



# **APPEA 2014**

## **Plenary session: Sustaining our Natural Advantage**

**7 April 2014**

*Natural gas:  
as an integral part of a sustainable global energy future*

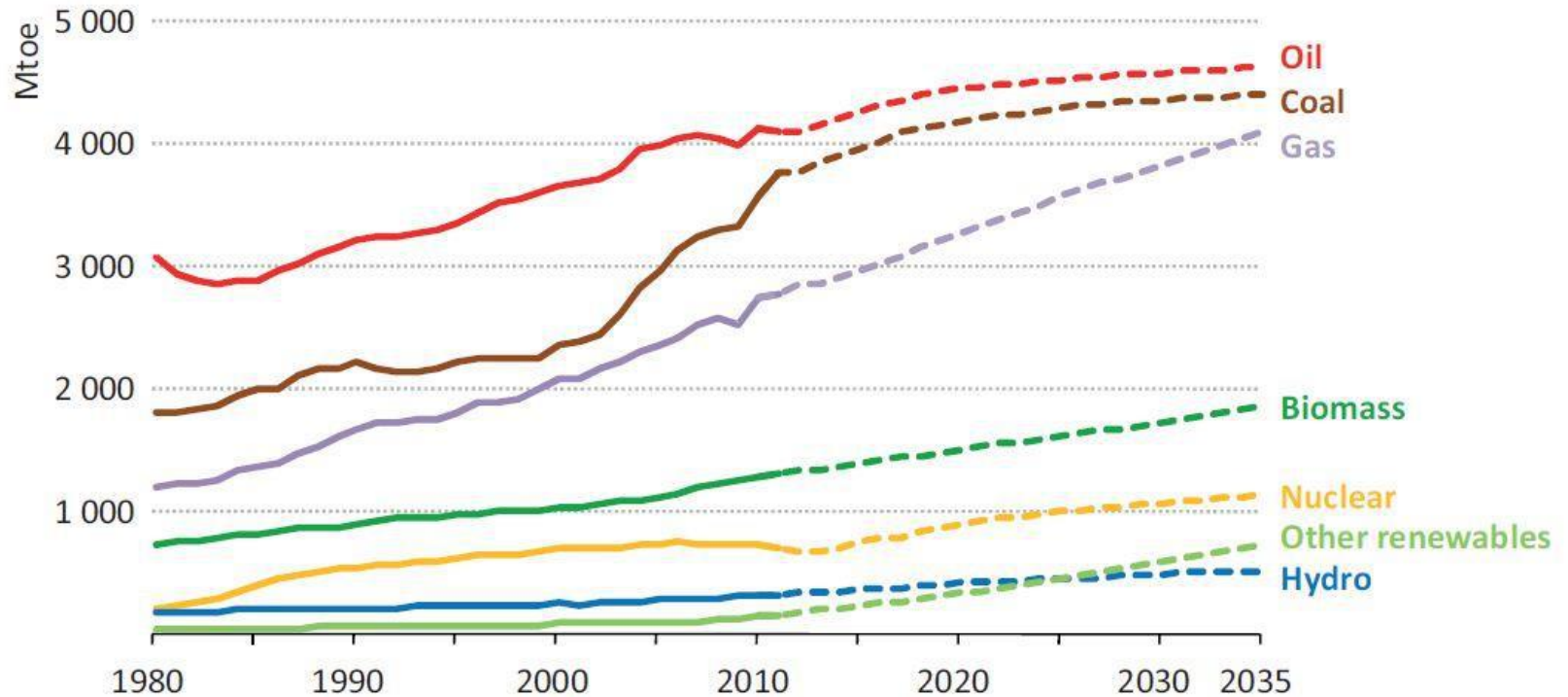
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**Jérôme Ferrier**  
**Président IGU**

# IGU is the voice of 95 % of the Global Gas Market



# Primary Energy Global Demand 1980 – 2035



Source: IEA WEO 2013 NPS

# Remaining technically recoverable gas resources by type and region, *end-2012* (Tcm)

## World gas consumption in 2012

3300 Bcm

|                   | Conventional | Unconventional |            |                 | Sub-total  | Total      |
|-------------------|--------------|----------------|------------|-----------------|------------|------------|
|                   |              | Tight gas      | Shale gas  | Coalbed methane |            |            |
| E. Europe/Eurasia | 143          | 11             | 15         | 20              | 46         | 190        |
| Middle East       | 124          | 9              | 4          | -               | 13         | 137        |
| Asia-Pacific      | 44           | 21             | 53         | 21              | 95         | 138        |
| OECD Americas     | 46           | 11             | 48         | 7               | 66         | 112        |
| Africa            | 52           | 10             | 39         | 0               | 49         | 101        |
| Latin America     | 32           | 15             | 40         | -               | 55         | 86         |
| OECD Europe       | 26           | 4              | 13         | 2               | 19         | 46         |
| <b>World</b>      | <b>468</b>   | <b>81</b>      | <b>212</b> | <b>50</b>       | <b>343</b> | <b>810</b> |

