



IEA Medium-Term Market Reports

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Didier Houssin
Director, Energy Markets and Security
International Energy Agency

- **Based on the most recent data available**
- **5 years outlook is important for policy making**
- **Natural gas and renewables are growing fastest**

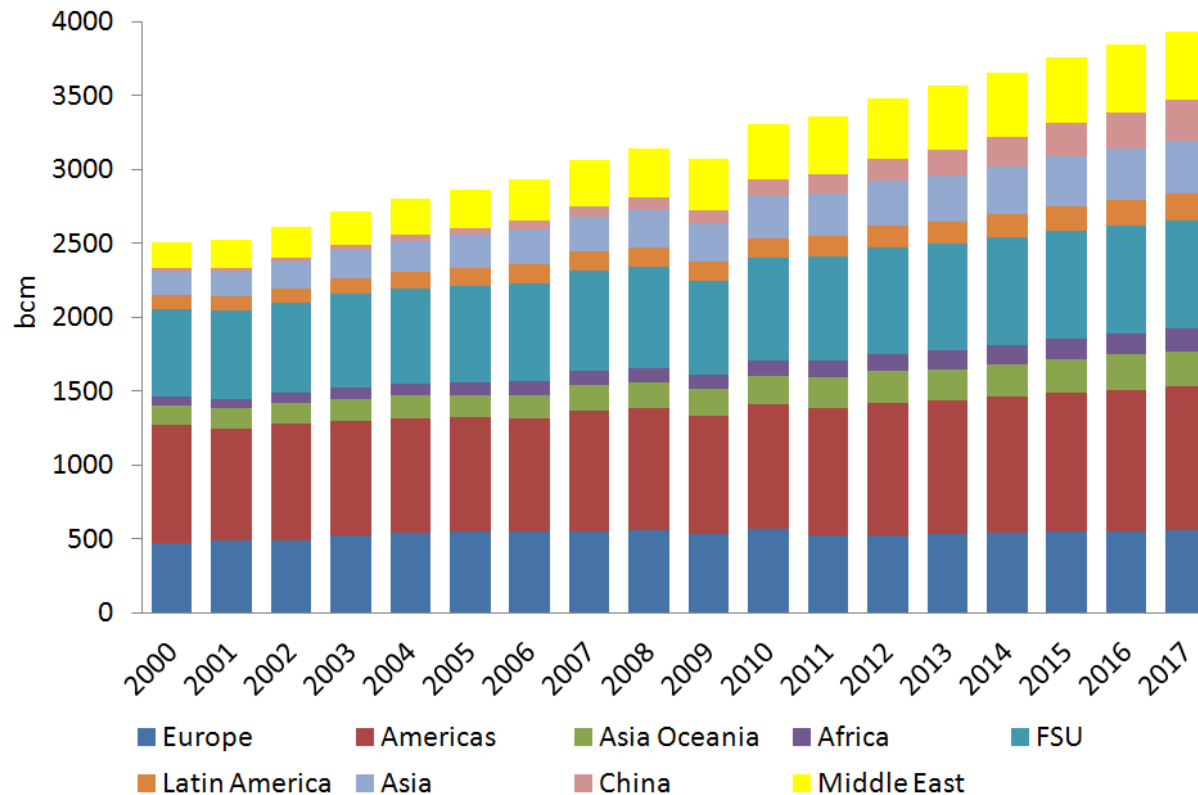
Gas: global developments

- **Natural gas demand is expected to increase by 576 bcm to reach 3937 bcm by 2017 (2.7%/y)**
 - 69% of demand will come from non-OECD countries
 - With 37% originating from Asian countries
 - No Golden Age of Gas in Europe

- **FSU and North America are the largest contributors to global supply**

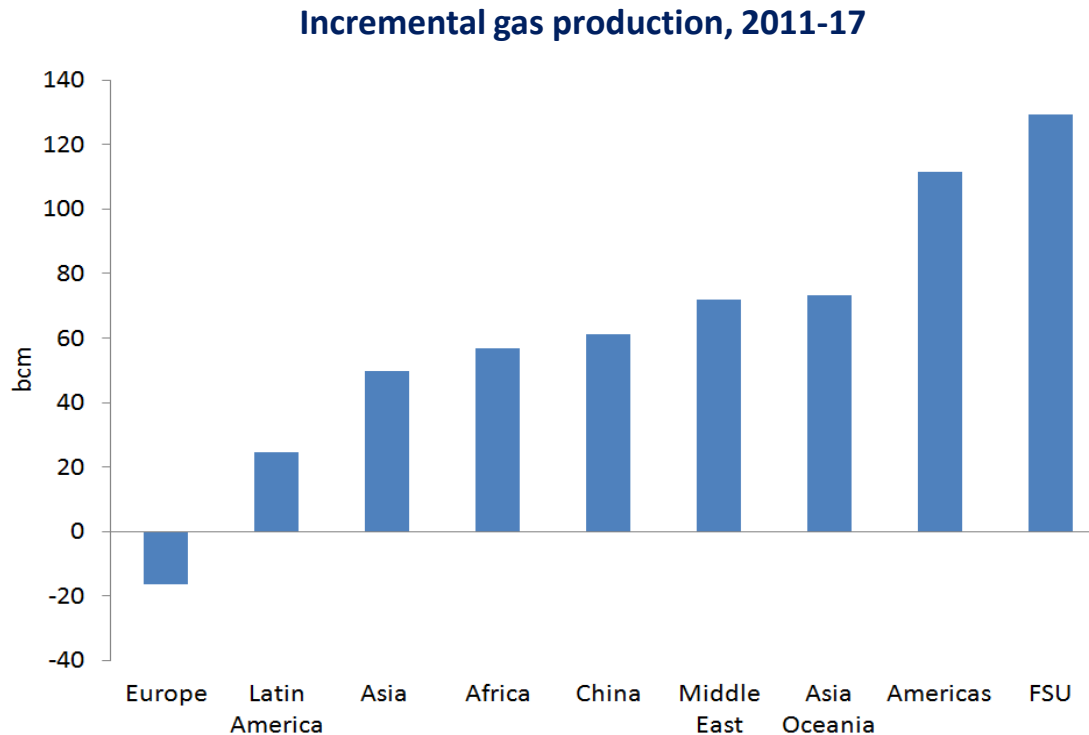
- **Global gas trade expands by one-third over 2011-17**
 - Trade is shifting to Asia
 - LNG markets will be tightening over 2012-14
 - The next wave of LNG exports starts only at end 2014
 - China becomes the third largest importer after Europe and Asia Oceania

Gas demand is projected to grow by 2.7%/y over 2011-17



- Gas demand is projected to reach around 3940 bcm from 3361 bcm in 2011 (+576 bcm)
 - 69% of the growth will come from non-OECD regions (+400 bcm)
 - OECD demand only increases by 180 bcm

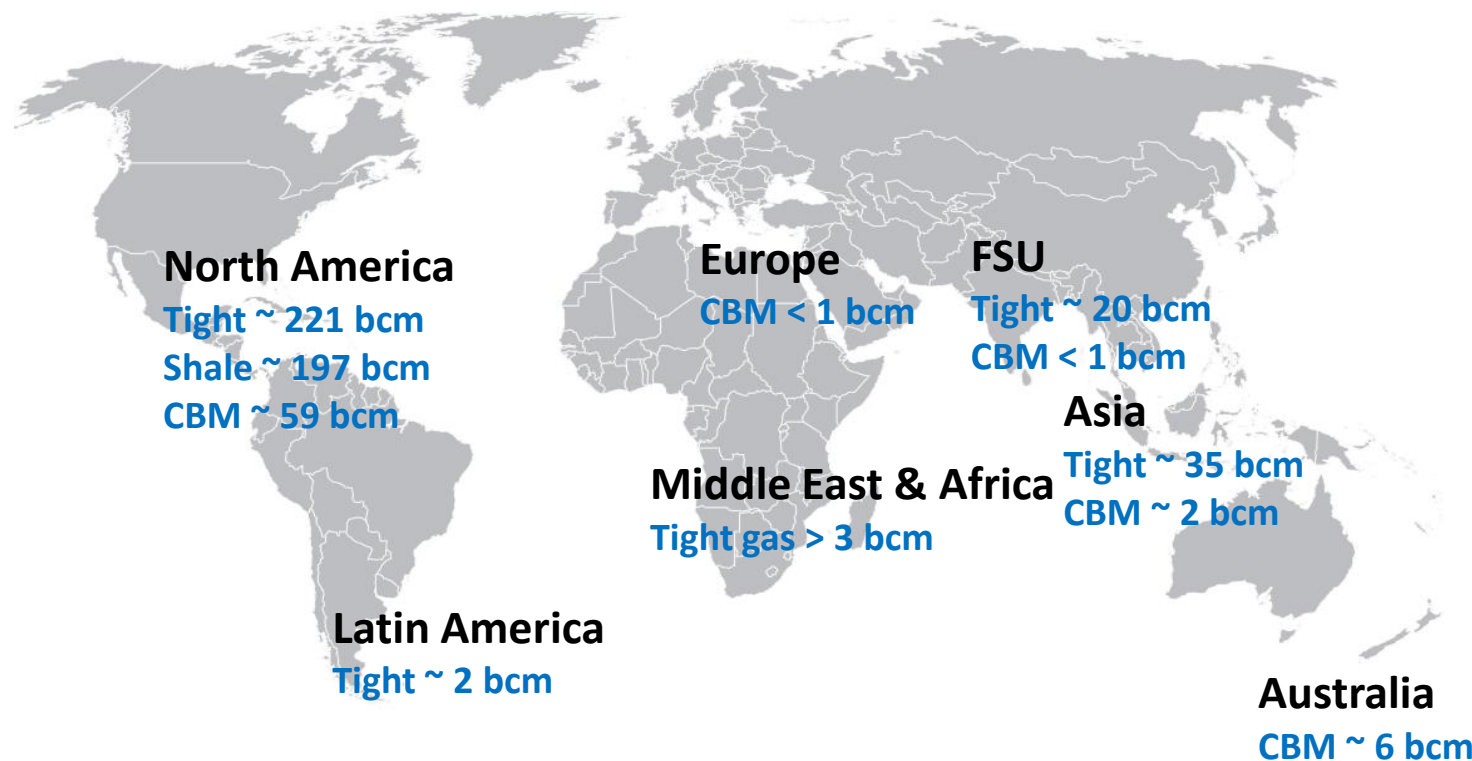
FSU and North America are set to be the largest contributors to additional supply



