International Energy Agency

WORLD ENERGY OUTLOOK

A changing global energy map

Dr. Fatih BIROL
IEA Chief Economist
Tokyo, 31 January 2013

The context

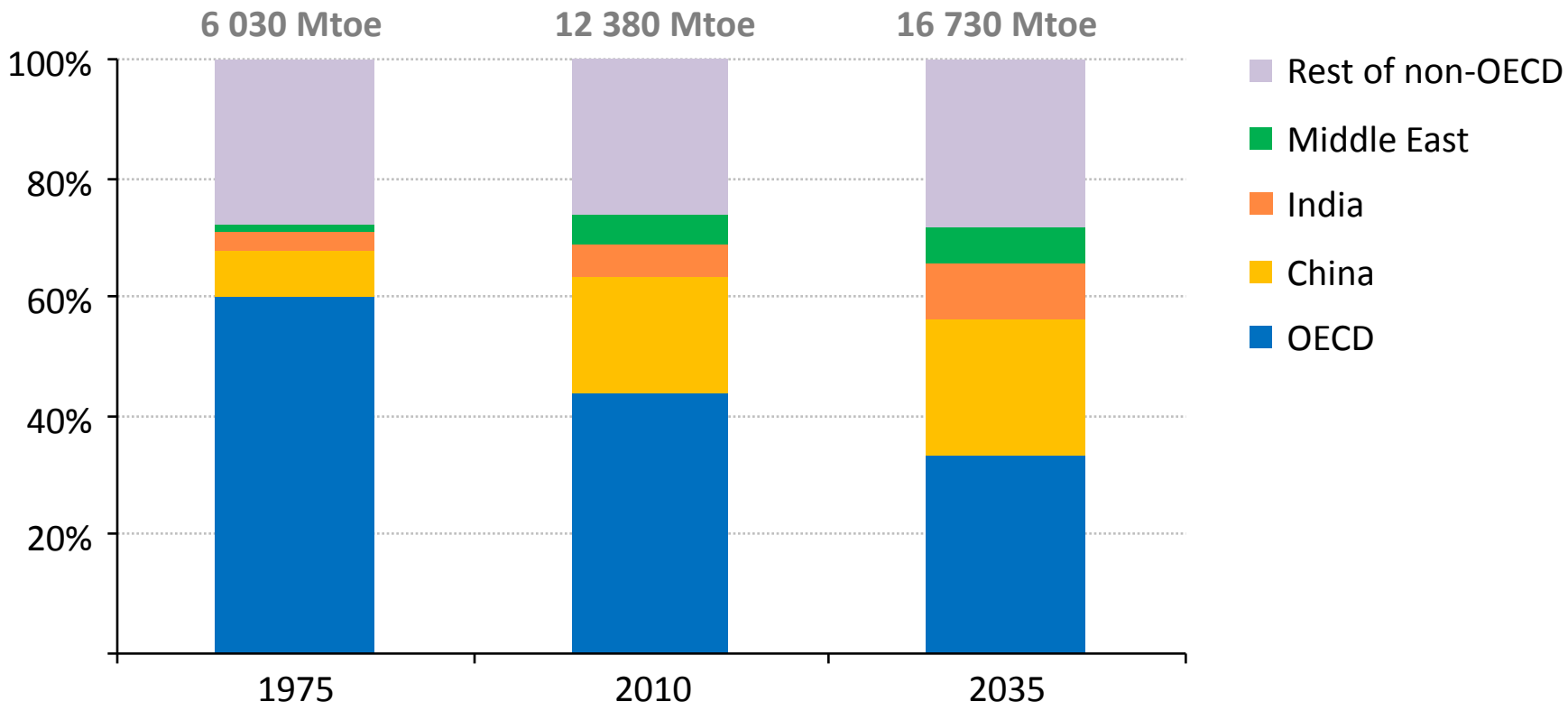
WORLD ENERGY OUTLOOK

- **Foundations of global energy system shifting**
  - *Resurgence in oil & gas production in some countries*
  - *Retreat from nuclear in some others*
  - *Signs of increasing policy focus on energy efficiency*
- **All-time high oil prices acting as brake on global economy**
  - *Divergence in natural gas prices affecting Europe (with prices 5-times US levels) and Asia (8-times)*
- **Symptoms of an unsustainable energy system persist**
  - *Fossil fuel subsidies up almost 30% to $523 billion in 2011, led by MENA*
  - *CO_2 emissions at record high, while renewables industry under strain*
  - *Despite new international efforts, 1.3 billion people still lack electricity*
  - *Water increasingly crucial for assessing the viability of energy projects*

