

Global Energy Dynamics: Outlook for the Future

Dr Fatih Birol
Chief Economist, IEA

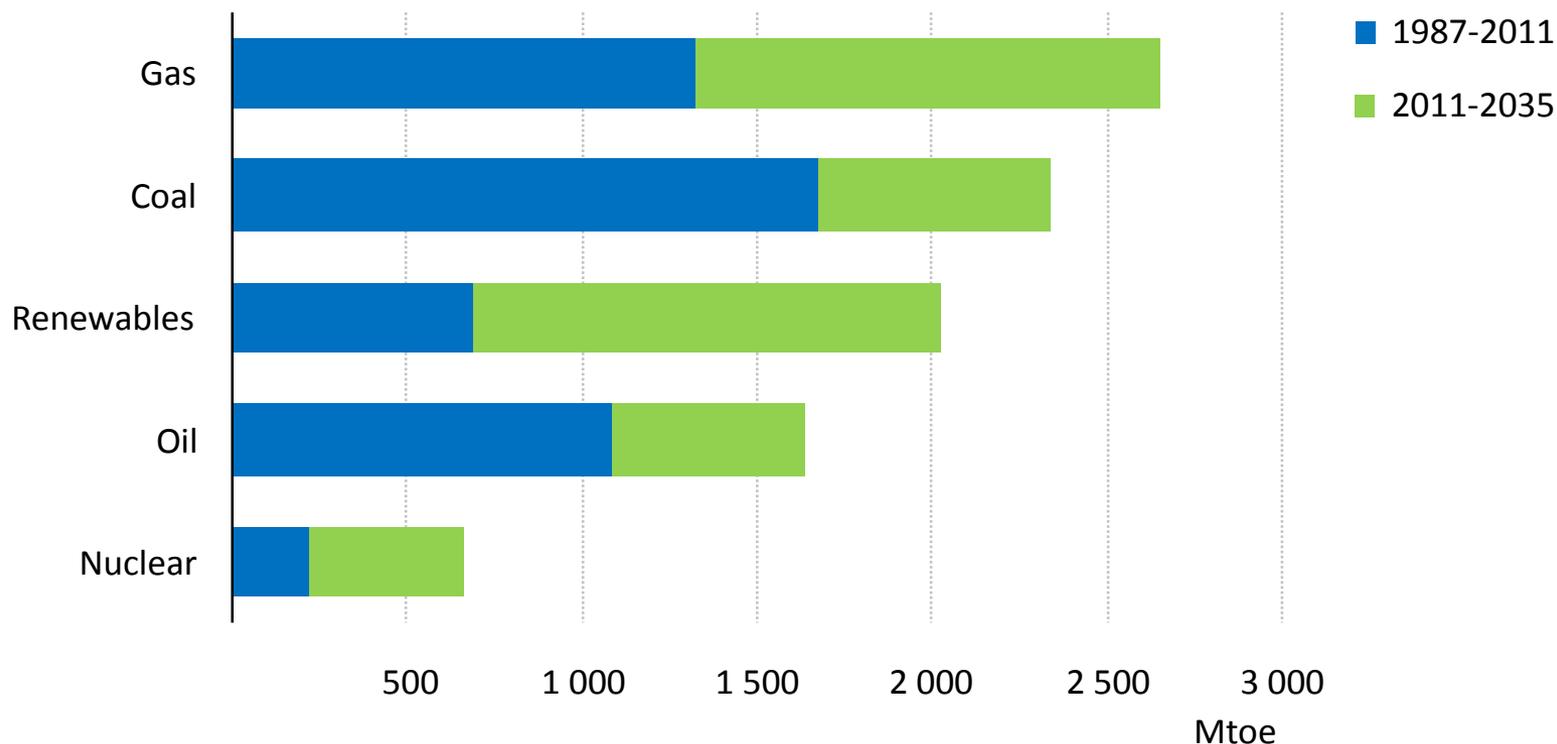
10 April 2014

The world energy scene today

- **Some long-held tenets of the energy sector are being rewritten**
 - *Countries are switching roles: importers are becoming exporters...*
 - *... and exporters are among the major sources of growing demand*
 - *New supply options re-orientate the energy trade map*
- **But long-term solutions to global challenges remain scarce**
 - *Renewed focus on energy efficiency, but CO₂ emissions continue to rise*
 - *Fossil-fuel subsidies increased to \$544 billion in 2012*
 - *1.3 billion people lack electricity*
- **Energy prices add to the pressure on policymakers**
 - *Sustained period of high oil prices without parallel in market history*
 - *Large, persistent regional price differences for gas & electricity*

