





Gas – The Bridging Fuel of the
Future:
Development of the EU and
Global Gas Markets

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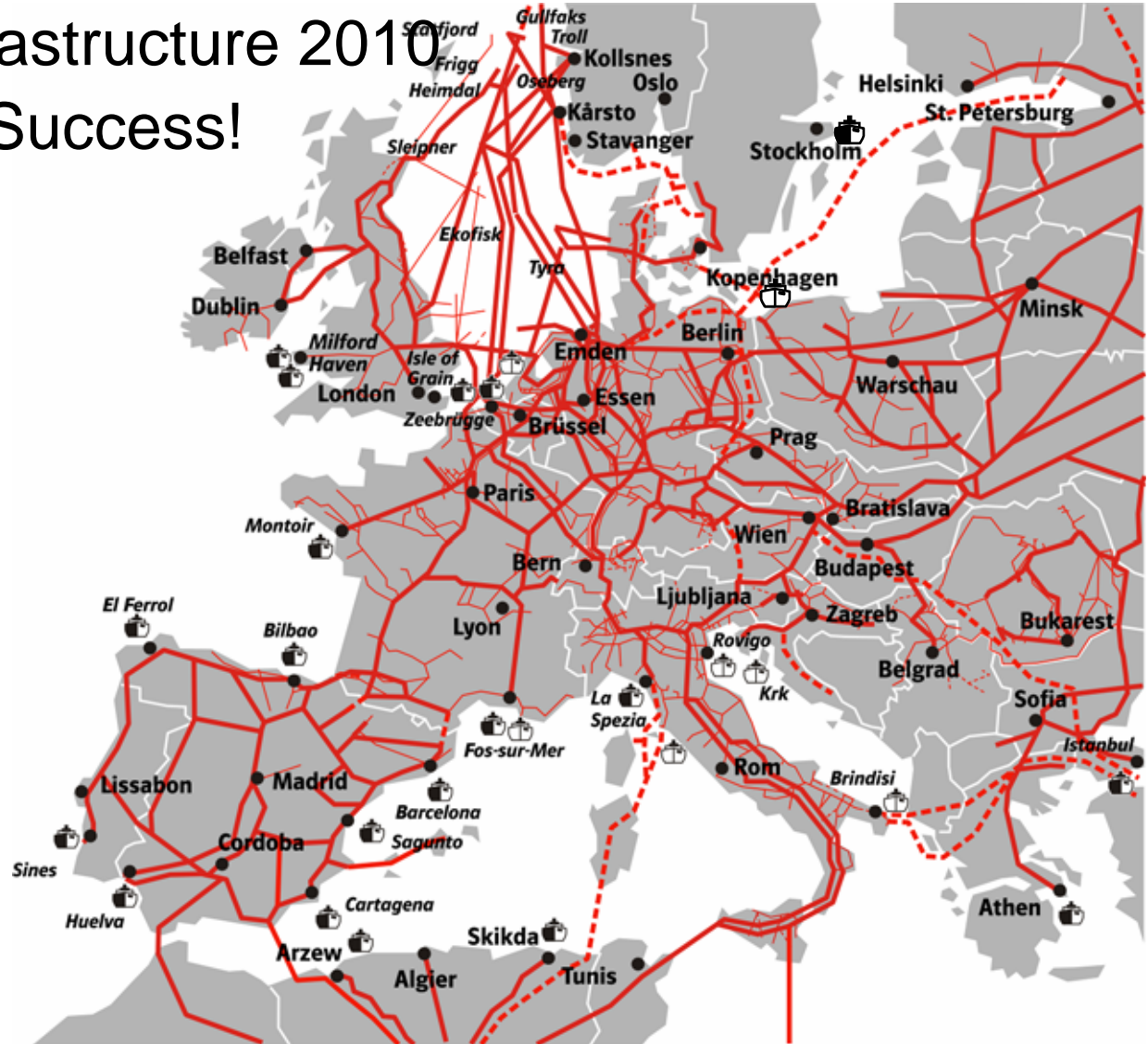
Gas in Europe 1970

