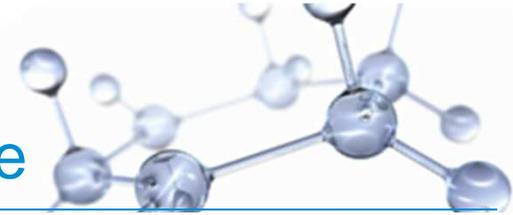
Global Gas Resource



World: ~250 years coverage at current demand
Large unconventional gains anticipated

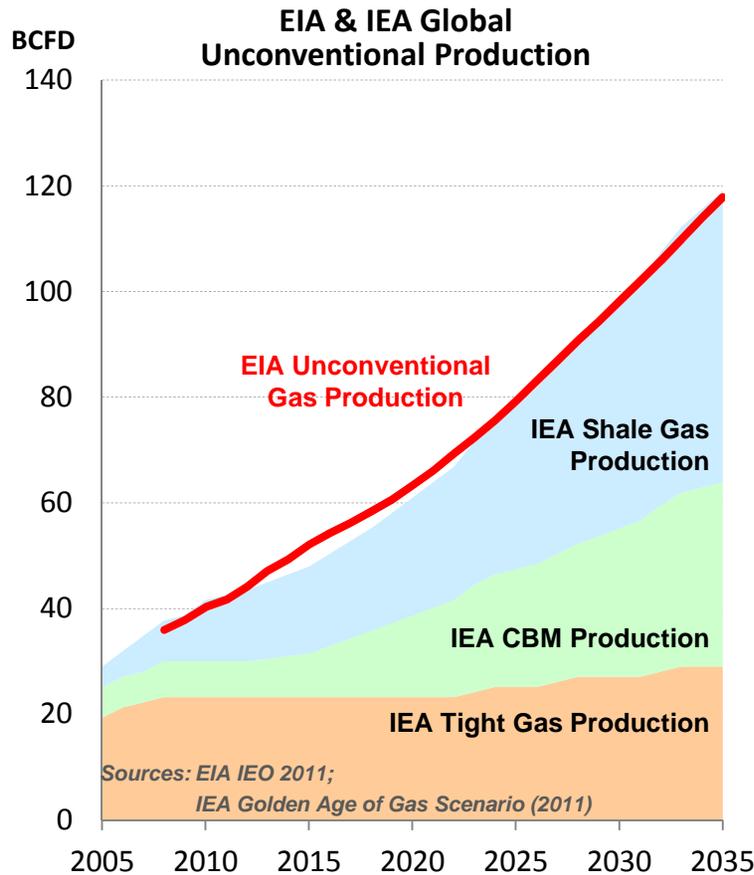
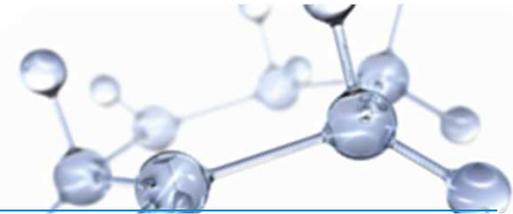