Emerging economies steer energy markets

WORLD ENERGY OUTLOOK

Share of global energy demand

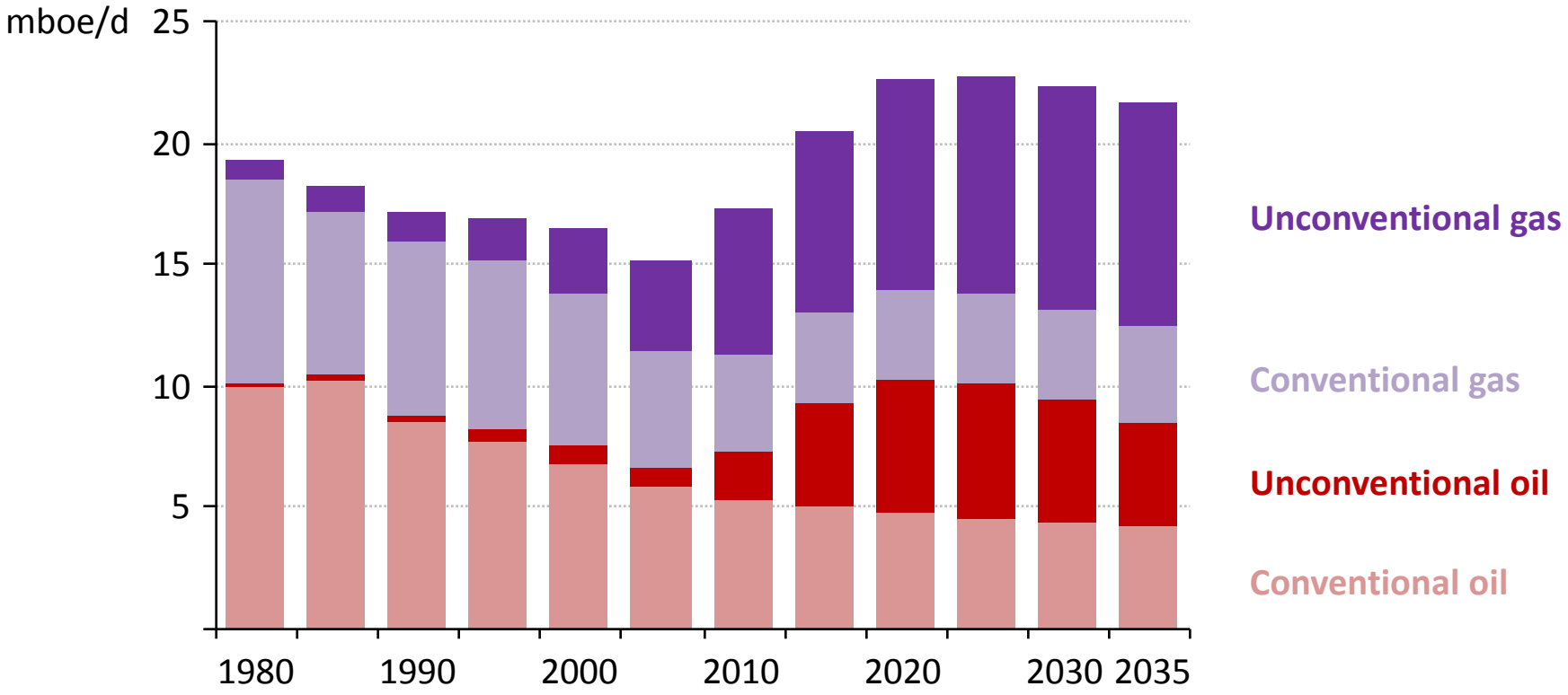


Global energy demand rises by over one-third in the period to 2035, underpinned by rising living standards in China, India & the Middle East

A United States oil & gas transformation

WORLD ENERGY OUTLOOK

US oil and gas production

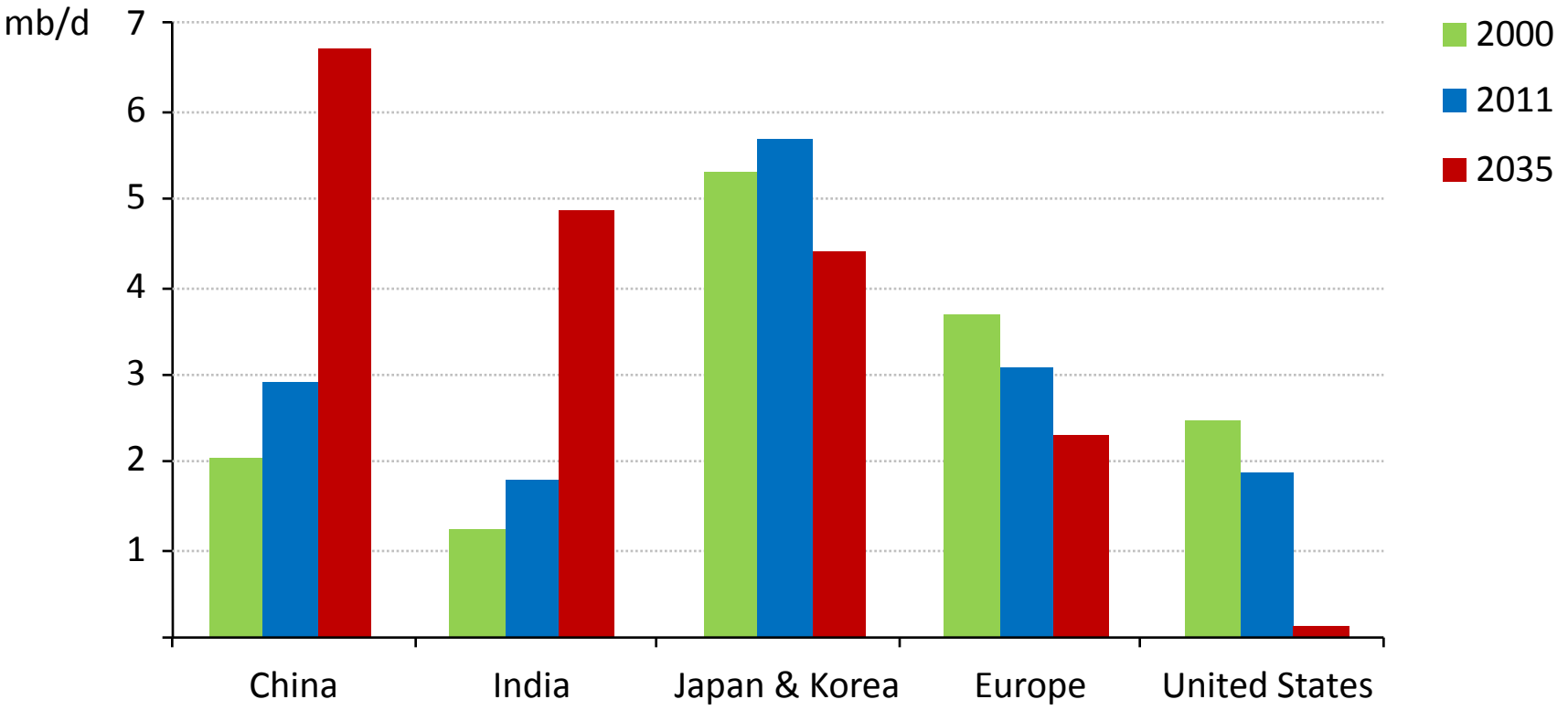


The surge in unconventional oil & gas production has implications well beyond the United States