- existing
- ⋯ under construction or planed 


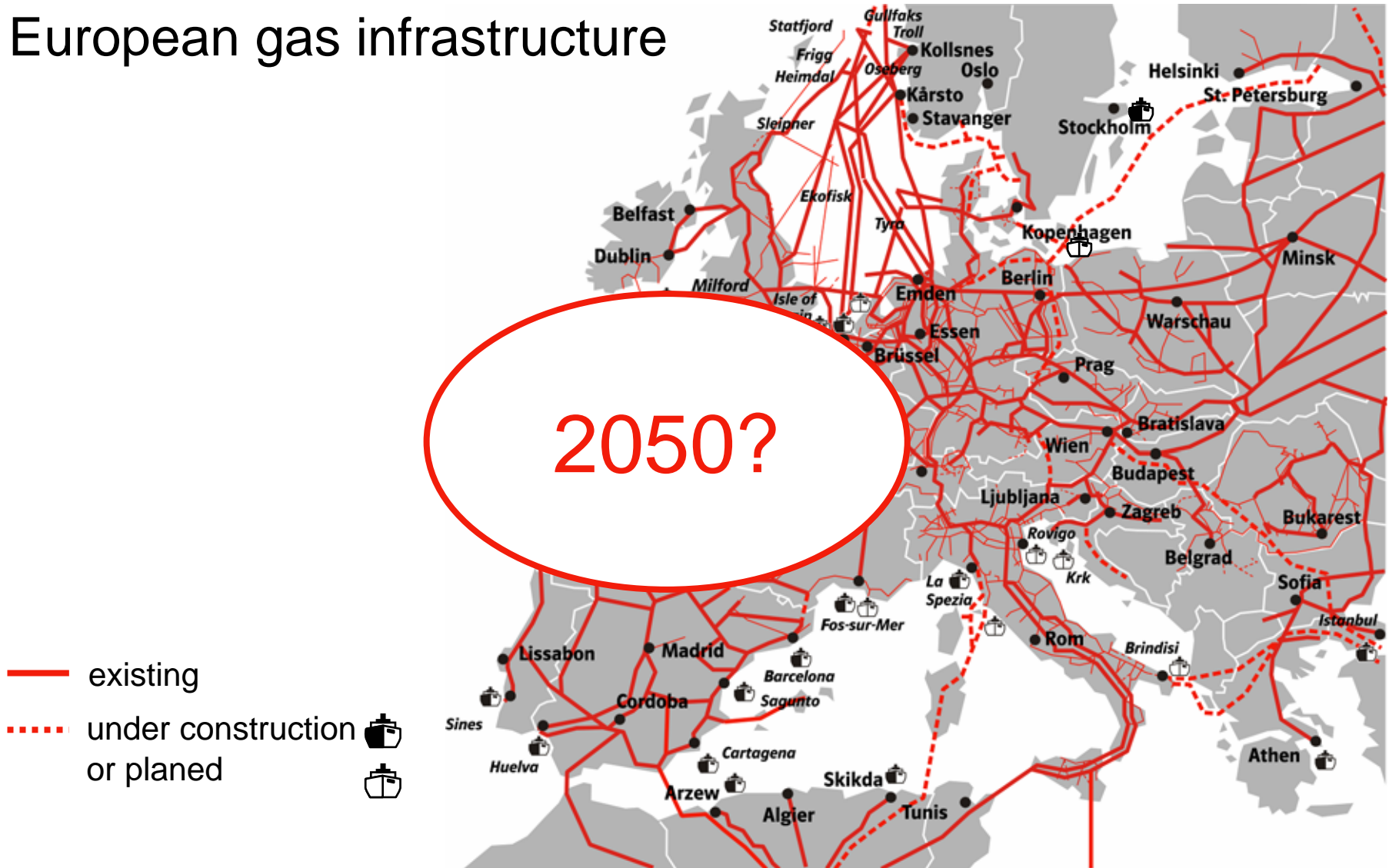


European gas infrastructure 2010 After Decades of Success!

- existing
- under construction or planned
-
-



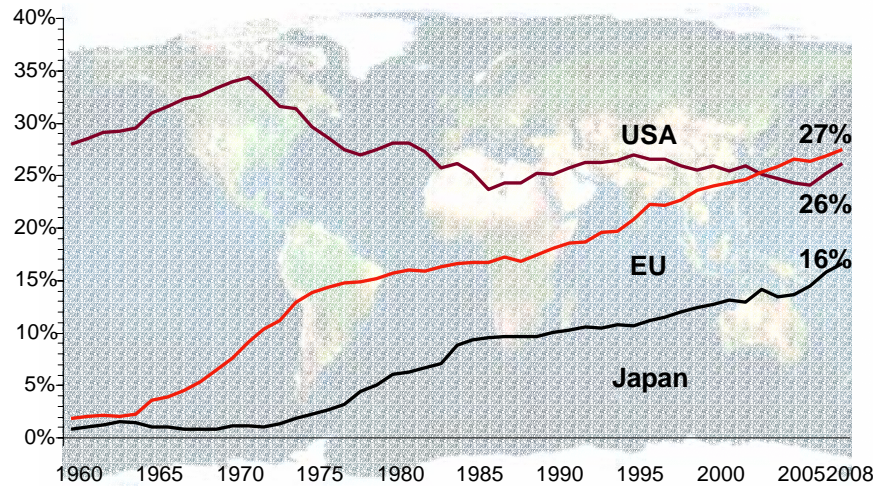
European gas infrastructure



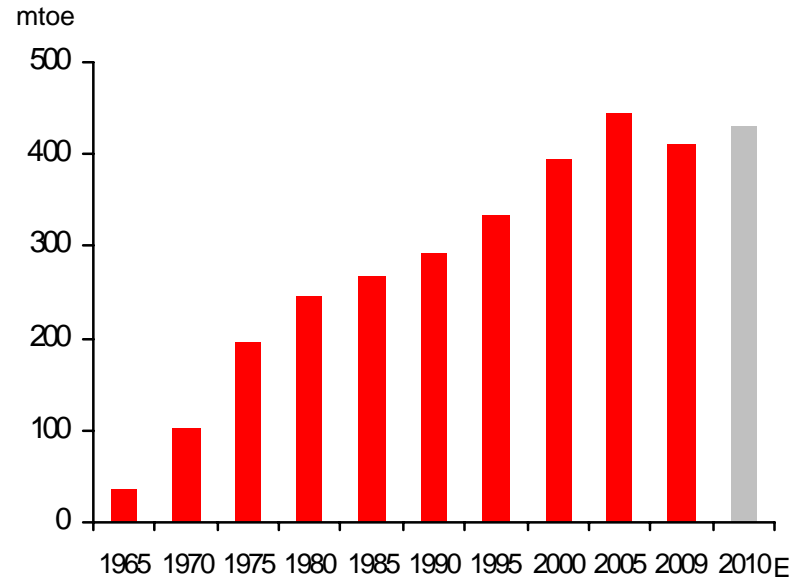
Natural gas has proved to be a climate-friendly, efficient and competitive source of energy in the world

