



Unconventional Natural Gas: Strategies for Ukraine's Energy Security

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Deputy Executive Director

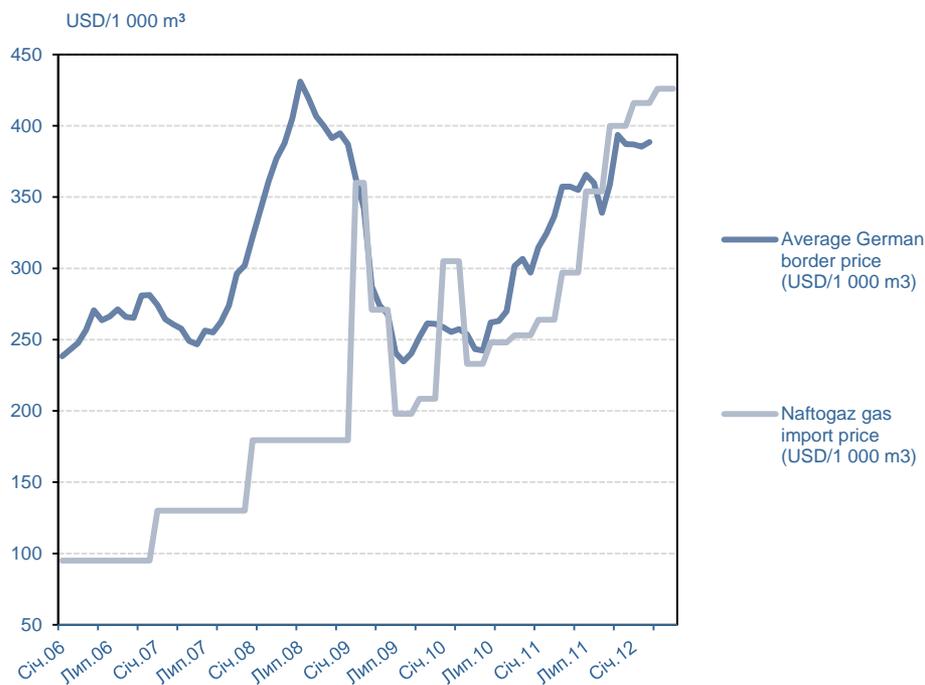
Ivano-Frankivsk National University for Oil and Gas
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The Context

- Ukraine In-Depth Energy Policy Review 2012
 - Key findings and recommendations
- Energy Security
 - Reducing gas import dependency
- Unconventional Gas Revolution
- WEO 2011 Golden Age of Gas Scenario
 - Unconventional Technologies
 - Environmental and social considerations
- Golden Rules for a Golden Age of Gas

Ukraine's energy sector at crossroads

Market based gas import prices since 2009



Domestic gas production stagnating, imports still high



Ukraine's untapped potential

- Unique opportunity for energy revolution
- Energy efficiency potential - the “hidden fuel”
 - Residential (district heating), industry and transport sectors
- Can Ukraine eliminate its import dependency in gas by 2030?
 - Maximizing energy efficiency gains
 - Enhancing conventional and encouraging unconventional gas production
 - Developing renewables
- Energy Community Treaty: framework for regulatory reforms
- Access to upstream resources, transportation systems and gas storage

Key gas transmission systems and transit position



Unconventional gas in Ukraine

- Recent tenders
 - Oleska block in Western Ukraine
 - Yuzivska block in Eastern Ukraine
 - Foros and Skifska in the Black Sea shelf
- Production Sharing agreement
 - Stabilization clause
 - Fiscal arrangements
- Need for unconventional gas regulations, to include
 - Clear, transparent and predictable regulatory framework
 - Technical standards and environmental regulations
 - Removal of two-tier natural gas prices
 - Incentives for investments in new technologies
- One-stop shop approach for hydrocarbon development