Middle East oil to Asia: a new silk road

WORLD ENERGY OUTLOOK

Middle East oil export by destination

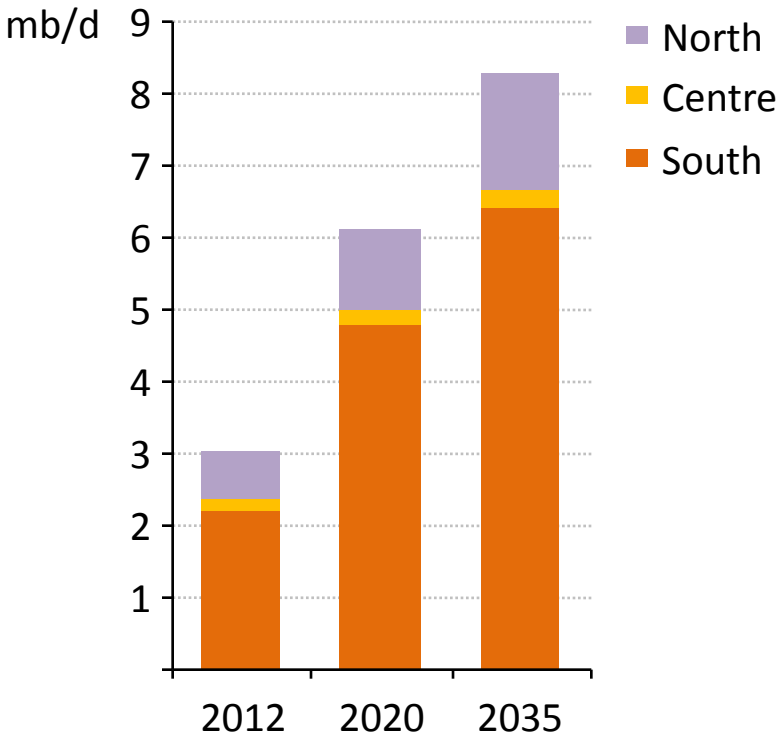


By 2035, almost 90% of Middle Eastern oil exports go to Asia; North America's emergence as a net exporter accelerates the eastward shift in trade