The energy mix is slow to change

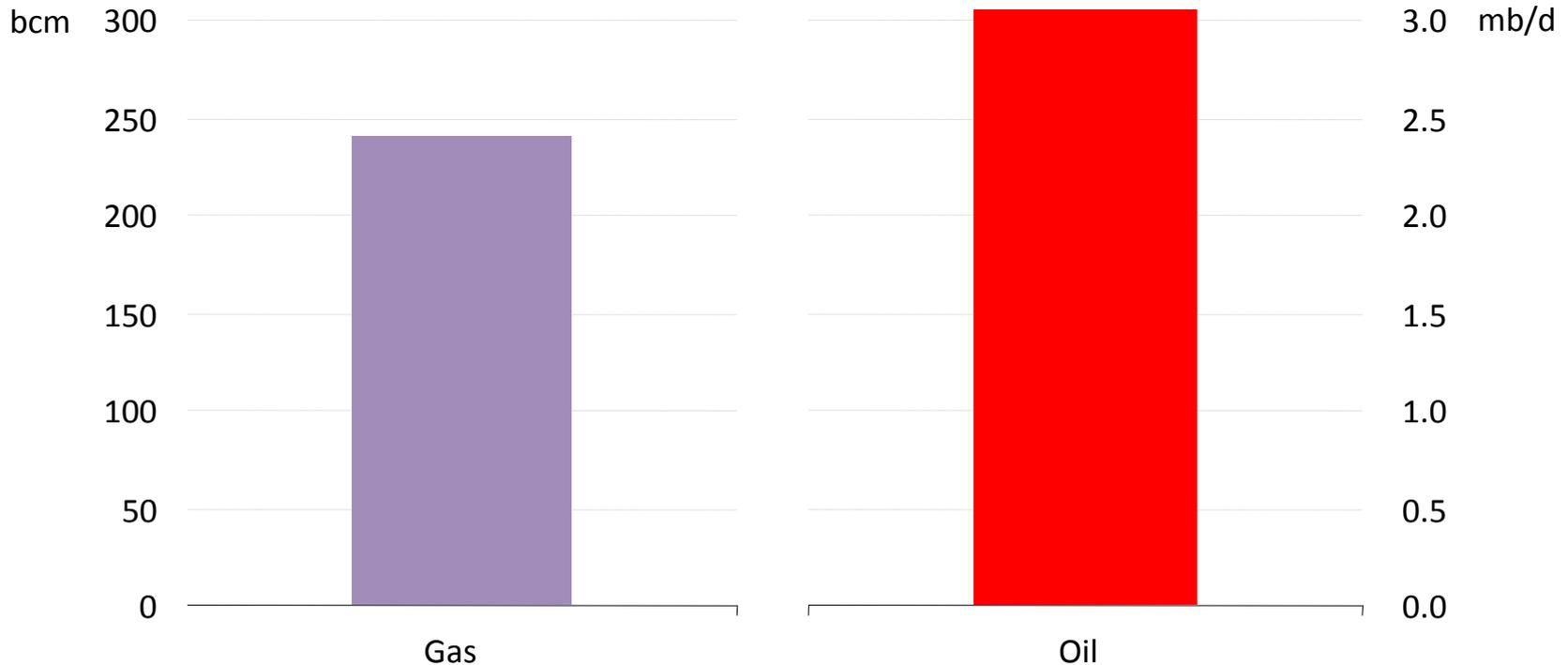
Growth in total primary energy demand



25 years ago the share of fossil fuels in the global mix was 82%; it is the same today & the strong rise of renewables in the future only reduces this to around 75% in 2035

