

N. Tanaka & J. Corben  
Washington, 8 June 2011

**ARE WE ENTERING A GOLDEN AGE OF GAS?**

*Special Report*

**WORLD  
ENERGY  
OUTLOOK**

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- **Mounting worries over energy security & climate change**
  - *Policy uncertainty favours gas*
- **Renewed debate surrounding nuclear power**
- **A transformation of natural gas markets is underway**
  - *The North American shale gas boom is spreading*
  - *Dramatic & continuing expansion of LNG trade*
- **Increasing concerns about local pollution in emerging economies**



# Are we entering a Golden Age of Gas ?

## ■ Objectives of the report:

- *Examine factors that could result in a more prominent role for gas*
- *Assess implications for all fuels, energy security & climate change*

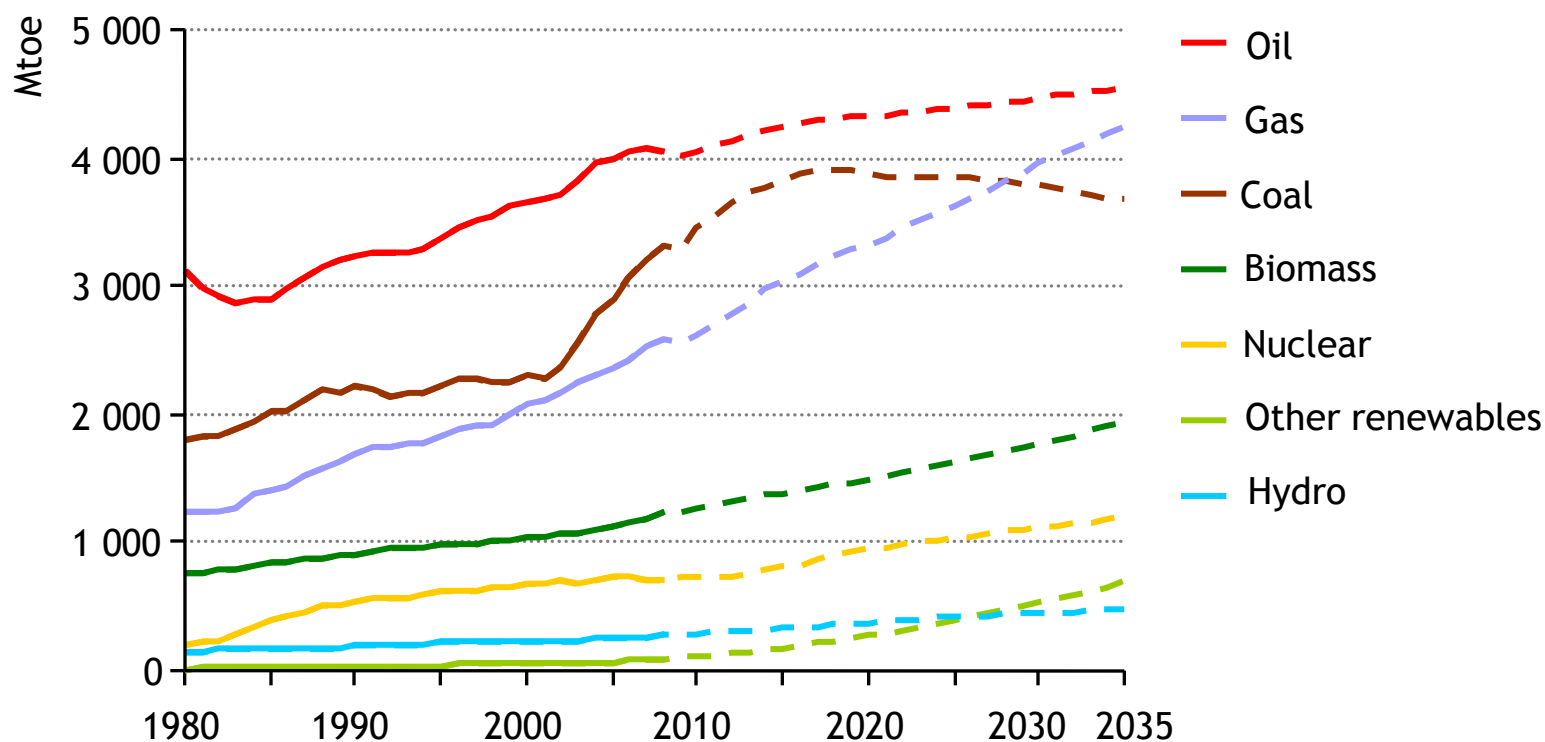
## ■ Key drivers of the *GAS Scenario*

- *Widespread development of unconventional gas*
- *Lower gas prices*
- *Gas targets in China's 12<sup>th</sup> Five-Year Plan*
- *Reduced growth of nuclear energy*
- *Increased deployment of natural gas vehicles*