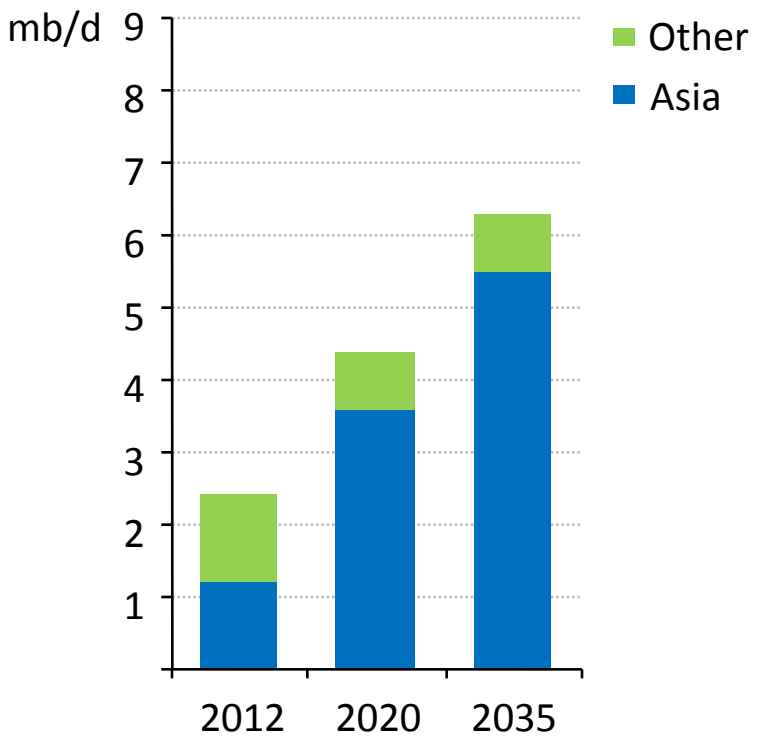
Iraq oil poised for a major expansion

WORLD ENERGY OUTLOOK

Iraq oil production



Iraq oil exports

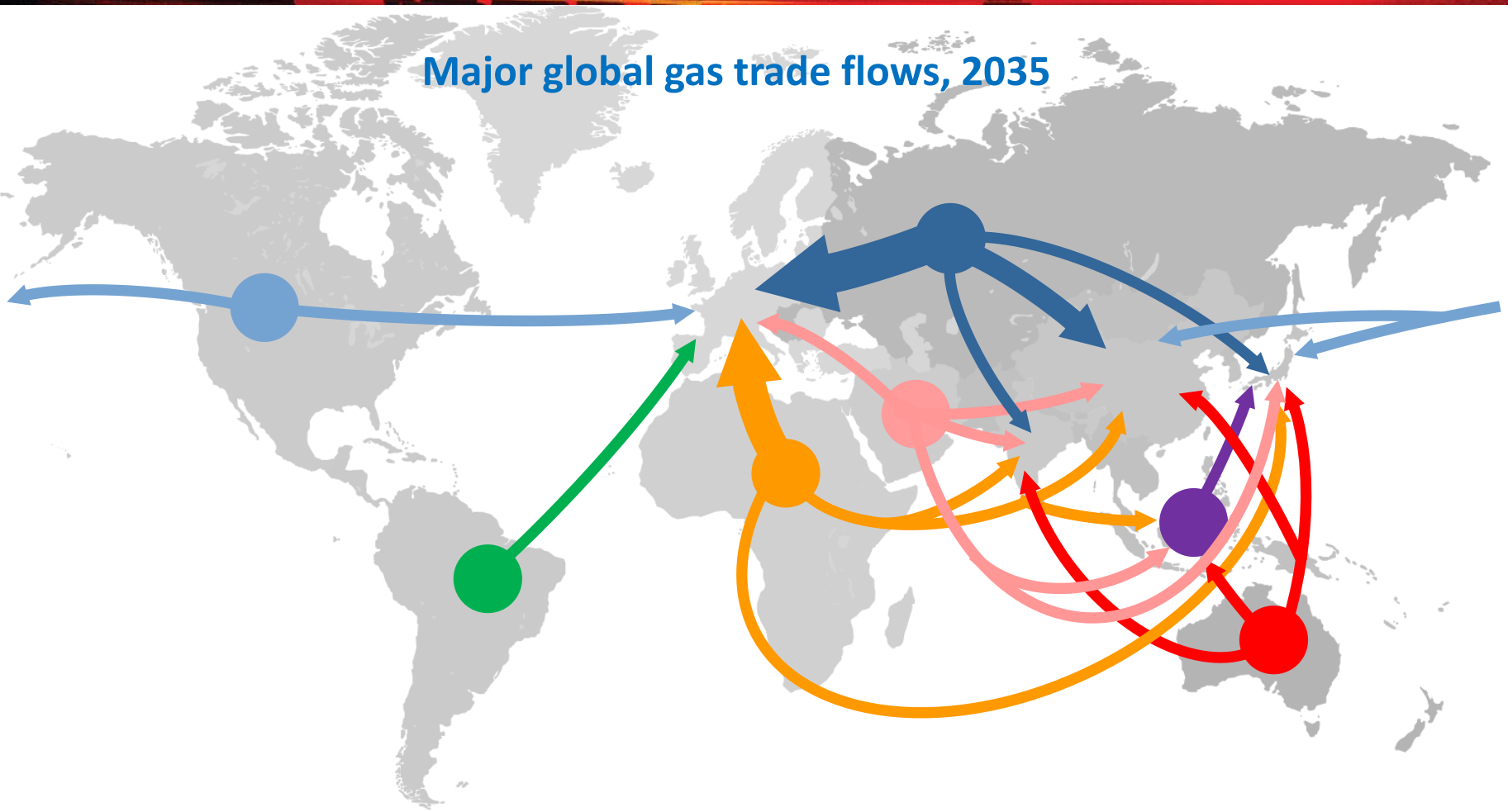


Iraq accounts for 45% of the growth in global production to 2035; by the 2030s it becomes the second-largest global oil exporter, overtaking Russia

Natural gas: towards a globalised market

WORLD ENERGY OUTLOOK

Major global gas trade flows, 2035

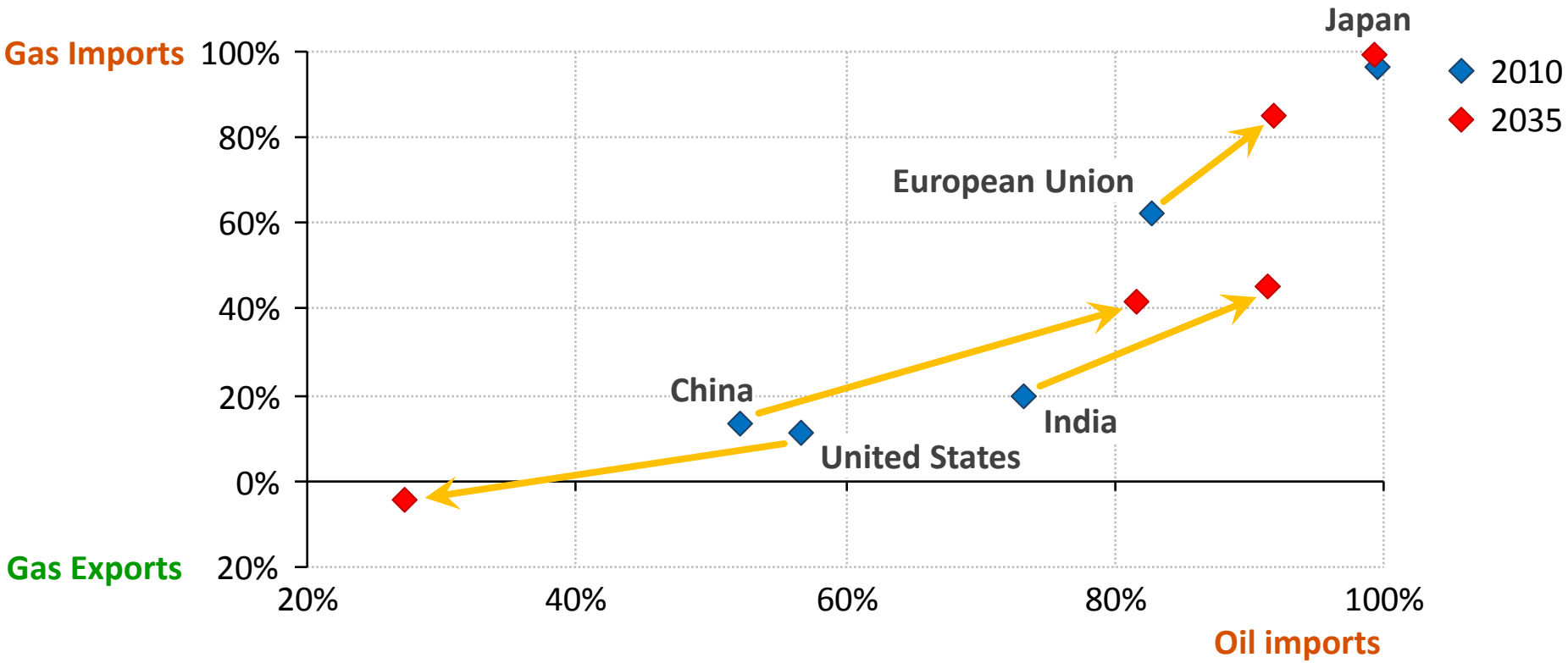


Rising supplies of unconventional gas & LNG help to diversify trade flows, putting pressure on conventional gas suppliers & oil-linked pricing mechanisms

