



The Energy Research Institute
of the Russian Academy of Sciences

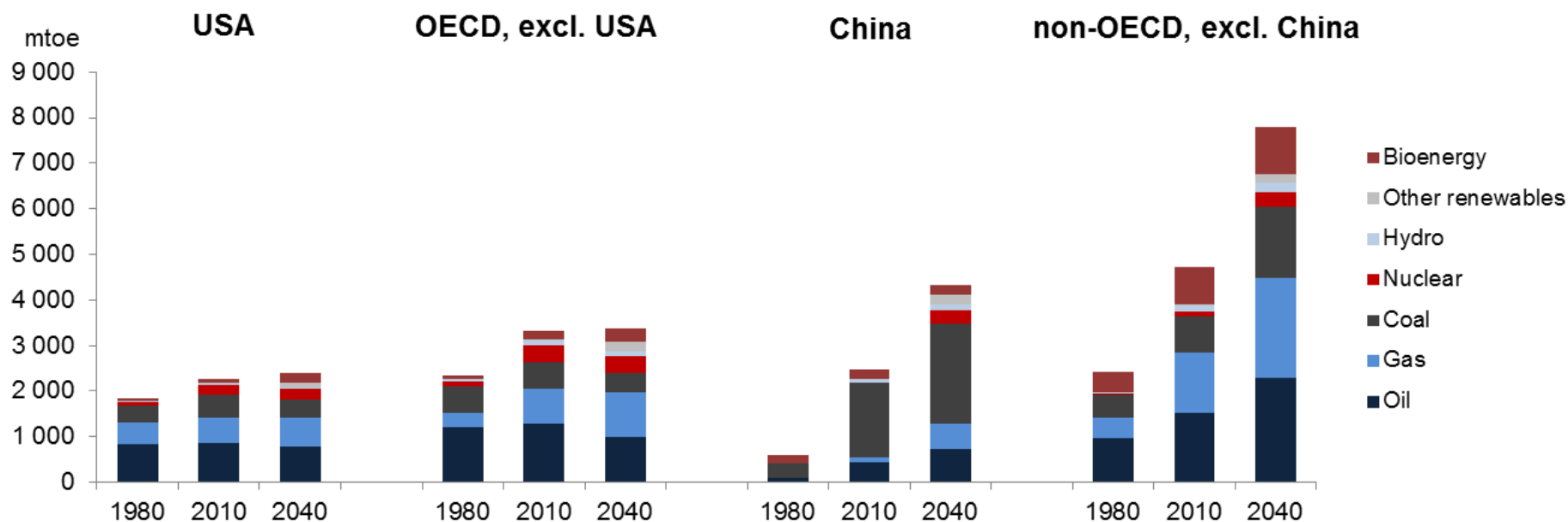
The Analytical Centre
of the Government of the Russian Federation

GLOBAL AND RUSSIA ENERGY OUTLOOK UP TO 2040



Primary Energy Consumption

The growth of primary energy consumption by region and type of fuel, Baseline Scenario

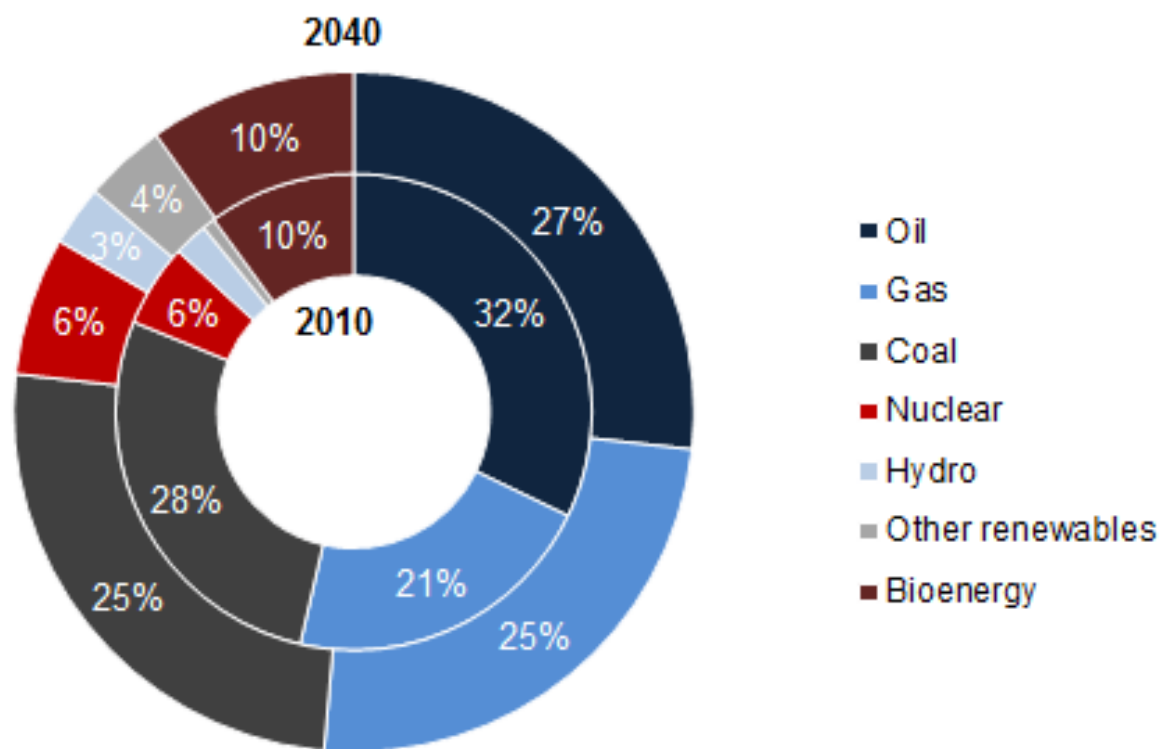




Primary Energy Consumption

Structure of world primary energy consumption by fuel type in 2010 and 2040, Baseline Scenario

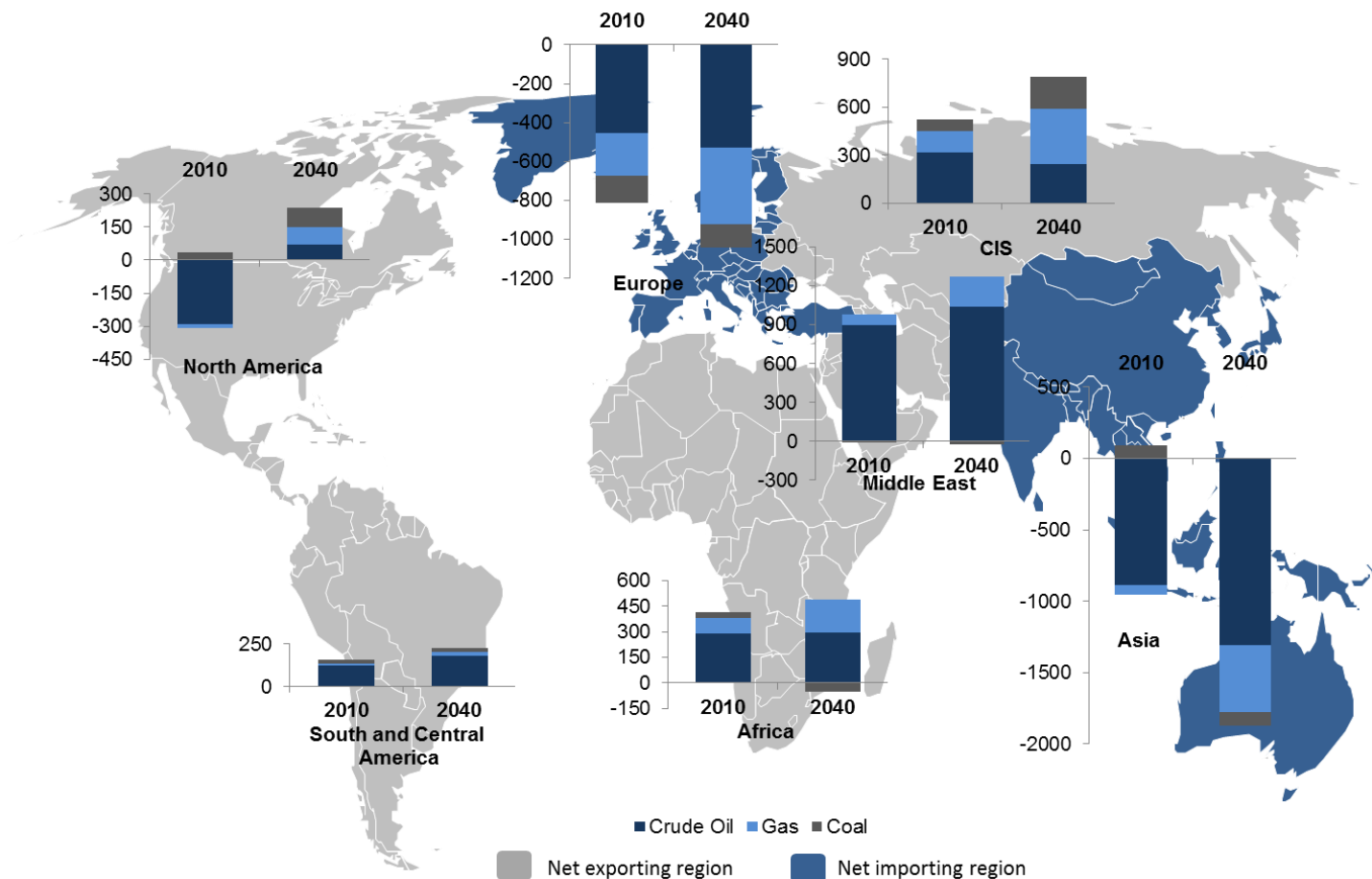
In the long term, the unequivocal dominance of fossil fuels will remain unchallenged; the share of oil and gas in global primary energy consumption will also be practically unaffected (53.6 per cent in 2010 and 51.4 per cent by 2040).





