



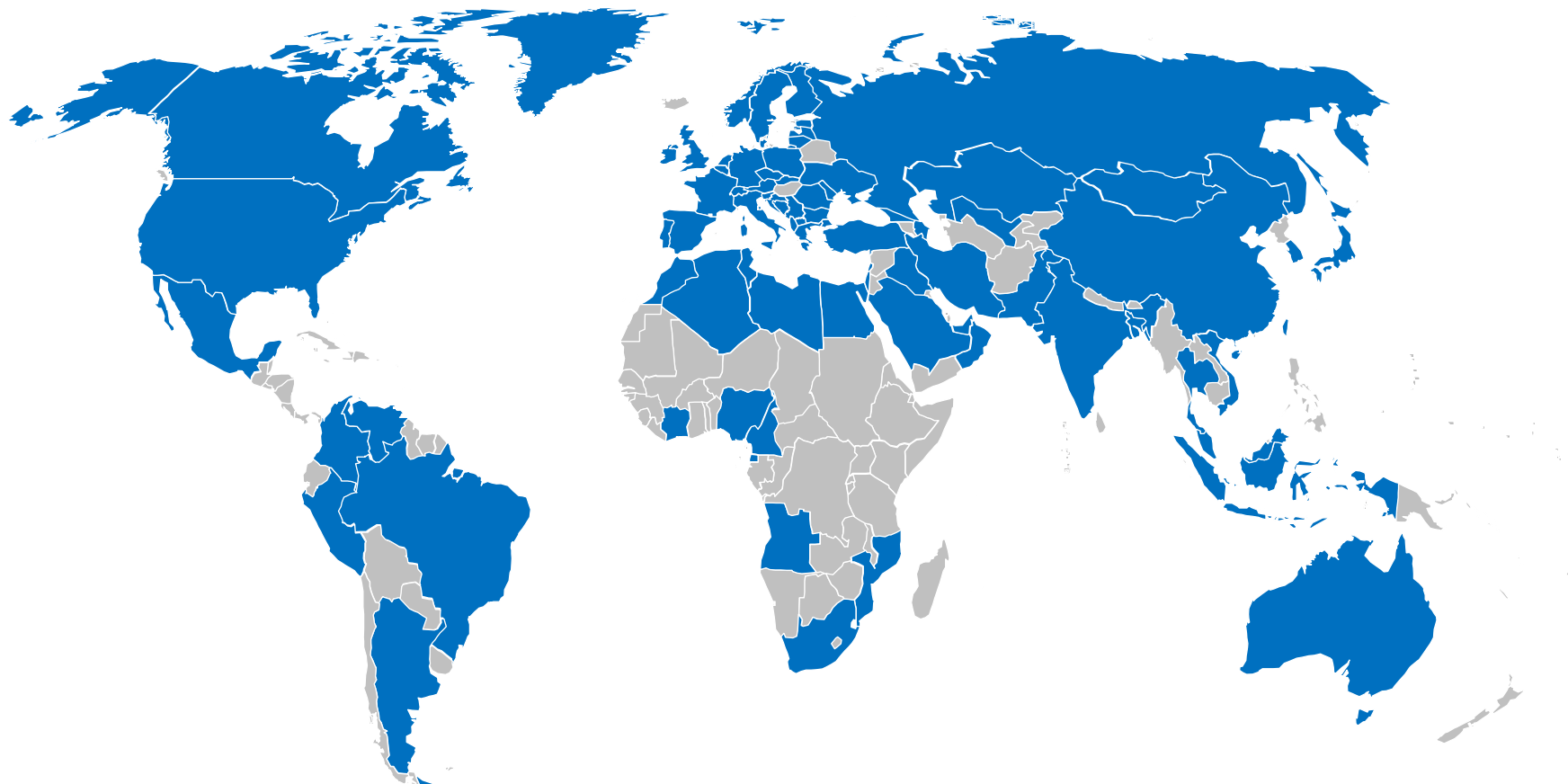
A New Role for Gas in a Green Economy

**Torstein Indrebø, Secretary General
International Gas Union**

Geneva, 22 November 2013

International Gas Union

- Supporting the gas industry worldwide



Founded in 1931

www.igu.org

 IGU members

83 Charter members
43 Associate members

The global energy future

Drivers:

- Rising population & middle class
- Economic development and job creation
- Public health: urban air quality
- Environmental concerns