Reserves in years  
of production

Conventional  
140 years

Unconventional  
100 years

Sources: BGR (2012); US EIA (2013); USGS (2000); USGS (2012a and 2012b); IEA databases and analysis

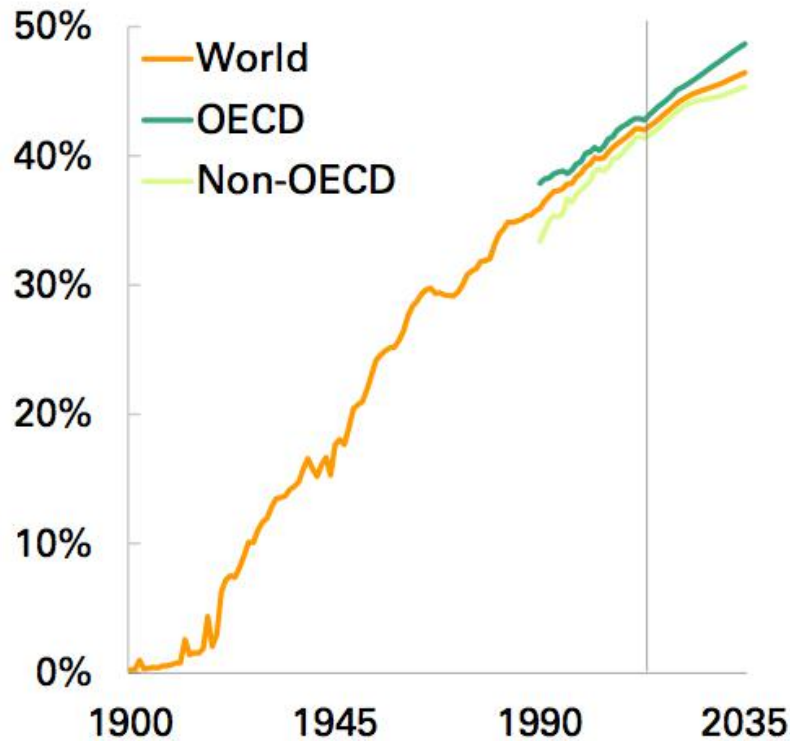
# Number of People without Access to modern Energy Services 2011- 2030

|                             | Without access to electricity |            | Without access to clean cooking facilities |              |
|-----------------------------|-------------------------------|------------|--|--------------|
|                             | 2011                          | 2030       | 2011                                       | 2030         |
| <b>Developing countries</b> | <b>1 257</b>                  | <b>969</b> | <b>2 642</b>                               | <b>2 524</b> |
| Africa                      | 600                           | 645        | 696  | 881          |
| Sub-Saharan Africa          | 599                           | 645        | 695  | 879          |
| Developing Asia             | 615                           | 324        | 1 869                                      | 1 582        |
| China                       | 3                             | 0          | 446  | 241          |
| India                       | 306                           | 147        | 818  | 730          |
| Latin America               | 24                            | 0          | 68   | 53           |
| Middle East                 | 19                            | 0          | 9  | 8            |
| <b>World</b>                | <b>1 258</b>                  | <b>969</b> | <b>2 642</b>                               | <b>2 524</b> |

