26th World Gas Conference

1 – 5 June 2015, Paris, France

Gas, renewables and electricity: together a perfect combination in the fight against climate change

Yves-Louis Darricarrère
President Upstream, TOTAL

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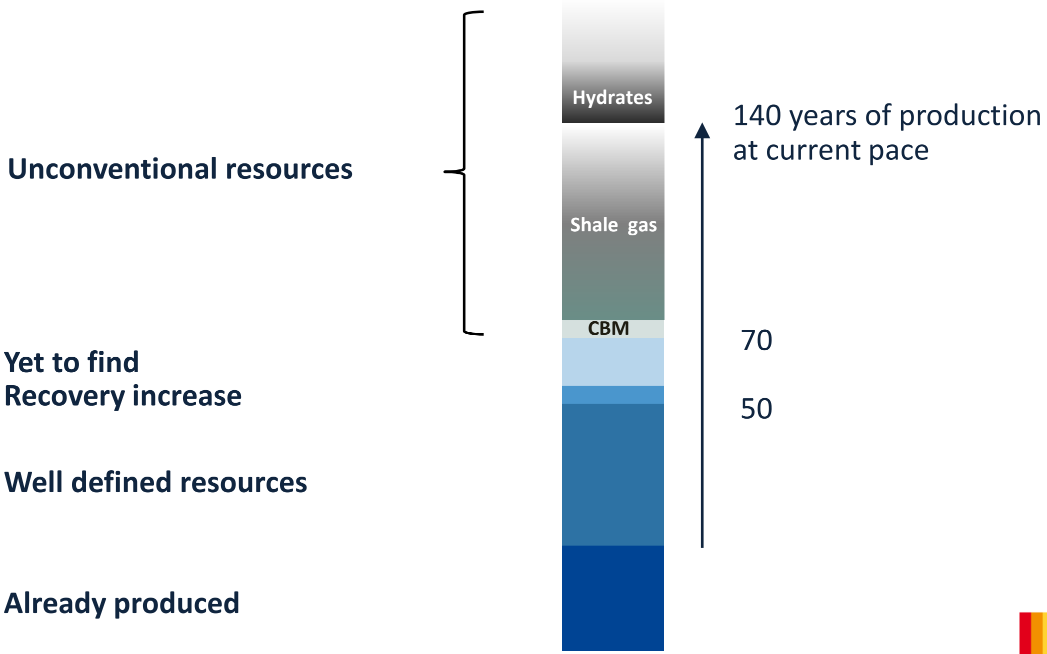
Abandant but complex gas resources

Ultimate unrisked gas resources **~2,900 Gboe** (w/o hydrates)



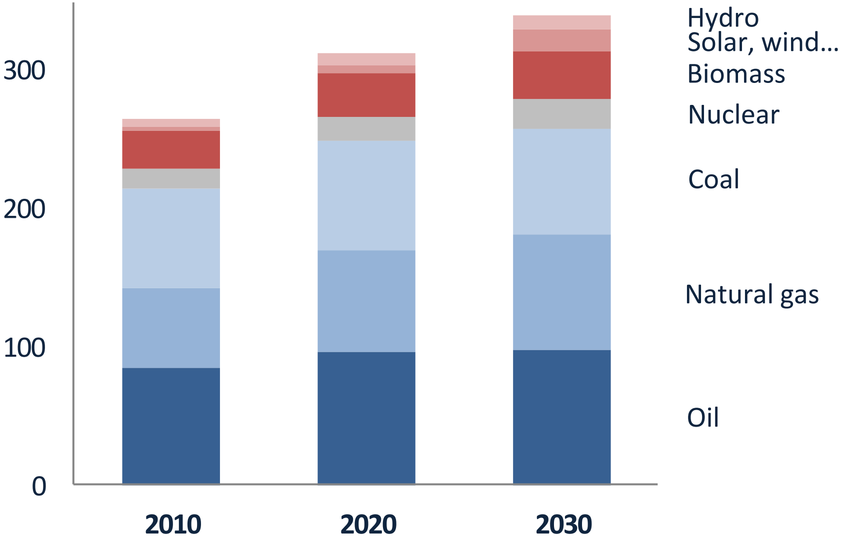
Source: TOTAL

A huge potential for unconventional gas

TOTAL

The future of energy mix, a Total perspective

World energy mix (Mboe/d)