- FSU is growing fast driven by incremental exports, notably to China
- North America's gas production meets booming demand and some LNG exports
- China and Australia become significant gas producers
- European domestic production continues to decline

Unconventional gas

Already 16% of global gas supply



- Half of the world's unconventional gas production comes from tight gas; shale gas is a North American story
- Environmental aspects as well as infrastructure, pricing, policy issues need to be tackled

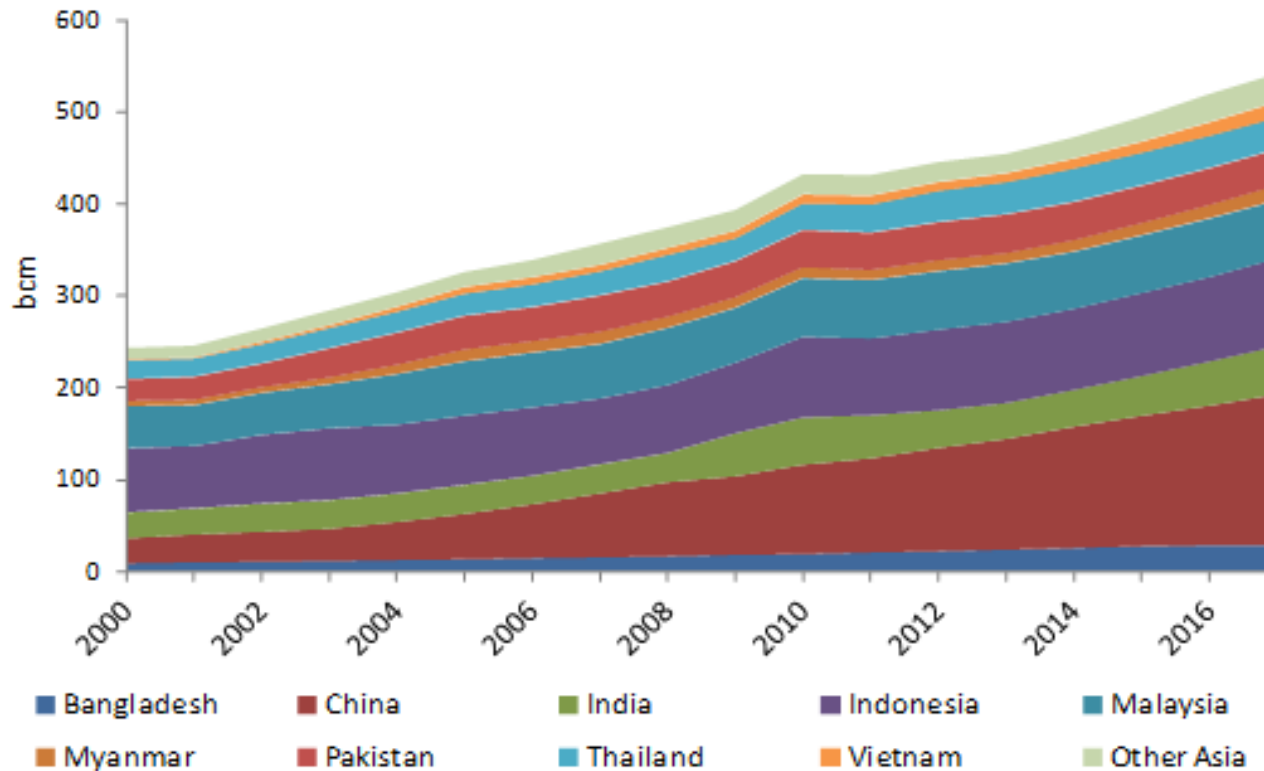
Russia and the Caspian

The interest is shifting to Asia



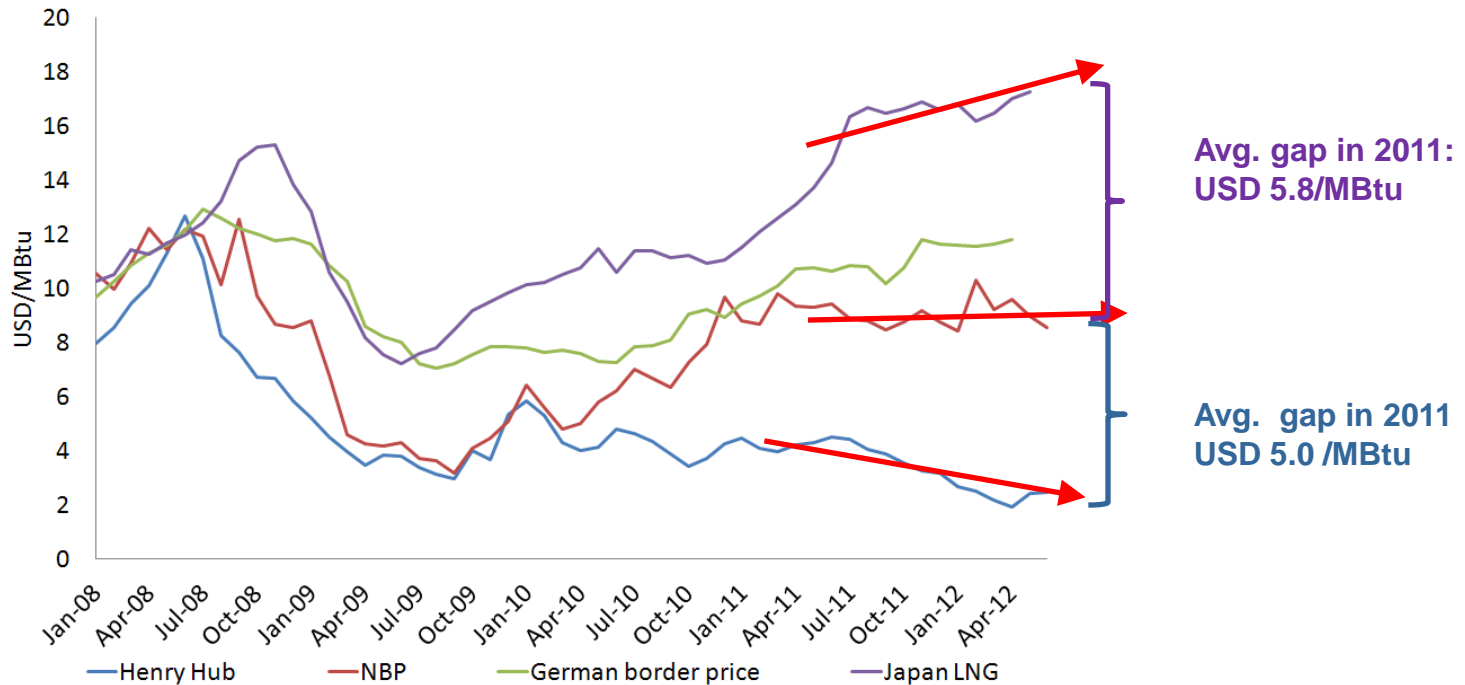
- Yamal expected to start producing in 2012 with a potential to produce 115bcm/y by 2017
- Far East/East Siberian projects for China/Korea/LNG export await FID
- Turkmenistan is increasing exports to China (possibly to 65 bcm by 2020)
- FEED on Shah Deniz-II started in 2012, production might begin 2018

Asia's gas production growth supported by China



- China production rises strongly but is insufficient to meet demand
- India's gas production struggles to grow
- New gas production in Papua New Guinea to support LNG exports
- Relatively flat production in Malaysia

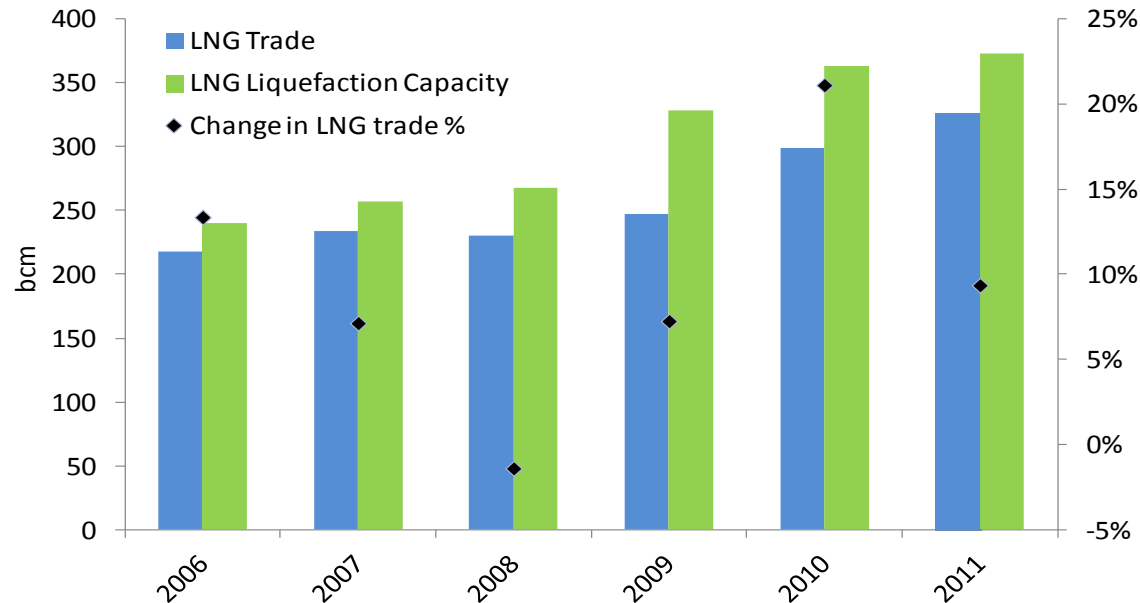
Regional gas prices are drifting further apart