Different trends in oil & gas import dependency

WORLD ENERGY OUTLOOK

Net oil & gas import dependency in selected countries

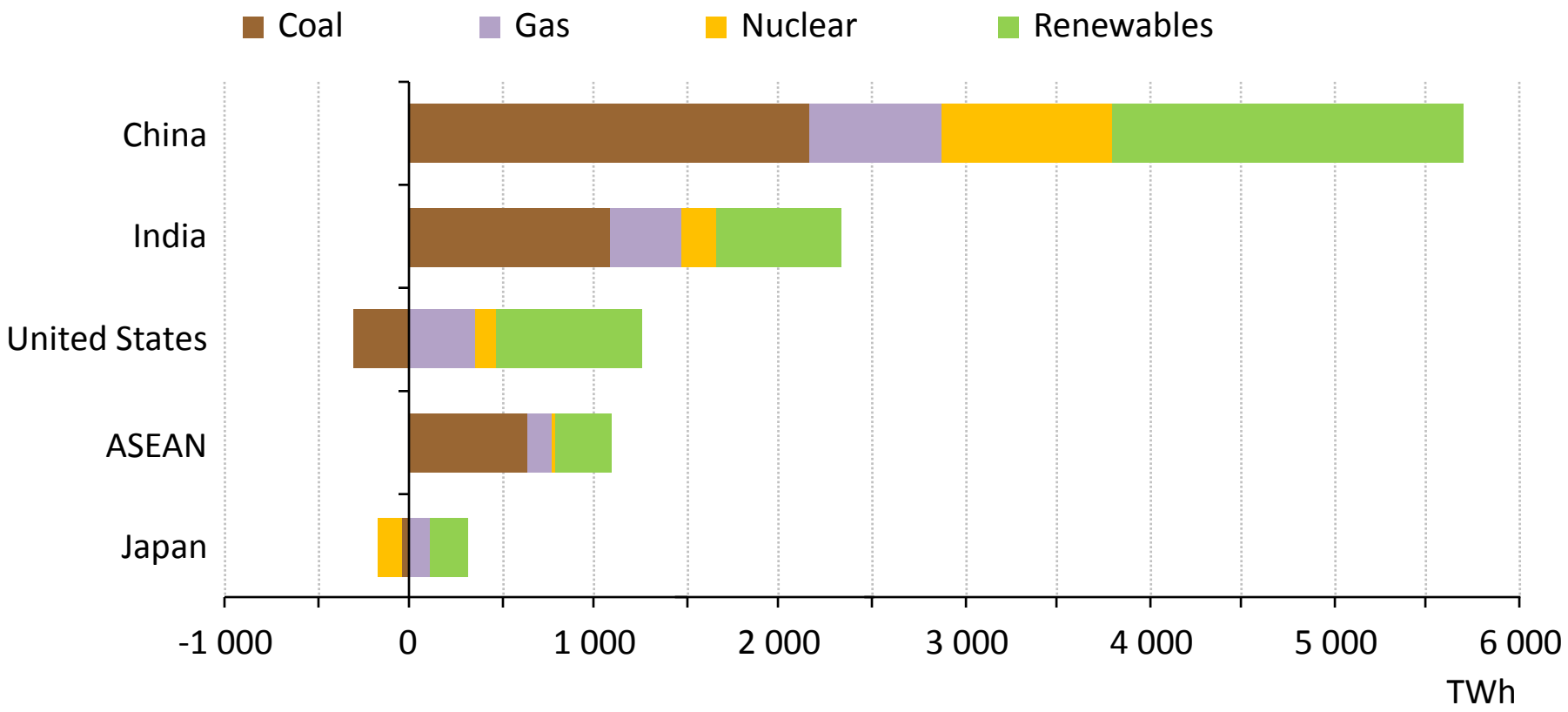


While dependence on imported oil & gas rises in many countries, the United States swims against the tide

A power shift to emerging economies

WORLD ENERGY OUTLOOK

Change in power generation, 2010-2035

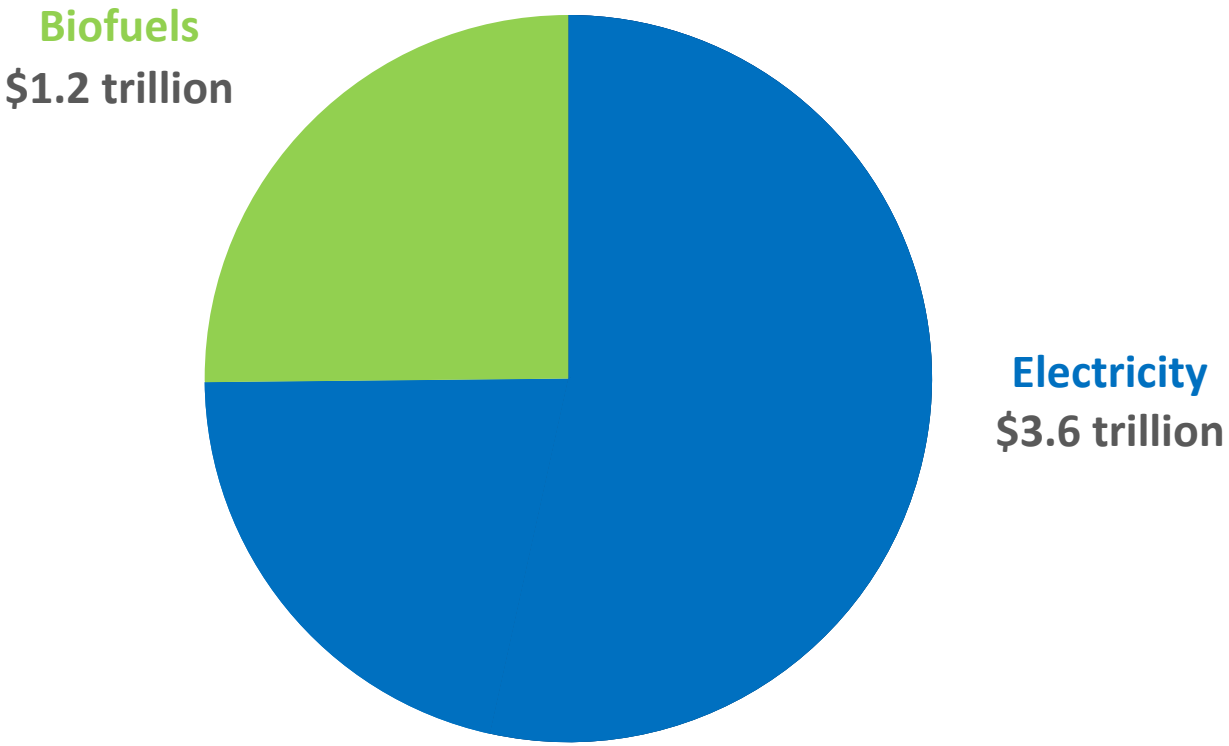


The need for electricity in emerging economies drives a 70% increase in worldwide demand, with renewables accounting for half of new global capacity