Unconventional oil and gas has made a major contribution to global production

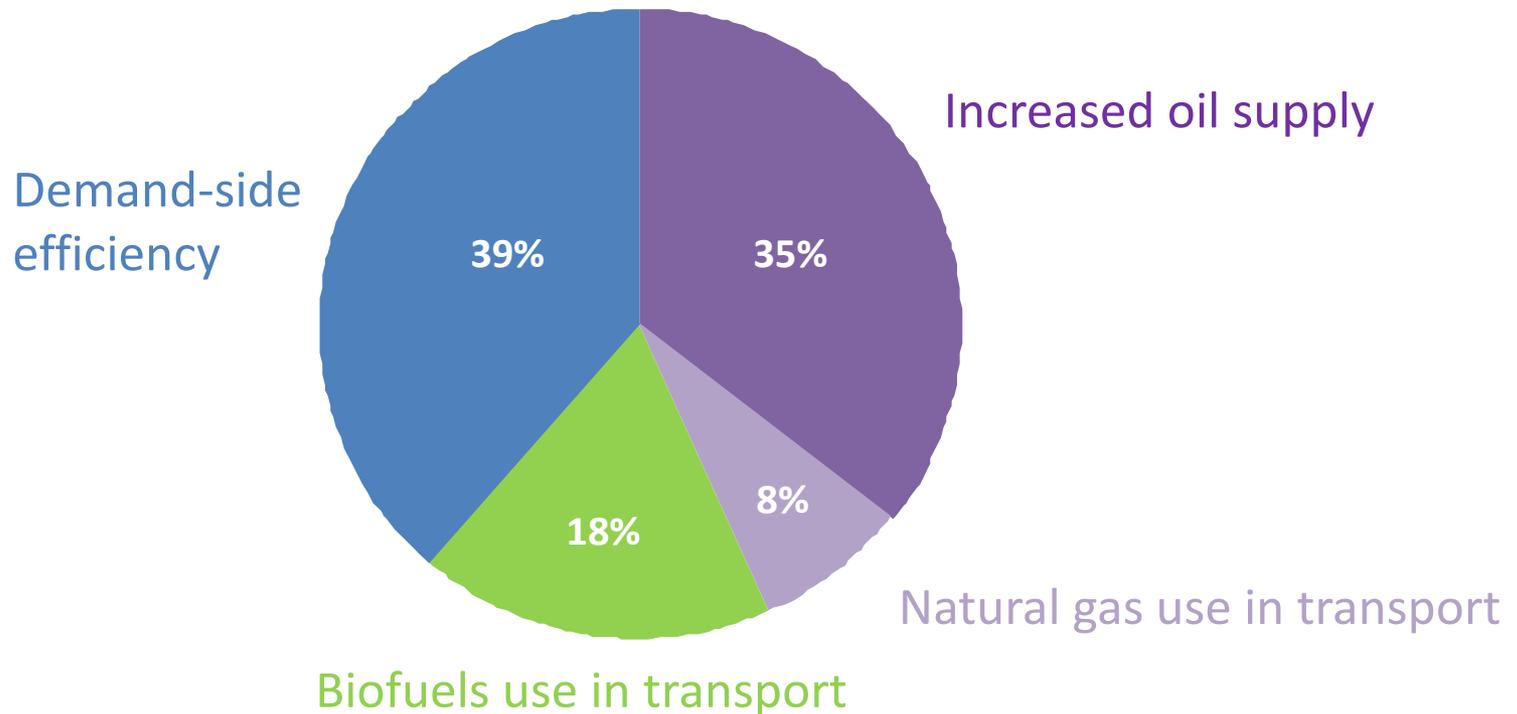
US shale gas and shale oil production increases: 2005-2014



Growth in US shale gas output since 2005 is equivalent to the total production of Qatar, Kuwait, UAE and Iraq combined; while shale oil output is equal to that of Iraq

US oil imports are shrinking rapidly – thanks to shale oil only?