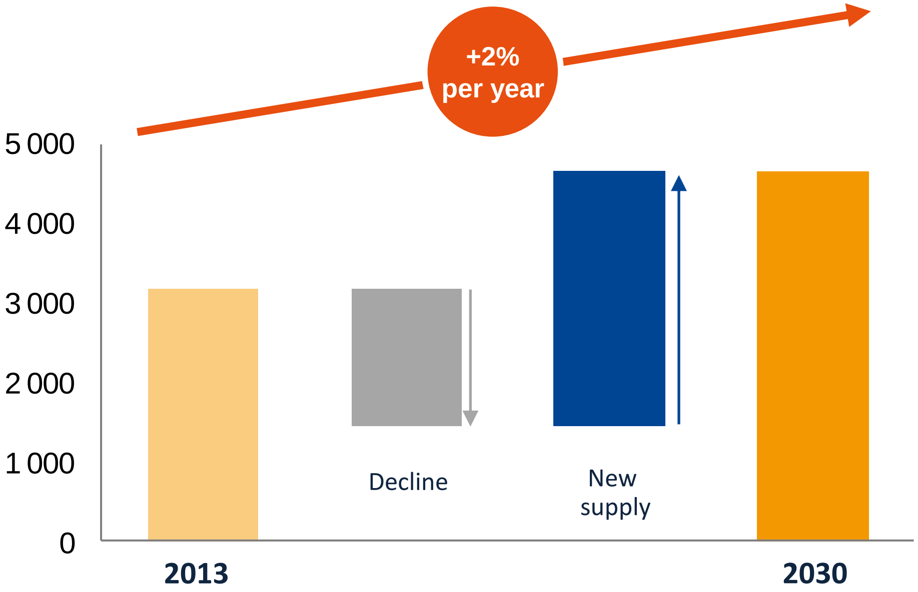


Source: TOTAL

Gas should become the second largest energy source

Steady growth in global gas demand

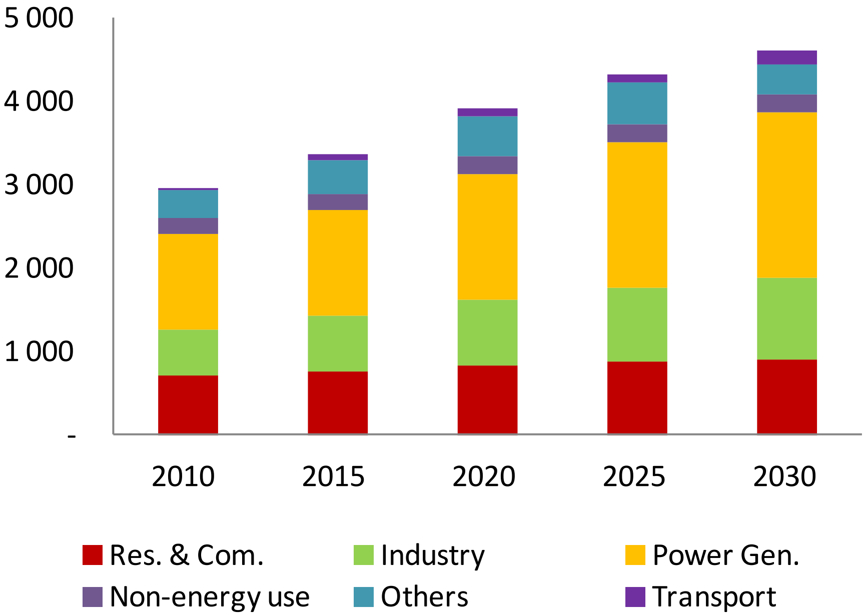
Gas supply-demand (Bcm)



Source: TOTAL

Significant investments required to satisfy demand

Gas demand by sector

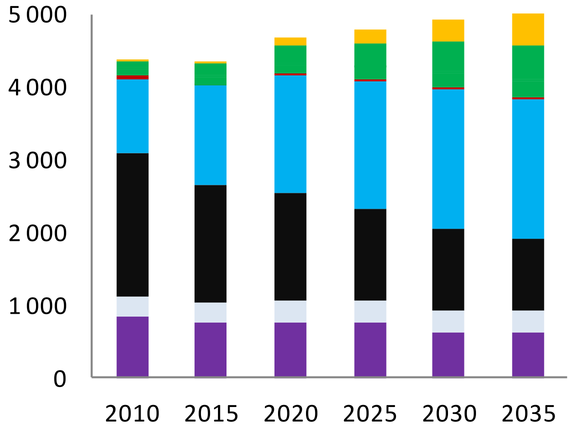


Source: TOTAL

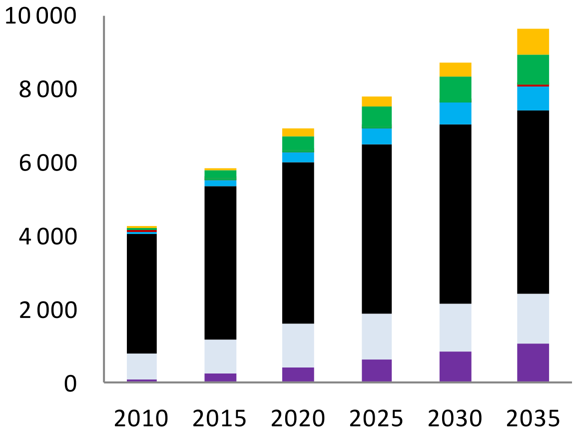
Power generation is the main driver of gas demand growth