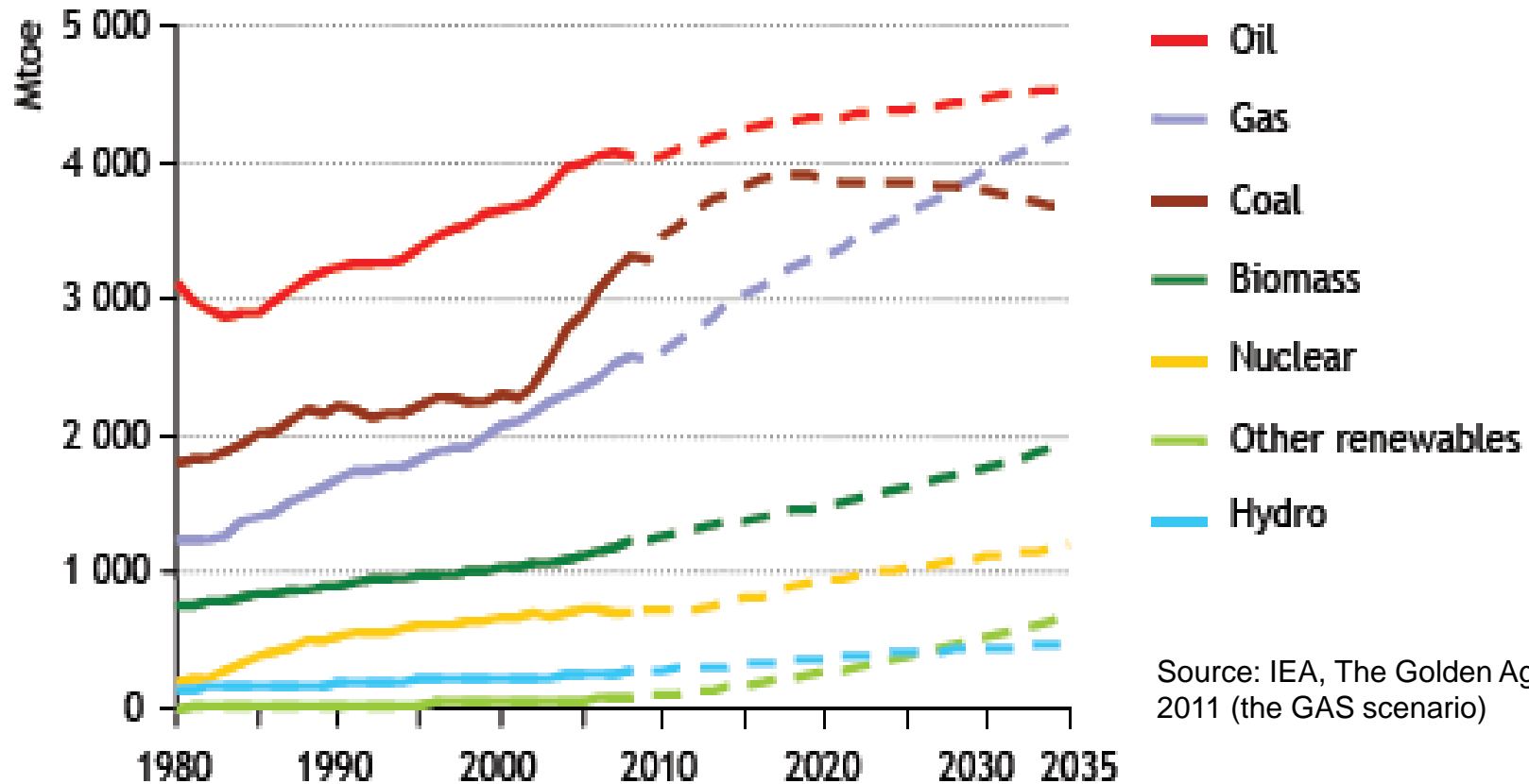
The world needs energy services:

- **Reliable, clean, affordable, safe**



Balanced and robust policies required

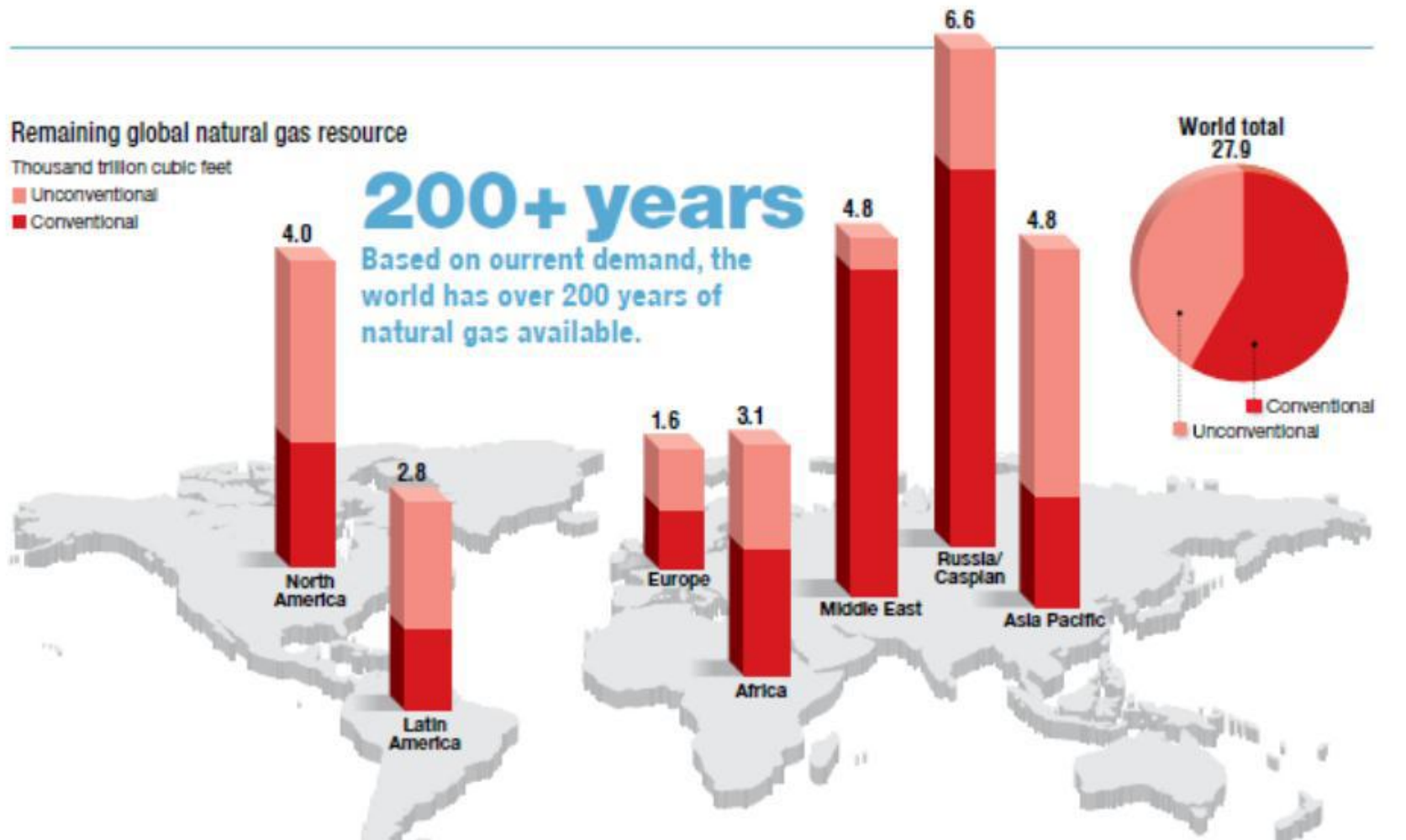
Growing energy demand – need for all energy sources available



Source: IEA, The Golden Age of Gas, 2011 (the GAS scenario)

- Oil and coal declining in the long run whereas gas and renewables are increasing