The multiple benefits of renewables come at a cost

WORLD ENERGY OUTLOOK

Global renewable energy subsidies of $4.8 trillion, 2011-2035

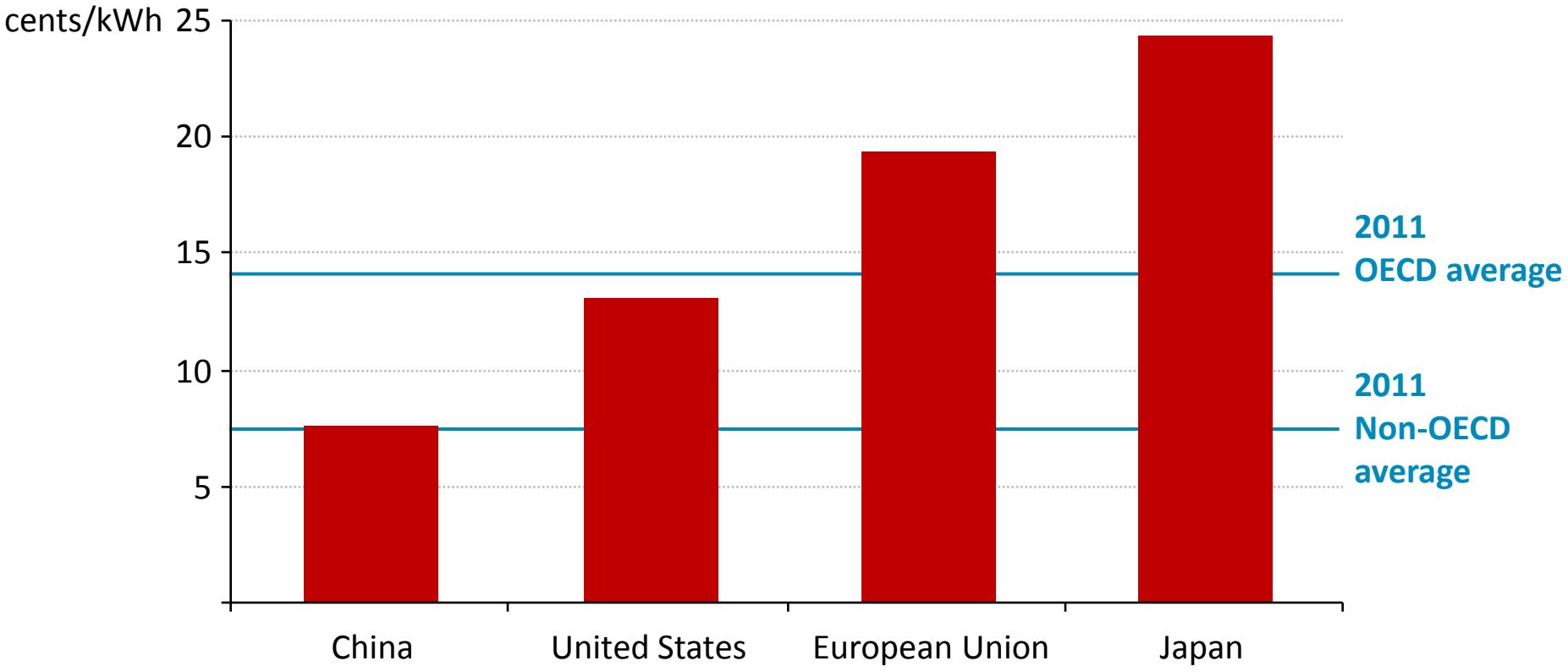


Renewable subsidies were $88 billion in 2011; over half the subsidies required to 2035 has been committed to existing projects or is needed to meet 2020 targets

Wide variations in the price of power

WORLD ENERGY OUTLOOK

Average household electricity prices, 2035

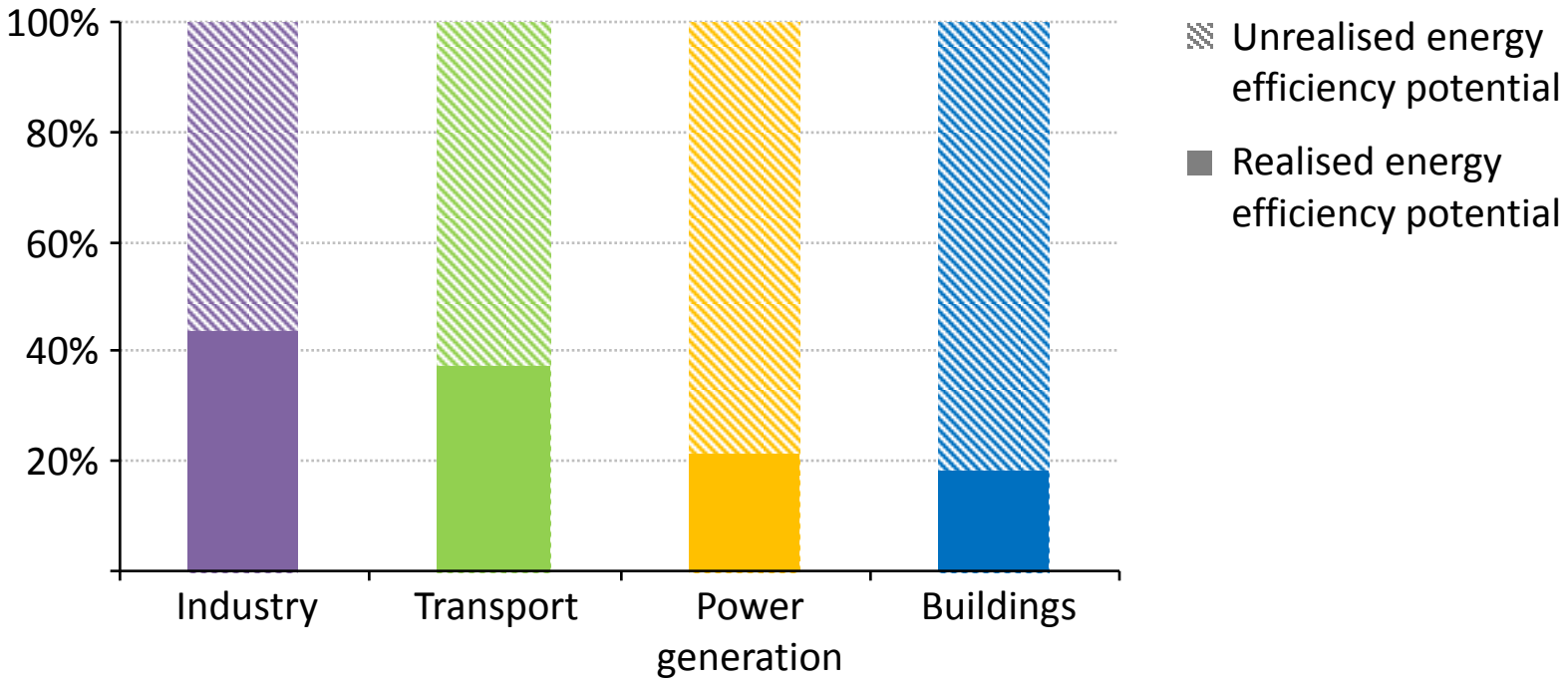


Electricity prices are set to increase with the highest prices persisting in the European Union & Japan, well above those in China & the United States