Share in primary energy consumption

European gas demand development



Source: E.ON Ruhrgas

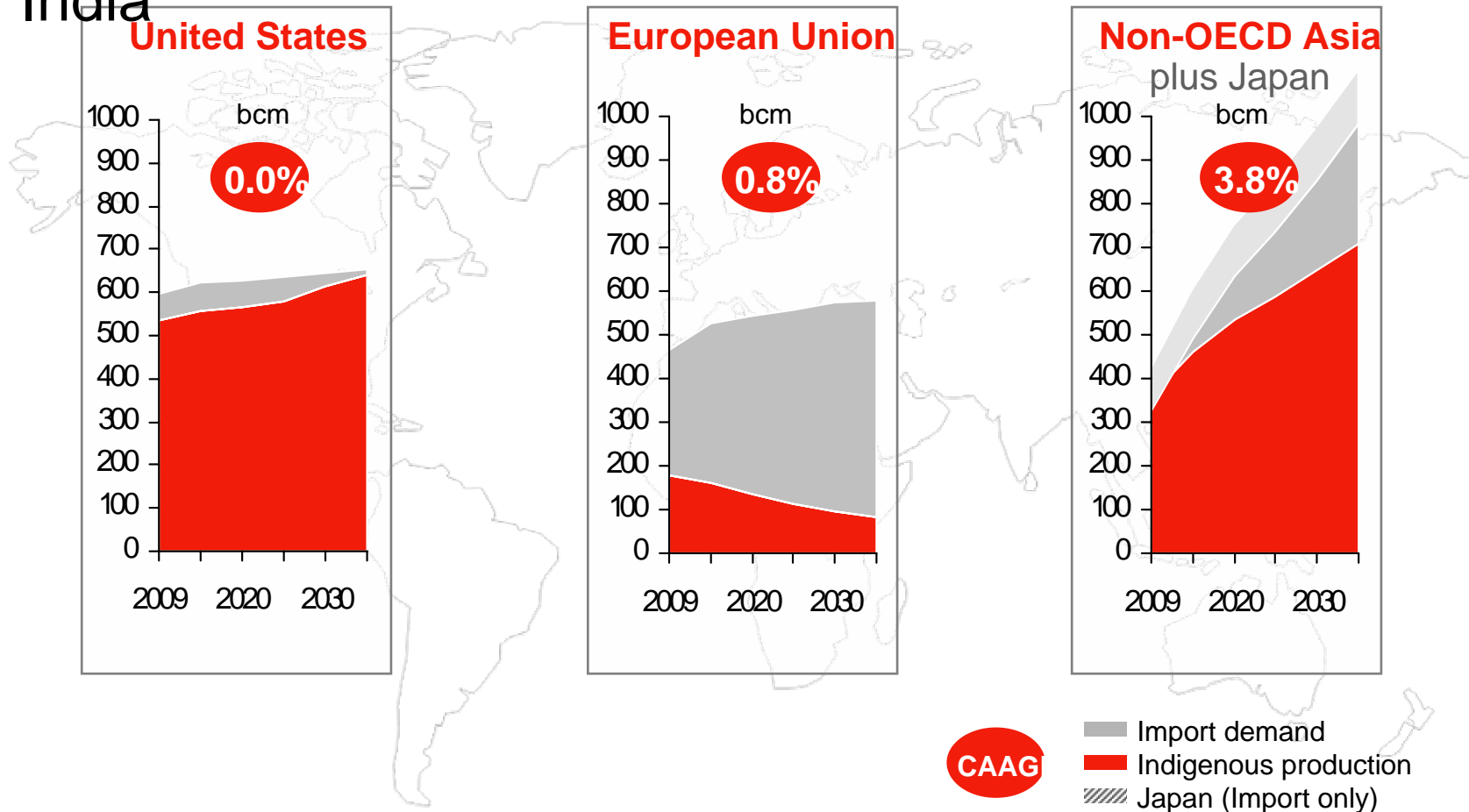


Source: E.ON Ruhrgas

But recently, the historic success story has been put on hold in Europe.

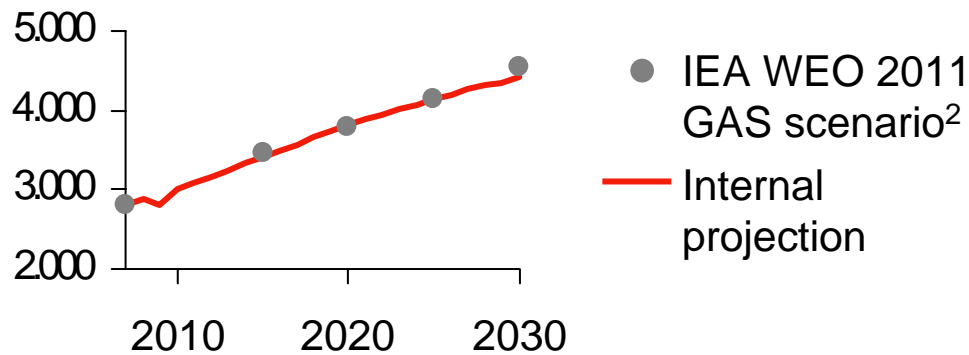
How will gas cope with energy conservation, ren. energ. & other challenges?