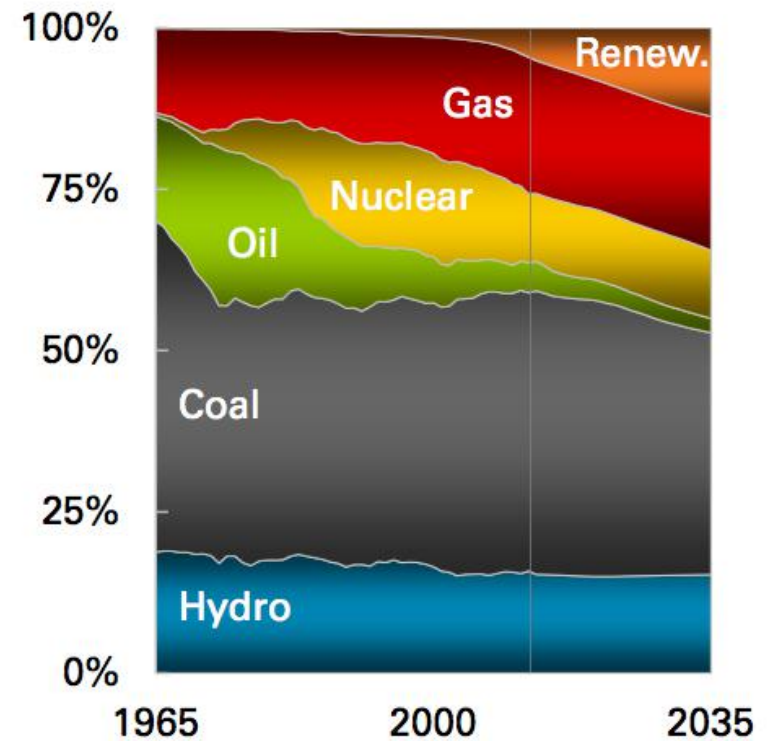
Source: IEA WEO 2013 NPS

# The Power Sector takes an increasing Share of Energy

### Inputs to power as a share of total primary energy



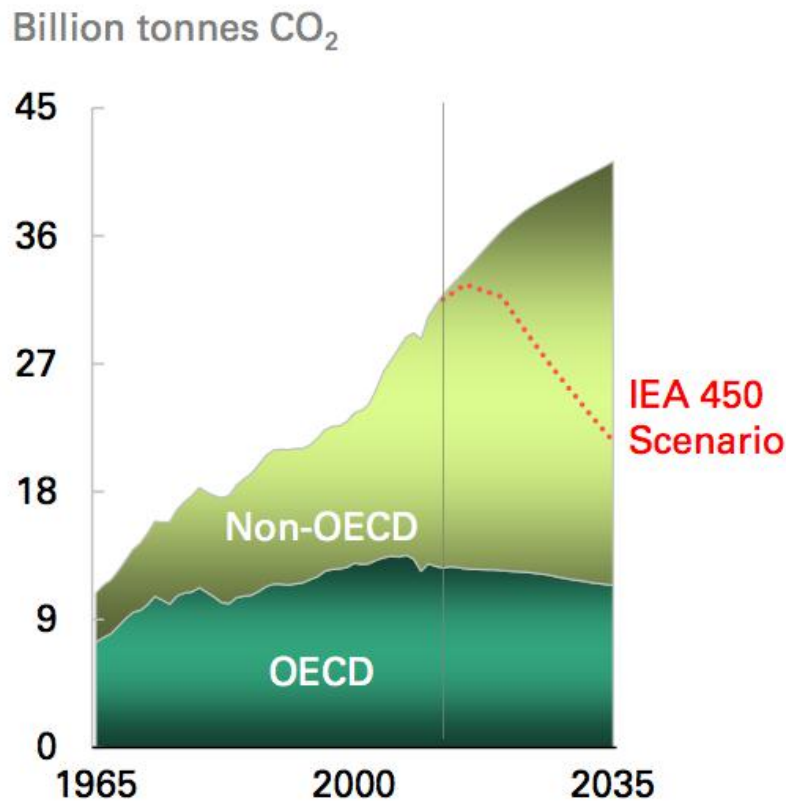
### Primary inputs to power



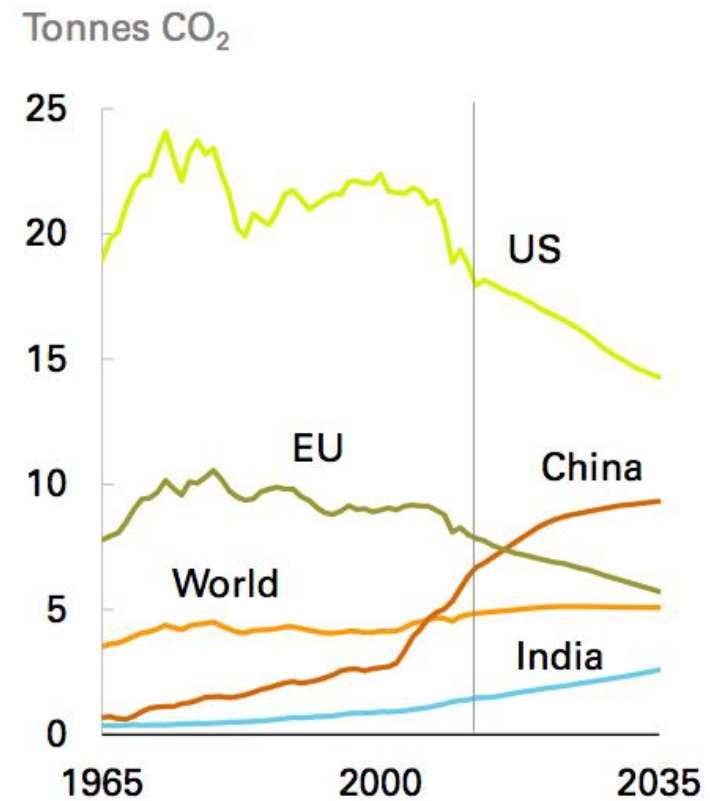
Source: BP Energy Outlook 2035