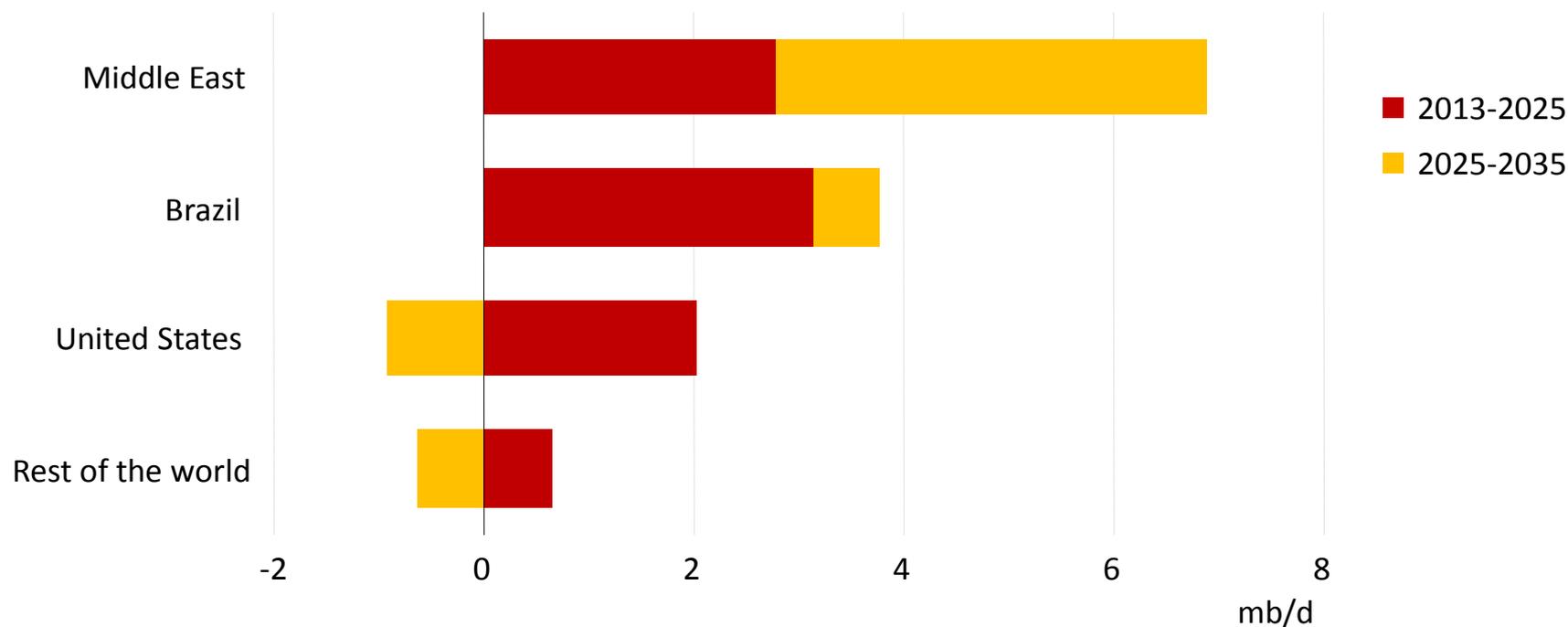
Reductions in US oil imports in 2035 relative to today



US oil imports are set to plummet due to increasing oil supplies and recently adopted policies to improve efficiency of cars and trucks

Two chapters to the oil production story

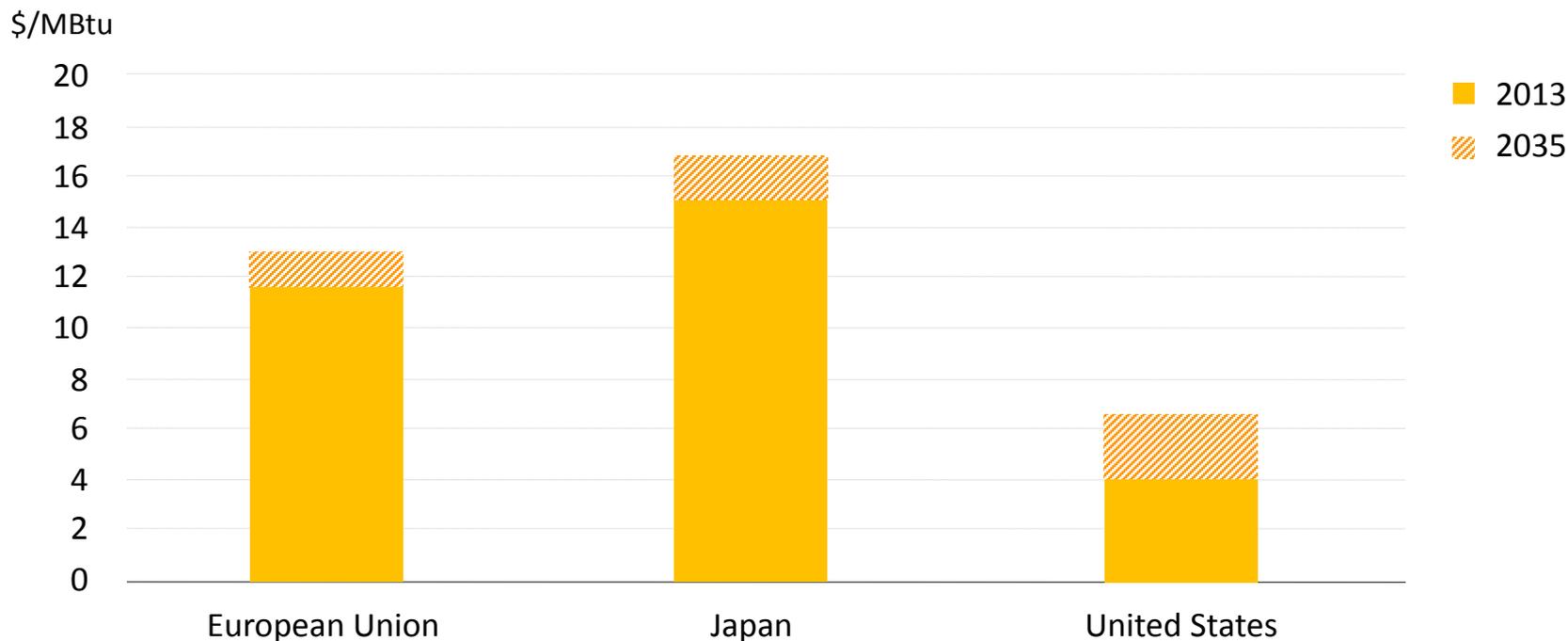
Contributions to global oil production growth