Energy efficiency: a huge opportunity going unrealised

WORLD ENERGY OUTLOOK

Energy efficiency potential used by sector in the New Policies Scenario

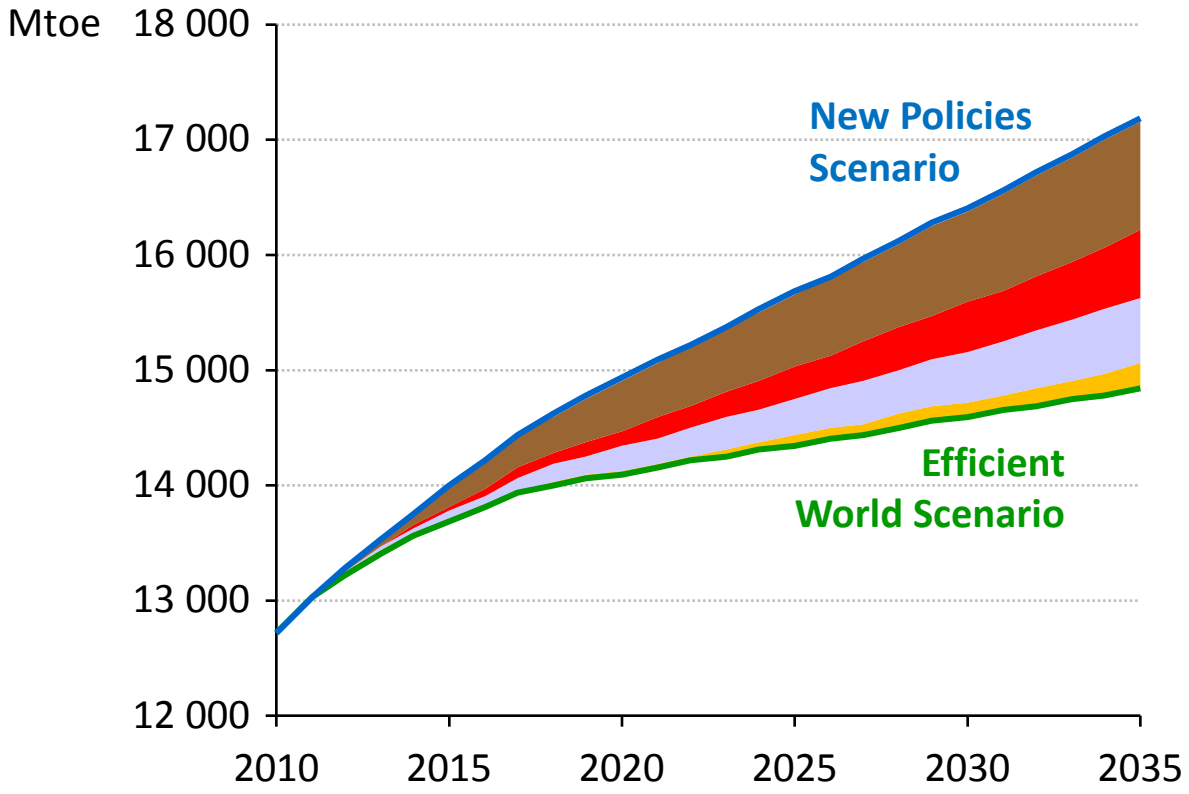


Two-thirds of the economic potential to improve energy efficiency remains untapped in the period to 2035

The Efficient World Scenario: a blueprint for an efficient world

WORLD ENERGY OUTLOOK

Total primary energy demand



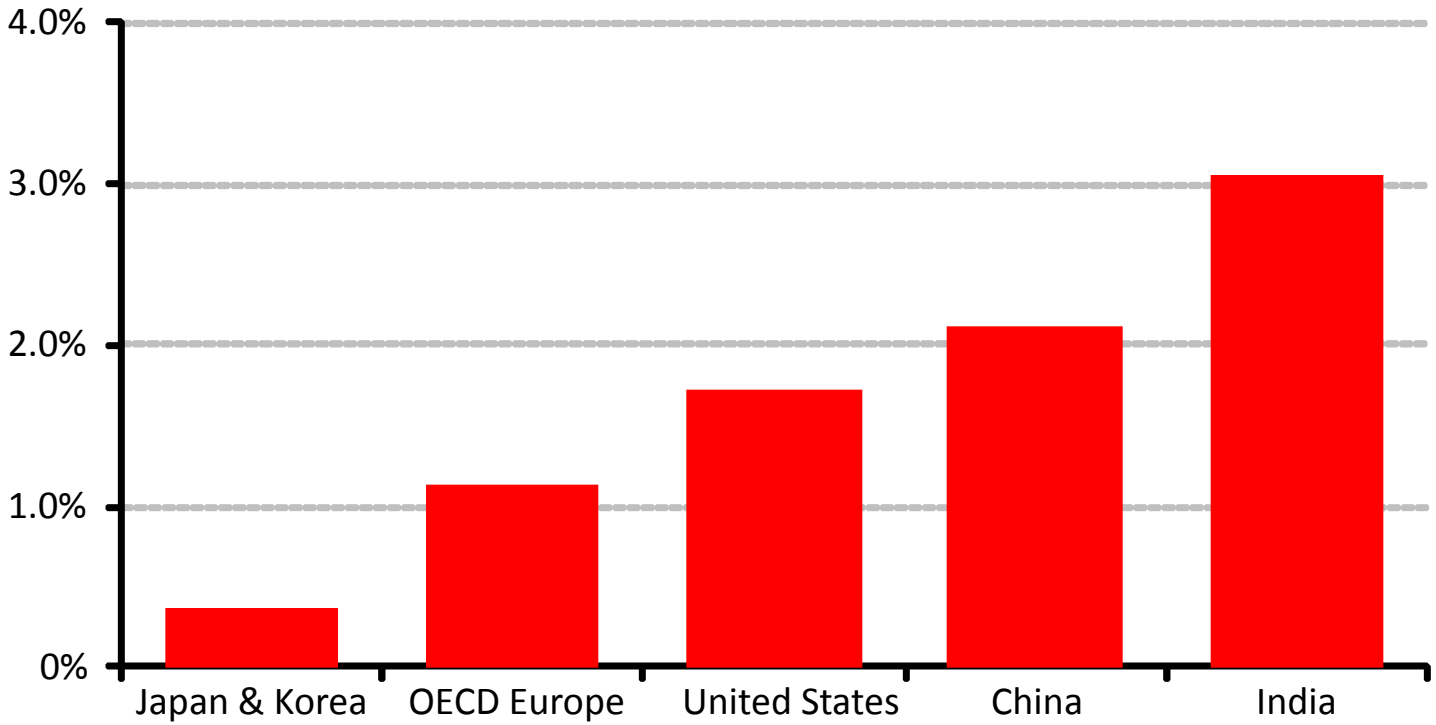
Reduction in 2035		
Coal	1 350	Mtce
Oil	12.7	mb/d
Gas	680	bcm
Others	250	Mtoe