# CO2 Emissions from Energy Use continue to rise

## Emissions by region



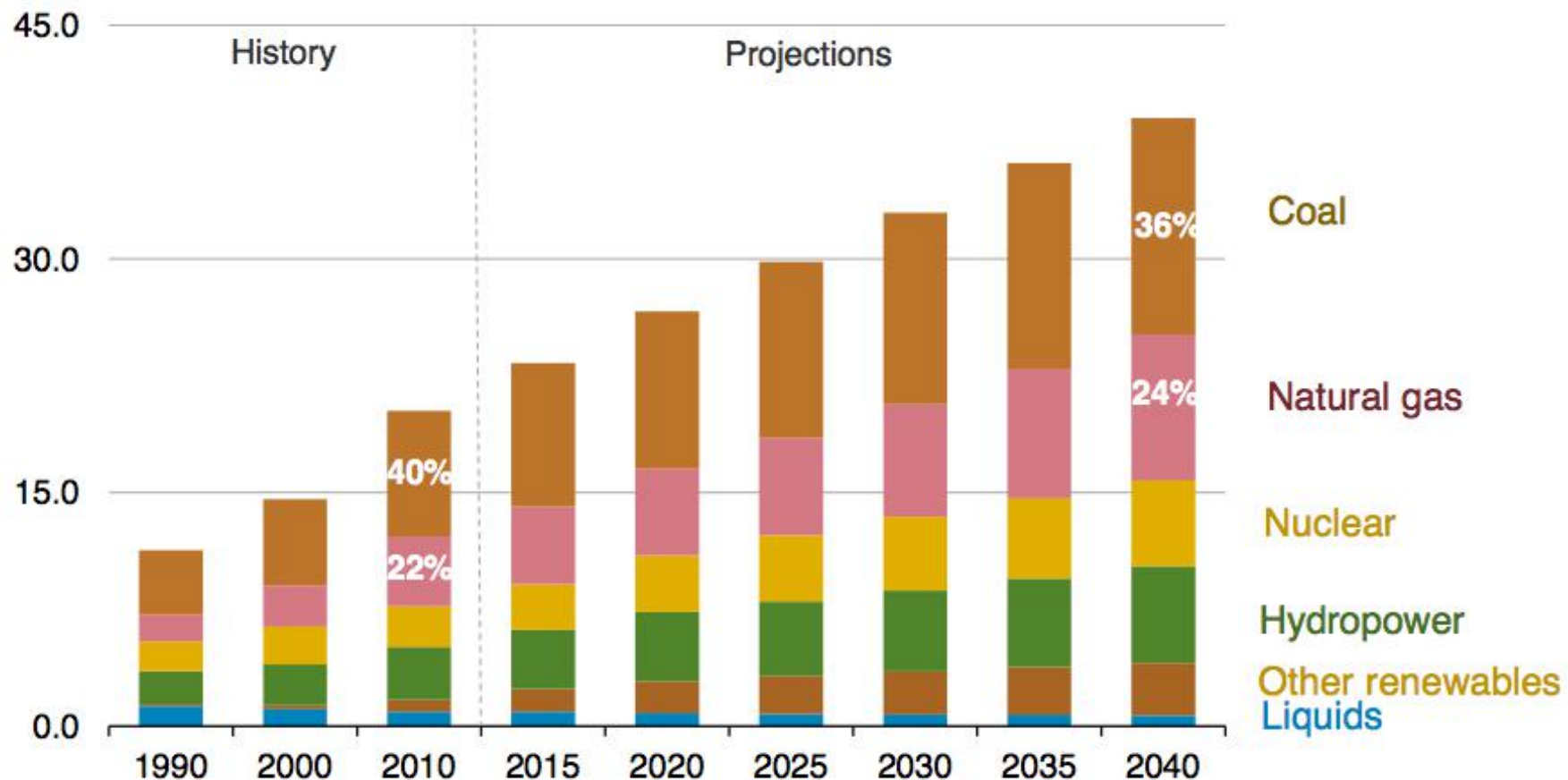
## Emissions per capita



Source: BP Energy Outlook 2035

# Coal still fuels the largest share of electricity generation in 2040

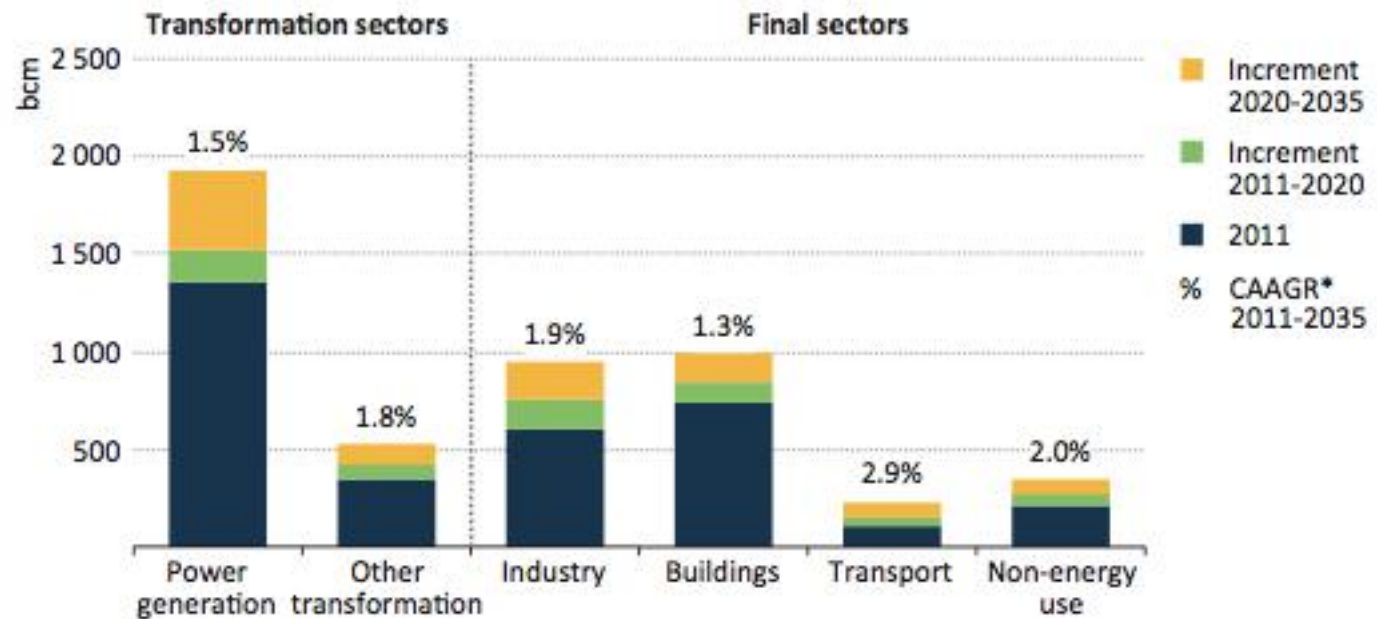
world electricity generation by fuel  
billion kilowatthours