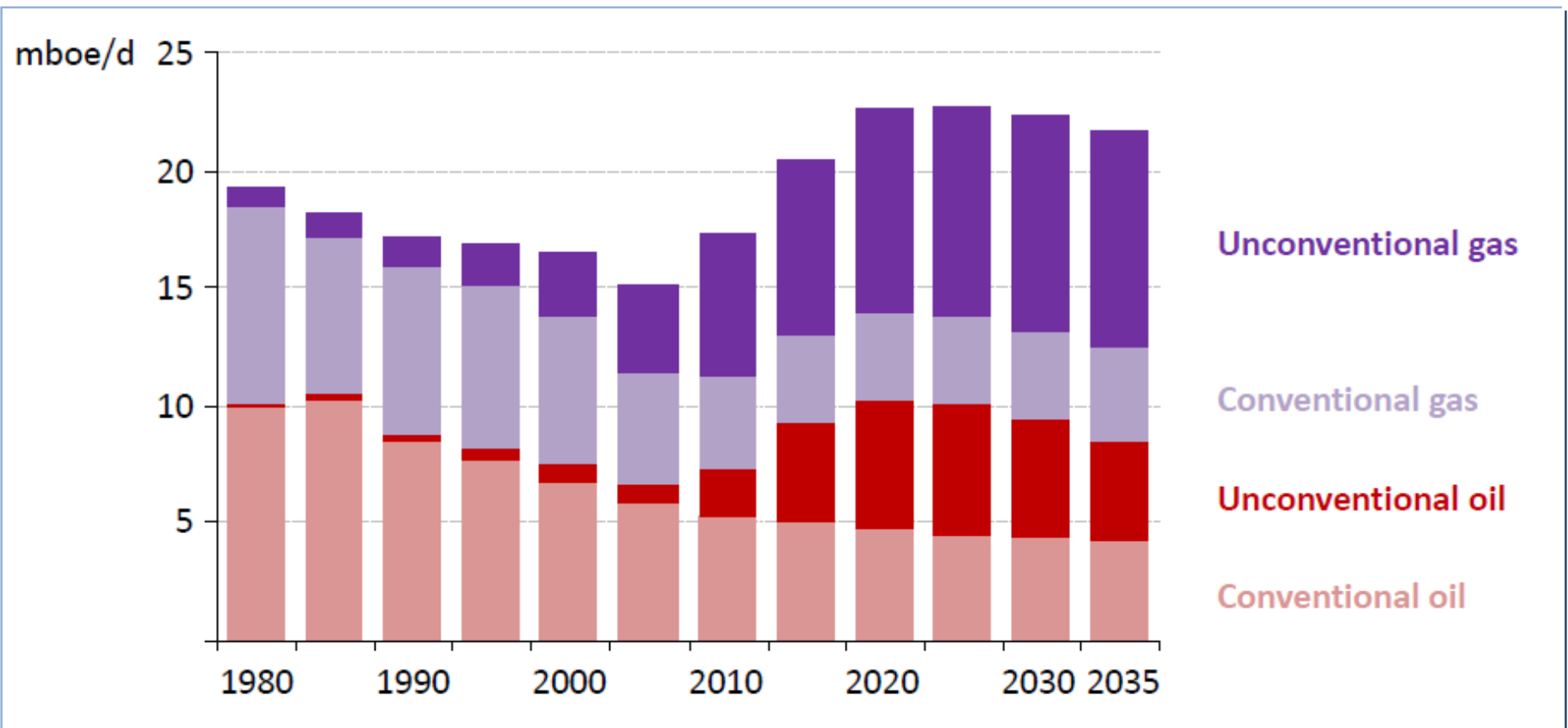
Gas is available - and widely distributed