While U.S. independent, Europe has the highest import needs – Asian demand growth is driven by China and India

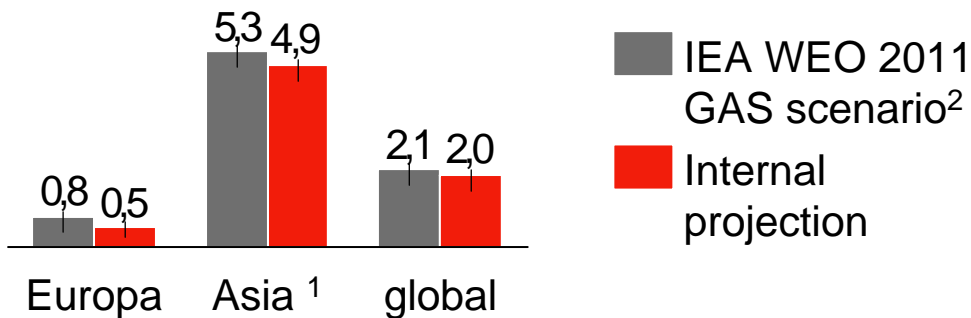


Despite Fukushima only marginal growth in gas demand in Europe – Asia main driver of global demand

Global gas demand [bn m³/a]



Ø Growth in demand p.a. 2007-2020 [in %]



1. Non-OECD Asia i.e. without Japan & South Korea

2. According to IEA World Energy Outlook Report „Golden Age of Gas“

- Gas as ‘the forgotten energy’ of the German energy concept 2010
- After Fukushima new great white hope? – IEA speaks of ‘the Golden Age of Gas’
- Growth in European gas demand strictly limited due to poor economic growth and energy efficiency objectives
- Global gas market primarily determined by demand for energy outside Europe

WEO 2011: only fossil fuel for which demand rises in all three Outlook scenarios.

Gas: „the Bridging Fuel of the Future“?

- So, USA is self sufficient ...
- Ok, Asia is a success story for gas ...
- But what about Europe?

Even if Europe is heading towards renewables: how do we get there?

For Europe, gas could be a bridge, but which type?



Öresund-Bridge

- **Modern and reliable**
- **Long remaining lifetime**
- **Connecting shores**

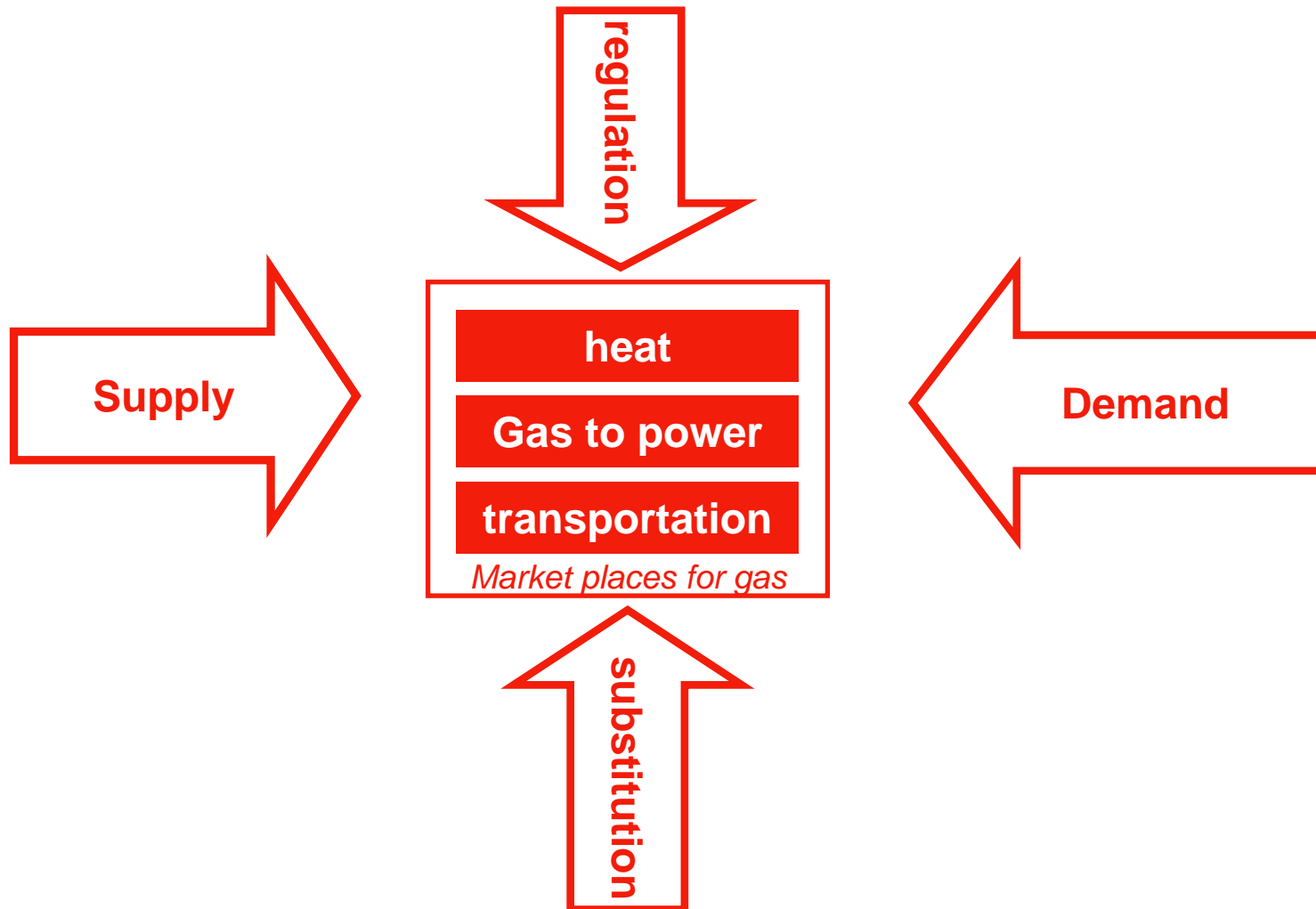
For Europe, gas could be a bridge, but which type?