Source: EIA, WEO 2013 NPS



# World Natural Gas Demands by Sectors 2011 to 2035

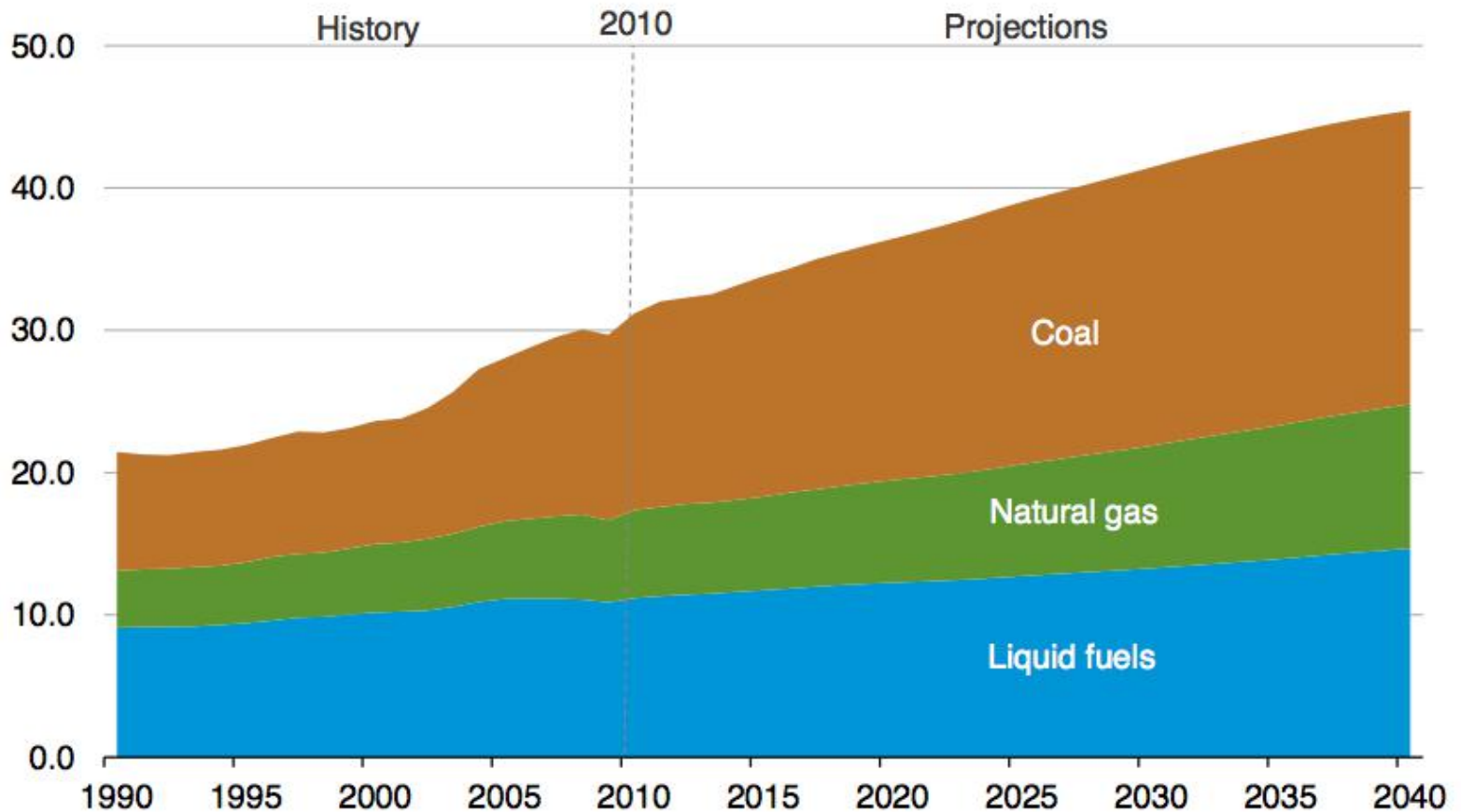


\* Compound average annual growth rate.