World Energy Outlook 2012

Special Report on Unconventional Gas

- Advances in technology have led to a surge in unconventional gas supply in North America
 - Intensive process, generally requiring hydraulic fracturing & more wells than conventional gas
- Many countries are lining up to emulate this success; notably in China, Australia, Europe & Latin America
- But concerns remain that production might involve unacceptable environmental & social damage
 - Major implications for local communities, land use & water resources
 - Serious hazards include the potential for air & water pollution
- Improperly addressed, these concerns threaten to hold back, & perhaps halt, the unconventional gas revolution

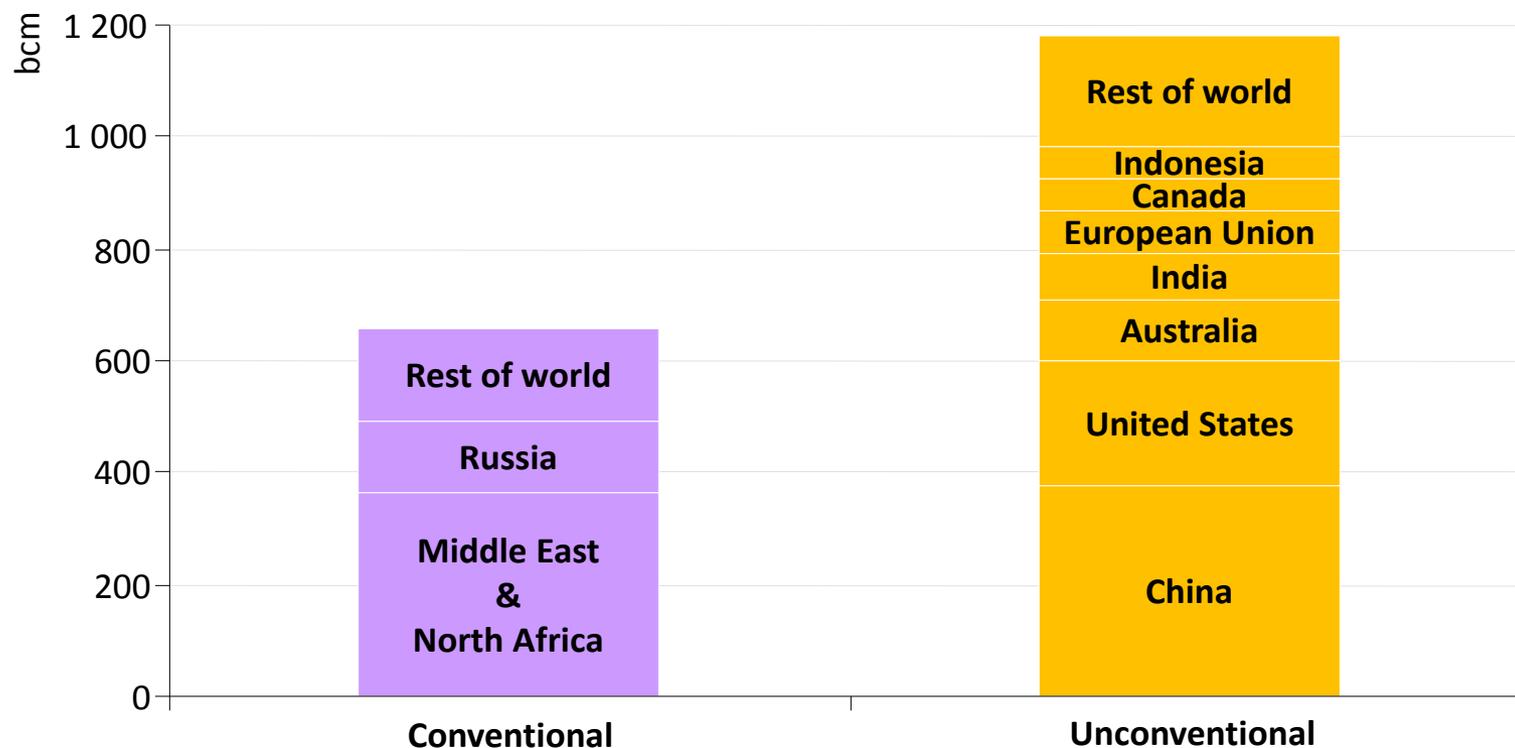
Golden Rules for a Golden Age of Gas

- The “Golden Rules” are principles that can allow governments, industry & other stakeholders to address these environmental & social impacts:
 1. Measure, disclose & engage
 2. Watch where you drill
 3. Isolate wells & prevent leaks
 4. Treat water responsibly
 5. Eliminate venting, minimise flaring & other emissions
 6. Be ready to think big
 7. Ensure a consistently high level of environmental performance

- “Golden Rules” can ensure operators have a “social license to operate”, paving the way for a golden age of gas

Fracturing the status quo

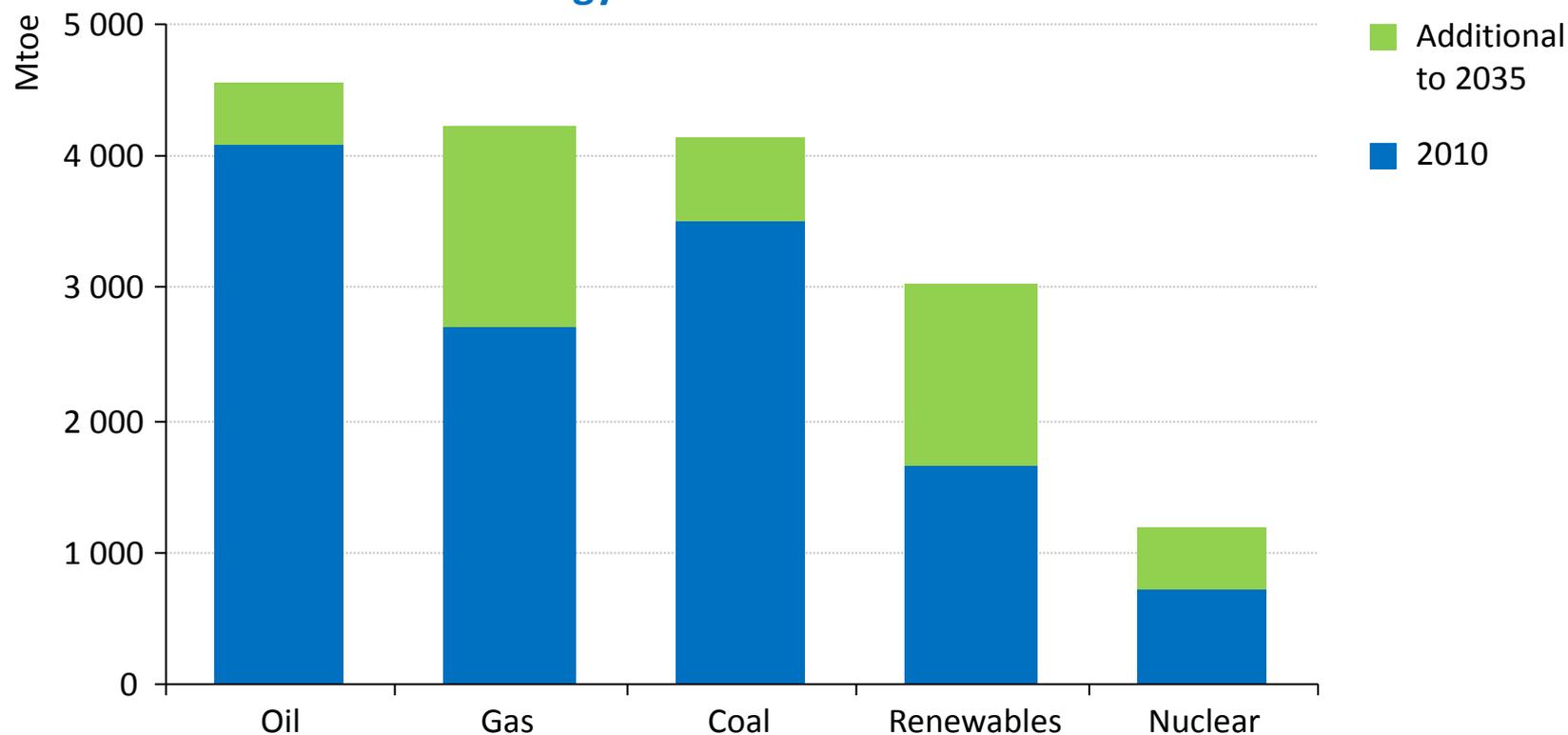
Natural gas supply growth in the Golden Rules Case, 2010-2035