Source: ICE, EIA, IEA, German Customs, Japanese Customs, McCloskey

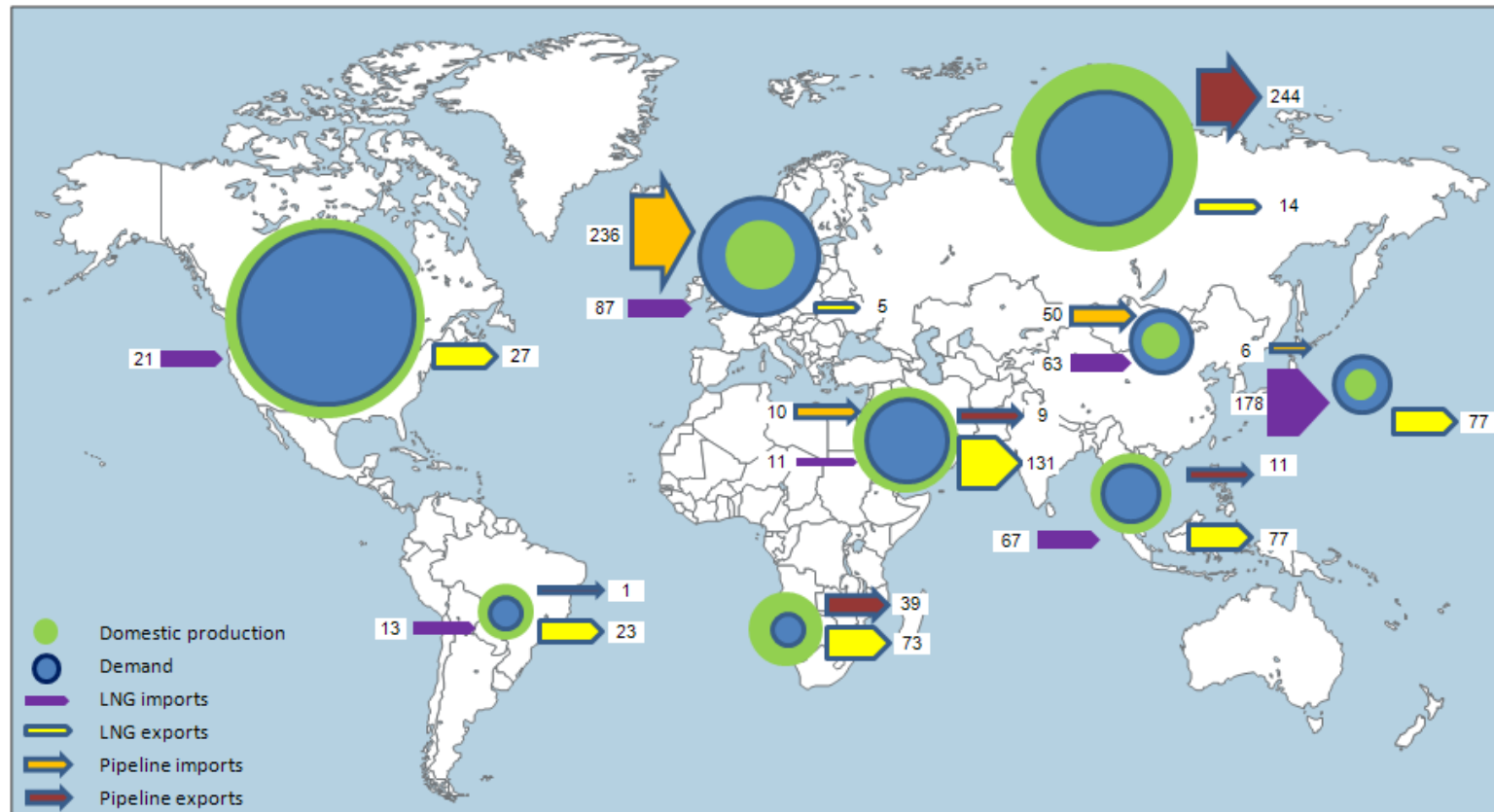
- There are widening disparities between regional gas prices, which are increasingly determined by their respective regional dynamics
 - Asian price development closely connected to oil price
 - North America is totally disconnected from other regions

LNG trade growth (2006 to 2011)



- Global LNG demand grew by 9.4% to reach 327 bcm (240 mtpa) in 2011, slowed down from the record increase of 21% in 2010.
- Thailand and the Netherlands started importing LNG
- Asia continues to be the most rapidly growing LNG market with 206 bcm (63% of global LNG trade) imported in 2011
- Japan needs more LNG in 2012 to compensate for low nuclear production

Global gas trade in 2017



- OECD Europe, OECD Asia Oceania and China are all net importers, both OECD regions also export LNG
- The trade balance is shifting to Asia, notably China, OECD Asia Oceania and other Asian countries
- North America is a net exporter

Renewables

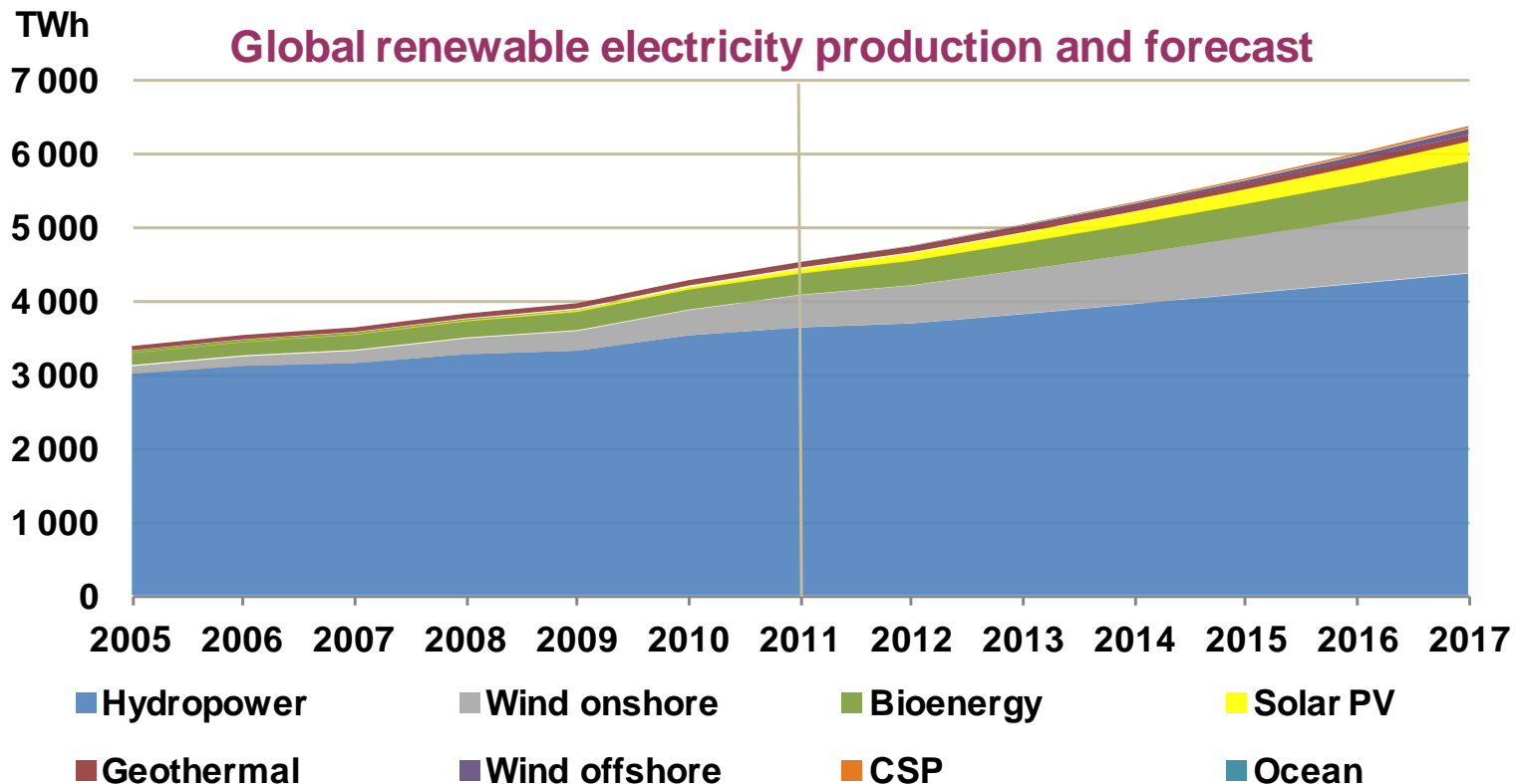
- **As a portfolio of renewable technologies matures, global renewable power generation is forecast to rise 40%**
 - Supported by policy/market frameworks and economic attractiveness in increasing range of countries and circumstances
 - Technology cost developments, grid/system integration, cost/availability of financing also weigh as key variables
 - High level of economic/policy uncertainty in some countries

- **This projected growth is an acceleration vs previous period**
 - Growth is 60% higher over 2011-17 versus 2005-11

- **Renewable deployment is projected to spread out geographically, with increased activity in emerging markets**
 - Deployment spurring economies of scale in some technologies - virtuous cycle of improved competition and cost reductions