„Le Pont d'Avignon“

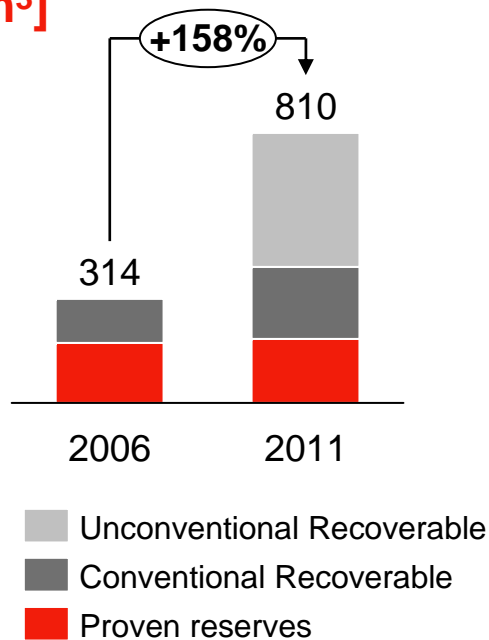
- **Romantic, lovely**
- **Operational days are over**
- **No longer reaching the other shore ...**

The Future of Gas in Europe: Questions

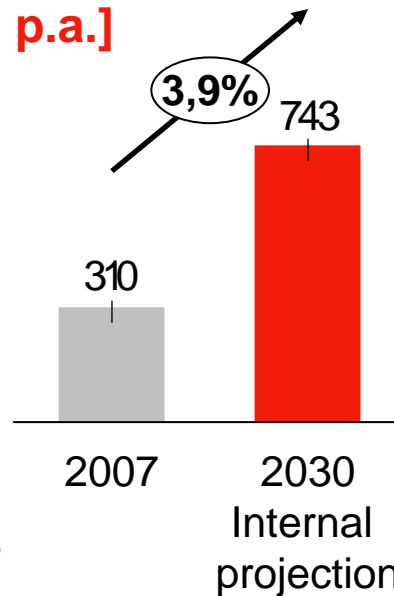


Supply: The world's gas resources can comfortably meet projected demand – unconventional improved the picture

Global Gas Reserves, estimated in 2006/2011¹ [trillion m³]



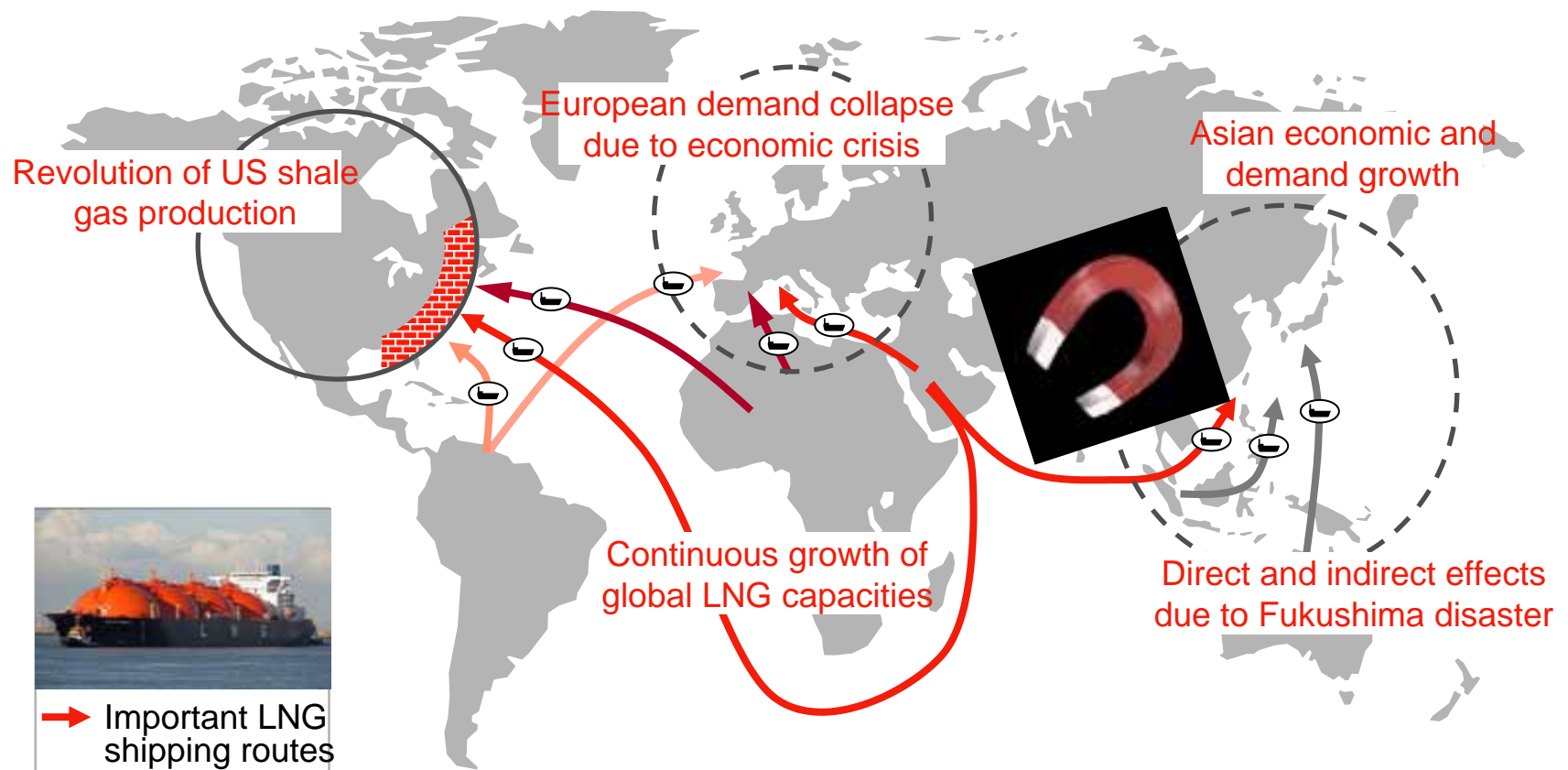
Unconventional gas production in North America [billion m³ p.a.]