International Trade

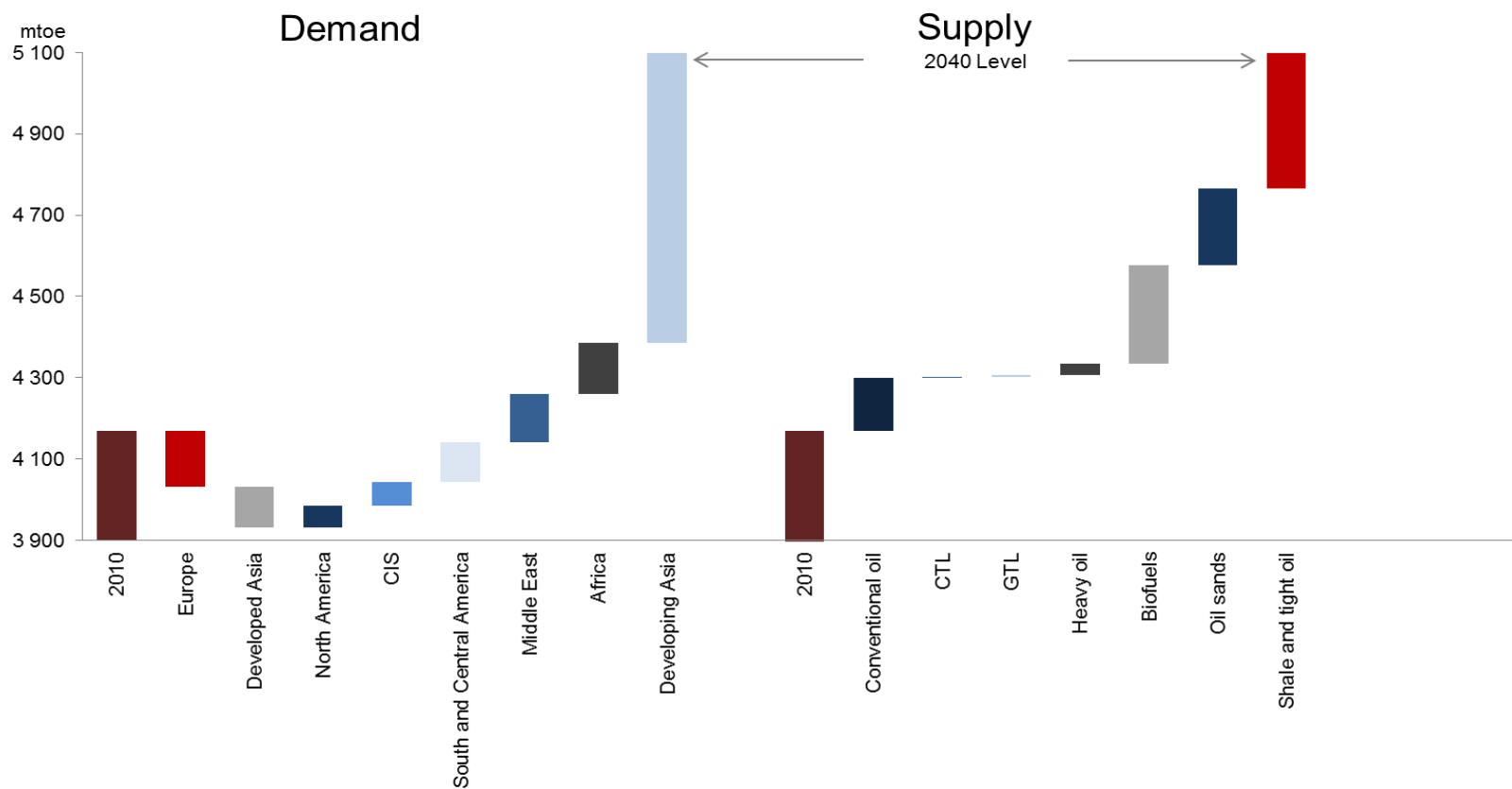
International energy trade, Baseline Scenario, mtoe





Liquid Fuels Market

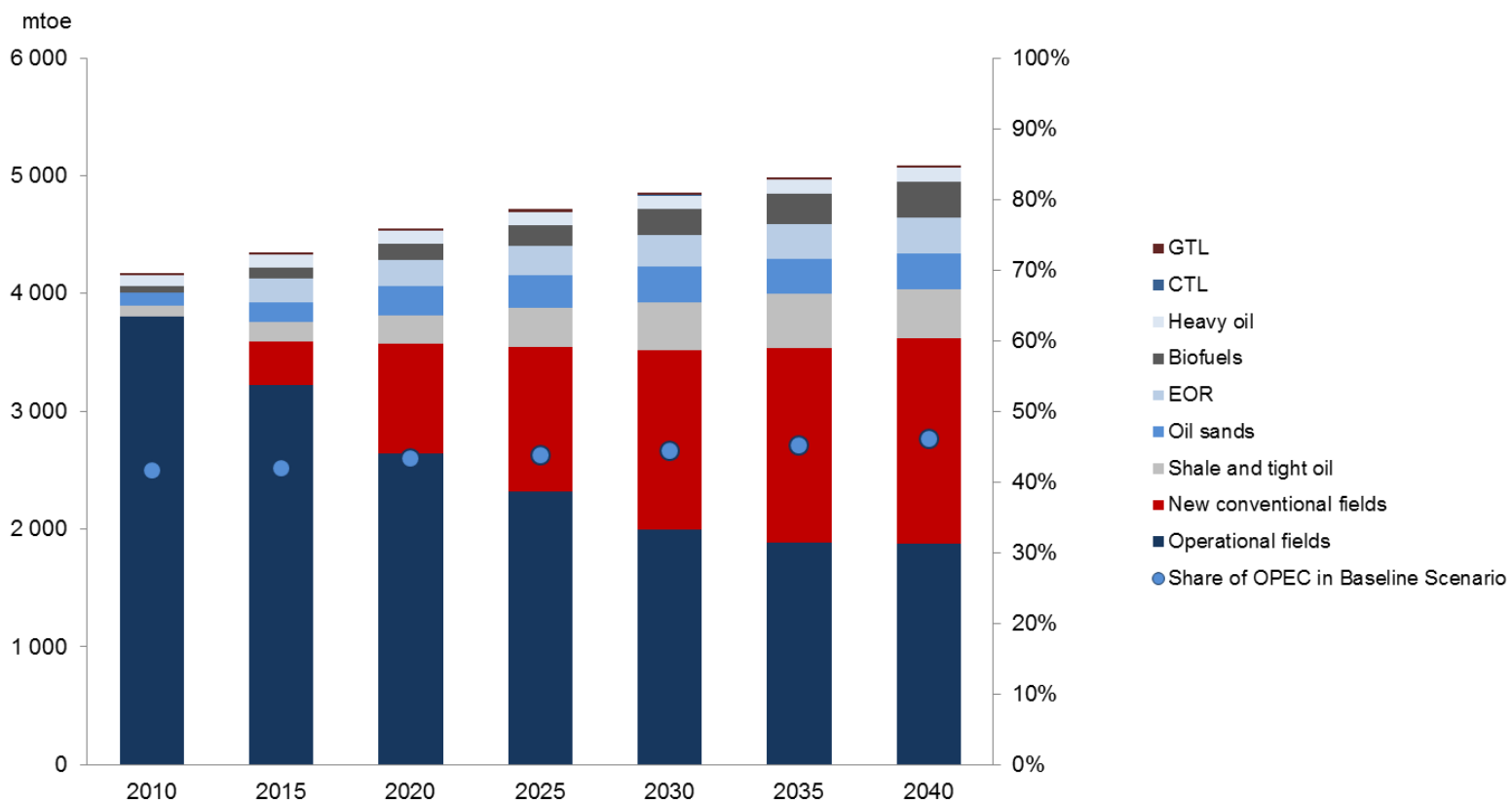
Liquid fuel supply and demand balance, Baseline Scenario





Liquid Fuels Market

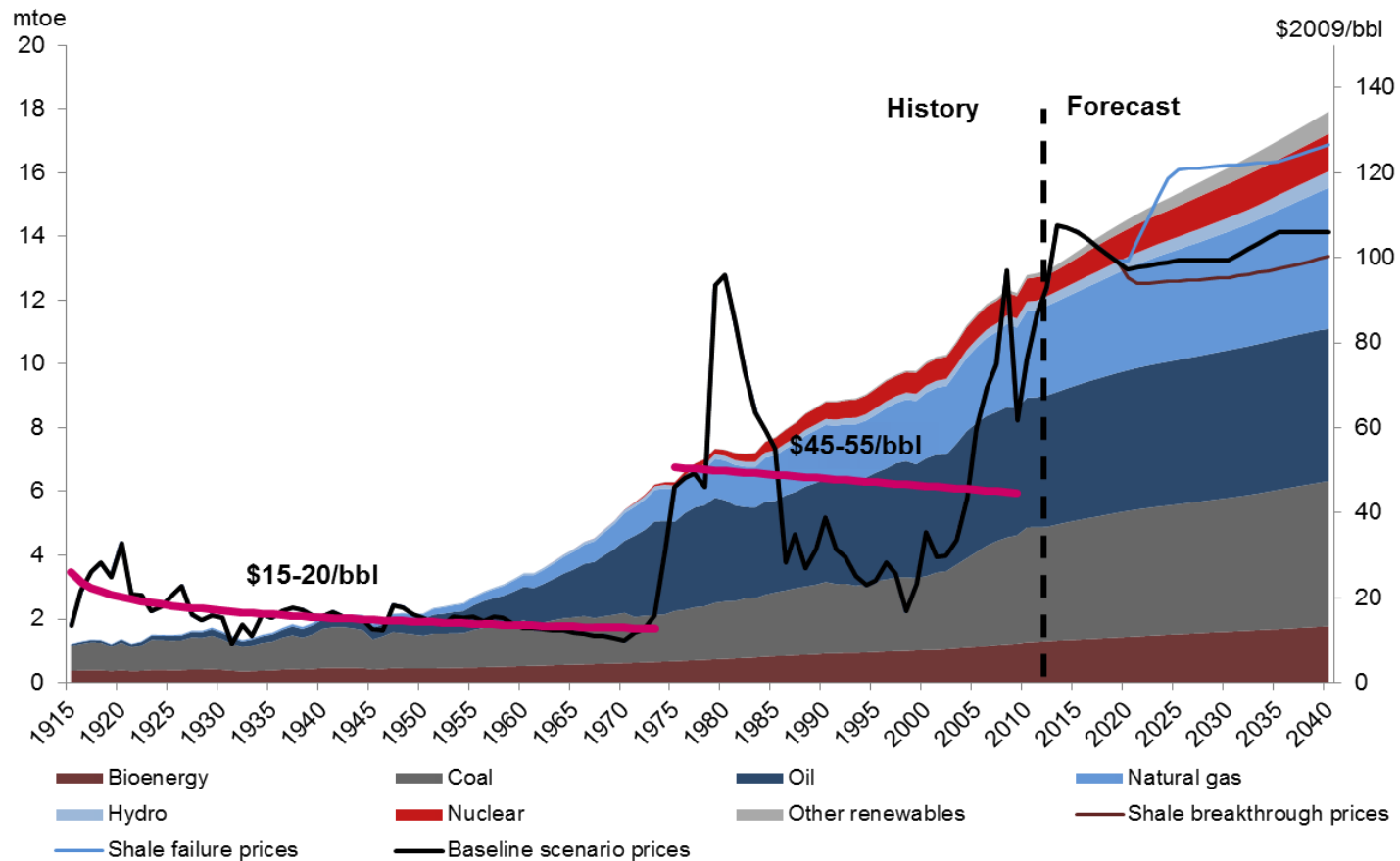
Dynamics of liquid fuels supply structure, Baseline Scenario