The United States (light tight oil) & Brazil (deepwater) step up until the mid-2020s, but the Middle East is critical to the longer-term oil outlook

Regional natural gas prices: who has the energy to compete?

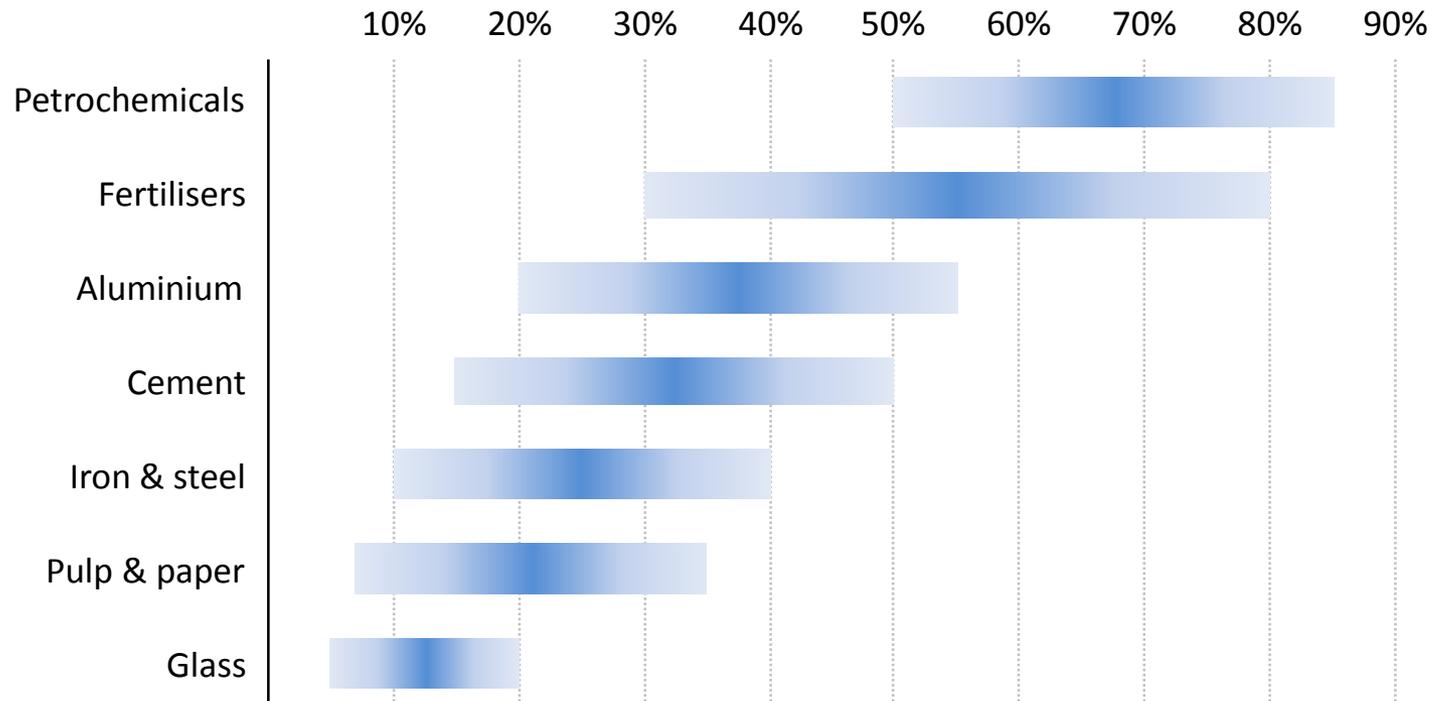
Natural gas prices by region



Regional differences in natural gas prices narrow from today's very high levels but remain large