- Total recoverable resources of approx. 800 tcm equal to 250 years of production at 2010 levels
- Unconventional gas changed the picture in last 5 years – today it is estimated to account for 50% of resources
- Unconventional gas was a game changer in US, but also has growing potential in Asia, LA and Eurasia
- But, unconventional production raises environmental concerns

1. Source: IEA World Energy Outlook 2006/2011

Supply: European market embedded in global context



Demand: Decarbonisation of European economy is challenging natural gas as a green future energy...

**-80%
GHG**



- EU aims at GHG-reduction of 80%-95% by 2050
- Uncertain gas demand outlook for 2030
 - Eurogas 620 bcm Δ 160 bcm
 - IEA 450ppm 460 bcm

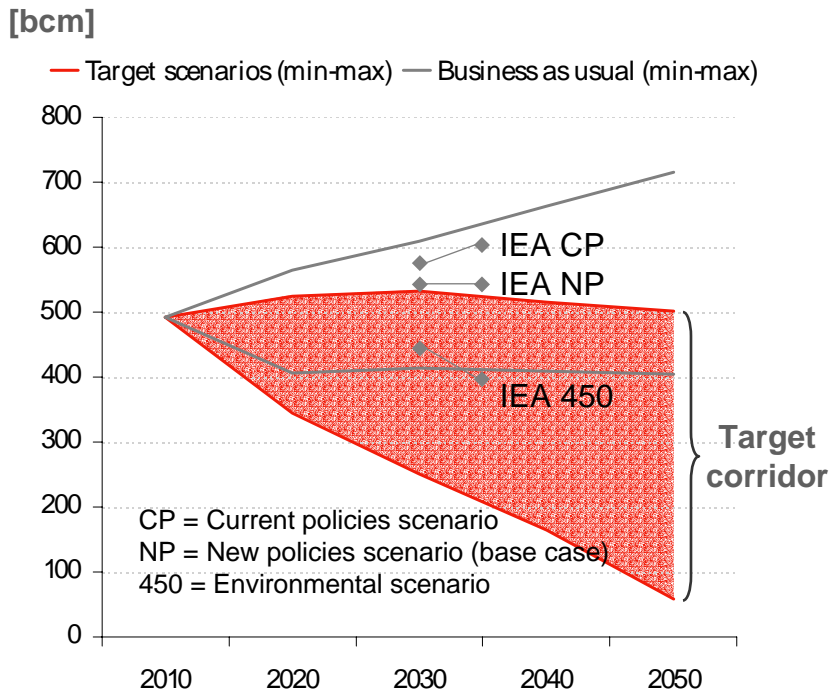
**>50%
RES***



- German energy concept with road map until 2050
- Huge investments in renewables and energy efficiency
- Role of natural gas not appropriately dealt with

Decarbonisation targets increase technological competition of energy systems – fossil fuels under political pressure