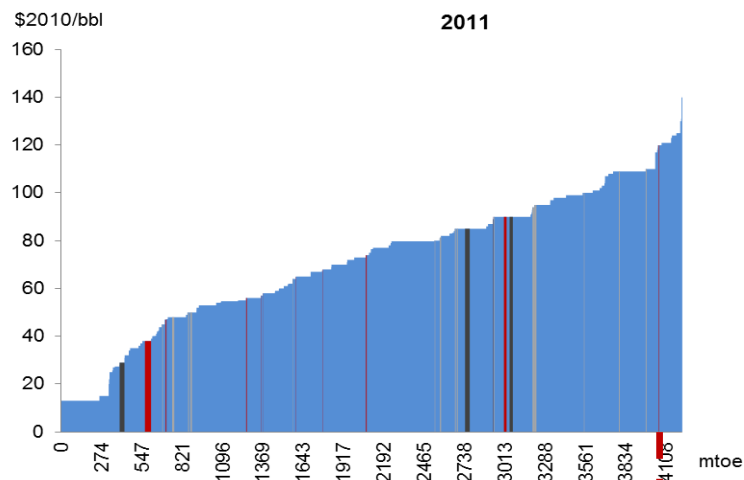
Liquid Fuels Market

Dynamics of energy consumption and oil price

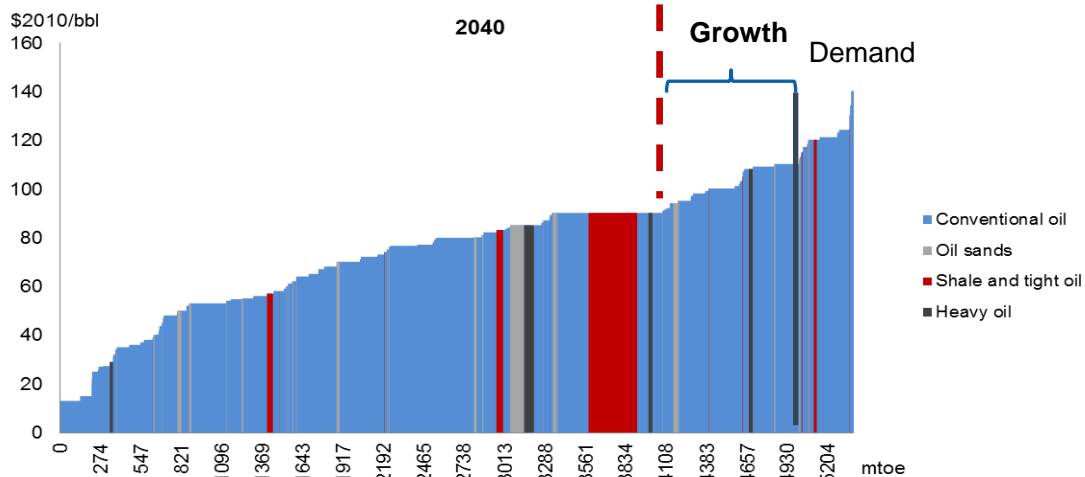




Liquid Fuels Market



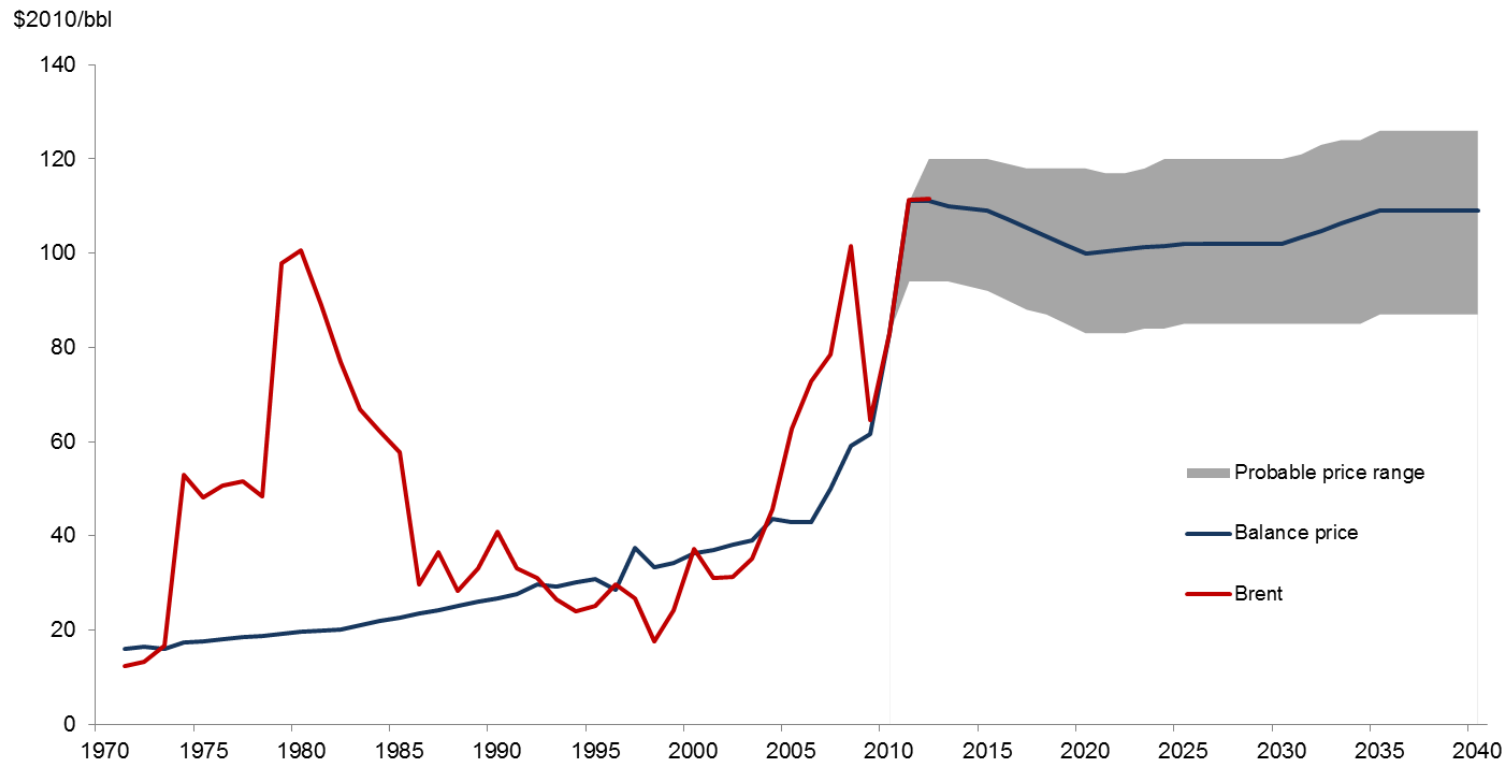
**Oil supply
(cost of production)
curve**





Liquid Fuels Market

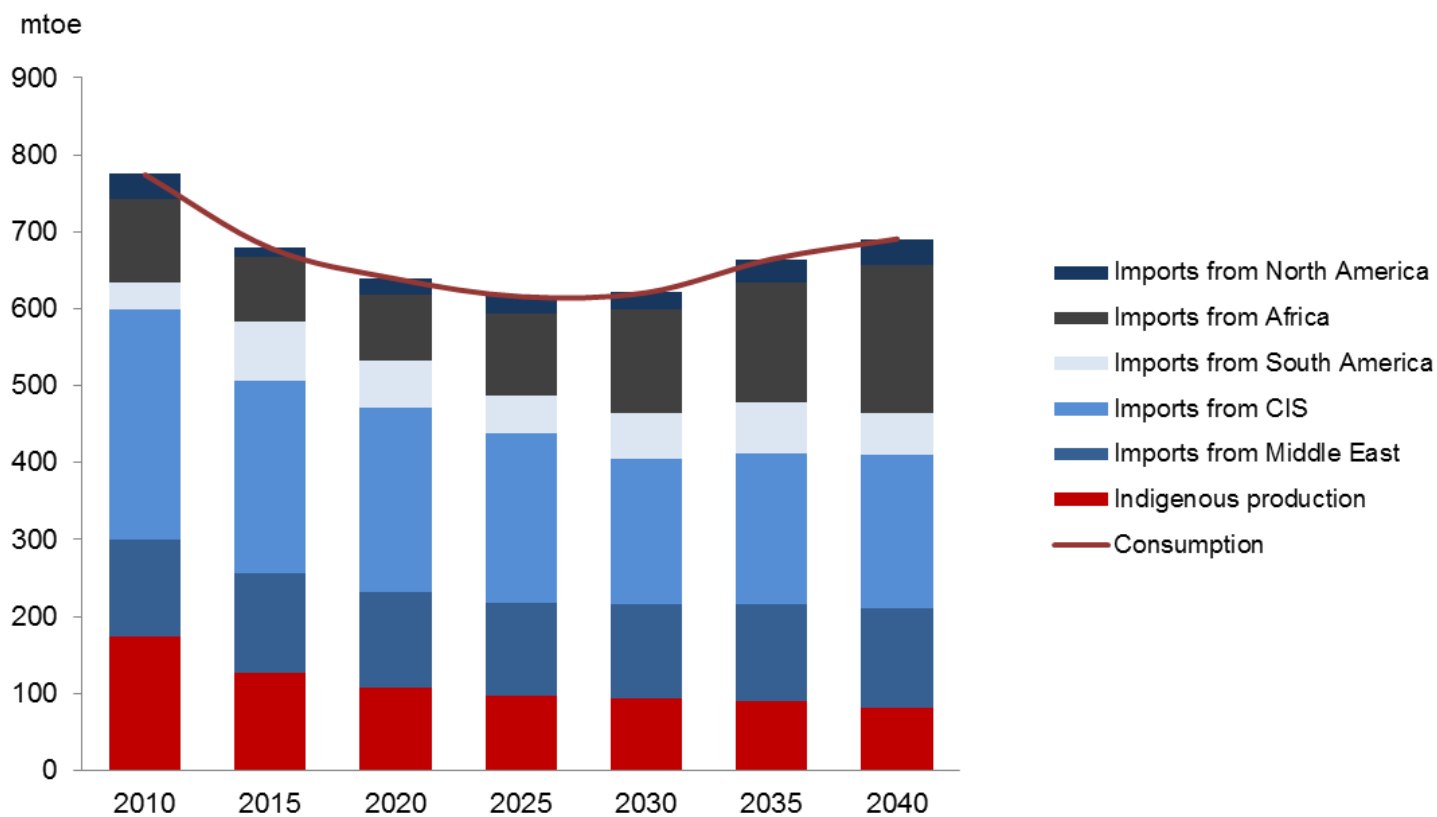
Projected price range of equilibrium oil prices