Energy-intensive industries need to count their costs

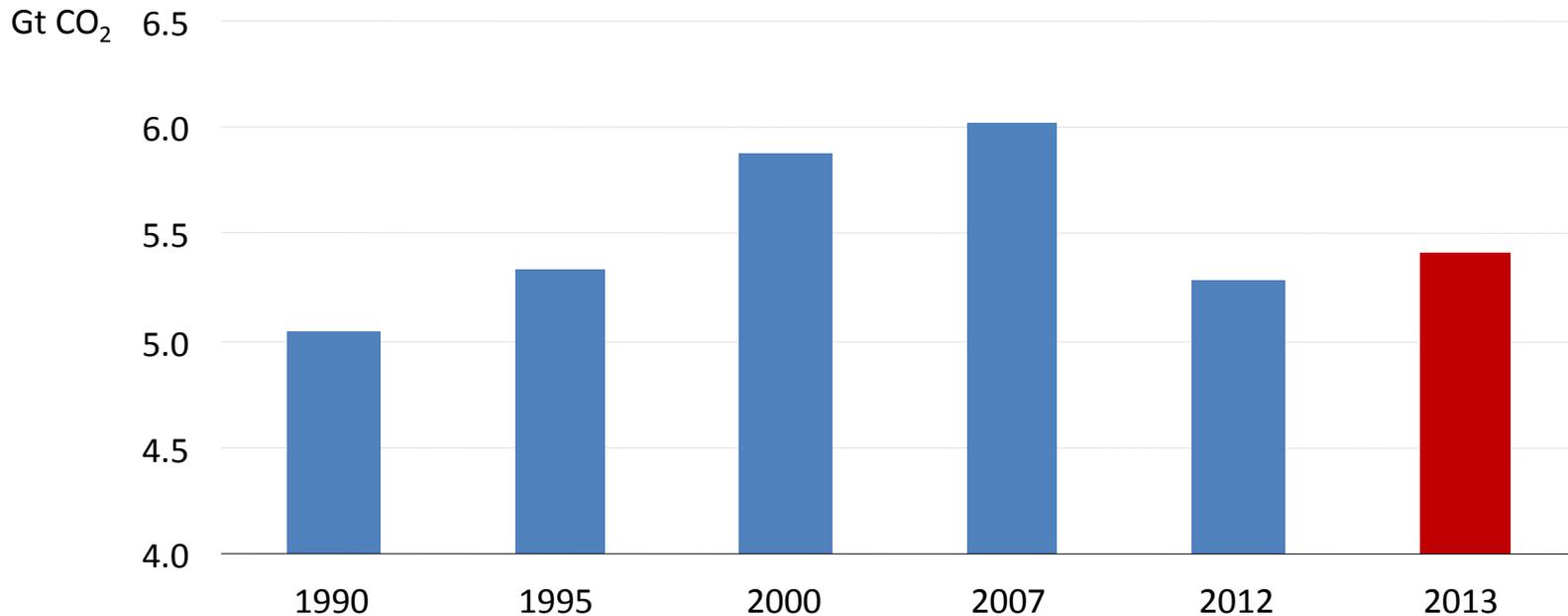
Share of energy in total production costs for selected industries



Energy-intensive sectors worldwide account for around one-fifth of industrial value added, one-quarter of industrial employment and 70% of industrial energy use.