Economically viable efficiency measures can halve energy demand growth to 2035; oil prices are $15 per barrel lower by 2035 due to oil demand savings

Energy efficiency can help drive economic prosperity

WORLD ENERGY OUTLOOK

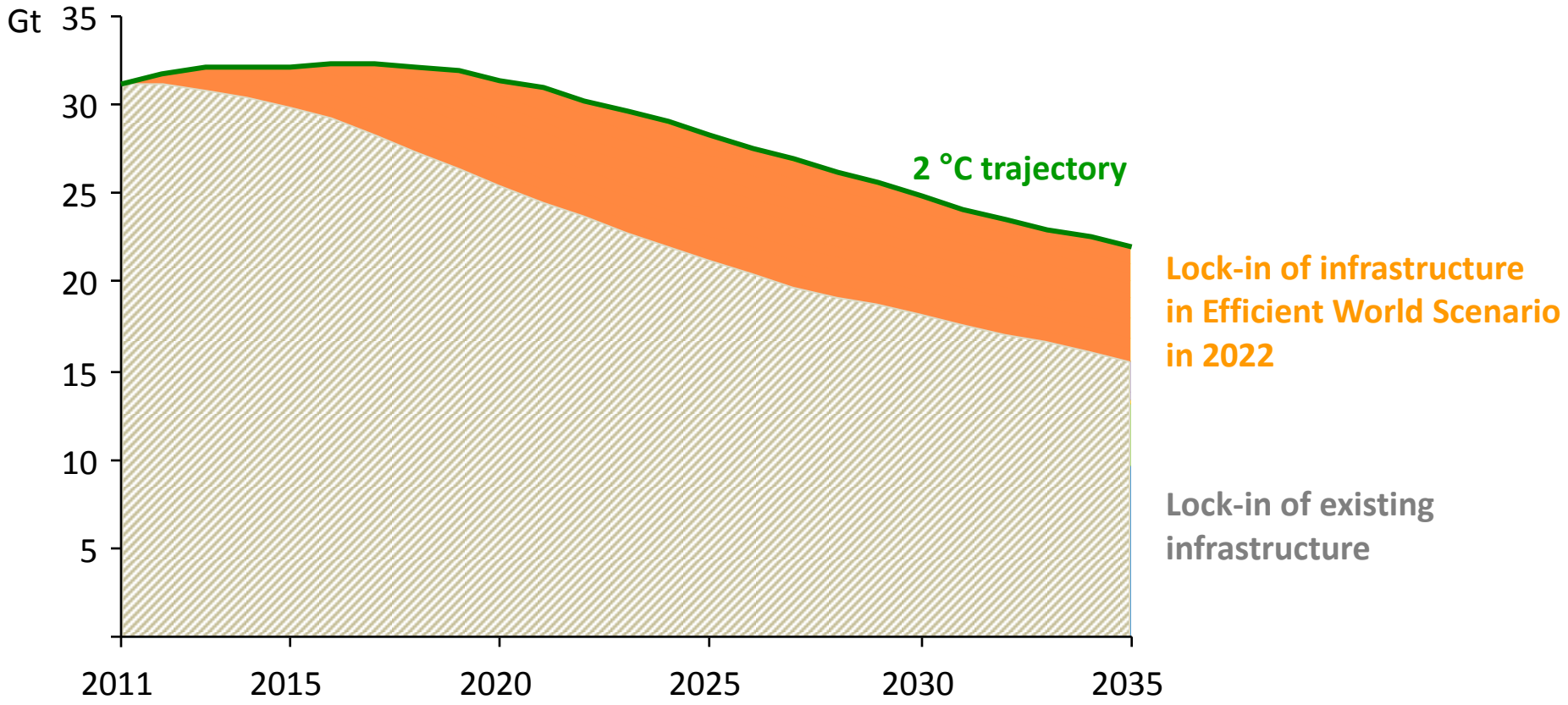
GDP in Efficient World Scenario versus New Policies Scenario, 2035



Cumulative investments in energy efficiency of $12 trillion are more than offset by fuel savings & trigger economic growth of a cumulative $18 trillion

The Efficient World Scenario delays carbon lock-in

WORLD ENERGY OUTLOOK



Energy efficiency can delay "lock-in" of CO_2 emissions permitted under a 2 °C trajectory – which is set to happen in 2017 – until 2022, buying five extra years

Foundations of energy system shifting

WORLD ENERGY OUTLOOK

- Policy makers face critical choices in reconciling energy, environmental & economic objectives
- Changing outlook for energy production & use may redefine global economic & geopolitical balances
- Iraq set to play a pivotal role in global oil markets
- As climate change slips off policy radar, the “lock-in” point moves closer & the costs of inaction rise
- The gains promised by energy efficiency are within reach & are essential to underpin a more secure & sustainable energy system