Liquid Fuels Market

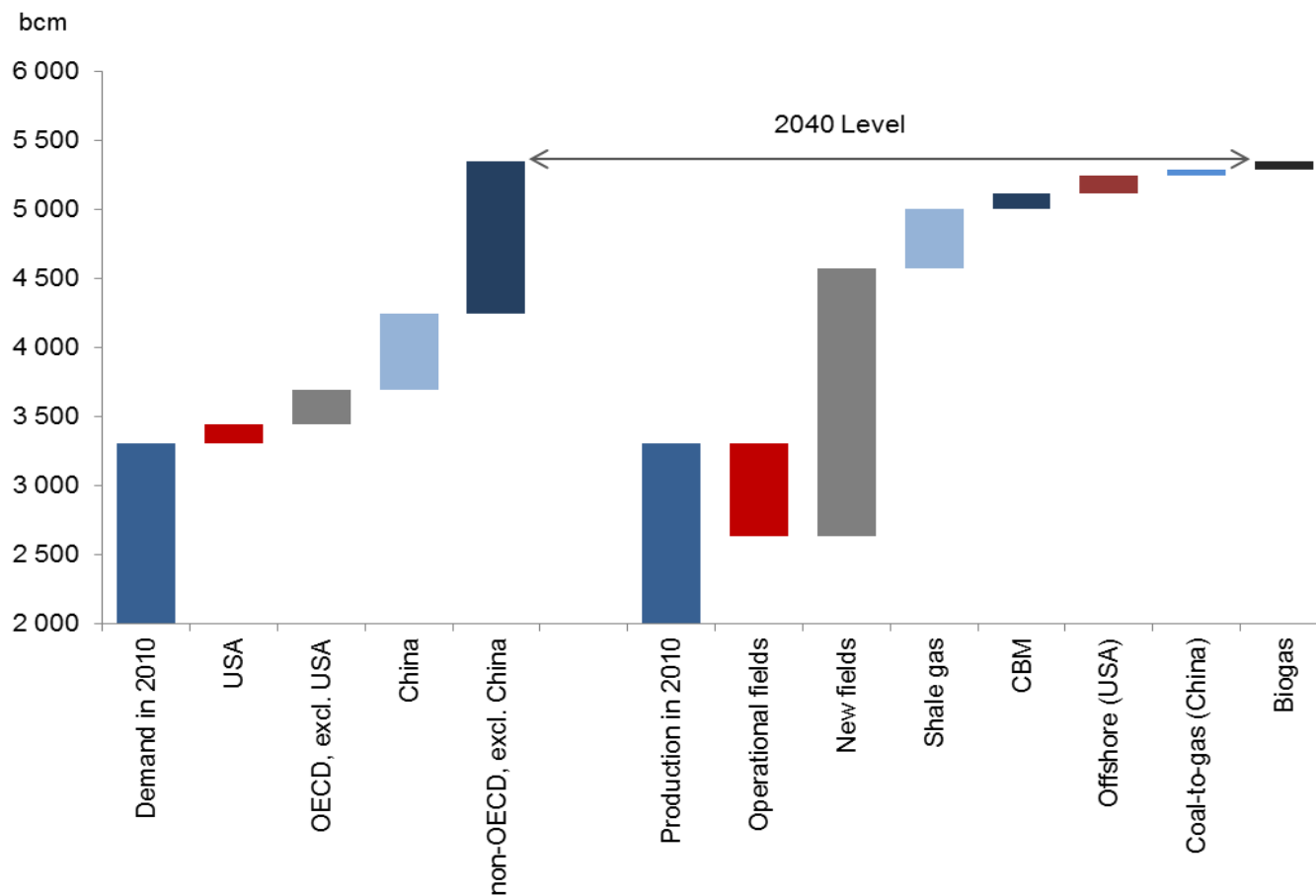
Crude oil balance in the European market





Gas Market

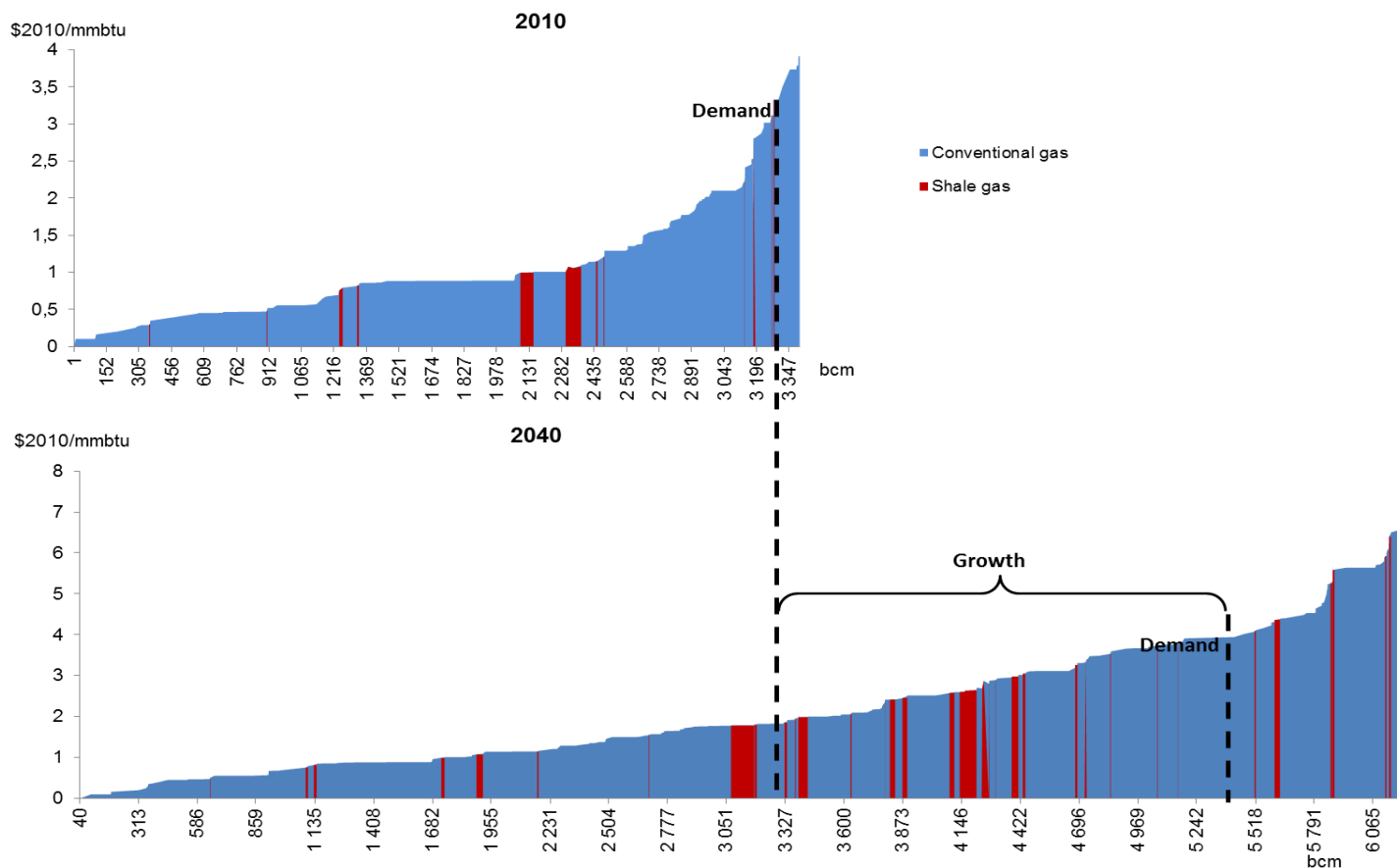
The Balance of gas supply and demand in 2040, Baseline Scenario