Combined unconventional gas output growth from the United States, China & Australia surpasses that of all conventional producers - mainly the MENA region & Russia

Natural gas poised to enter a golden age

Global energy demand in the Golden Rules Case

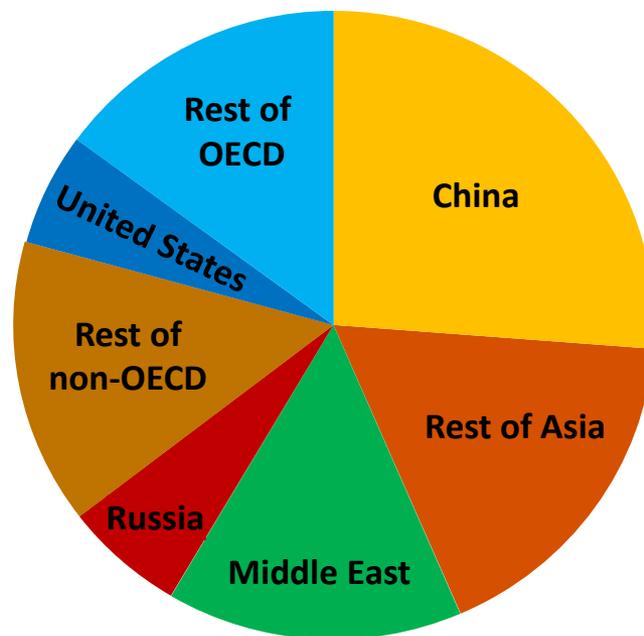


Global natural gas demand growth equals the combined increase from coal, nuclear & oil; resulting in gas overtaking coal as the second most important fuel

Emerging economies take the lead

Natural gas demand growth in the Golden Rules Case, 2010-2035

Total = 1 842 bcm

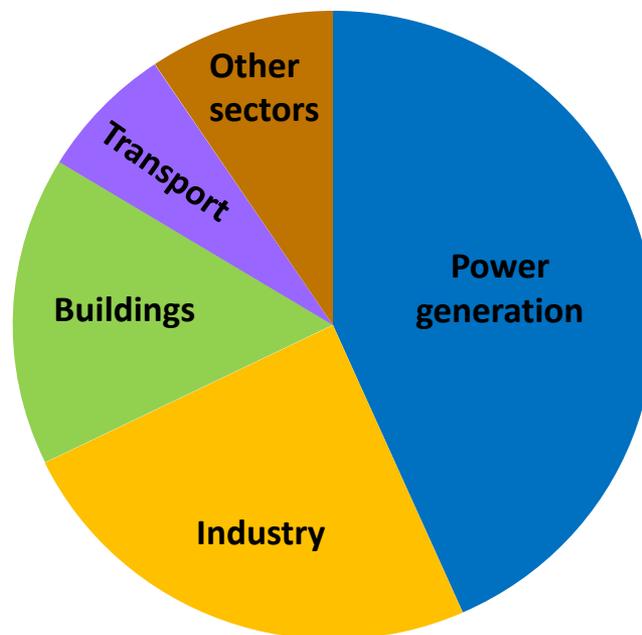


80% of growth in gas use comes from outside the OECD; chiefly in Asia & the Middle East ...