Shale Gas – A Growing Global Resource

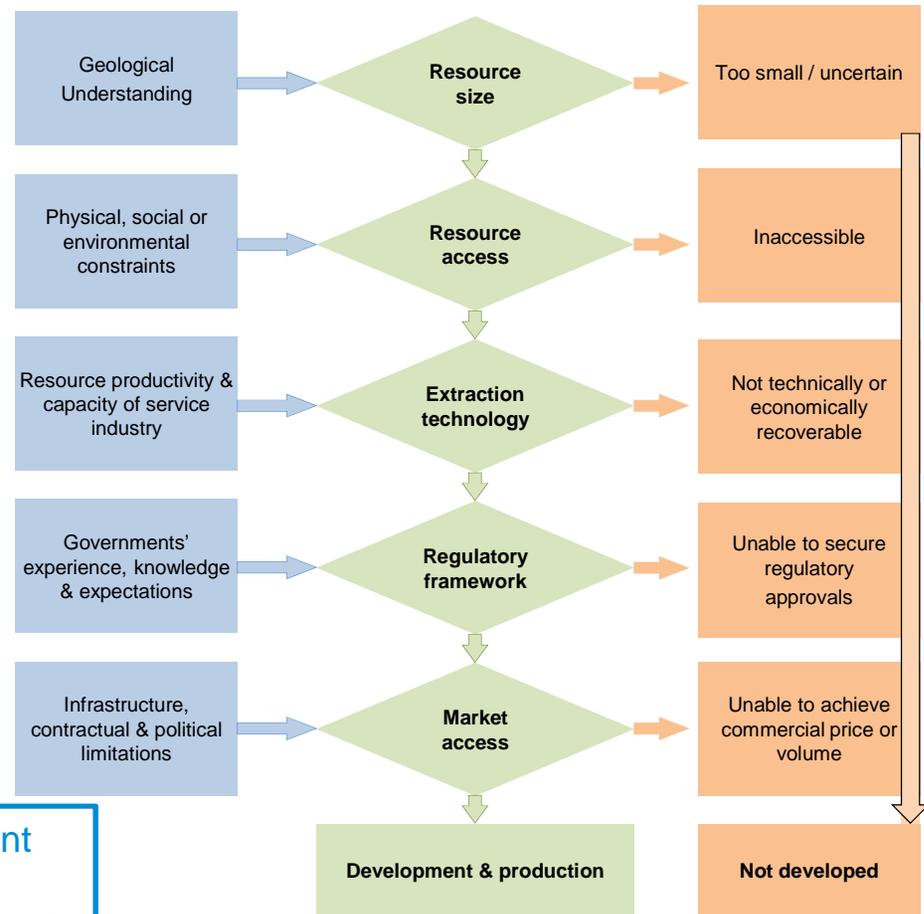


- EIA estimates technically recoverable shale gas resource of more than 6,000 TCF in 33 countries
- Global resource assessments vary in methodology and global coverage; variability with or without production history