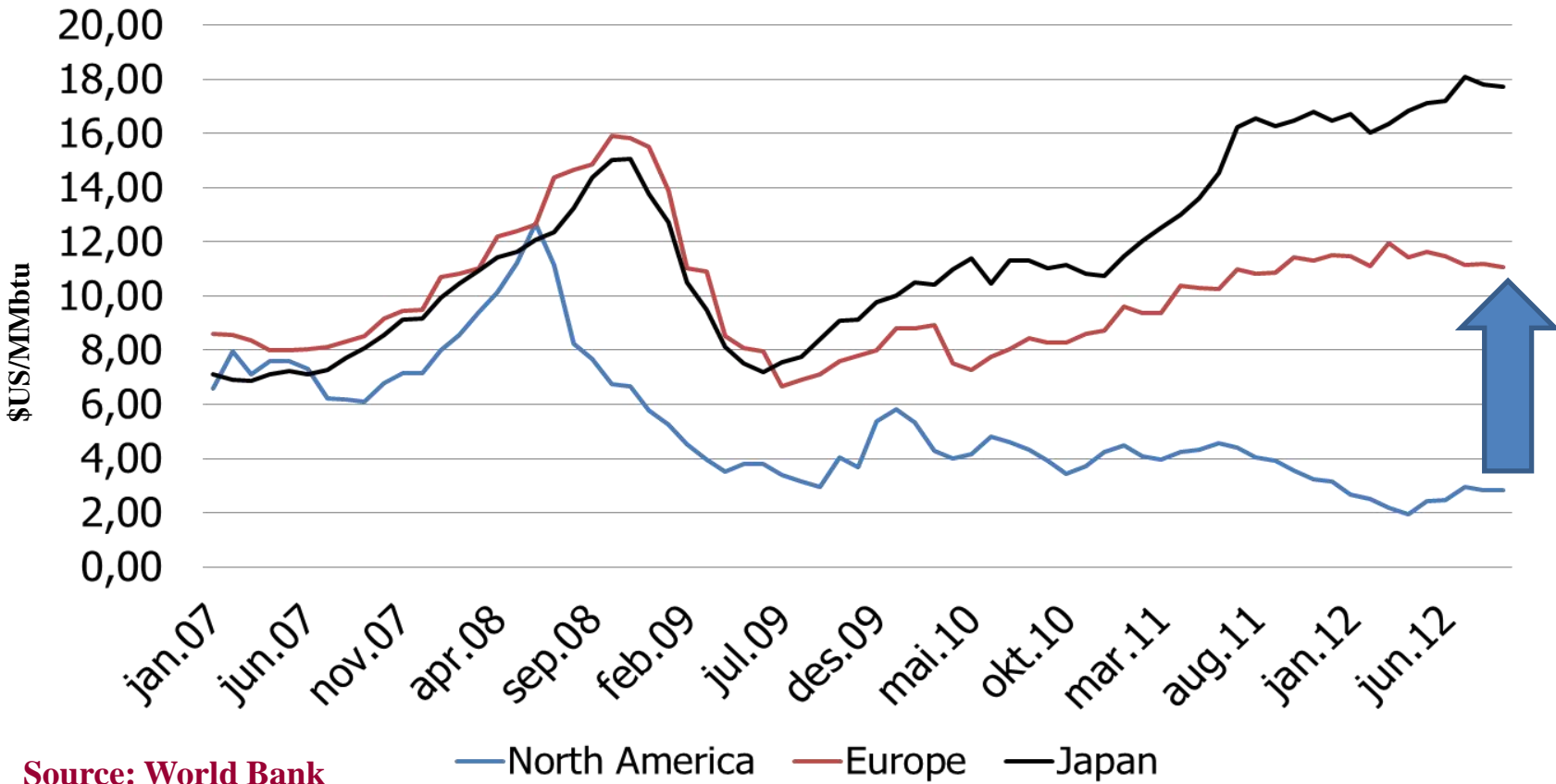


Do Not Drink
His Water

US Oil and Gas Production (IEA)