Source: IEA WEO 2013 NPS

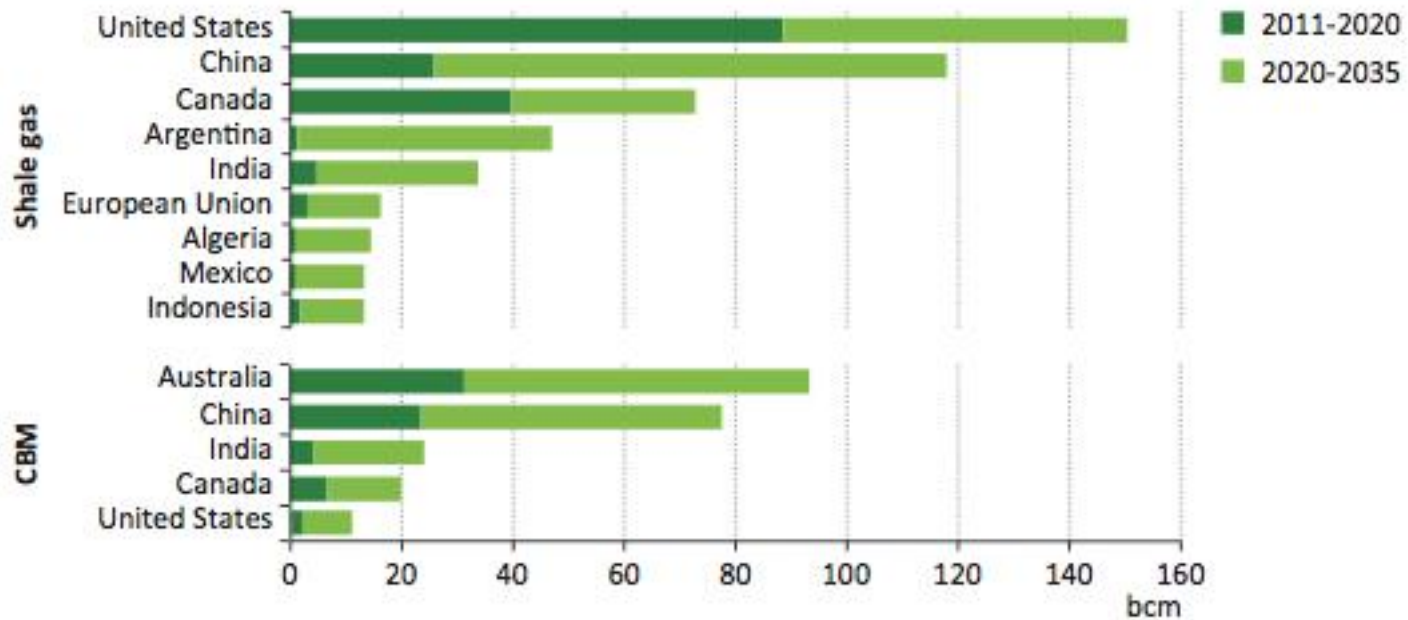
# Coal continues to account for the largest share of CO<sub>2</sub> emissions throughout the projection