Gas Market

World natural gas supply curve (cost of production) Baseline Scenario

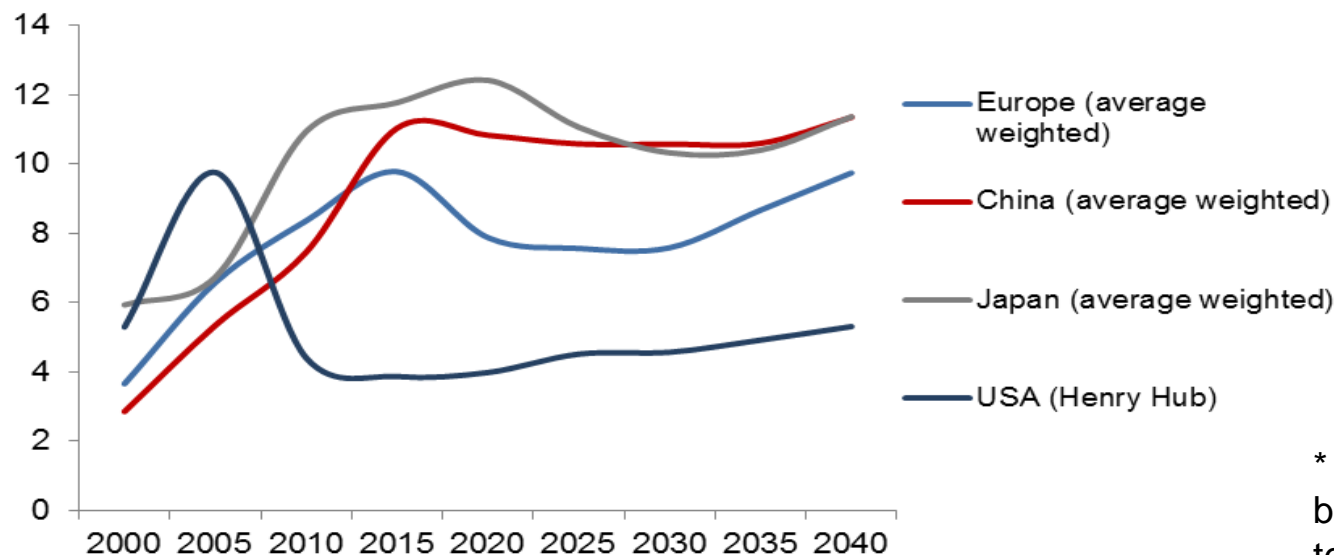




Gas Market

Forecast weighted average price* of gas by regional market, Baseline Scenario

\$2010/mmbtu



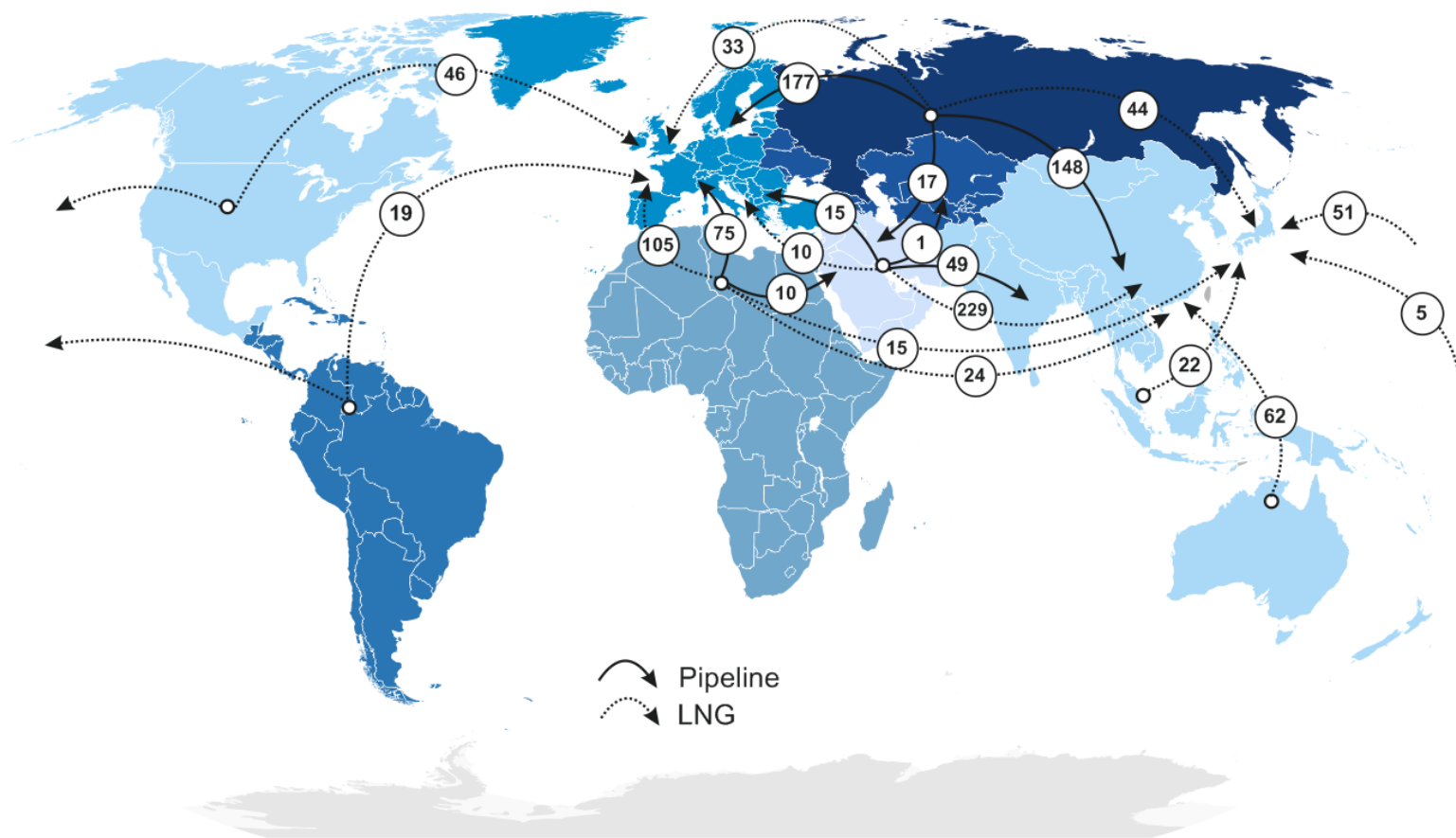
* Weighted average price between the prices of long-term contracts linked to alternative fuels, and spot prices.

For the period to 2040, conditions will not be right for the formation of a single global gas market and a unified gas price.



Gas Market

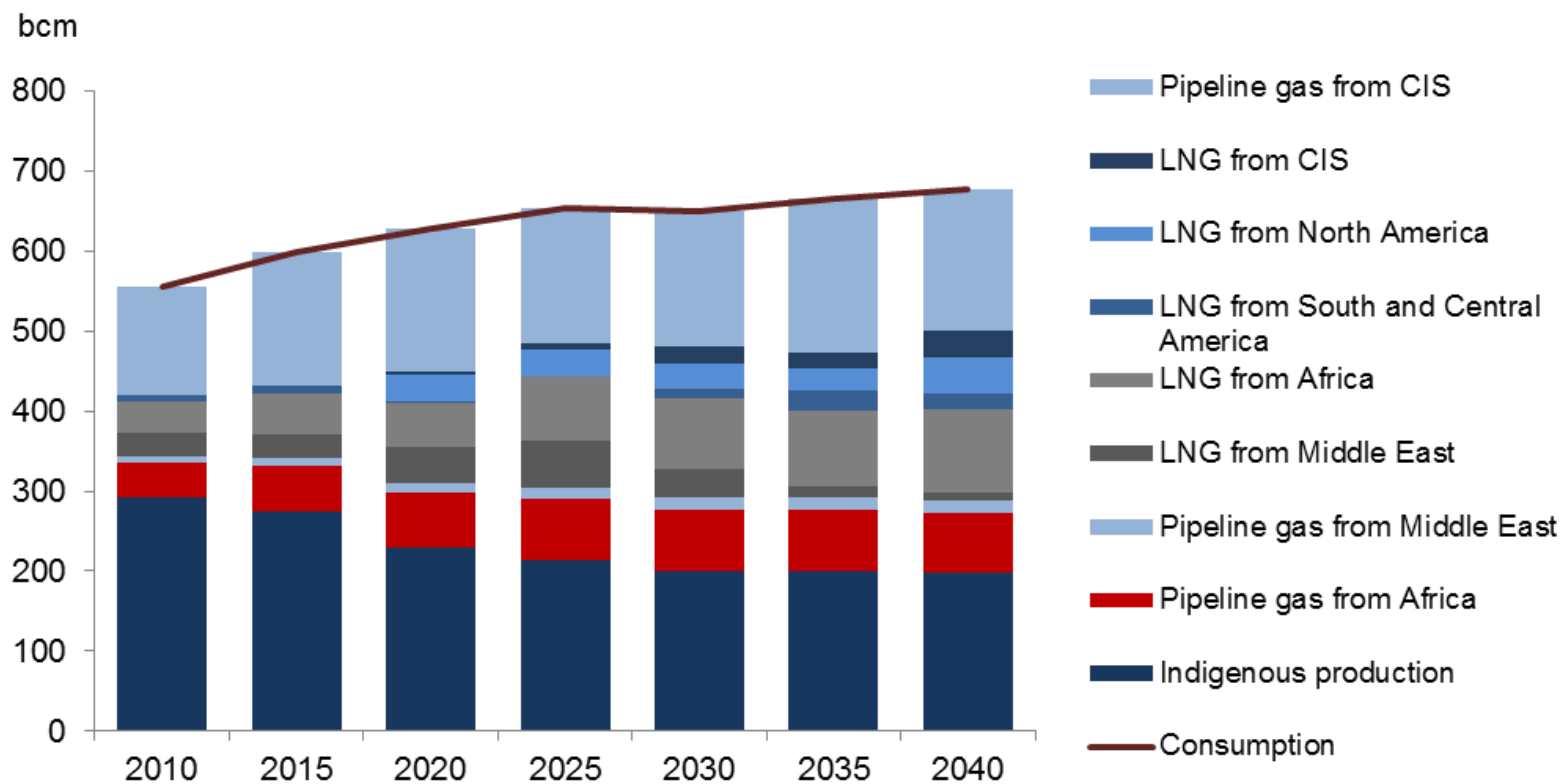
Inter-regional gas trade in 2040, Baseline Scenario, bcm