Unconventional Gas Development Challenges



Factors Determining the Viability of Natural Gas Developments

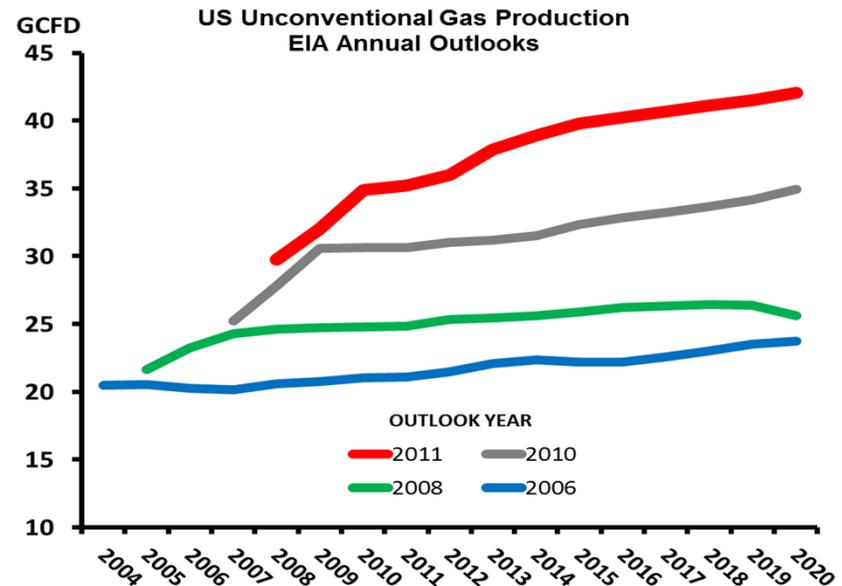
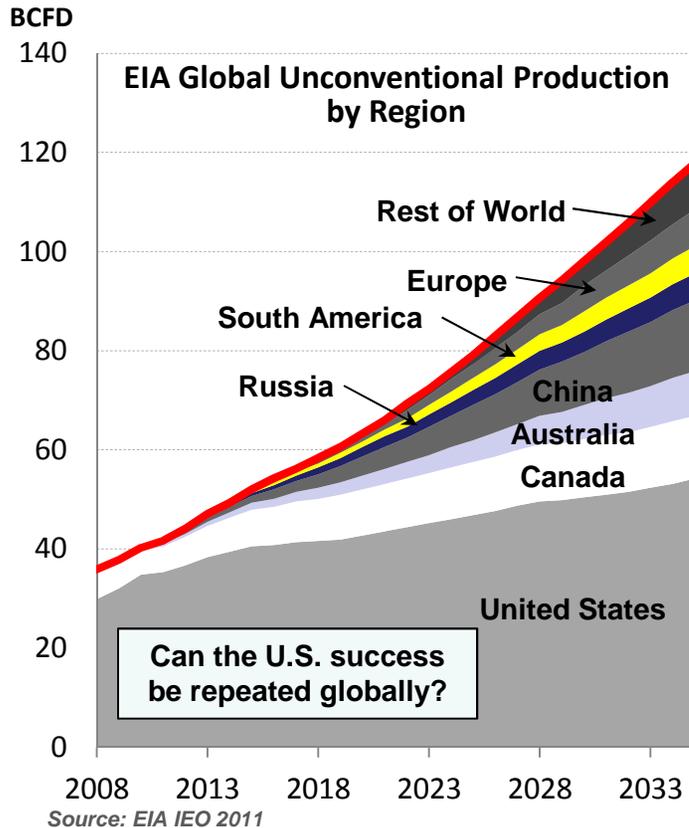
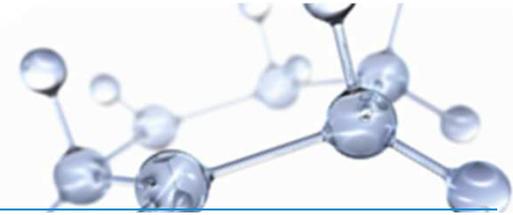


Source: Adapted from IEA. World Energy Outlook 2011: Special Report –Are We Entering the Golden Age of Gas?