world energy-related carbon dioxide emissions by fuel  
billion metric tons



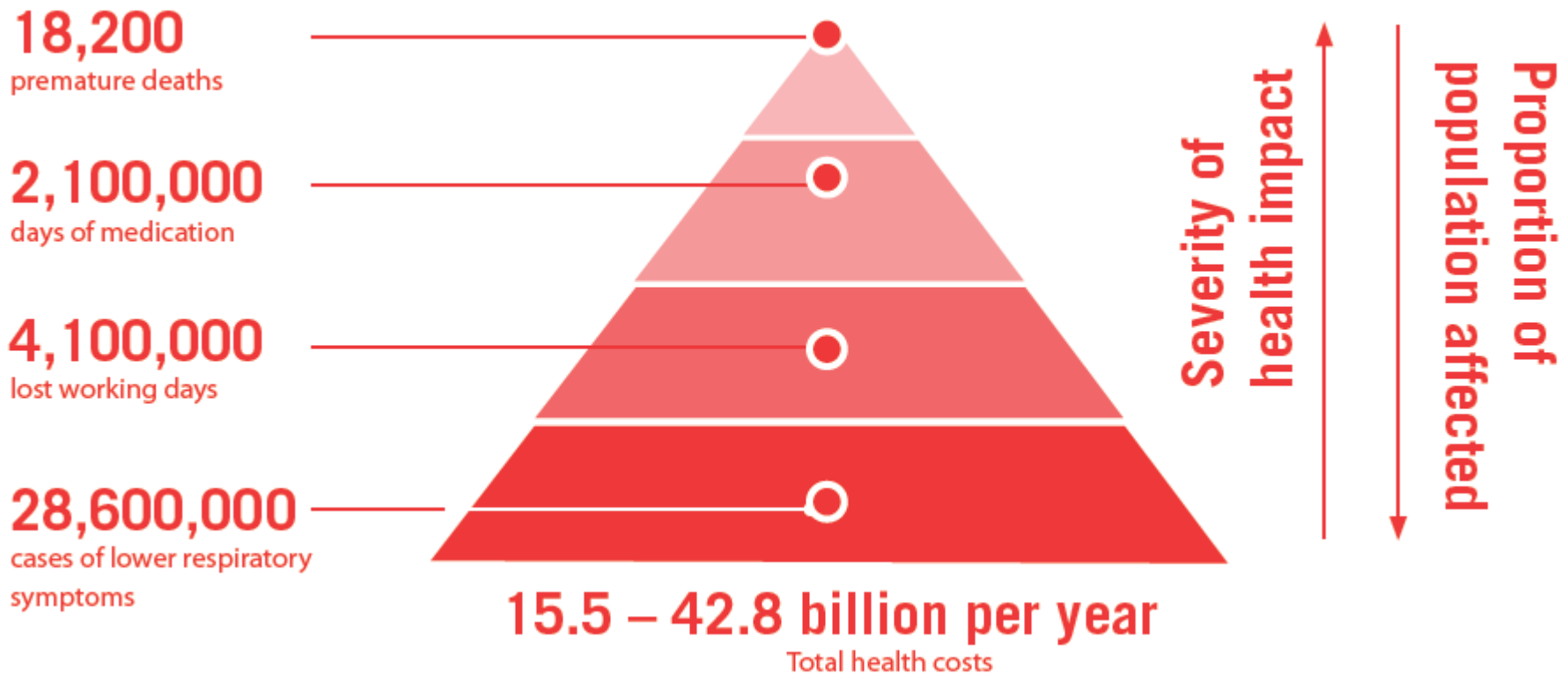
Source: EIA WEO 2013

# Growth of Unconventional Gas Production in selected countries



Source: IEA WEO 2013 NPS

# Health damage from coal power plant emissions



**Annual health impacts caused by coal power plants in the EU (27 countries)**

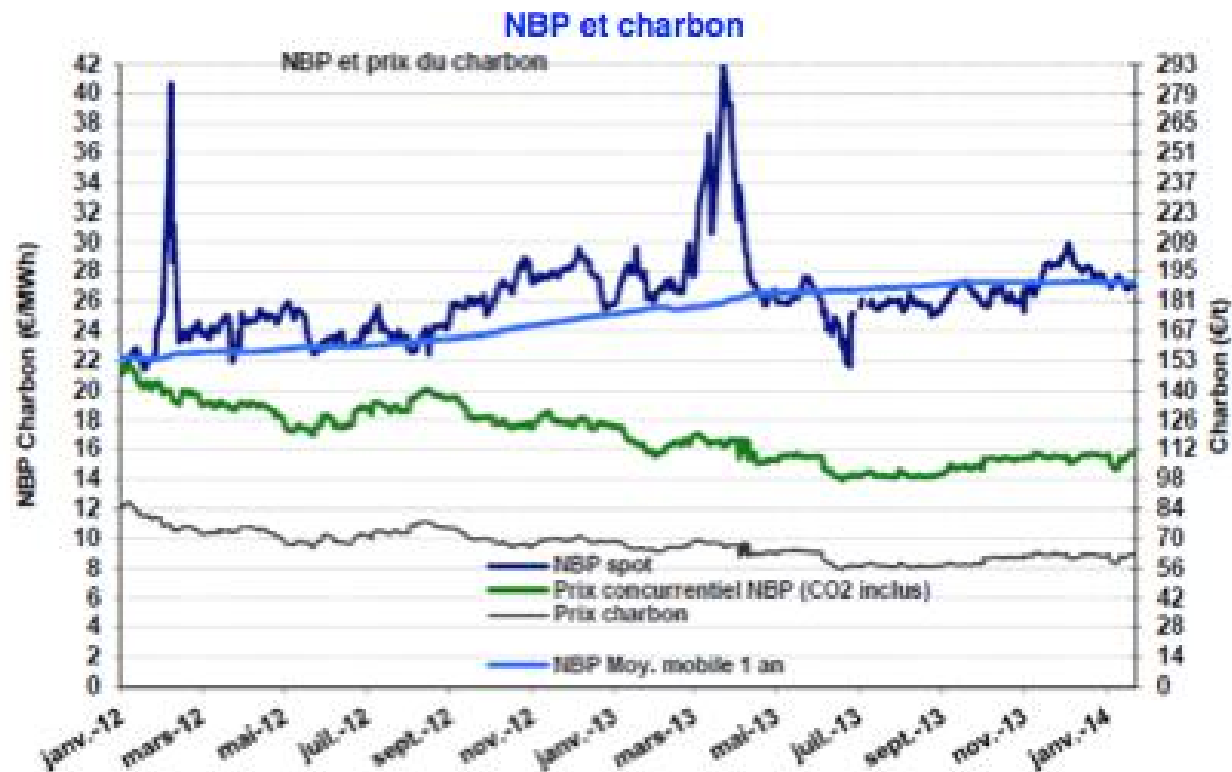
Source: HEAL, expert assessment

# Beijing: February 2014



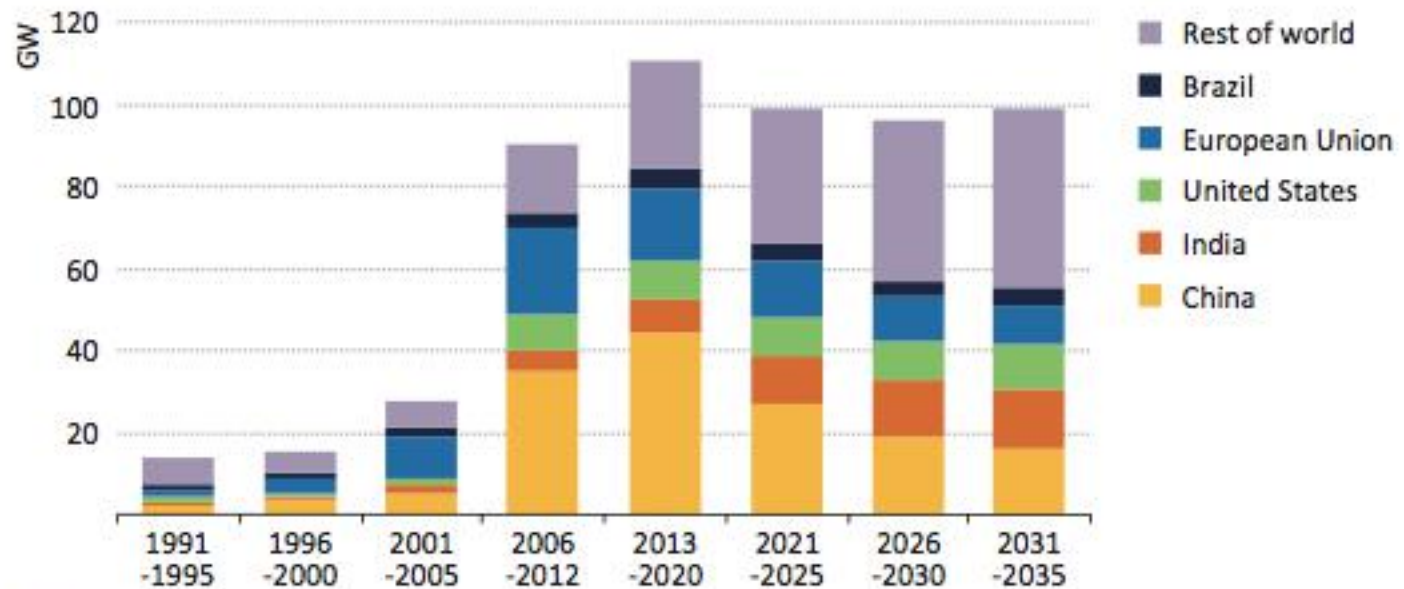
- **EPS requires that any new coal fired power plant demonstrate CCS on at least 300 MW of the proposed generating capacity:**
  - **Sets a CO<sub>2</sub> emission limit at 450 g/kWh until 2045**
  - **Guarantees stability of emission regulation until 2045 (grandfathering)**
  - **EPS complements the economic signals provided by the Carbon Floor Price and, when applicable, the feed-in electricity purchase tariff with Contract for Difference (CFD)**
  - **EPS gives incentives to « Good Quality » CHPs, by discounting the volumes of CO<sub>2</sub> saved in the heat production by displacing other fossil fuels**

# Natural gas competitiveness with coal in Northern Europe



Source: DGEC et IFP EN

# Average annual increases in Renewable based Power capacities



\* Excludes capacity that directly replaces retired capacity of the same technology type.

Source: IEA WEO 2013 NPS