## ■ *WEO-2010* New Policies Scenario serves as benchmark for comparison

# Gas grows nearly twice as fast as total energy.....

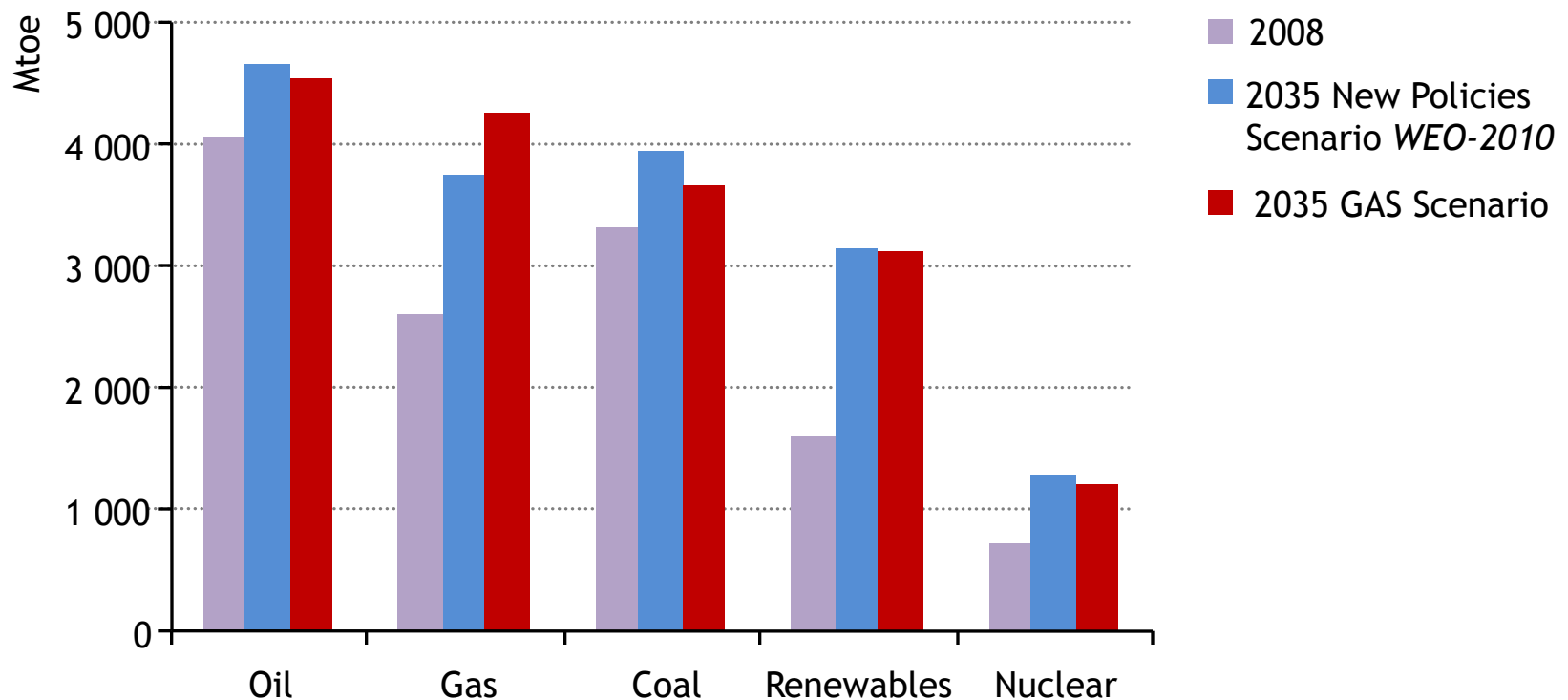
**World primary energy demand by fuel in the GAS Scenario**