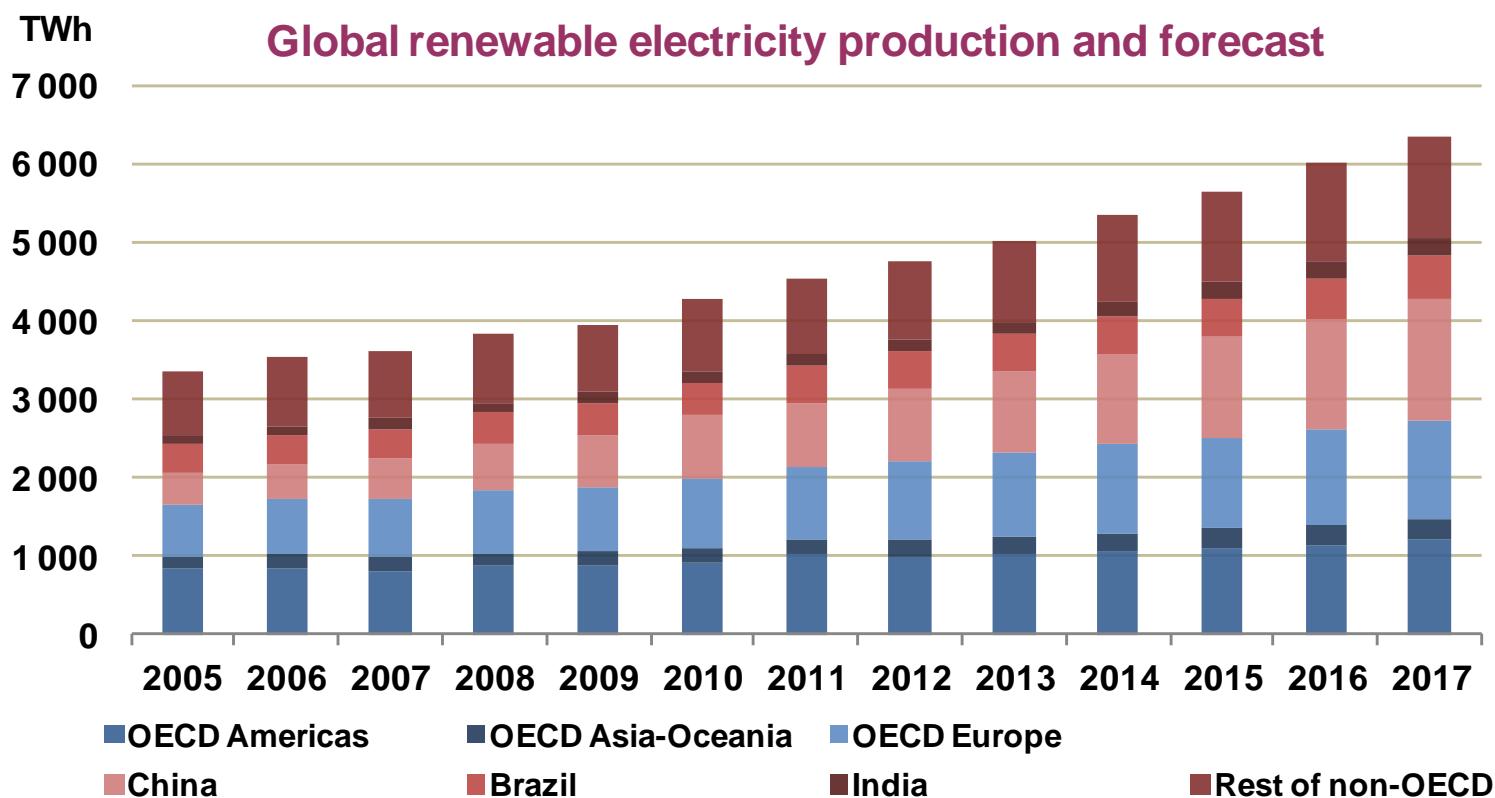
Growth in renewable power is forecast to accelerate

- Hydropower remains the main renewable power source (+3.1% p.a.)
- Non-hydro renewable sources grow at double-digit annual percentage rates (+14.3% p.a.)



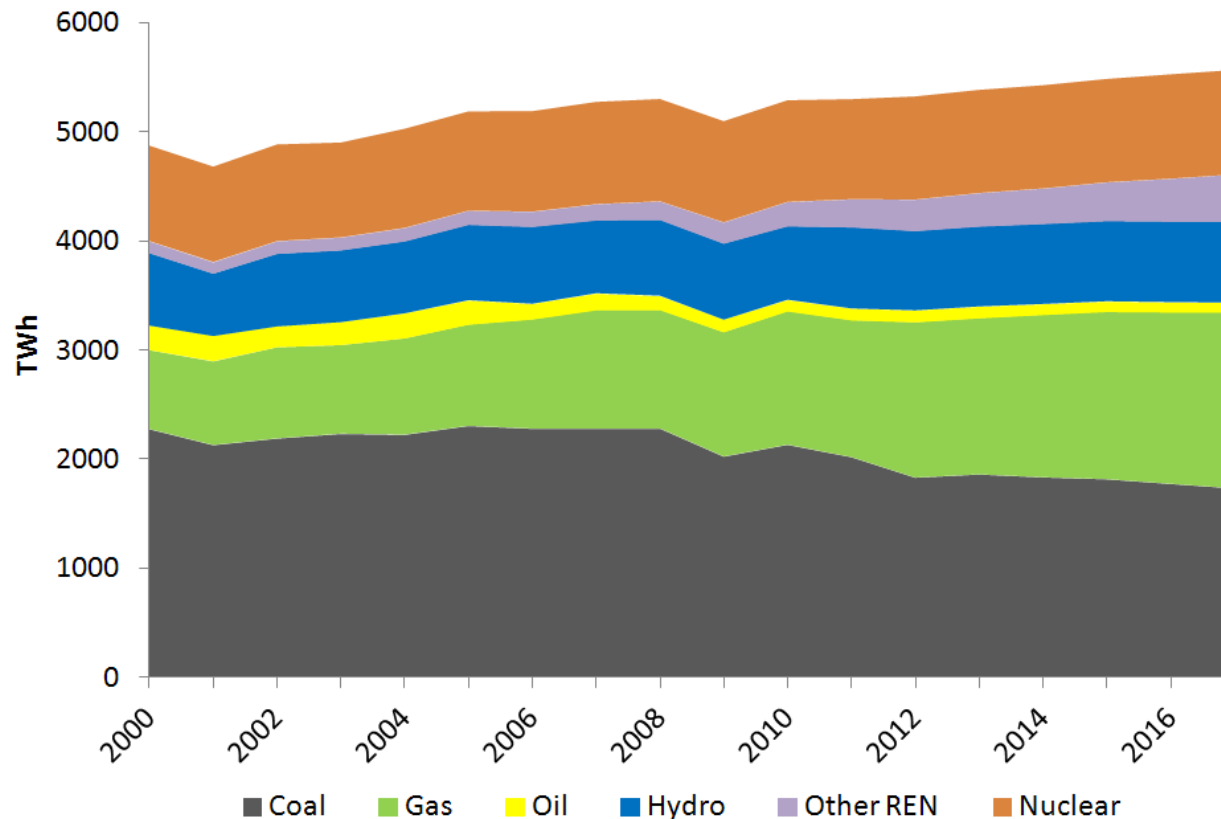
Growth is led by non-OECD countries

- Non-OECD accounts for two-thirds of the overall growth
 - China, Brazil, India lead; others grow significantly as well
- OECD growth still largely driven by Europe but Americas and Asia-Oceania make significant contributions



Regional analysis

Gas drives coal down in Americas

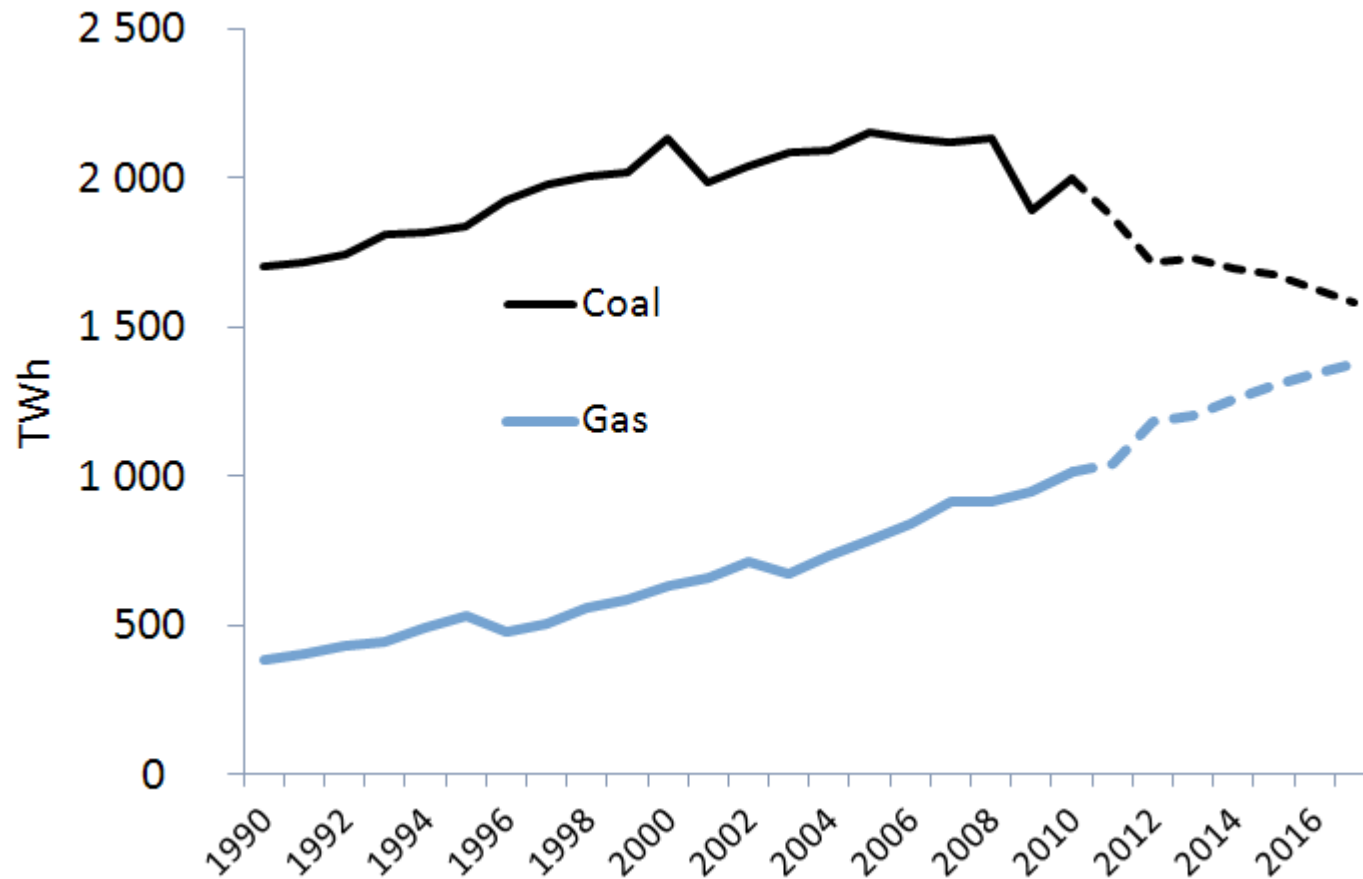


- Very low gas prices enable gas-fired plants to win market shares at the expense of coal
- Renewables generation (excl. hydro) increases strongly but still represents a small share of total generation (8%)