# Natural gas matches the challenges posed by renewables

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## ● **Variability:**

- CCGT and cogeneration ensure back-up of production during wind and solar intermittence
- Natural gas grid and underground storage can accommodate hydrogen flows from electrolysis of excess power production

## ● **Resource location:**

- CCGT can increase the electricity supply to the grid in remote areas (offshore wind) so as to mitigate the cost of extending the transmission network
- Natural gas grid and underground storage provide biogas access to market and flexibility

## ● **Uncertainty:**

- Balancing power supply at a short notice (on a hourly basis) with flexible forms of generation such as gas turbines
- Hybrid electricity and natural gas (or biogas) vehicles would offset much of the limitations restricting the use of electrical vehicles.

## natural gas

- +++ crucial role for a sustainable energy system/ to fight global warming
- +++ ideal partner on the way to a renewable energy system
- +++ still a limited and fossil resource and a possible obstacle to renewable energy / climate protection
- +++ “fracking”: more risks than benefits
- +++ storage capacities for renewable gas, a new market
  
- +++ industry should develop a “road-map 2050”: with strategies to tackle climate change and pathways to a sustainable energy future

GREENPEACE

# 2015 World Gas Conference



26<sup>th</sup>

WORLD GAS CONFERENCE  
PARIS FRANCE  
1 - 5 June 2015