***Gas overtakes coal before 2030 and meets one quarter of global energy demand by 2035  
– demand grows by 2% annually, compared with just 1.2% for total energy***

.....mainly displacing coal

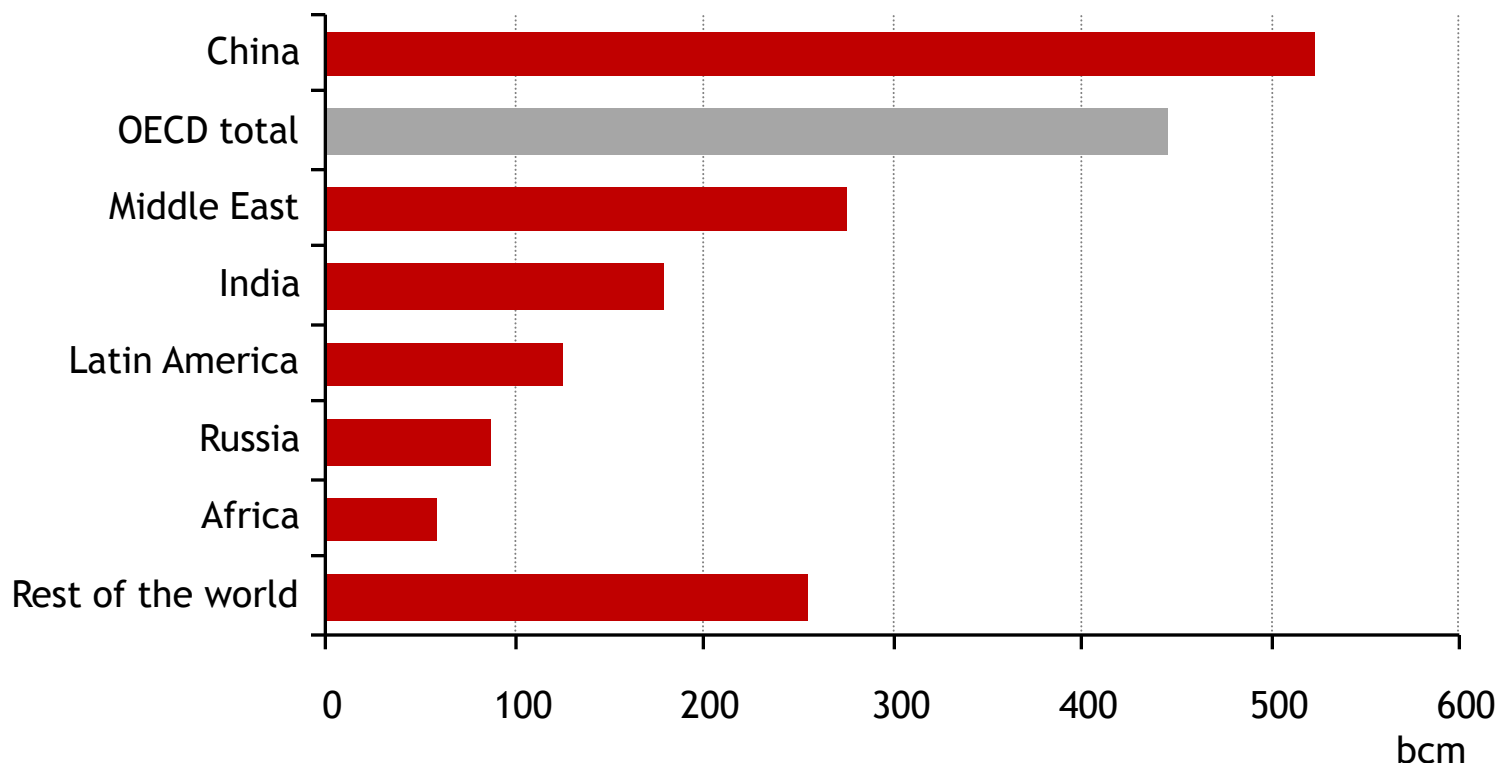
**World primary energy demand by fuel and scenario**