World Natural Gas Prices



**Cost of export from US to Asia/Europe:
Henry hub plus 5-6 USD/mmbtu**

Natural gas fueling the global economy – offers a wide range of applications



Fuel for
Gas District Cooling



Fuel for
Residential



Fuel for
Commercial



Fuel for
Automotive



Fuel for
Industry



Fuel for
Power Generation



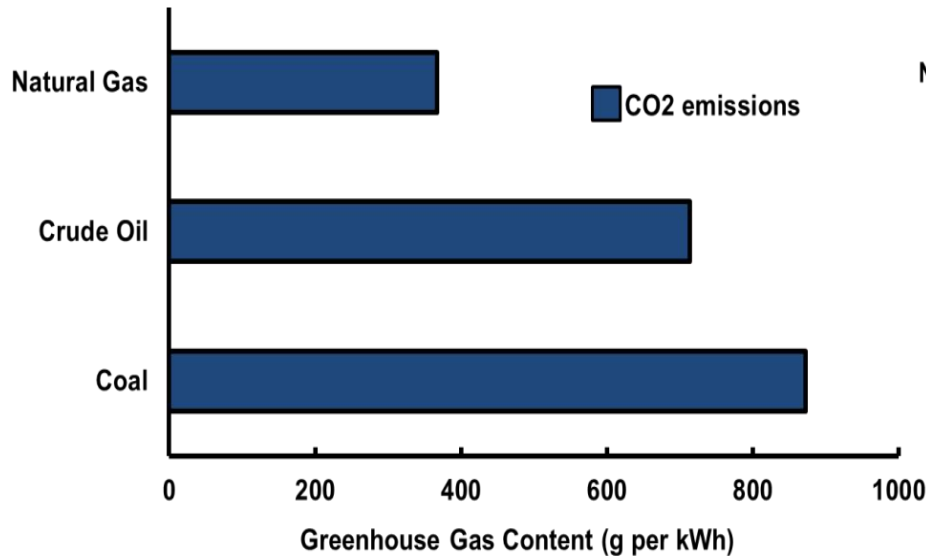
Fuel for
Petrochemical Feedstock

Natural gas in the power sector

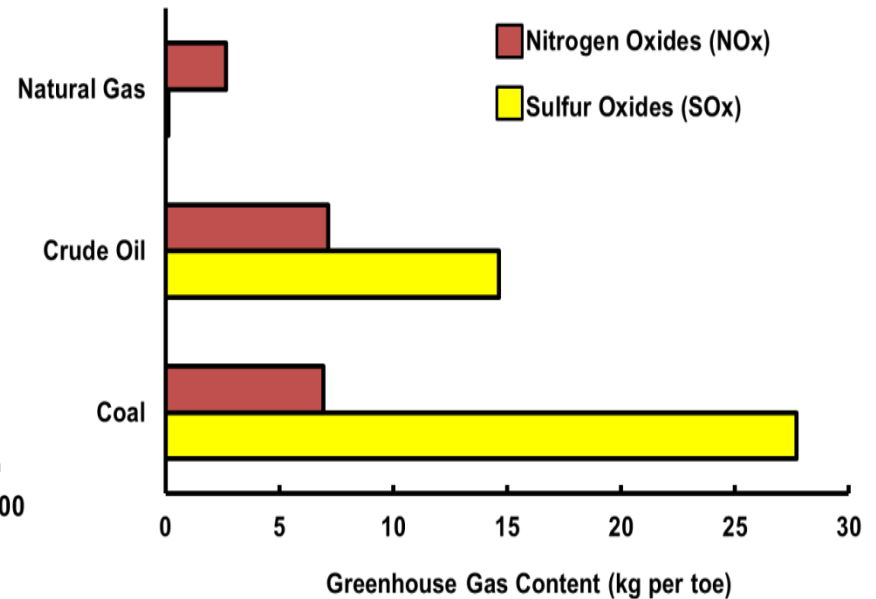


....clean-burning and affordable

Carbon dioxide emitted during electricity generation by fuel



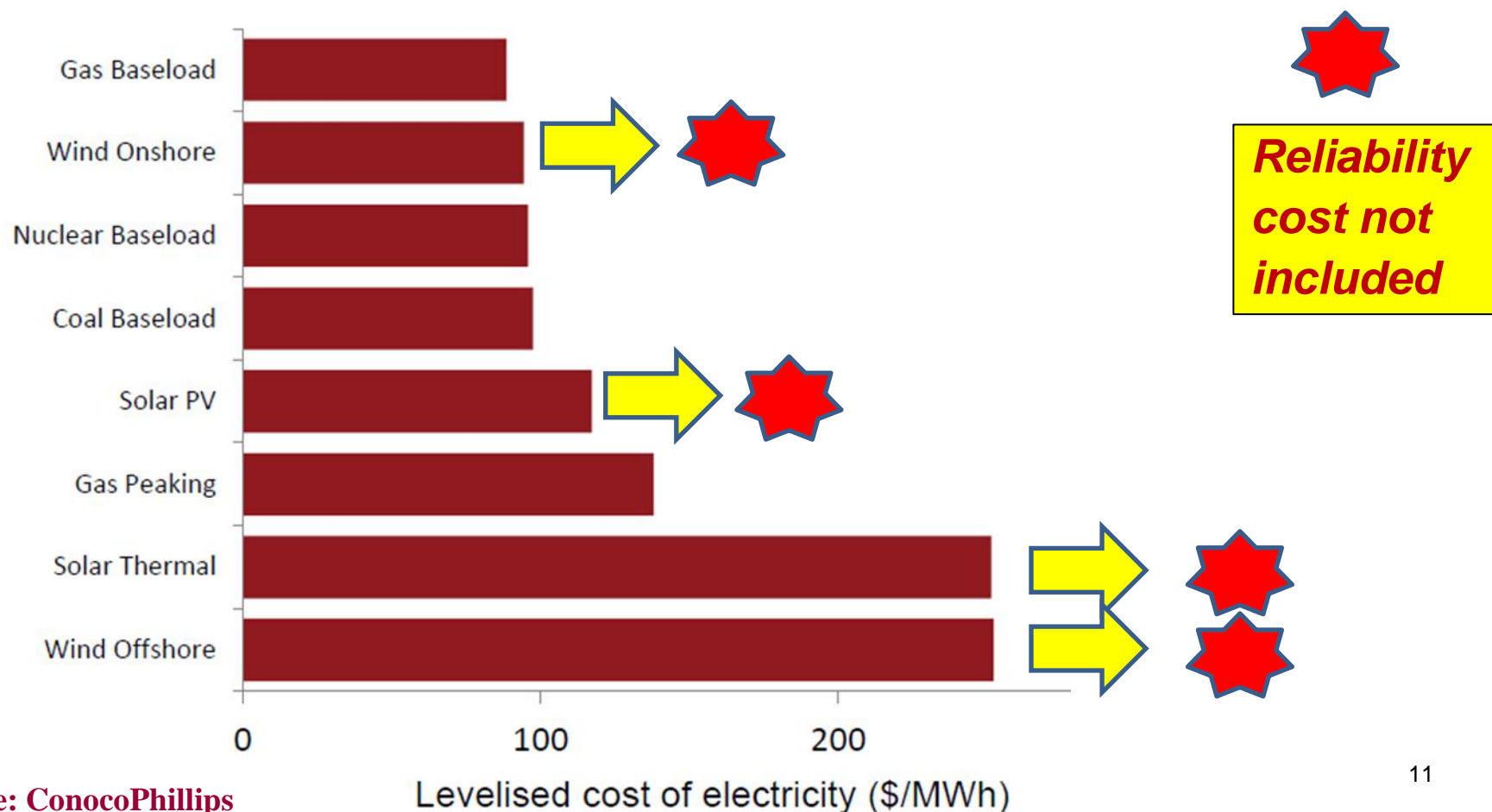
NOx and SOx content by fuel



Natural Gas – competitive & affordable

Comparison of generation cost

(10 eur/T CO₂, 10 usd/mmbtu gas, 100 usd/mt coal, cap cost EIA 2013)



Natural gas partnering with renewables

Society needs energy 24 hours / 7days

Gas



Wind



Solar



Hydro