US power sector can absorb more gas

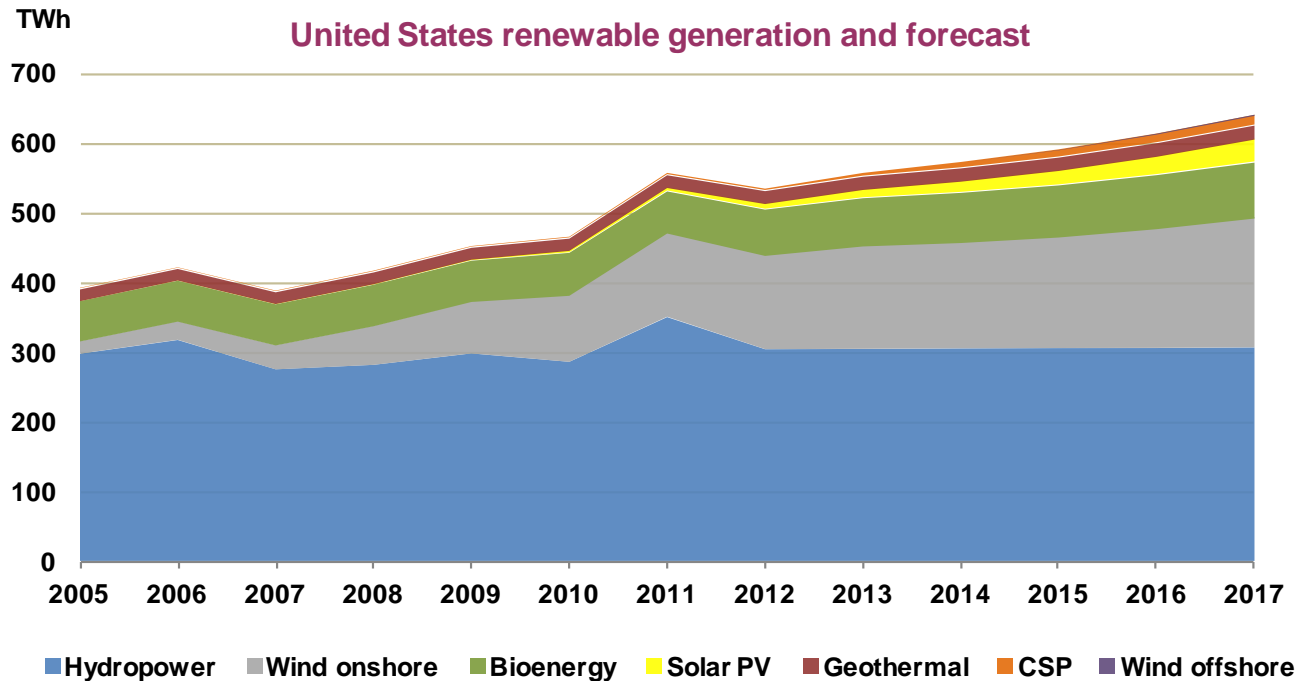
Gas continues growing, coal starts to fall sharply

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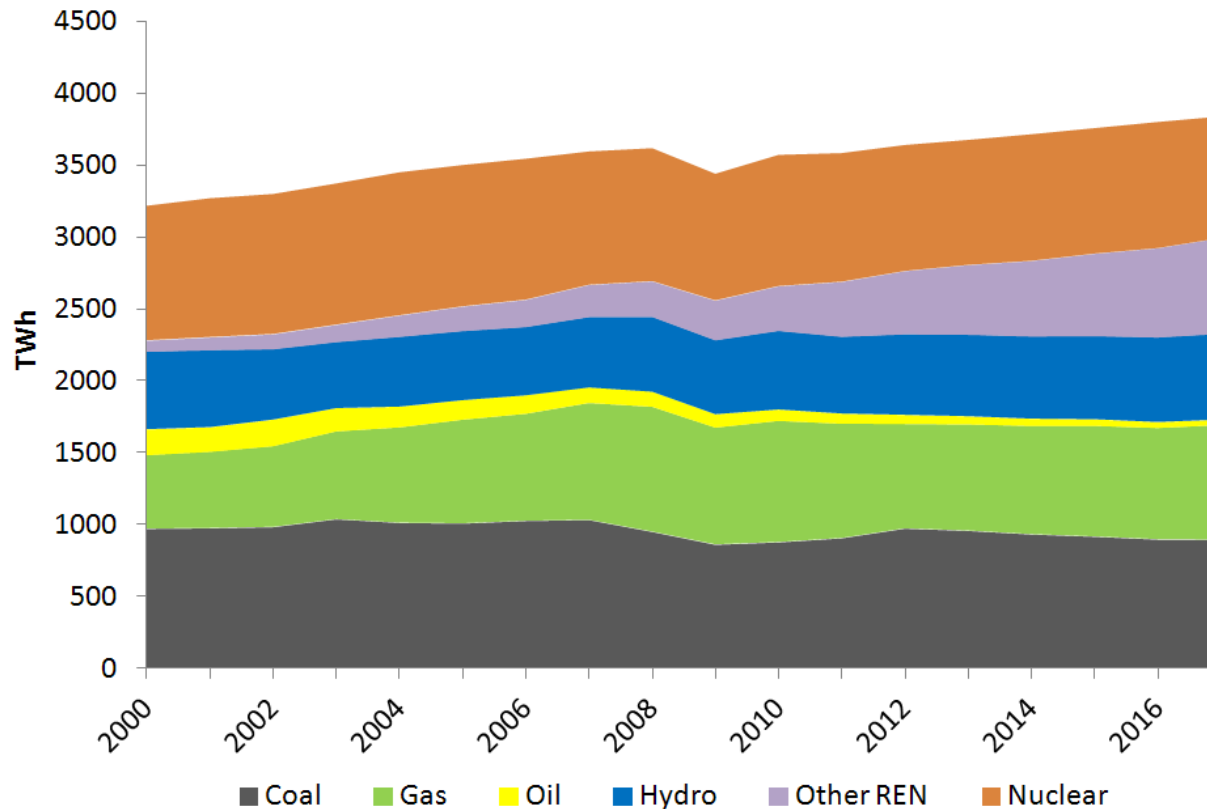
- Despite the constraints, around 300 TWh of coal generation is to be displaced by natural gas over 2011-17

US renewable generation expected to continue to grow steadily



- Average renewable growth of 2.4% annually over 2011-17
- Non-hydropower growth at stronger rate, + 8.4% annually
 - Onshore wind, solar PV and bioenergy grow strongest
 - CSP and geothermal growth are large in global terms
- % of total power gen: 9% (2005), 13% (2011), 14-15% (2017)

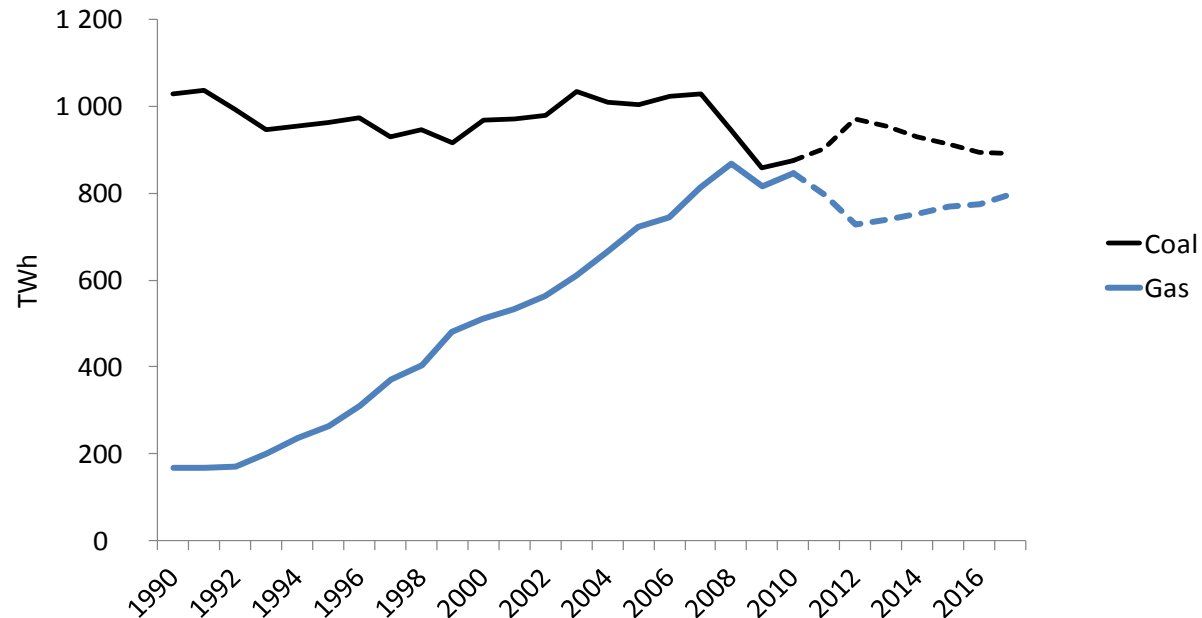
Europe: power demand increases slower due to low GDP growth