Gas Market

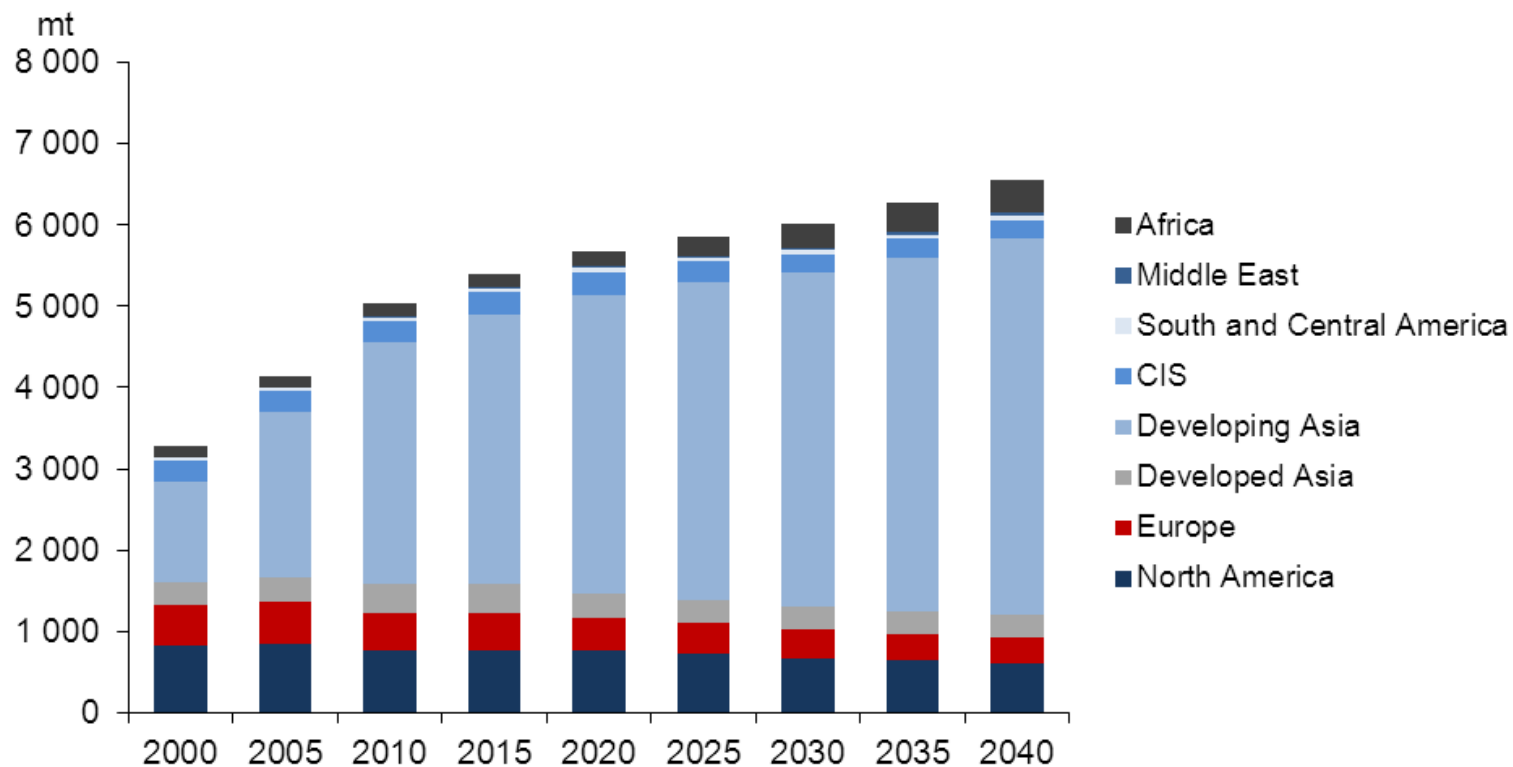
Gas balance in Europe





Solid Fuel Market

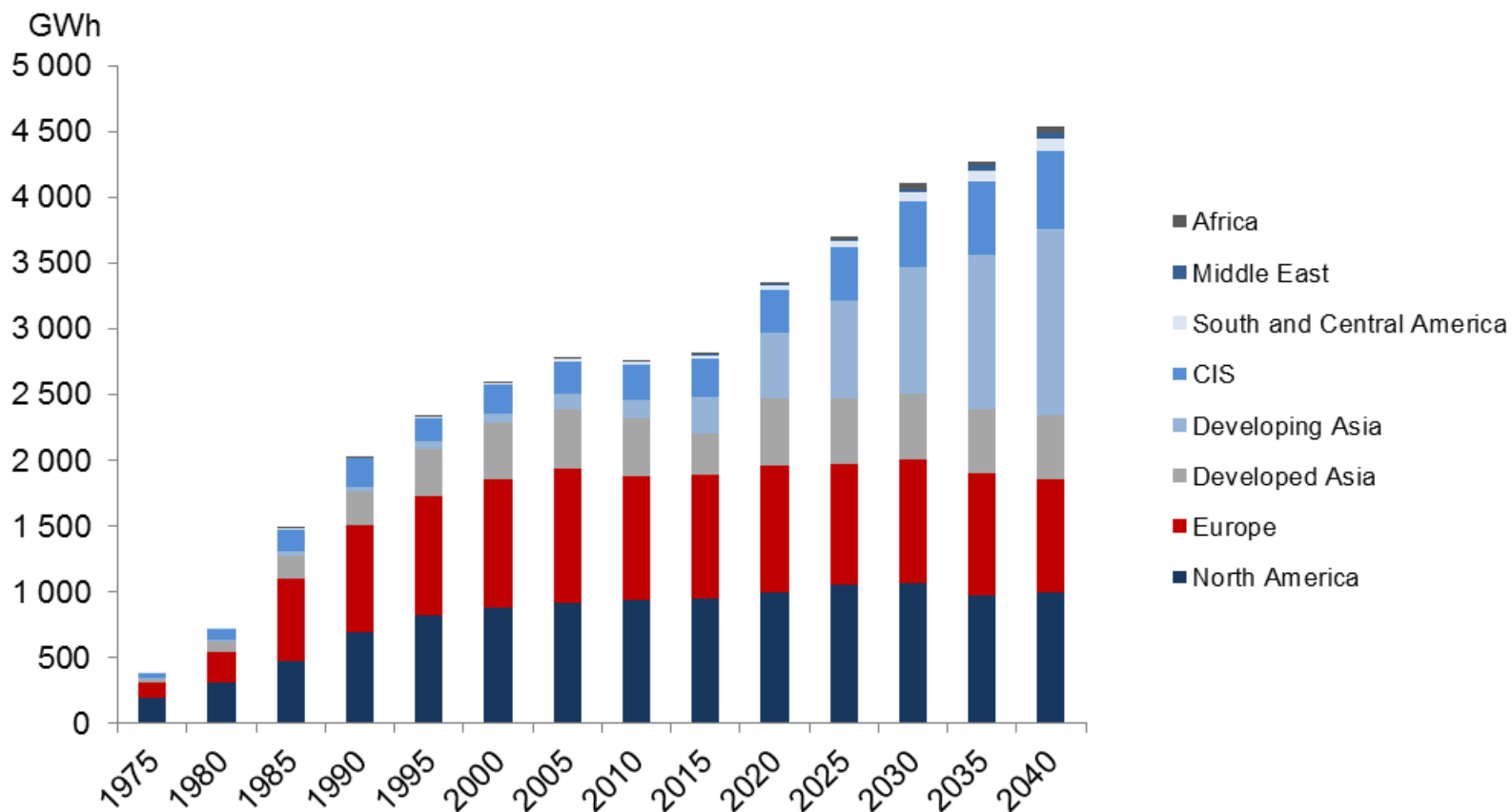
Coal consumption by region, Baseline Scenario





Nuclear Energy

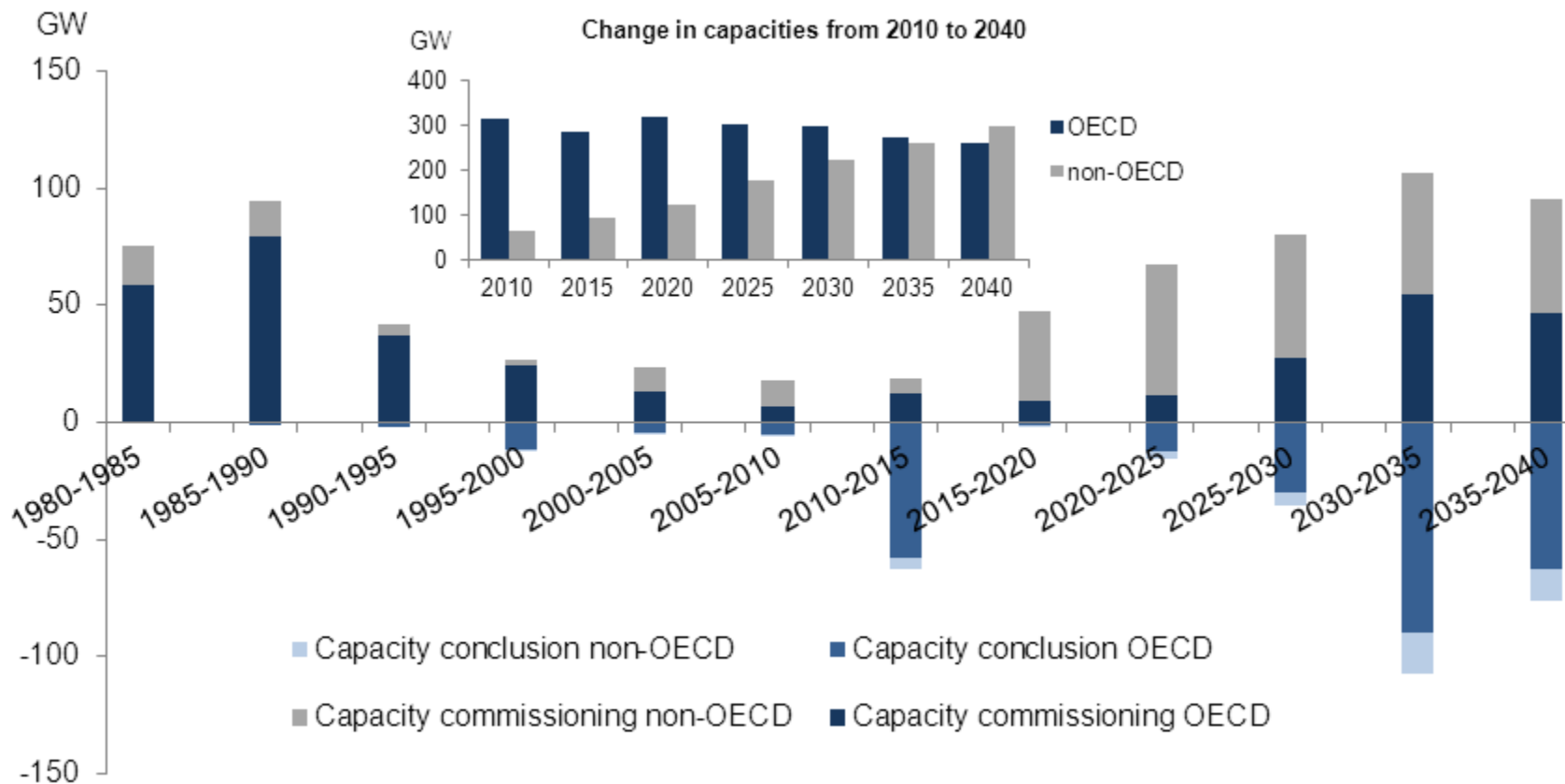
Nuclear electricity generation by region