Emerging economies take the lead

Natural gas demand growth in the Golden Rules Case, 2010-2035

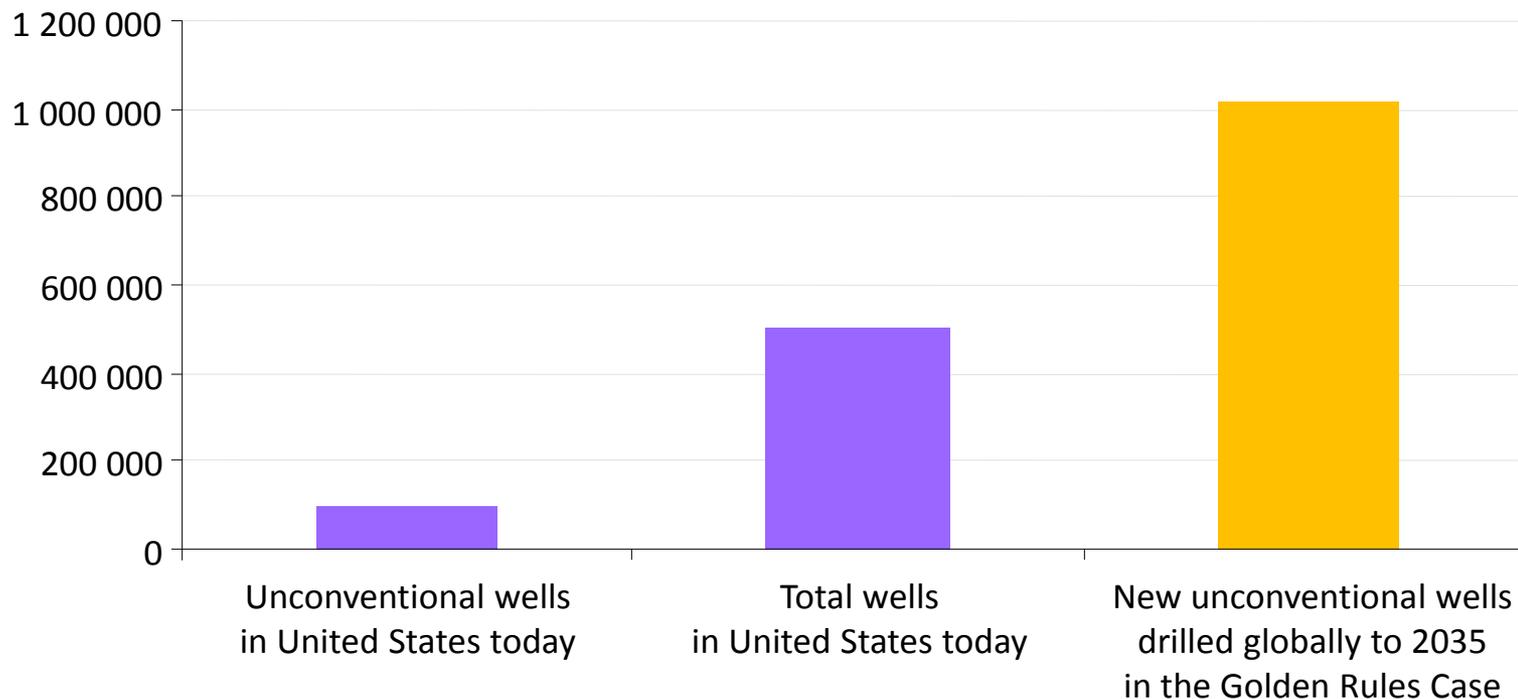
Total = 1 842 bcm



***80% of growth in gas use comes from outside the OECD; chiefly in Asia & the Middle East ...
... driven largely by demand for electricity and from industry***