***Gas demand in 2035 is 13% higher than in the New Policies Scenario, while demand for coal, nuclear & oil declines***

# Consumption grows most in developing economies

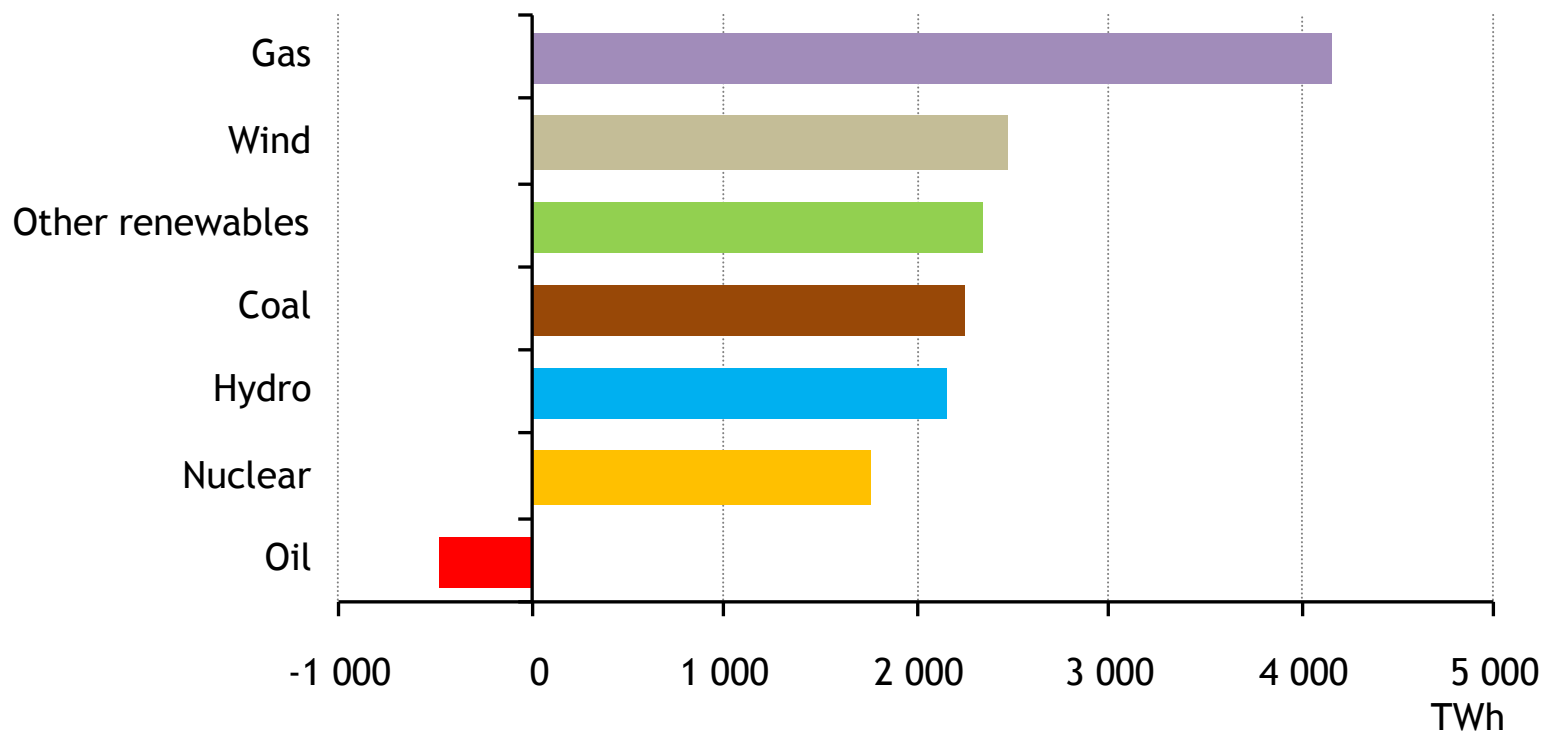
## Increase in natural gas consumption in the GAS scenario, 2010-2035



***Non-OECD countries account for 80% of demand growth – China alone makes up nearly 30% of global growth & uses as much gas as the EU by 2035***