Nuclear Energy

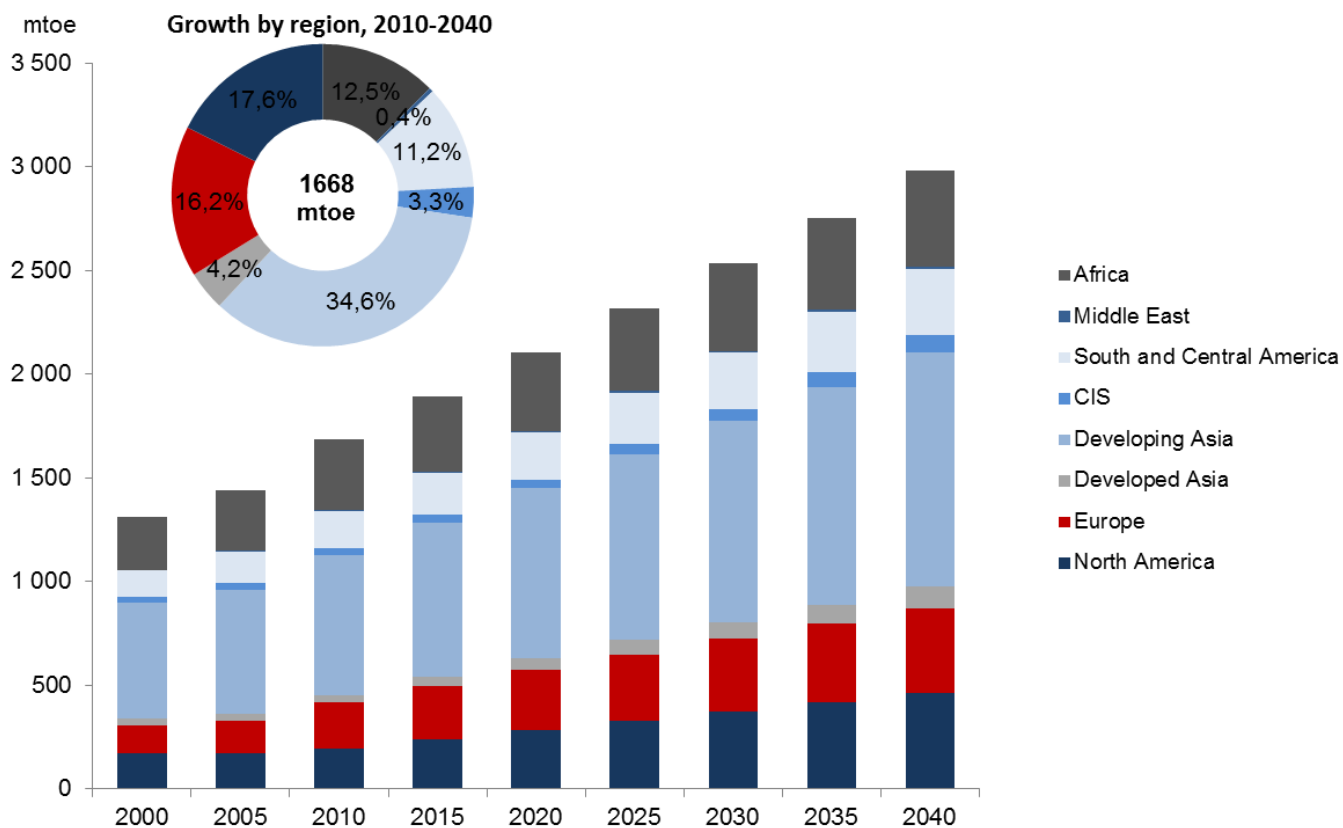
The dynamics of nuclear capacities





Renewable Energy

Renewable energy consumption and growth by region, Baseline Scenario

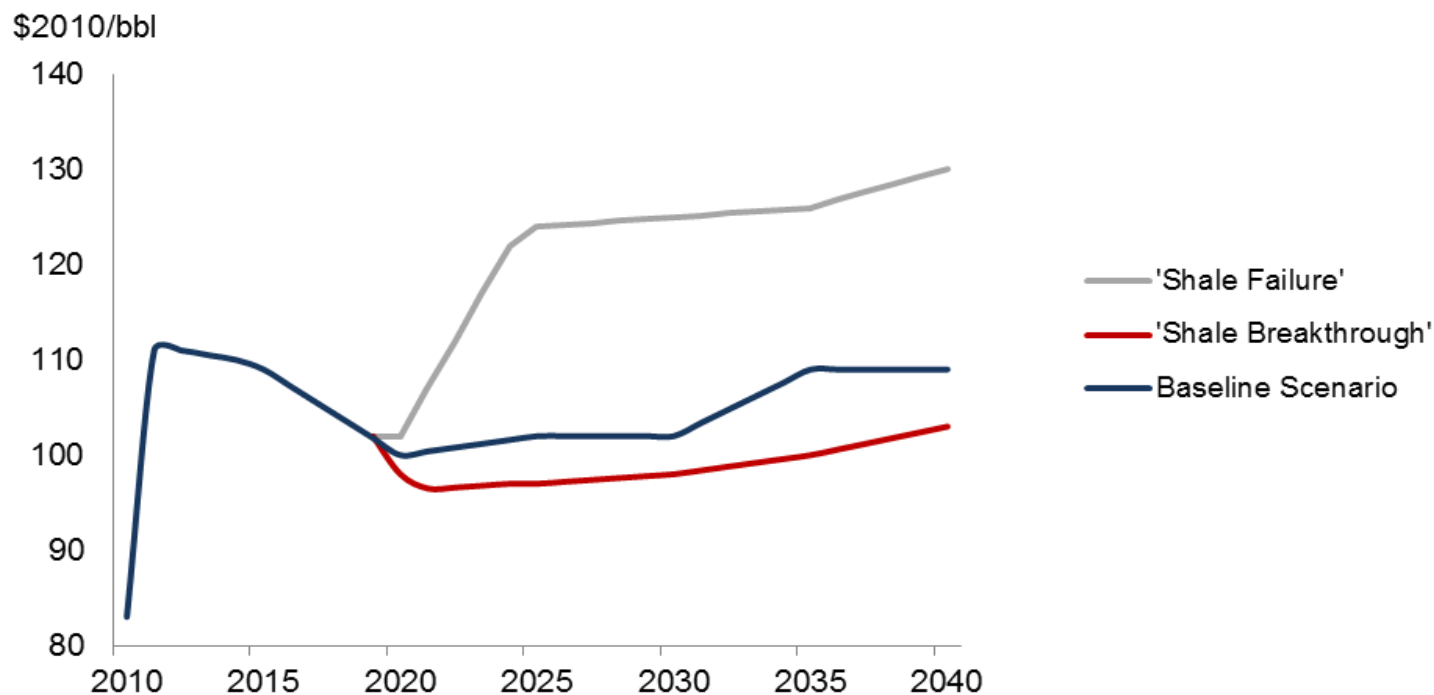




The Impact of Technological Breakthroughs on Energy Markets

'Shale Breakthrough' and 'Shale Failure' Scenarios

Equilibrium oil prices in the three scenarios

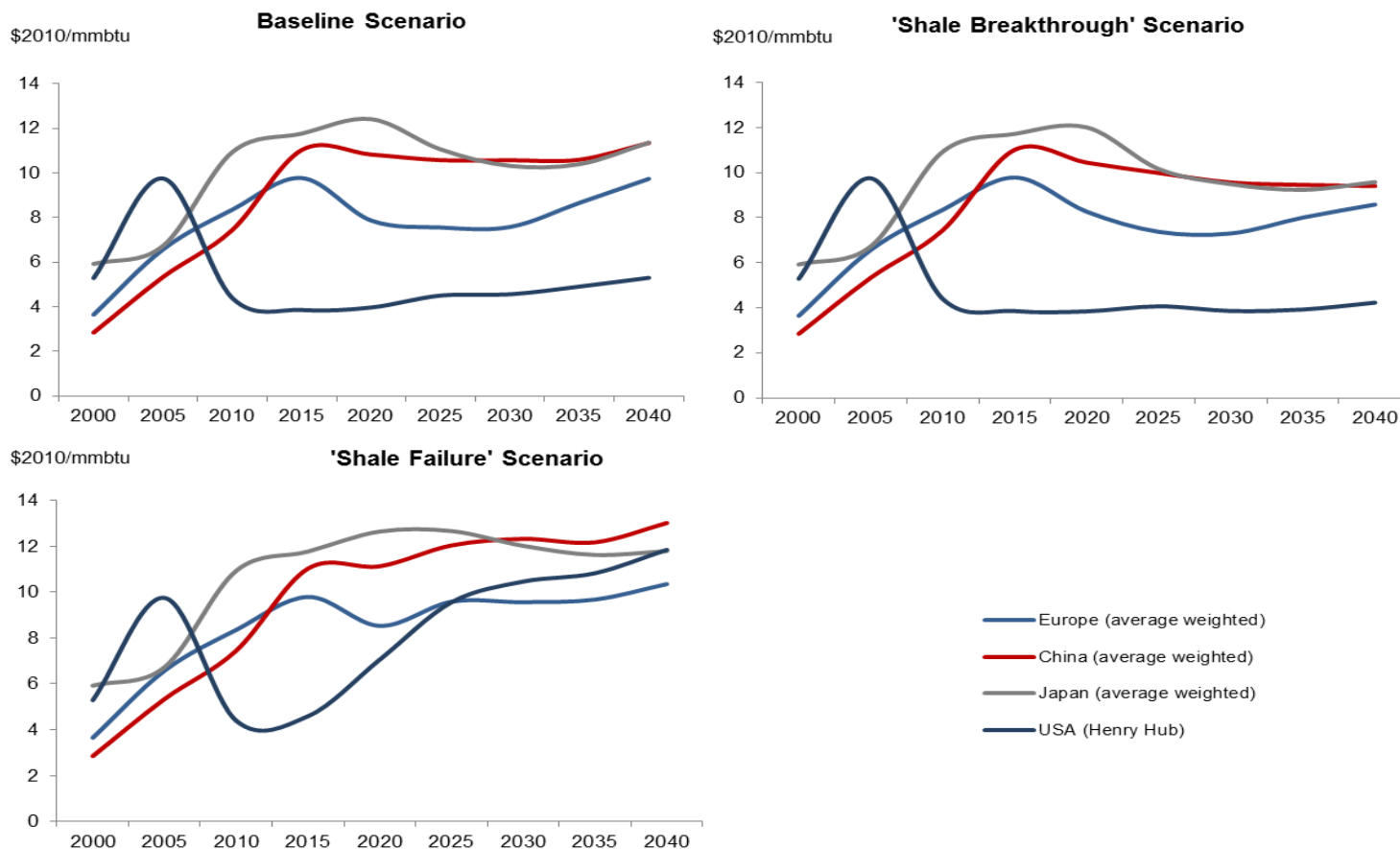




The Impact of Technological Breakthroughs on Energy Markets

'Shale Breakthrough' and 'Shale Failure' Scenarios

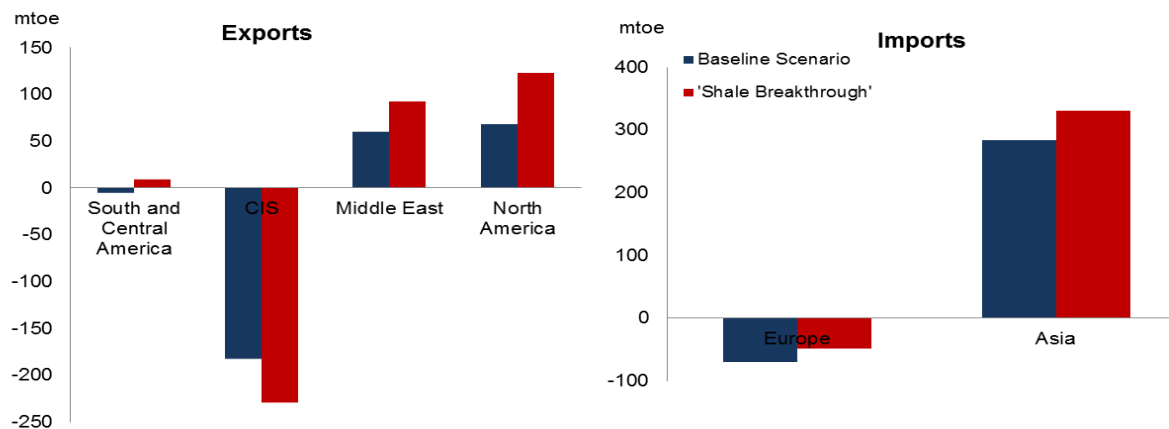
Equilibrium gas prices in the three scenarios



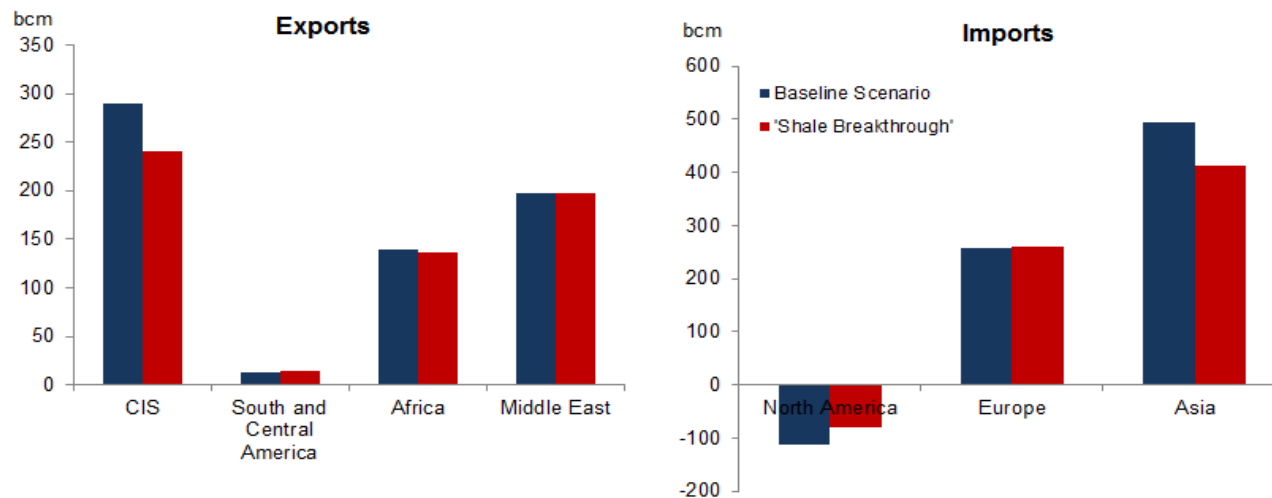


The Impact of Technological Breakthroughs on Energy Markets

Changes of oil net export and import volumes in 2040 relative to 2010, Baseline and 'Shale Breakthrough' Scenarios



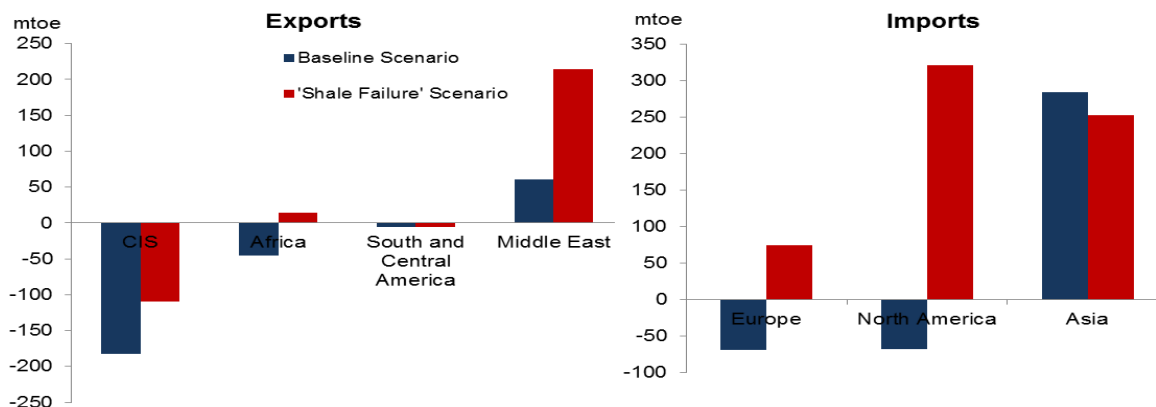
Changes of gas net export and import volumes in 2040 relative to 2010, Baseline and 'Shale Breakthrough' Scenarios



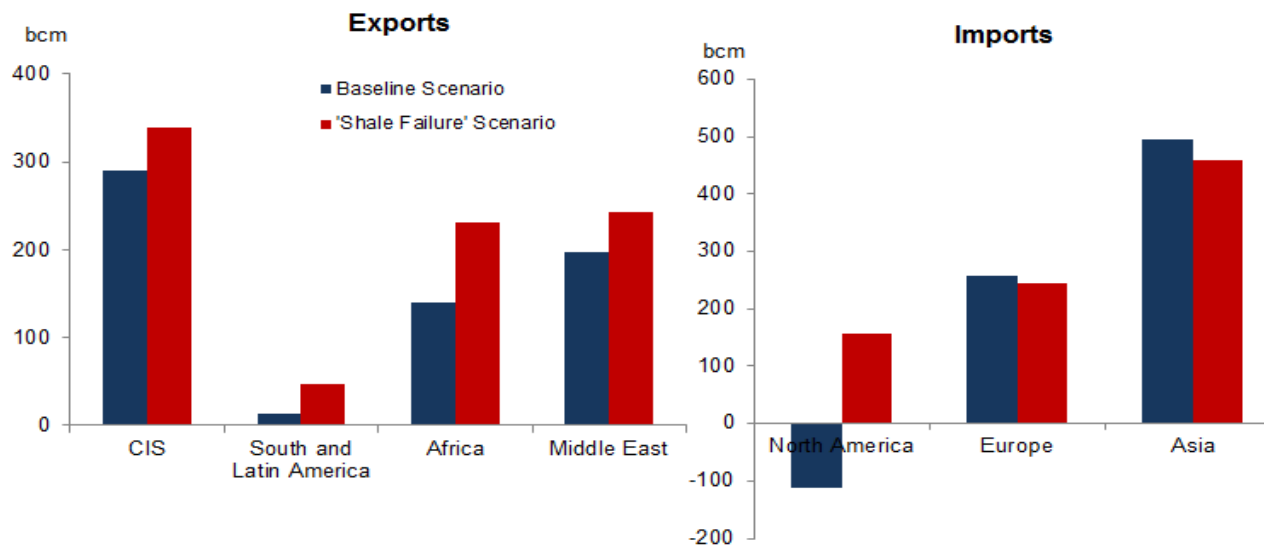


The Impact of Technological Breakthroughs on Energy Markets

Change of crude oil net import and export volumes in 2040 relative to 2010, in Baseline and 'Shale Failure' Scenarios



Change of natural gas net import and export volumes in 2040 relative to 2010, in Baseline and 'Shale Failure' Scenarios





Key findings

- The protracted nature of the current global financial crisis has led to **reduced forecasts of economic and energy consumption growth** accompanied by an obvious accelerated increase in the share taken by developing countries.
- In the long term, fossil fuels will remain dominant. The 'shale breakthrough' has postponed for two or three decades the threat of running out of economically viable oil and gas reserves – which had seemed so close just five to seven years ago – and has secured the predominantly hydrocarbon character of the world's energy sector. The share of oil and gas in world primary energy consumption will remain practically unchanged (53.6 per cent in 2010 and 51.4 per cent by 2040).
- The study of oil and gas price dynamics in different scenarios **did not show fundamental cause for alarmist forecasts predicting either too high, or extremely low, prices within the period under review.** In all cases – ranging from future success to possible failure of shale technologies – oil prices in 2040 will not move out of the range \$100–130/bbl. Gas prices will be closely correlated with oil prices, but also strongly differentiated by region (which does not exclude large short-term fluctuations in prices under the influence of political and speculative factors).
- Despite the integration of oil and gas markets, as international trade in oil and liquefied natural gas (LNG) expands, **the trend towards regionalization of prices**, resulting in considerable differences in price levels, will gain momentum.
- Natural gas will account for the most substantial increase in absolute volumes of consumption, and the share taken by gas in primary energy consumption will increase more than that of any other fuel. **The next 30 years could, quite reasonably, be considered as 'the era of gas'.**



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