A huge task for industry & regulators

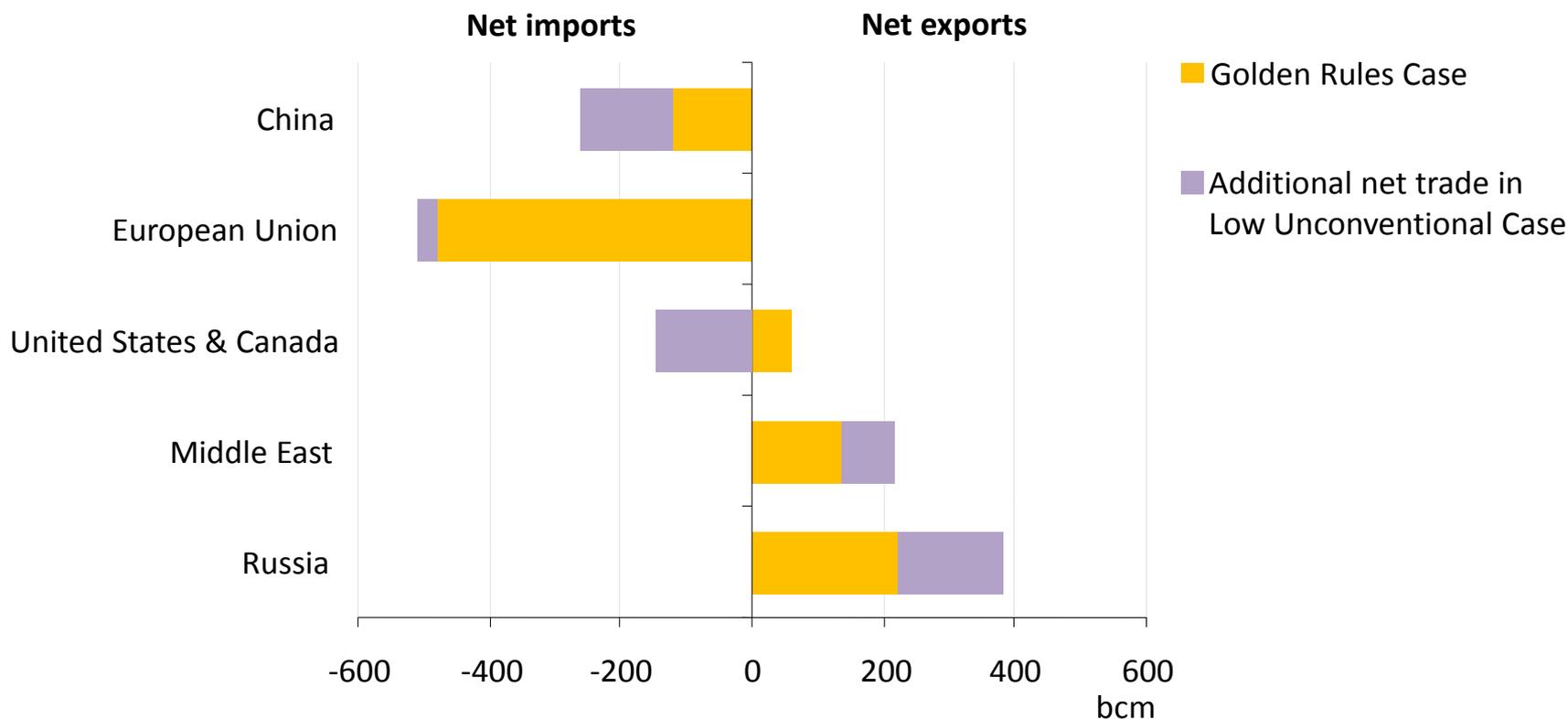
Number of gas wells



More than one million new unconventional gas wells would be needed globally to 2035: applying the “Golden Rules” could raise costs slightly, by 7% for a typical shale-gas well

What if the tide turns?