■ There is less room for fossil fuels

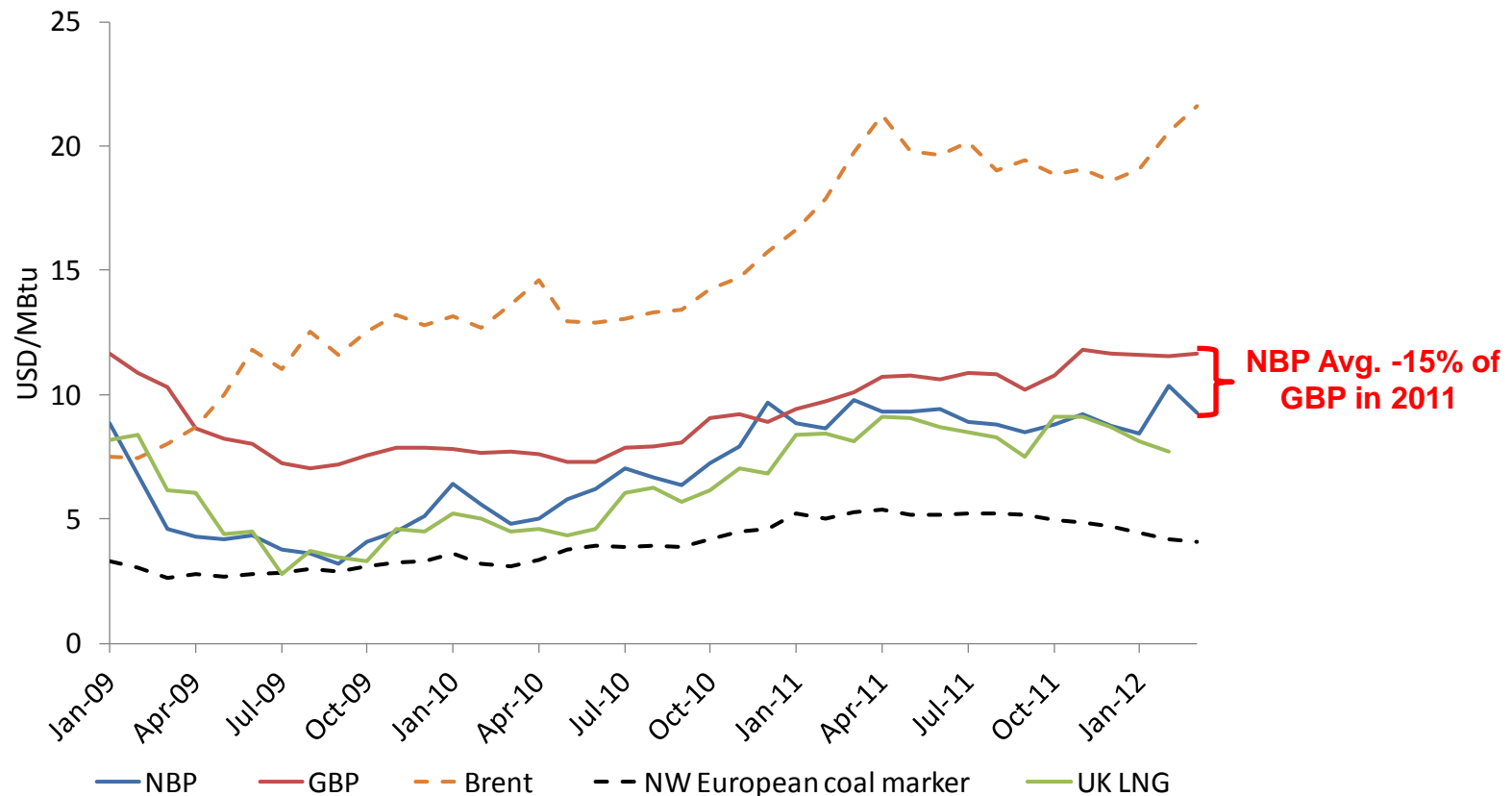
- Gas has to compete against coal-fired plants
- Gas is disadvantaged in the early period due to high gas prices

Golden age of coal in Europe?



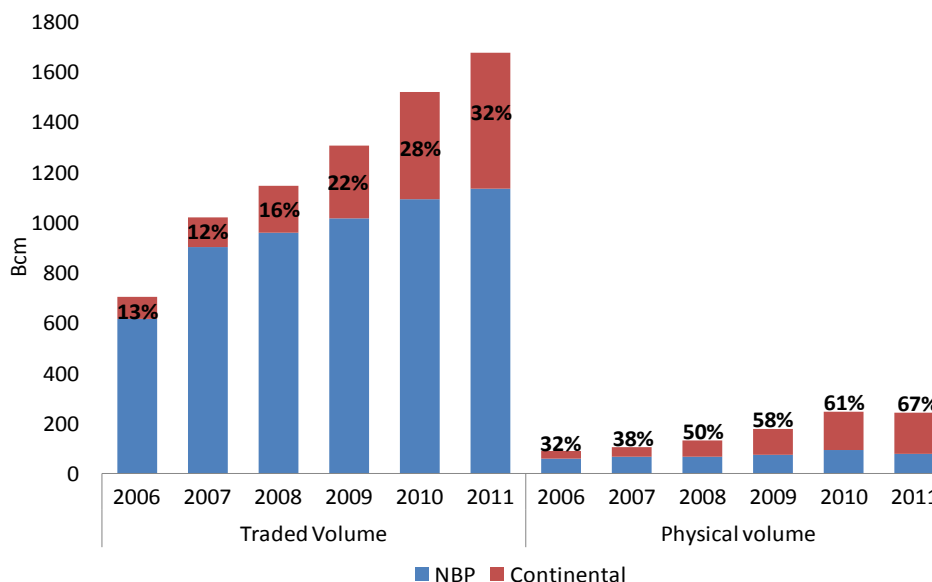
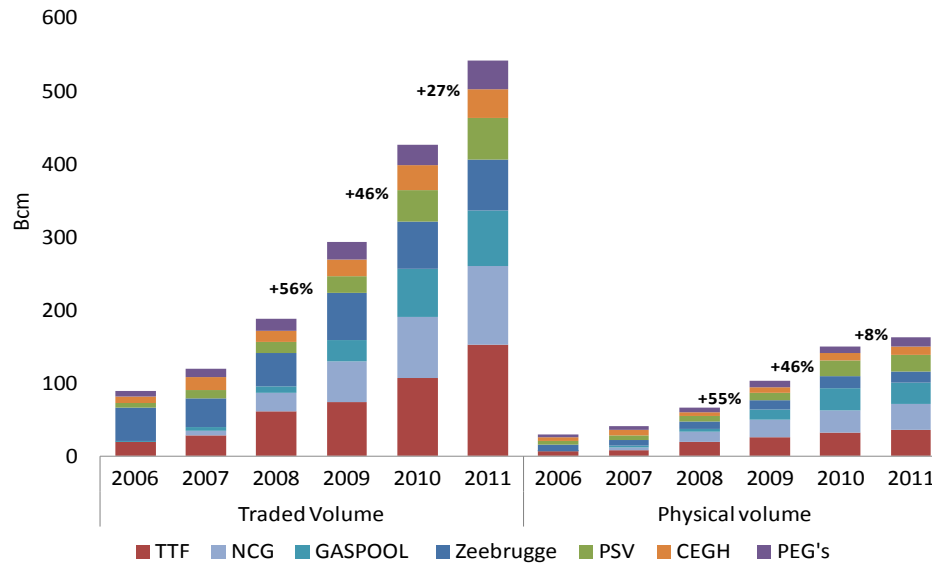
- In 2011, demand in the power generation sector dropped by 3 bcm
 - Low (or negative) power demand growth
 - Strong growth of renewables
 - High gas prices with low CO₂ prices make gas-fired plants uncompetitive
- Gas loses competitiveness in the short term, but will recover (at lower levels than 2011)

Natural gas prices in Europe



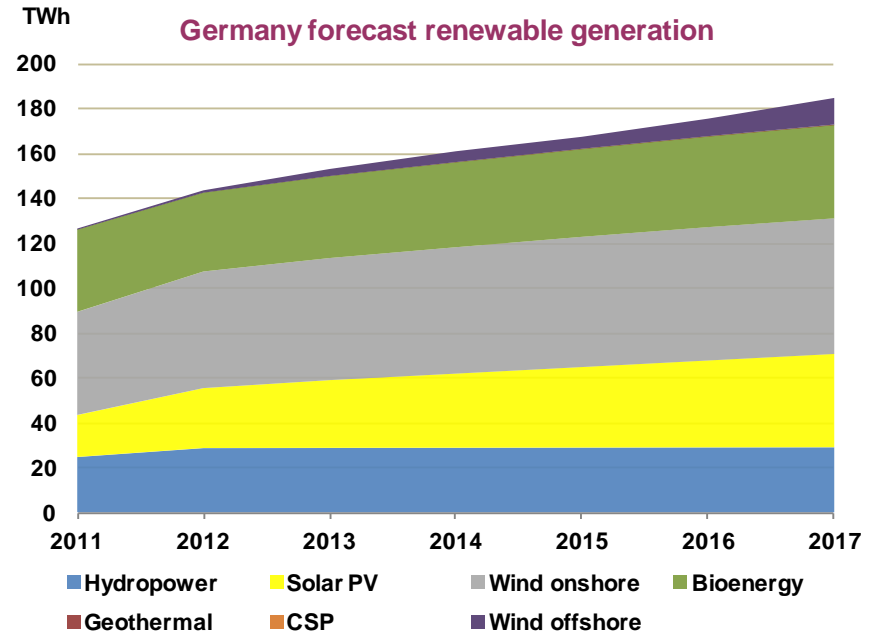
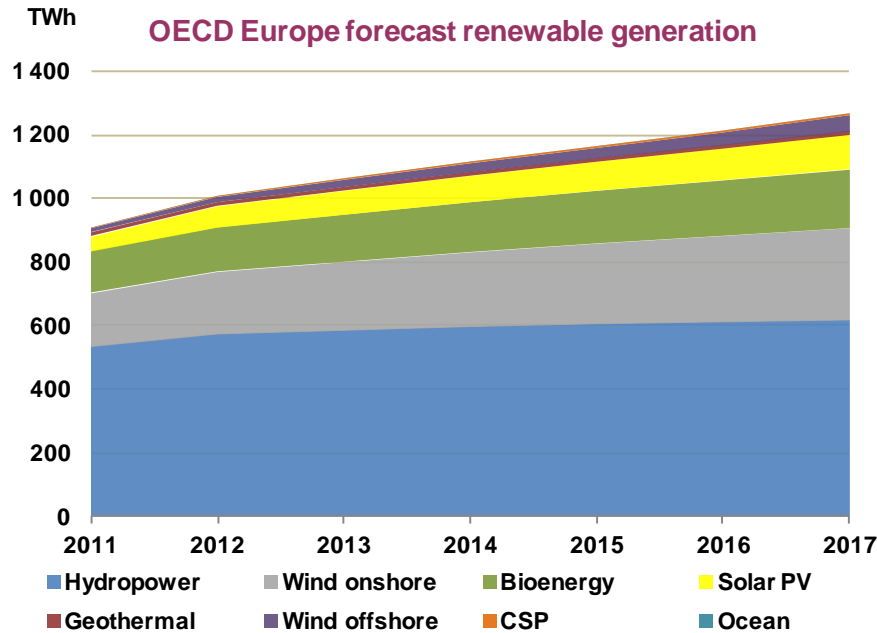
- European spot market prices continued to dwell below oil indexed import prices in 2011
- Spot market prices stayed low due to overall sluggish demand for natural gas in Europe