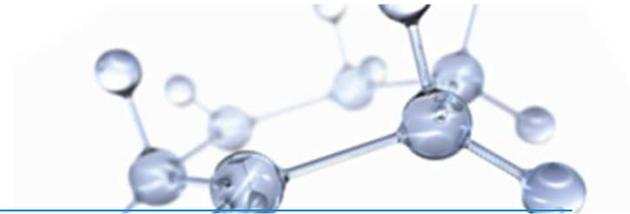
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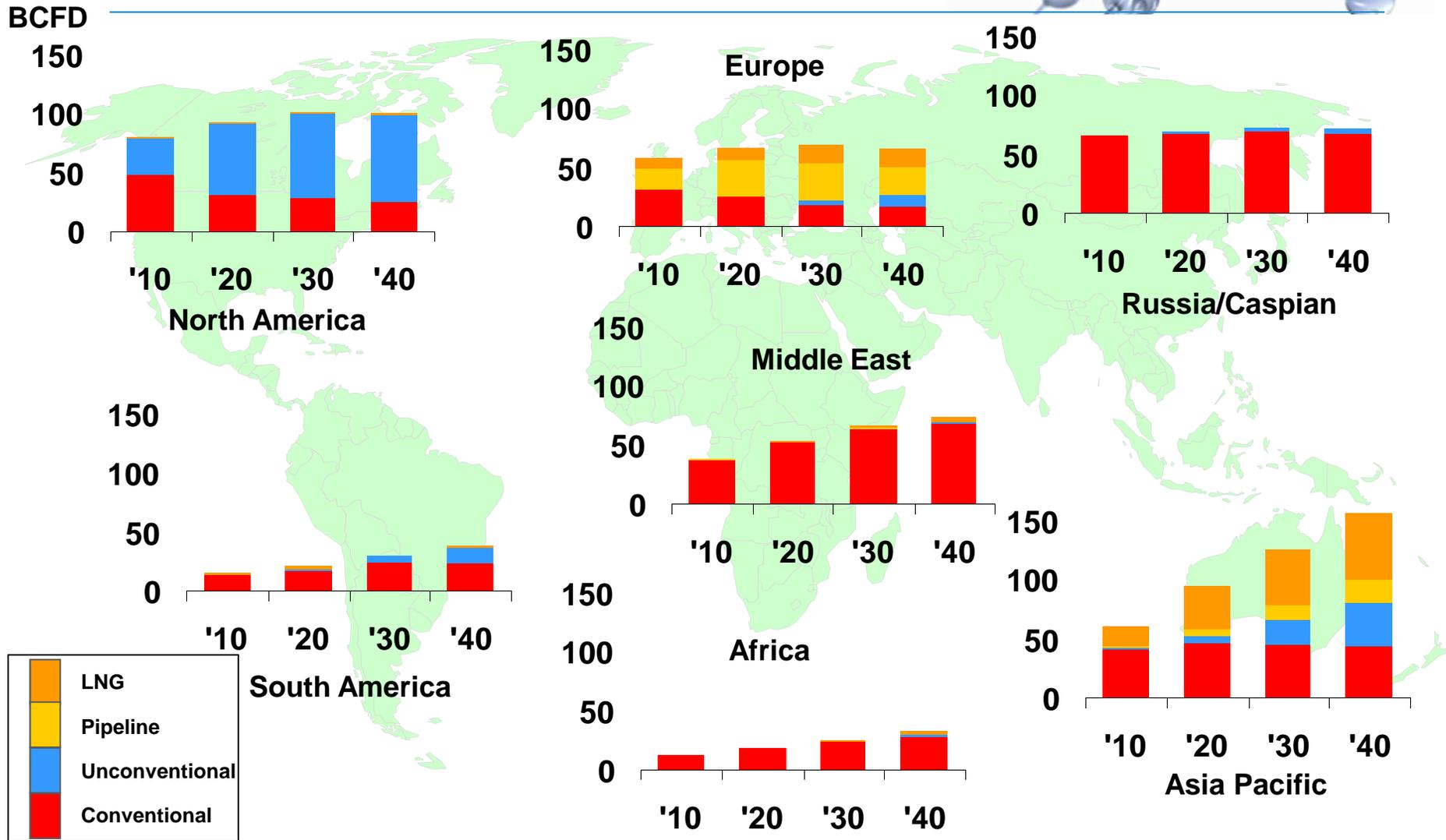
Significant Potential for Global Unconventional



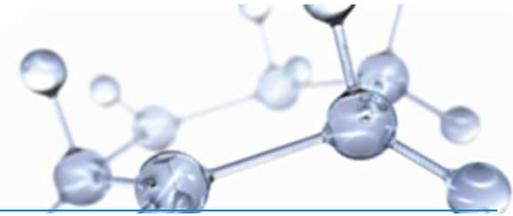
- Current global unconventional gas production is just emerging compared to North America. Significant potential based on assessment of resource size
- However, uncertainty about pace of development and production outlook exist. The U.S. has seen significant changes to assessment of unconventional gas resource size and production outlook