Fuel for power generation, regional variation

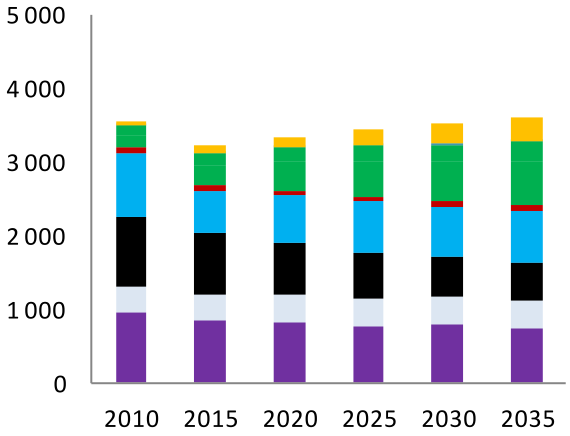
US – Power generation by fuel (TWh)



China – Power generation by fuel (TWh)



EU28 – Power generation by fuel (TWh)



Nuclear Hydro Coal Natural Gas Oil Other renewables Solar

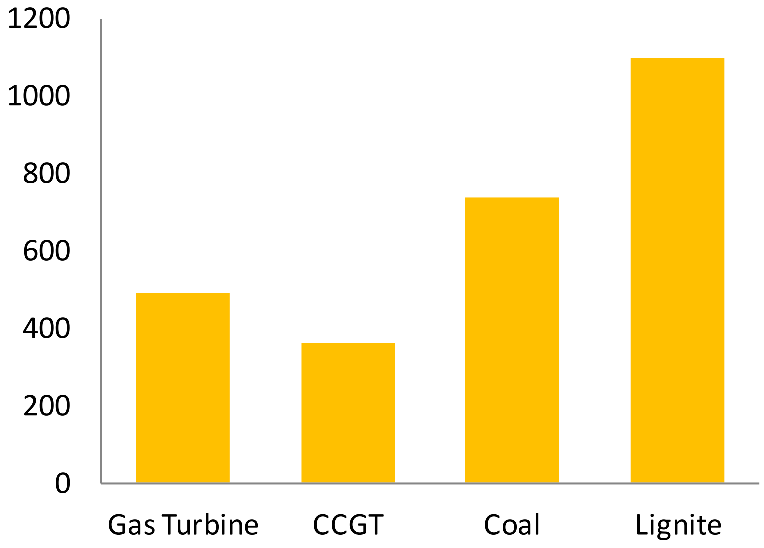
Source: TOTAL

Natural gas growth to meet new power demand

TOTAL

CO2 emissions in power generation

CO2 emissions by type of fuel (g/kWh)



CO2 emissions per kWh are
2 to 3 times lower
with gas than with coal or lignite
in power generation