Energy studies: EU-27 gas demand 2050 Long-term demand perspective 2050



Power

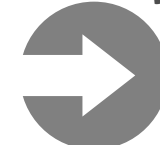


Demand 2050

130-310 bcm



Industry



120-130 bcm



Household



10-20 bcm

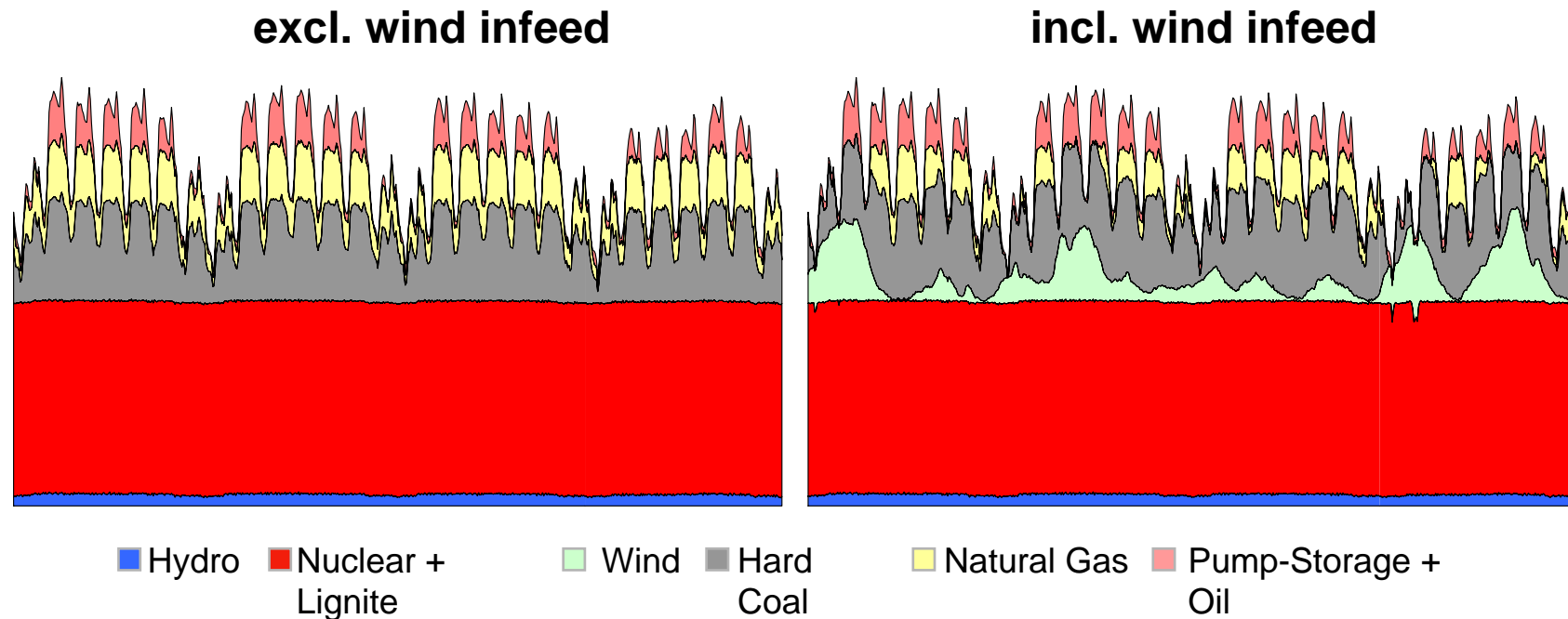


Transpo



10-25 bcm

Demand: With Low Carbon Prices, Gas Suffers Most from Renewables Infeed



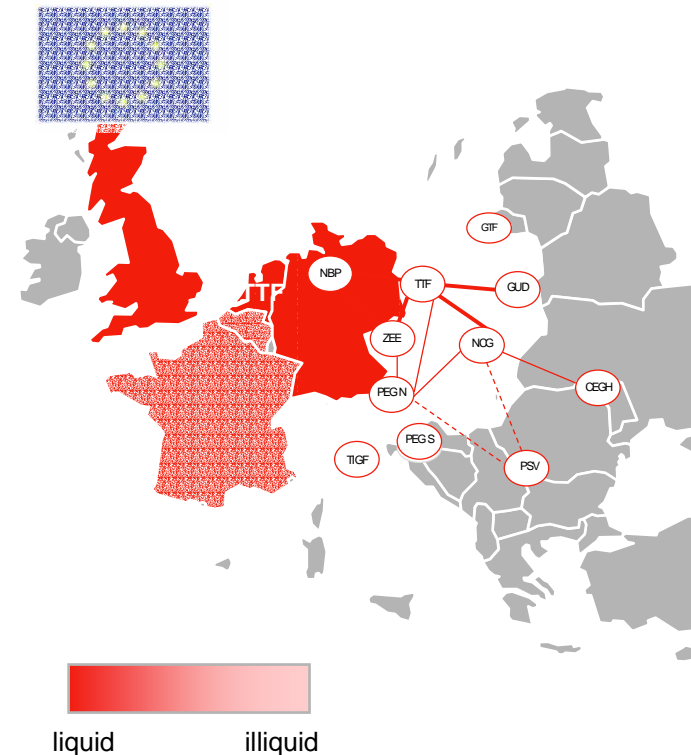
In this example, 40% gas consumption is lost due to wind infeed.

European energy markets are highly competitive – functioning integrated market expected

European market framework

- Transparent and competitive market environment
- Market opening through national regulation
- Cross-border market integration by European regulation
- European gas hubs: continuing growth of volumes and liquidity
- Strong correlation between national trading hubs (NBP, ZEE, TTF, NCG)
- Sustainable decoupling of oil-based LTC prices and hub prices