**Capacity
utilisation**

90-100%

30-40%

10-25%

Drought

***Natural gas easy
to turn on and off***



People are also concerned about impact of renewable energy.....

- **Windmills – landscape and birds**
- **Solar - use of land**
- **Hydro - dams taking land away**
- **Transmission lines – mega structures**
- **Electricity bills**



.....but we all need energy!

Cost of back-up for renewable energy

Energy security requires investments:

- Double capacity often needed
- Capacity payments for power plants?
- What about: gas storage, gas pipelines, production systems?



Reality check is required

Natural gas for transportation (CNG/LNG)



Less

- Particles/soot
- CO₂
- NO_x - smog



Fleets



Maritime

Economics & environment – the main drivers

Particulate Matter – urban air quality

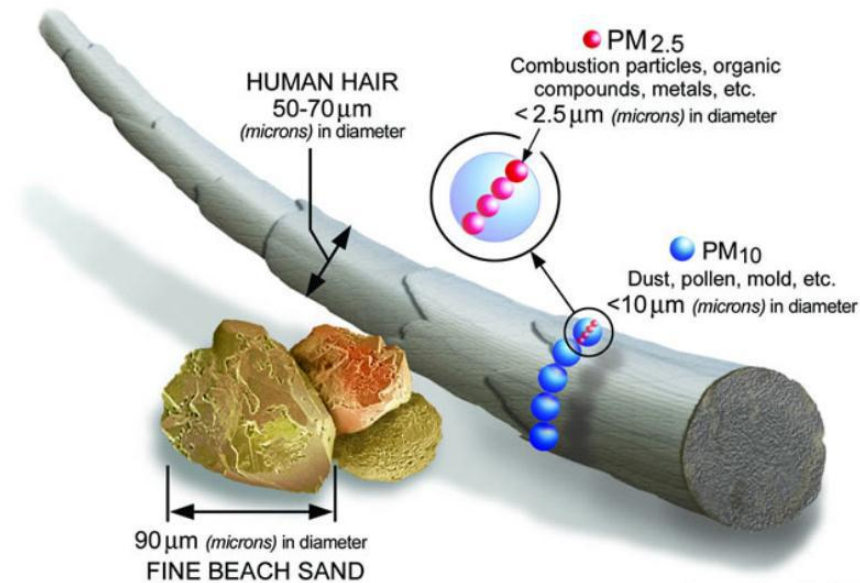


Image courtesy of the U.S. EPA

Fine particles PM 2.5 may cause health problems as:

- *premature deaths*
- *heart and lung diseases*
- *asthma, coughing*

Electric cars – increasing in urban areas



Less

- **Particles/soot**
- **Local air quality**

Less

- **CO₂?**

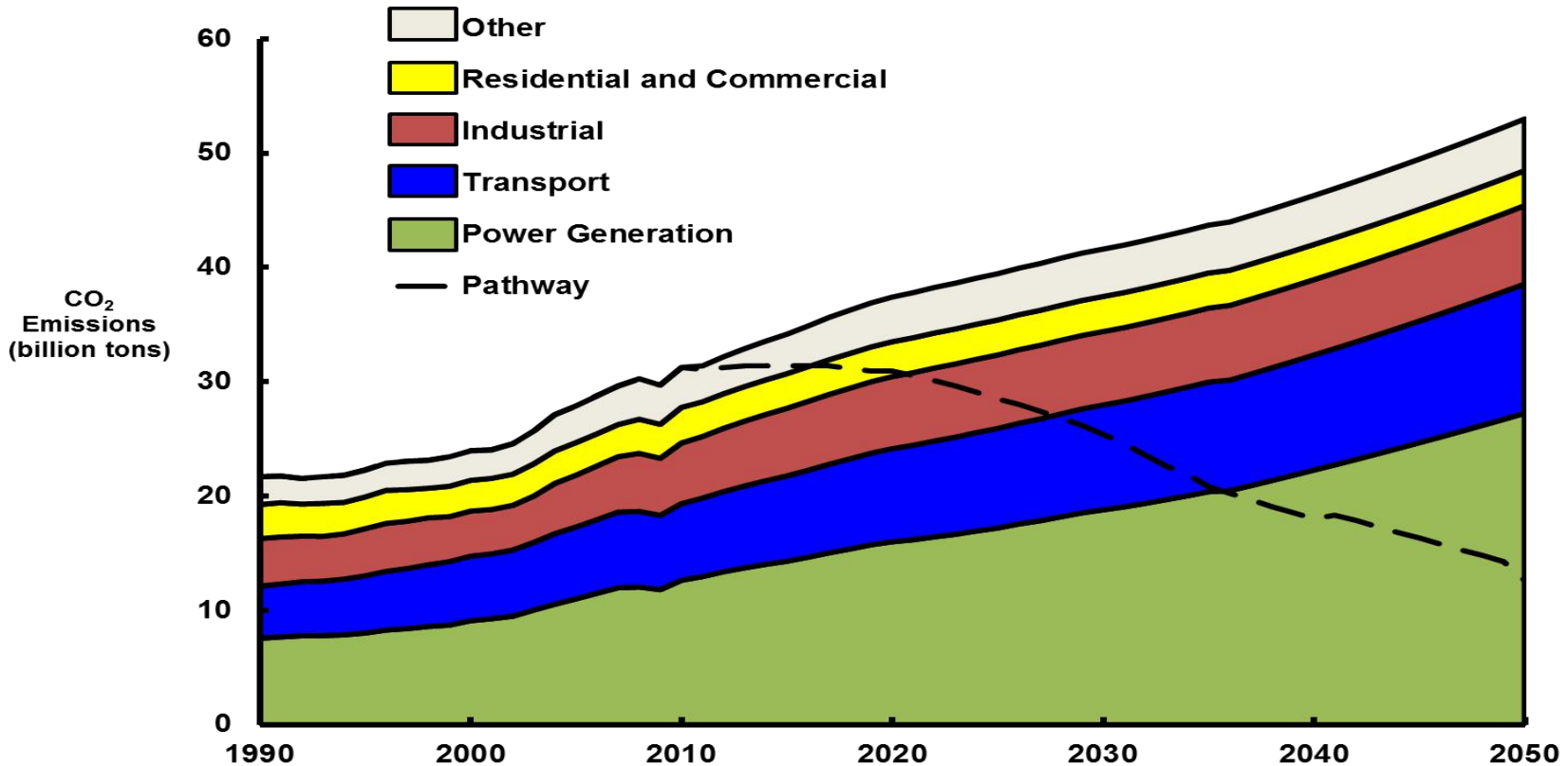


How is the electricity produced?

The Pathway towards a Sustainable Future

Meeting future global energy needs
whilst addressing air quality and climate change concerns

Global Emissions Trajectory Base Case



Enhanced use of gas in UNECE-region

- **Economic and social development**
 - Jobs, government income, trade
- **Improved urban air quality**
- **Reduction of greenhouse gases**
- **Transfer of technology across UNECE-region**



Gas: providing sustainable energy solutions

Thank you for your attention!



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