US emissions on a downward trend

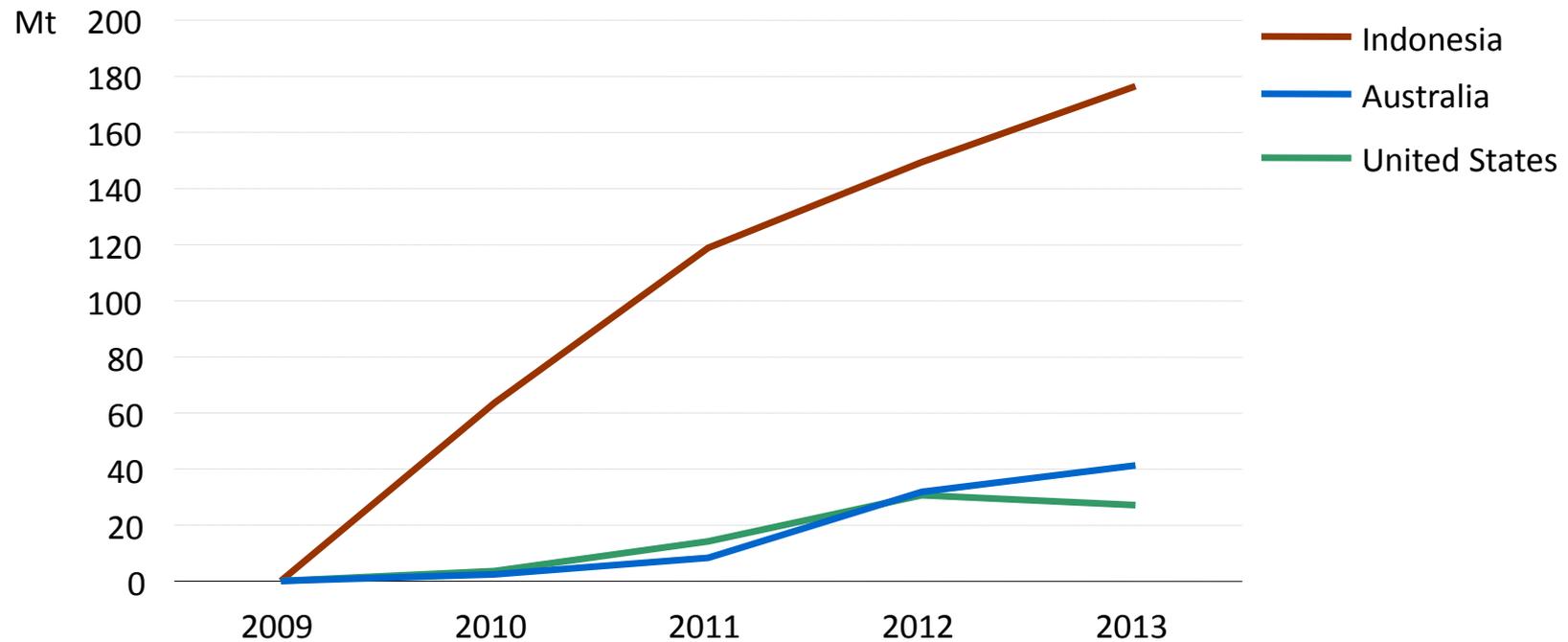
Energy-related CO₂ emissions in the United States



CO₂ emissions fell sharply since the shale gas revolution, but rebounded last year on the back of a partial gas-coal switch and increased industrial activity

Who has flooded the markets?