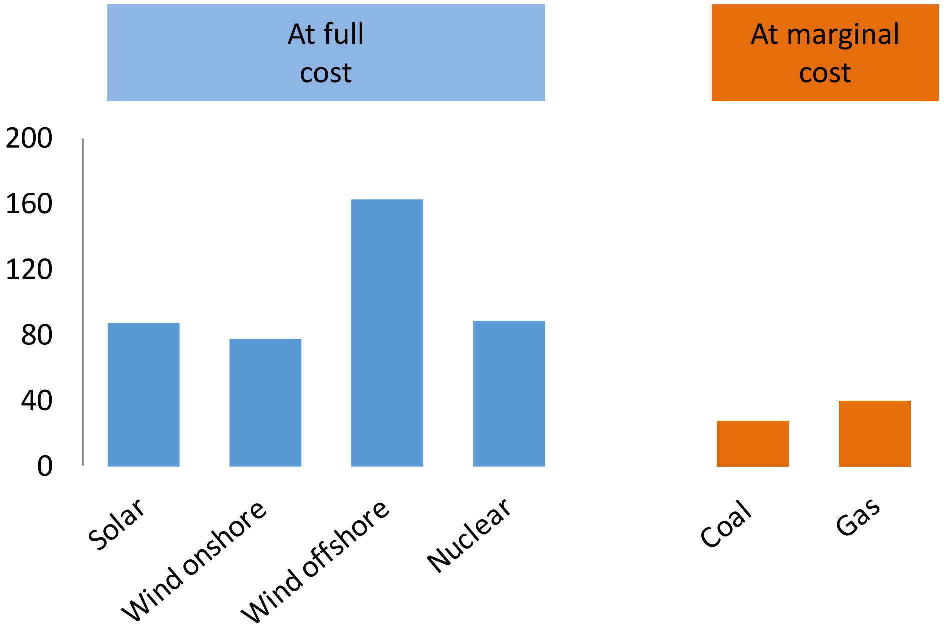
Source: TOTAL

TOTAL

Gas is recognized as a genuine alternative to coal

Strong reduction expected from coal generation

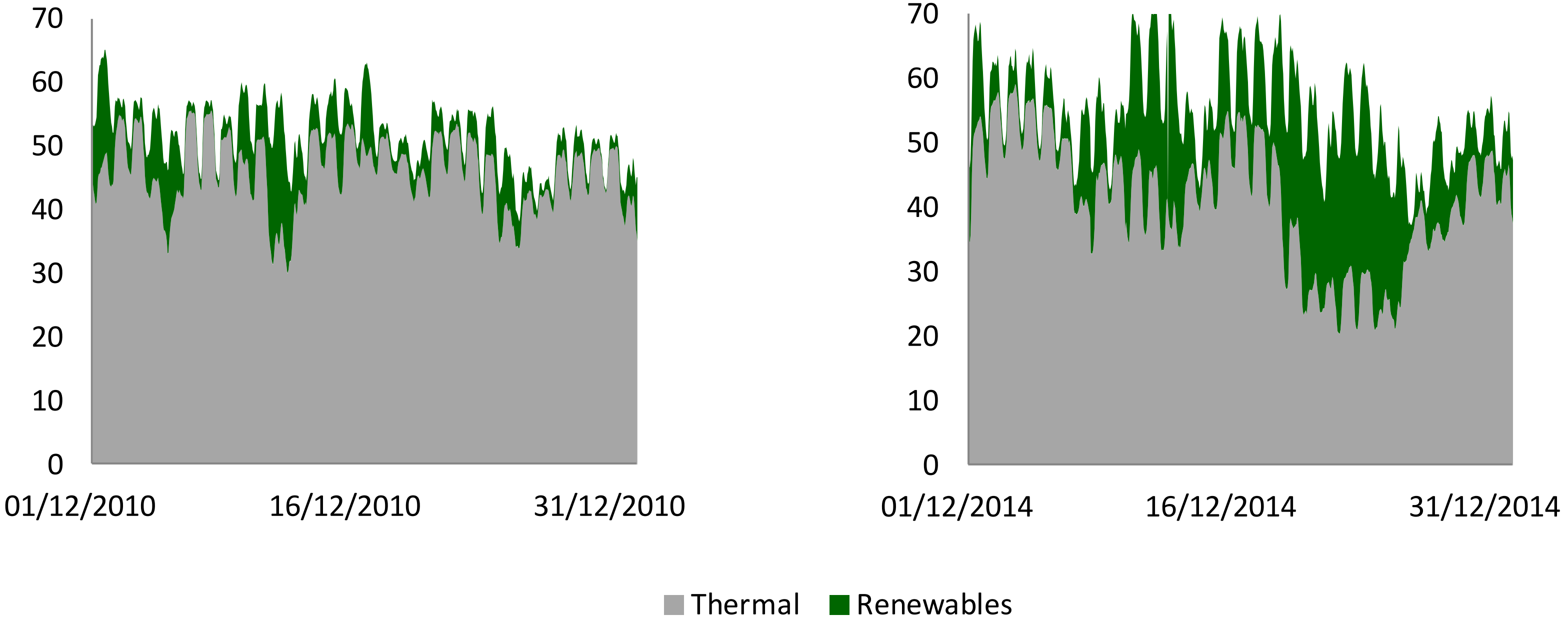
Levelized cost of electricity Europe (€/MWh)



Gas is the cheapest option when replacing coal

Need for back-up fuel to stabilize the grid

Germany – Power generation by fuel, Dec. 2010 vs. Dec. 2014 (GWh)



Thermal: Nuclear, Lignite, Coal, Gas, Oil. Source: TOTAL

Gas is the most flexible backup for renewables

Total, a major and responsible operator in the gas sector

A class-leading natural gas operator

Integrated along the entire gas chain

More than **50%** of our total production in 2014, around 35% ten years ago

A pioneer in global LNG

More than **12 Mt** of LNG sales in 2014, expected to double by 2020

Developing new energies to **complement** oil and gas

Second in **solar** energy

Decreasing routine flaring **by 50%** between 2005 and 2014

Reducing our greenhouse gas emissions **by 15%** between 2008 and 2015

Improving the energy efficiency of our operations **by 1.5% per year** between 2012 and 2017

Supports **international initiatives** (UN Global Compact on carbon pricing, World Bank "Zero Routine Flaring by 2030 " initiative, UN/CCAC "Oil and Gas Methane Partnership")

Founding member of the **Oil & Gas Climate Initiative**

Call for **carbon pricing**

TOTAL

Committed to better energy

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