# Power sector drives gas demand

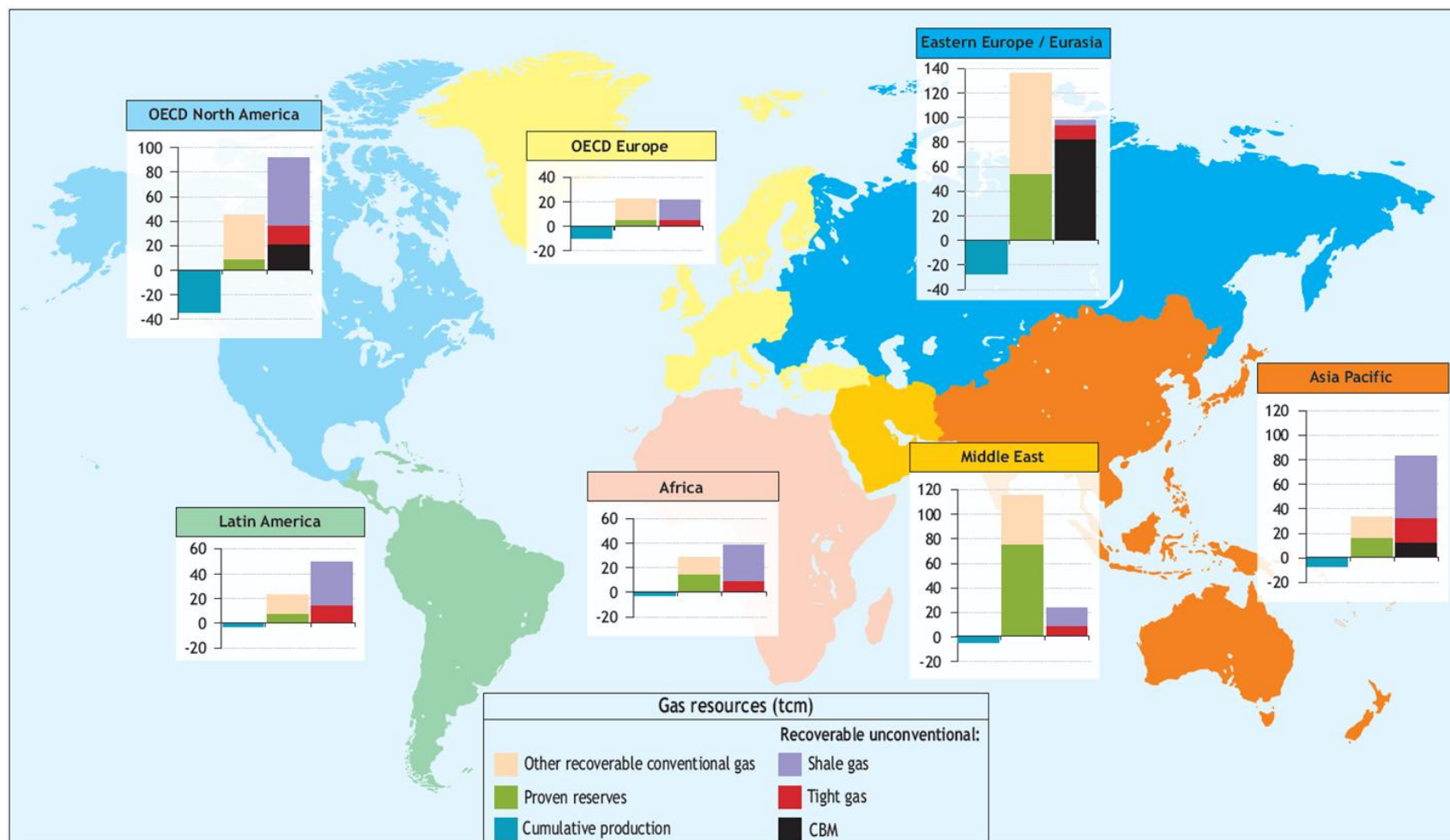
## Change in power generation by fuel in the GAS scenario, 2010-2035