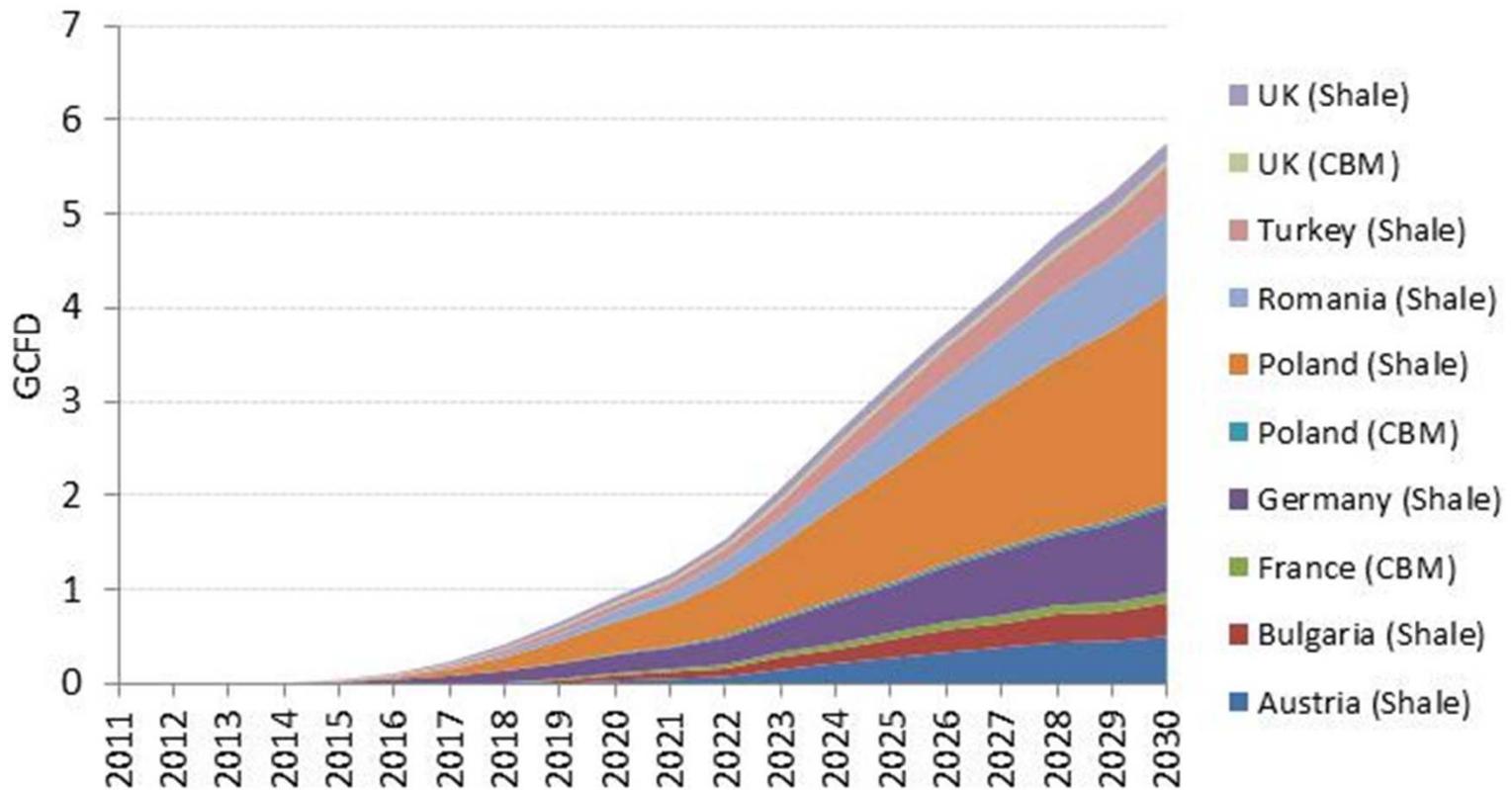
World Gas Supply



Potential in Europe Lower



Europe Unconventional Potential



Source: Wood Mackenzie Europe Gas and Power Service
Nov 2011

Will Europe Differ from the U.S.?



Exploration

Pilot Development

Full Development / Production

Decommissioning

- Europe is only just beginning; no proven resources, uncertain future contribution
- Different geology: smaller basins, more clay-rich shales, complex burial histories
- Exploration licenses differ in size and commitment
- Practices have evolved significantly over the past decades
- Supply and service sector less developed in Europe
- The pace in Europe will be more measured, given social and environmental factors
- Different phases may require different regulatory systems