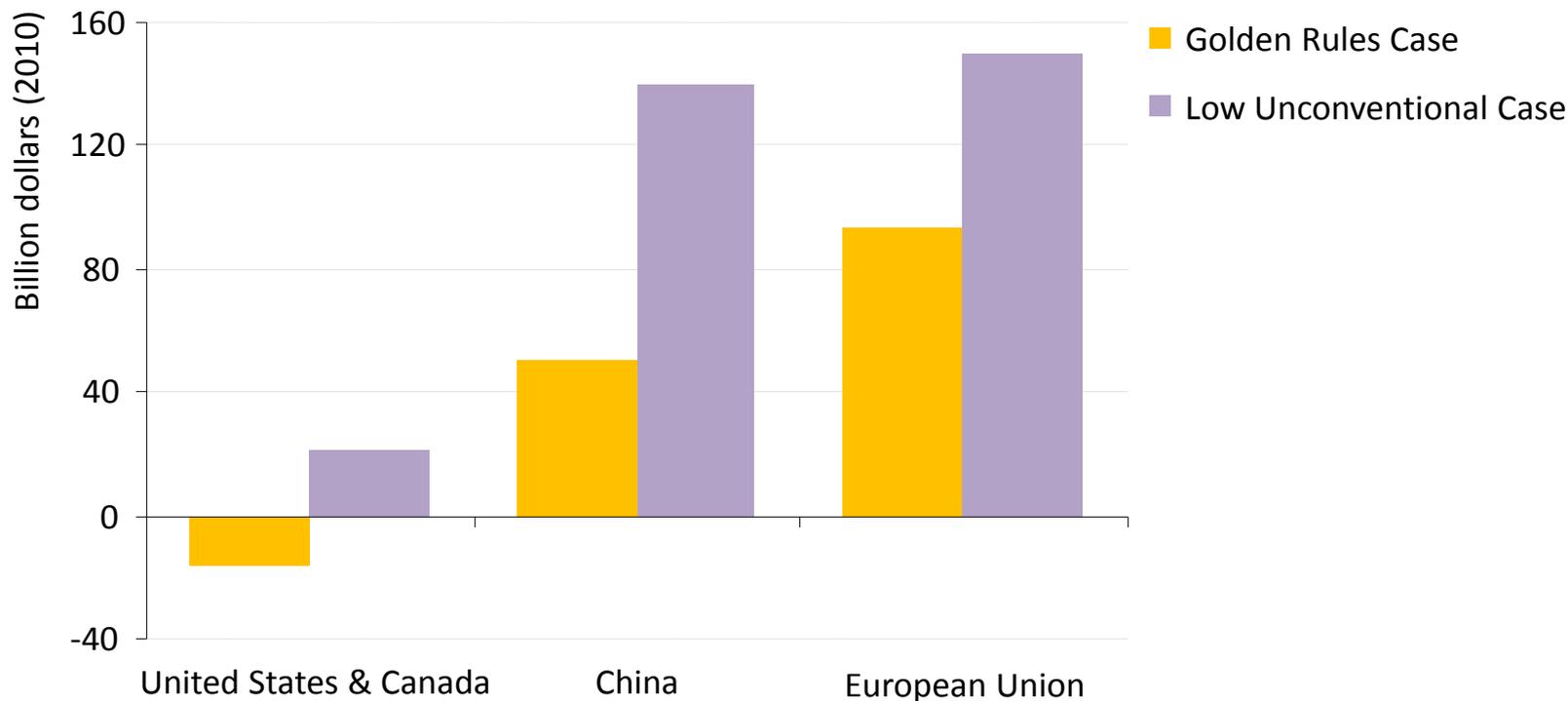
Selected natural gas trade volumes, 2035



Gas trade in the Low Unconventional Case is up 30%, some trade patterns are reversed, gas prices are higher & the position of the main conventional exporters reinforced