***Total electricity demand increases 70% by 2035, underpinned by a near doubling of gas-fired generation***



# Natural gas: recoverable unconventional resources match conventional



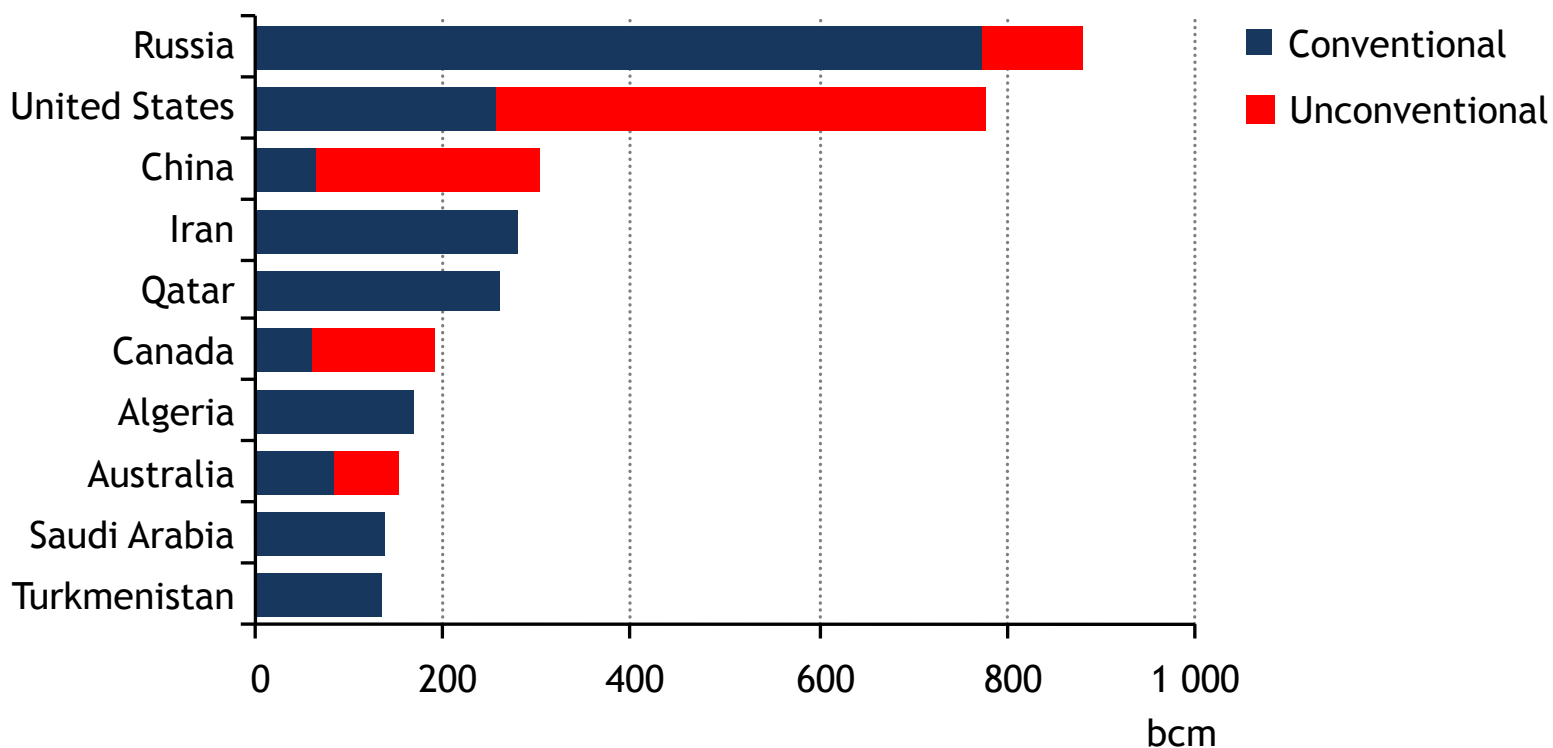
This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

**Natural gas can enhance security of supply: global resources exceed 250 years of current production; while in each region, resources exceed 75 years of current consumption**