Liquidity in Continental European markets

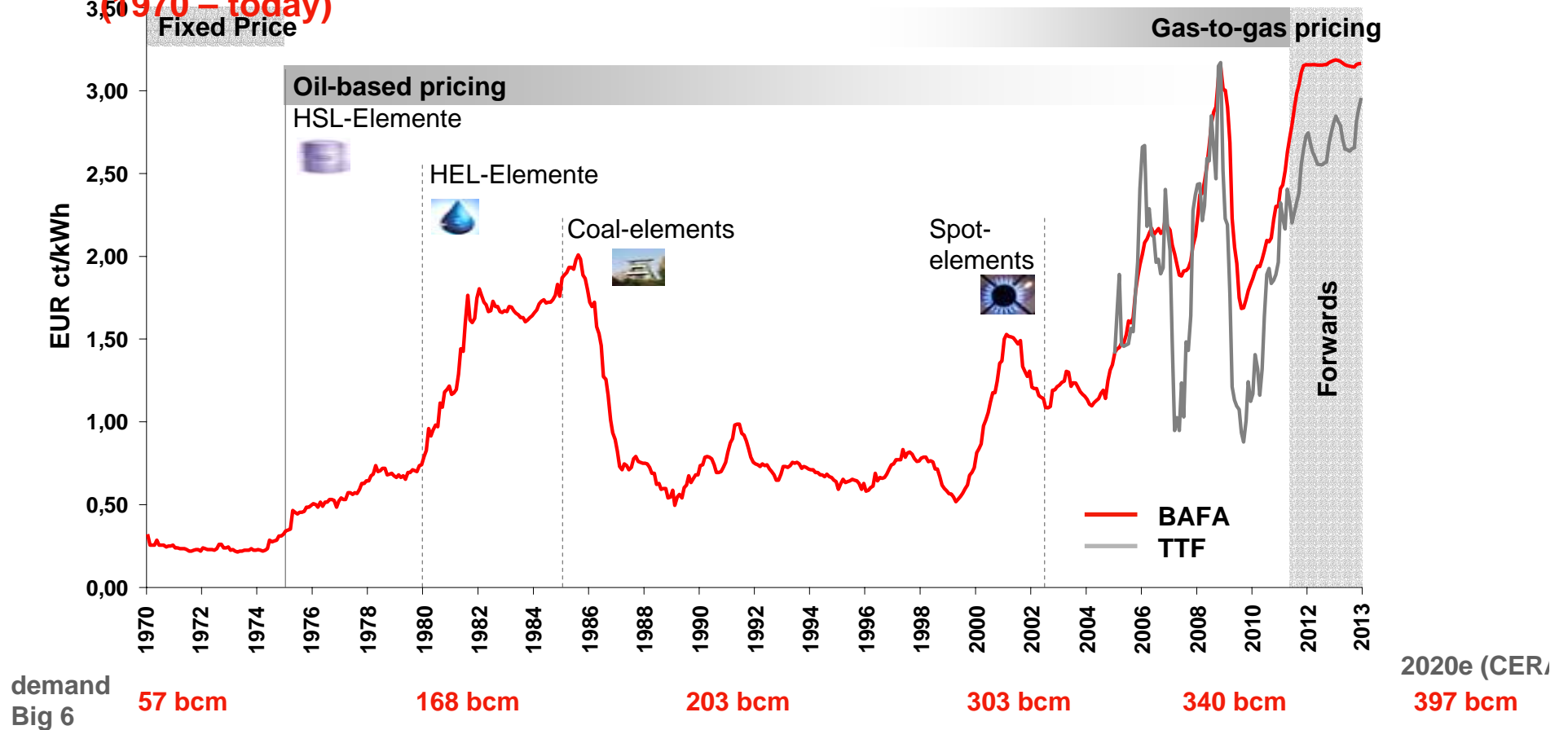


Source: Heren Liquidity Index

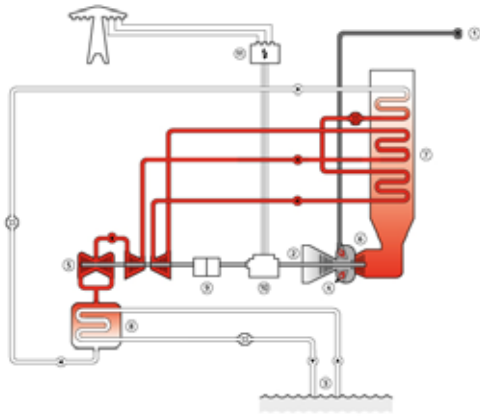
In the Past, the Gas Industry Has Successfully Adapted

...

Example Germany: Development of import price and indexation elements (1970 – today)



Technology: World Record Power Plant „Ulrich Hartmann“



Key Information		Timing / Milestones	
Name:	CCPP Irsching 4	Start Project	06 / 2004
Type of Plant:	CCGT	Development:	
Owner:	E.ON Kraftwerke	Start EPC Contract:	11 / 2005
Location:	Irsching, Germany	Start Plant Erection:	04 / 2006
Gross Capacity:	569 MWel	First Fire:	01 / 2011
		COD:	07 / 2011

Technical Specifics		Main Partners /	
Fuel Type:	Natural Gas	Siemens	EPC Power Plant
Net Efficiency:	60,4 %	E.ON Ruhrgas:	Gas pipeline 12 km
Gas Turbine:	Siemens SGT5 / 8000	E.ON Netz:	Grid Connection 400 kV
Gross Capacity:	570 MW		
Fuel Cons:	91.000 Nm ³ /h		
Steam Turbine:	Siemens SST5 / 5000		
Gross Capacity:	200 MW		
Emissions:	330 g/kWh		
Grid	400 kV		

Connection:

Gas: „the Bridging Fuel of the Future“? - conclusions

- The market position of gas will be heavily challenged until 2050 in all relevant market segments.
- Best technology has to be available.
- Supply seems to be manageable from a resource perspective. But who will take the necessary risks and investments in a changing market environment?
- Political support and political targets are still unclear.
- Producers' market behaviour will have a vital role in enabling the further development of the markets for gas through reliable, economical supplies.

The continuation of the gas success story in Europe is not a self starter and needs active development in all parts of the value chain!



E.ON AG

Thank you very much
for your attention



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please contact:

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