Economic costs & benefits

Increase in natural gas-import bills by 2035 relative to 2010

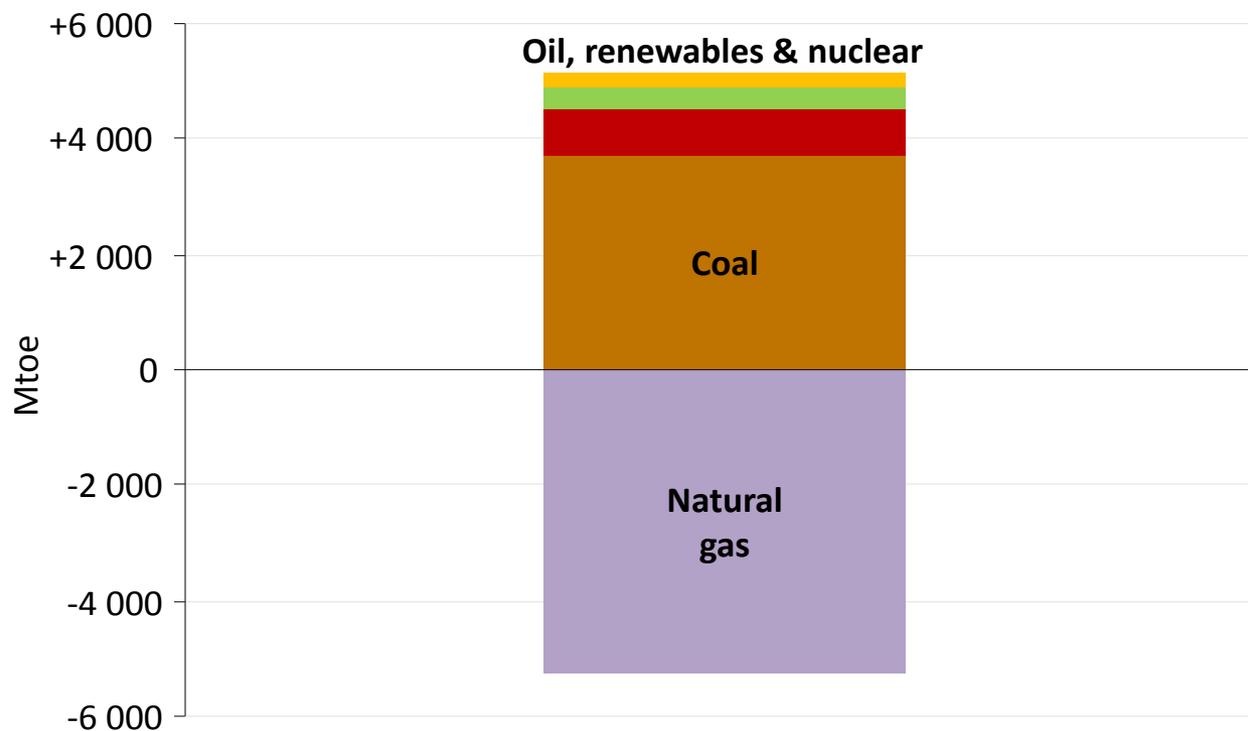


Benefits to gas importers from improved energy trade balances & lower prices disappear in a Low Unconventional Case, where worldwide gas import bills by 2035 are 60% higher

Coal fills the gap left by gas

Change in primary energy demand

in the Low Unconventional Case relative to Golden Rules Case, 2010 to 2035



Emissions are 1.3% higher in 2035 than in the Golden Rules Case, offsetting the claim that a reduction in unconventional gas output brings net environmental gains

Key messages

- The “Golden Rules” can address the environmental & social impacts of unconventional gas – making the golden age of gas a reality
- IEA stands ready to share best practice examples with Ukraine in developing its unconventional gas reserves
- Unconventional gas can transform energy markets by:
 - putting downward pressure on prices
 - broadening diversity & security of gas supply
 - Utilizing gas in moving to a low-carbon energy economy
- Continuous drive needed from governments & industry to improve performance if public confidence is to be earned or maintained

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The European
Commission
also participates
in the work
of the IEA.

Reserve Slide

IEA Members (28 countries)