# Production of unconventional gas becomes widespread

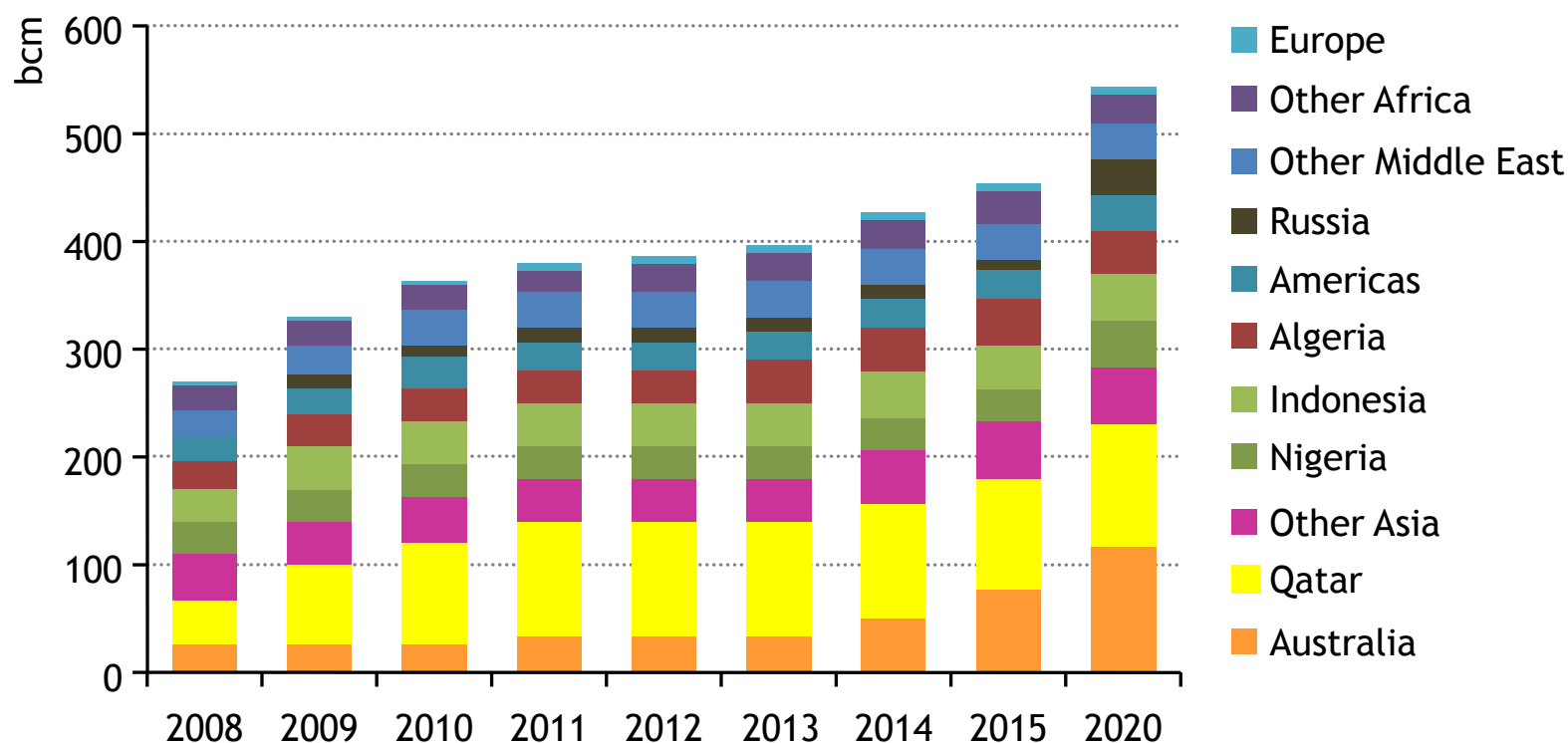
**Largest gas producers in the GAS Scenario, 2035**



***Unconventional gas supplies 40% of the 1.8 tcm increase in gas demand to 2035, making up nearly one quarter of total production***