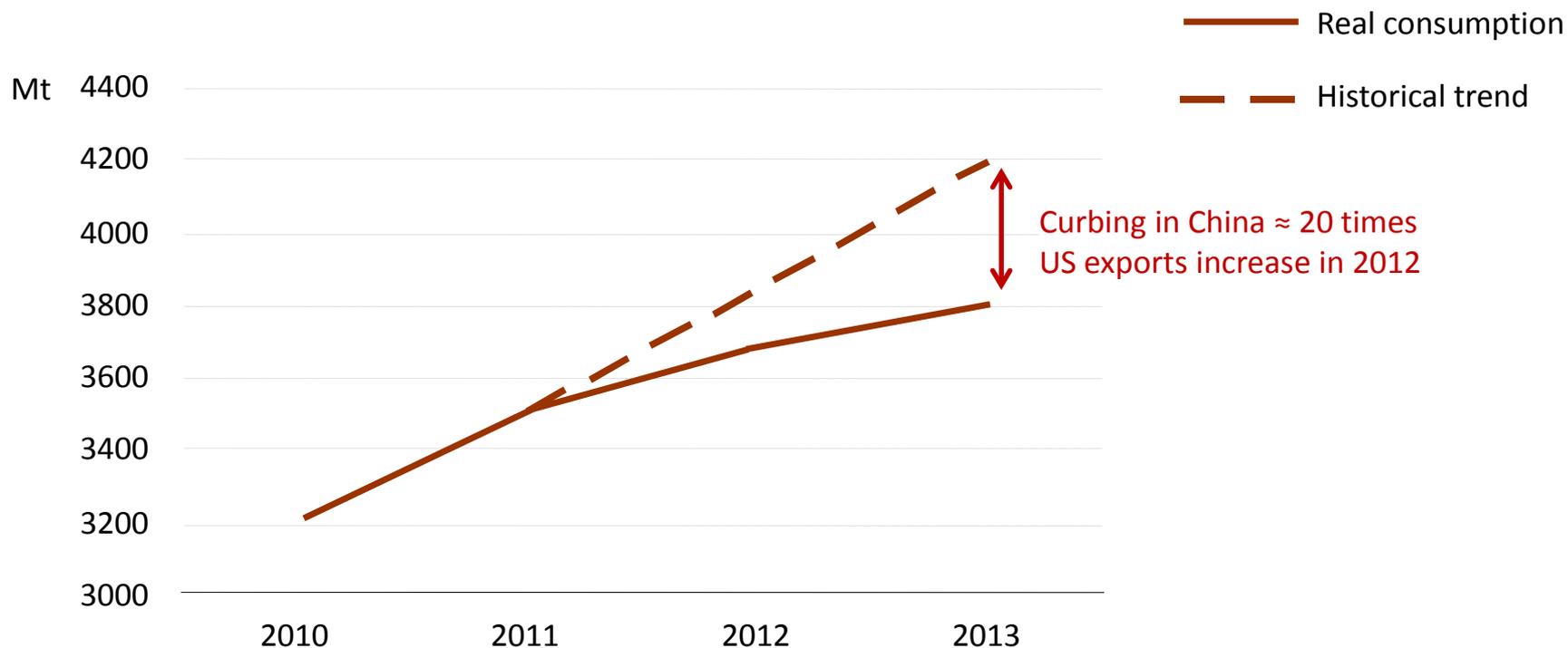
Incremental steam coal exports



The US accounted for only 7% of the increase in global steam coal exports since 2007

The slowdown in Chinese demand caught the industry off-guard

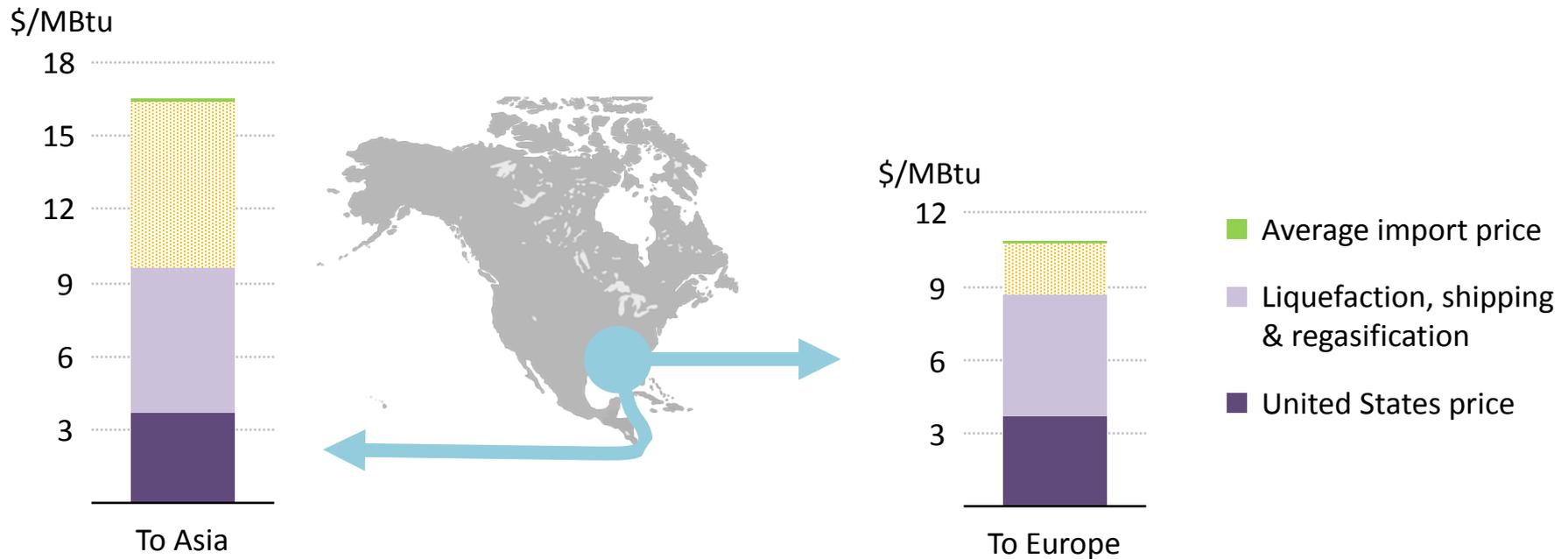
Coal demand in China: real demand vs historical trend



China's move away from coal will be a far greater determinant of the direction of the coal markets than the shale gas revolution in the US

LNG from the United States can alleviate strain on the gas markets, but is no silver bullet

Indicative economics of LNG export from the US Gulf Coast



New LNG supplies accelerate movement towards a more interconnected global market, but high costs of transport between regions mean no single global gas price

Concluding remarks

- **The shale revolution is having an unprecedented impact on the global energy landscape, economy and geopolitics**
- **While US natural gas prices may rise, large disparities between regions will persist**
- **Middle East oil will continue to be indispensable to world markets – the right signals to invest must be sent**
- **US energy policy must guard against complacency – not to forget importance of energy efficiency, nuclear power and clean coal**
- **How will the United States adapt its energy strategy and foreign policy to the reality of a richer resource base?**