European hubs: strong growth in trade



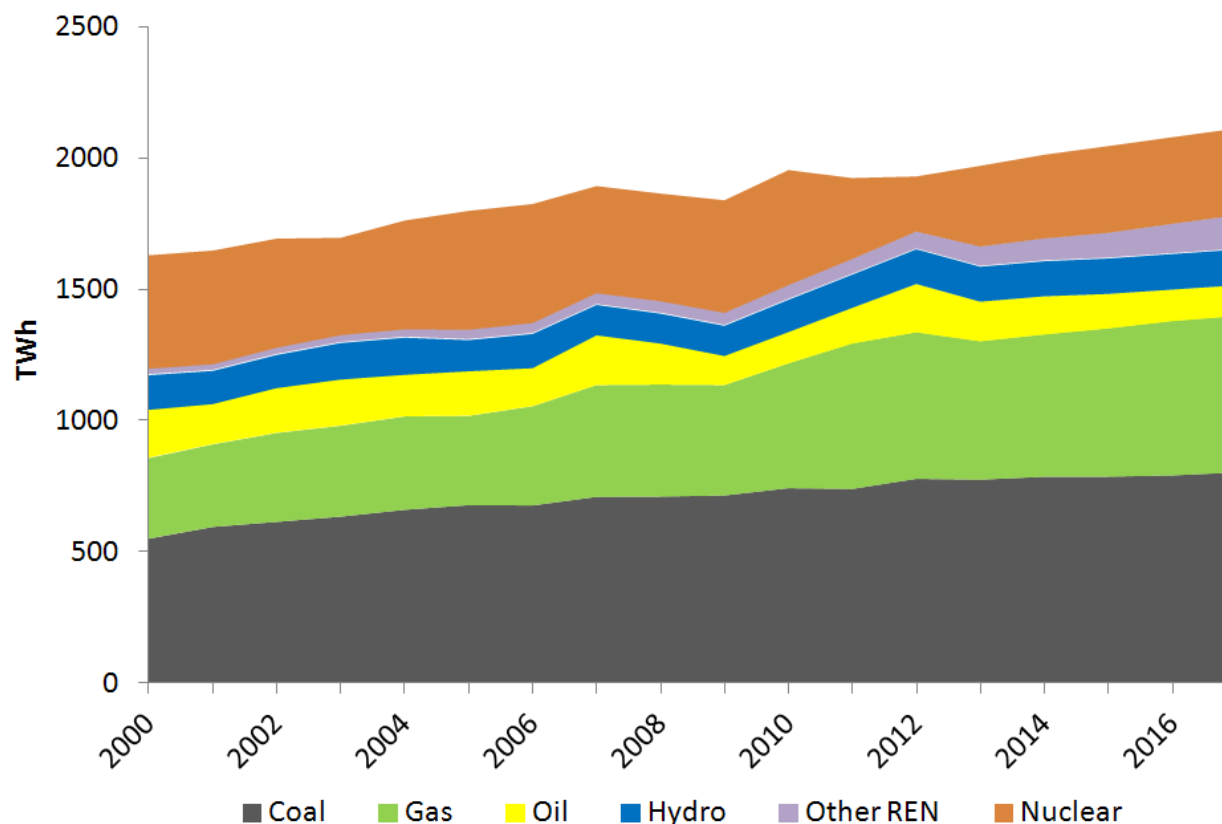
- Physical and traded volume in Europe has continued to increase throughout 2006 -11
- Increase shows a decreasing trend in continental Europe
 - +27% Traded volume versus 2010
 - +8% Physical volume versus 2010
- Continental hubs have overtaken NBP in physically delivered volumes since 2008
- NBP continues to dominate trade with 68% of total traded volume in Europe

Europe continues strong renewable growth, but economic/policy uncertainties weigh



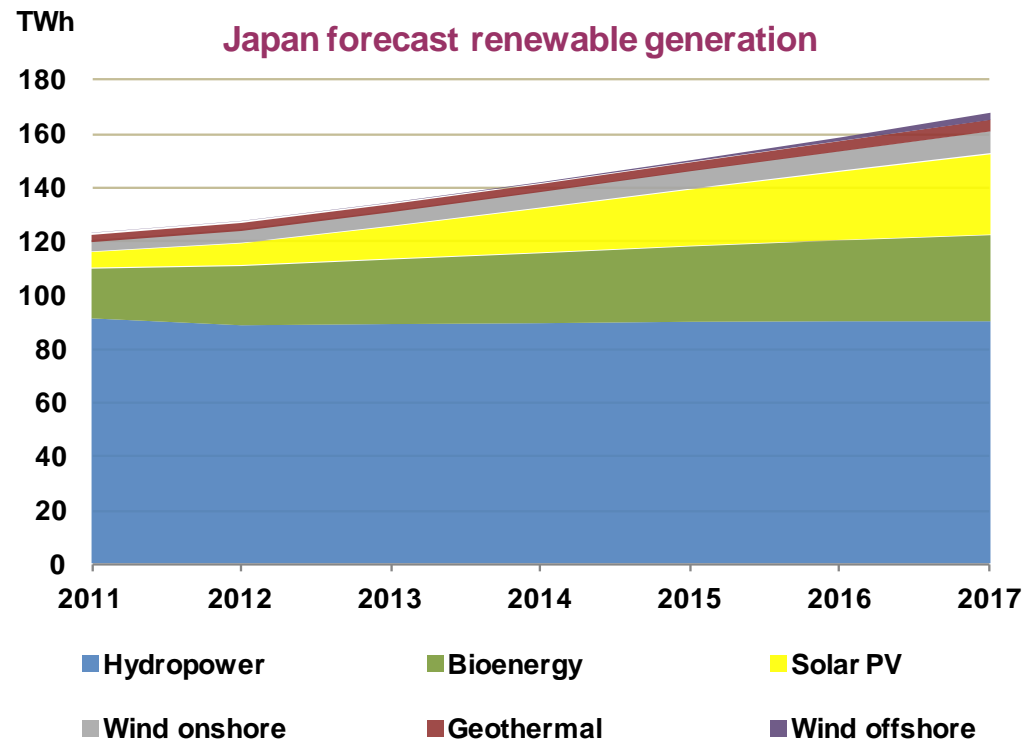
- Germany, UK and Turkey are largest growers
- Nordic countries grow steadily
- Economic conditions and overcapacity challenge Italy, Spain
- Eastern Europe growing despite crisis and has a long way to go to fulfill EU 2020 goals

In Asia Oceania, the key question mark is Japan's future energy policy



- Assumes some nuclear comes back in Japan (less than half 2010)
- Gas-fired generation set to grow, notable to replace missing nuclear
- But coal increases as well (Australia, Japan, Korea)
- Renewables generation doubles but represents only 6% of total generation

Japan renewable energy grows strongly with uncertain nuclear and new feed-in tariffs



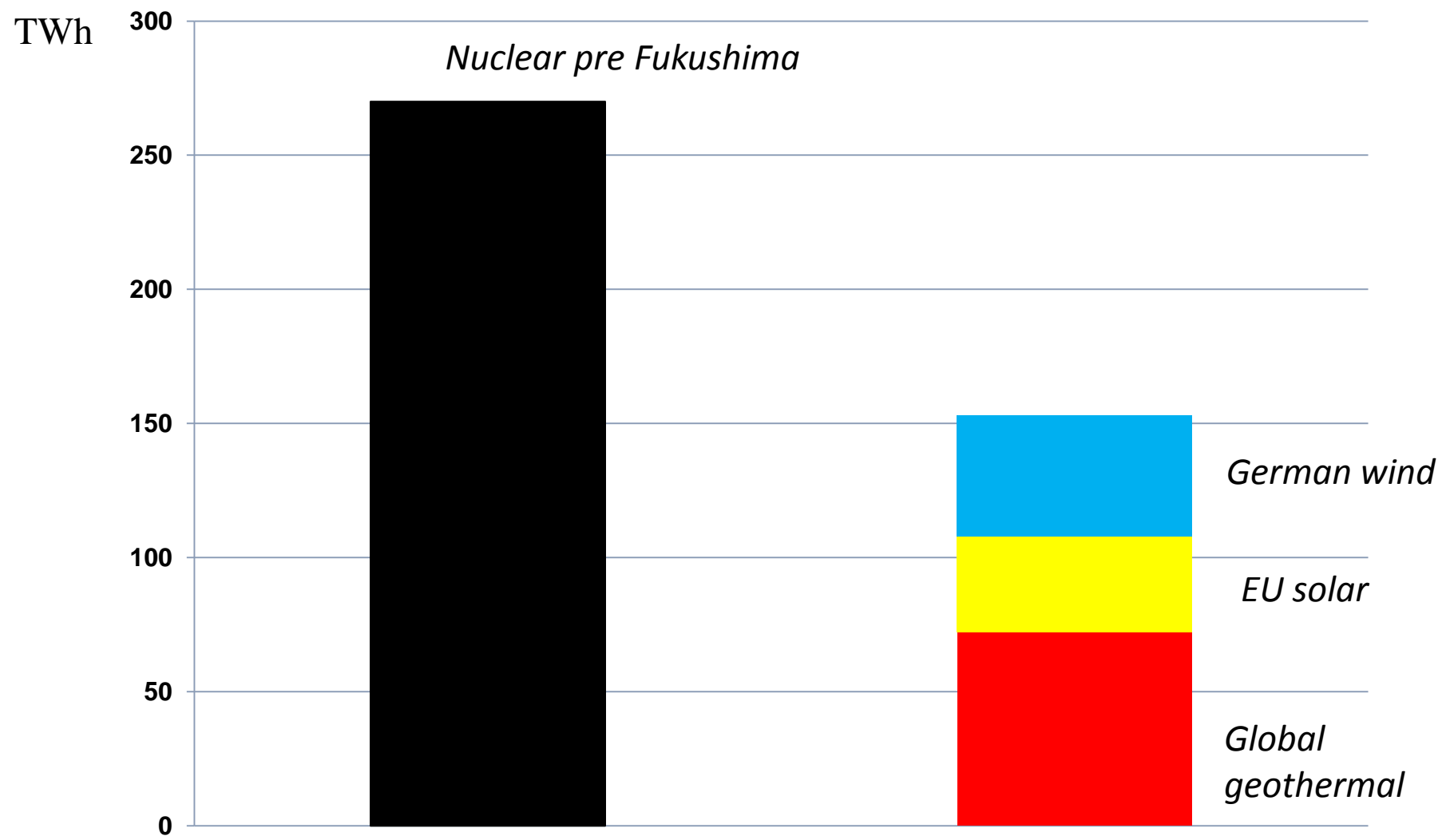
Drivers:

- Uncertain nuclear restart
- New feed-in tariffs
- Good match of solar PV for shaving peak load

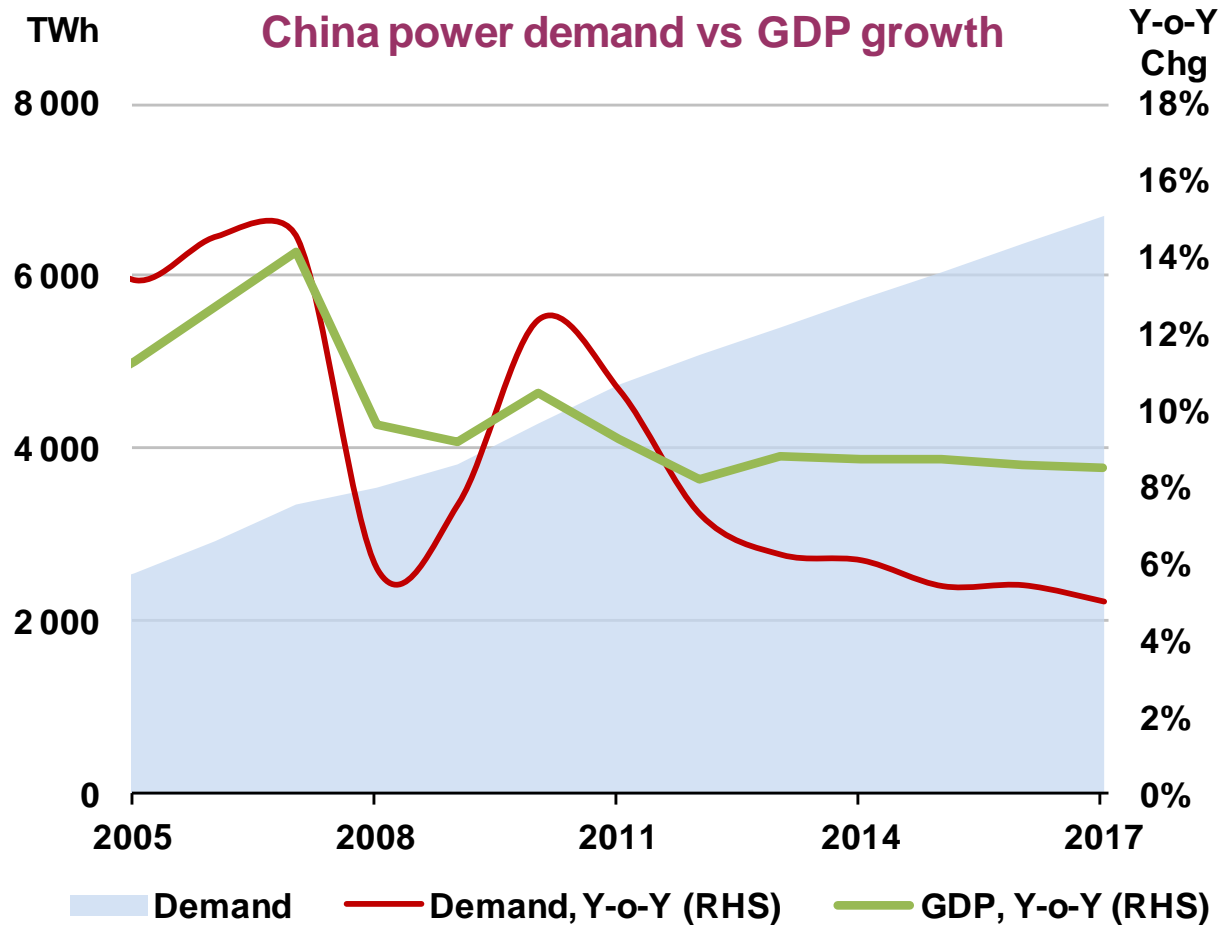
Challenges:

- Power system fragmentation
- Relatively high capital costs of renewable energy
- Location of wind and geothermal resources far from demand centres

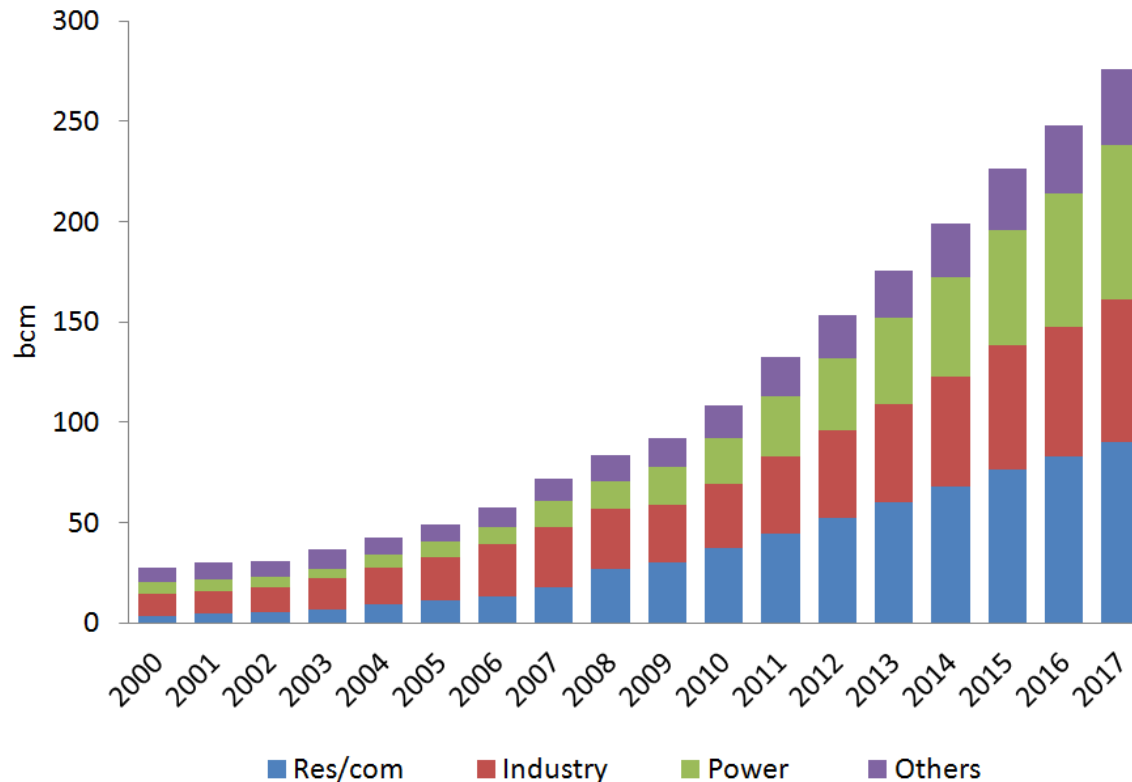
But replacing nuclear is almost guaranteed to boost LNG demand



China power demand can accommodate both fast REN and gas growth

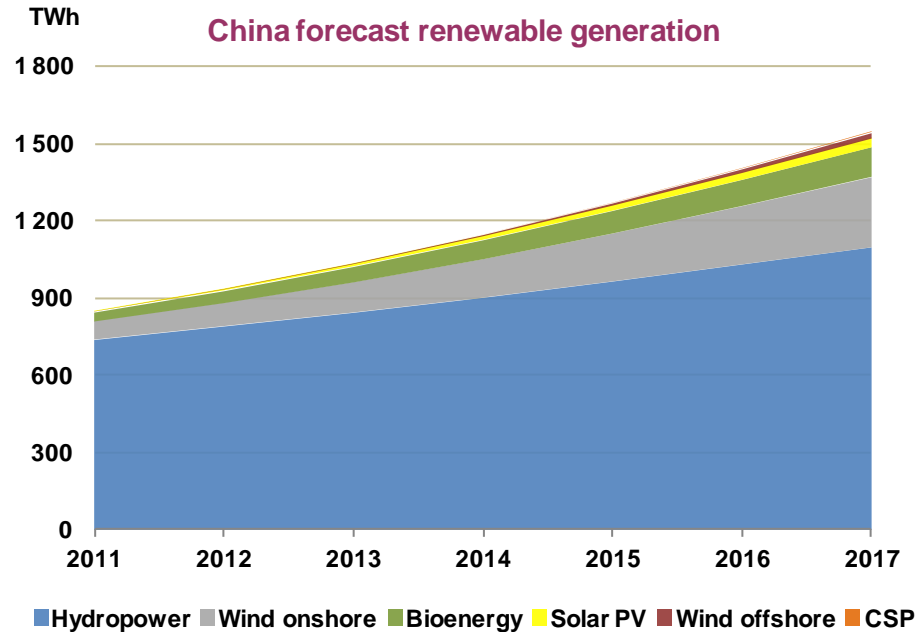


China is the fastest growing region of gas demand



- Gas demand grows in all sectors, except fertiliser producers
- New sectors emerge such as transport
- But there remains supply constraints limiting demand
- China needs to solve issues such as pricing and regulation

China accounts for 40% of global growth in renewable generation



■ Drivers:

- Growing energy needs
- Diversification
- Government targets
- Ample low-cost finance
- Robust manufacturing

■ Challenges:

- Pricing framework
- Priority dispatch
- Grid upgrades
- Prohibitive licensing for small-scale systems

Want to know more?



- The Medium-Term Gas Market Report and Medium-Term Renewable Energy Market Report 2012 can be purchased online at:

www.iea.org

Thank you!