# Growing LNG enhances supply security & market flexibility

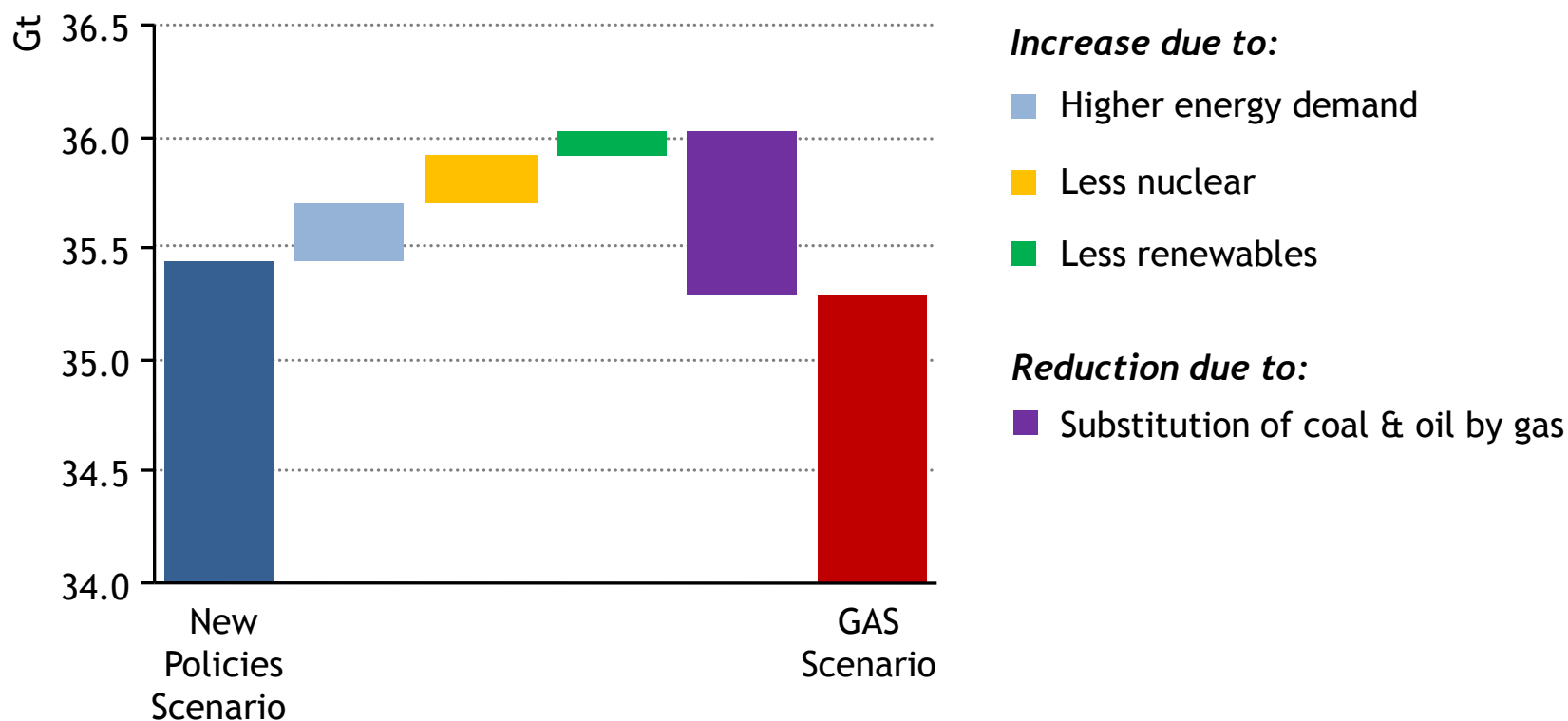
**Projected LNG liquefaction capacity by country**



***Trade in natural gas between major regions doubles to over 1 tcm by 2035, with Australia becoming a leading LNG supplier***

# CO<sub>2</sub> emissions drop, but only slightly

## CO<sub>2</sub> emissions in the GAS Scenario compared with the New Policies Scenario, 2035



**CO<sub>2</sub> emissions are just 160 Mt lower than in the New Policies Scenario in 2035. Substitution of coal & oil by gas cuts emissions by 740 Mt, but this is largely offset by other effects**



# Environmental concerns with unconventional gas

## ■ Existing regulatory regimes are being tested

- *Hydraulic fracturing: water use, contamination & disposal*
- *Greenhouse-gas emissions*

## ■ But regulatory & operational best practices can mitigate the risks

- *Ensuring gas, water & chemicals cannot enter other formations*
- *Minimising water use*
- *Treating & disposing of water appropriately*
- *Limiting gas venting*

## ■ Using best practice, “well-to-burner” emissions from shale gas production are 3.5% higher than from conventional gas

# Key messages

- **Market uncertainties create opportunities for natural gas**
- **Greater gas use could enhance regional energy security**
  - *New supplies & trade routes emerge*
- **Gas has a role to play in a low-carbon energy economy, but increased use in itself is far from sufficient to reach the 2 °C goal**
- **Unconventional resources could boost supplies substantially**
  - *But best practice regulation is essential to mitigate environmental risks*
- **In the GAS Scenario, demand for gas grows more than 50% by 2035, providing over 25% of world energy.....**

*..... surely a prospect to designate the Golden Age of Gas*



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