Energy Perspectives

Long-term macro and market outlook

June 2011

Statoil

Editorial process concluded 31 May 2011, with data update concluded 25 May 2011.

This report has been edited and coordinated by CFO Macroeconomics and Market Analysis in Statoil, based on input from different parts of the Statoil organisation..

Disclaimer: This report is prepared by a variety of Statoil analyst persons, with the purpose of presenting matters for discussion and analysis, not conclusions or decisions. Findings, views, and conclusions represent first and foremost the views of the analyst persons contributing to this report and can not be assumed to reflect the official position of policies of Statoil. Furthermore, this report contains certain statements that involve significant risks and uncertainties, especially as such statements often relate to future evens and circumstances beyond the control of the analyst persons and Statoil. This report contains a number of forward-looking statements that involve risks and uncertainties. In some cases, we use words such as "ambition", "believe", "continue", "could", "estimate", "expect", "intend", "likely", "may", "objective", "outlook", "plan", "propose", "should", "will" and similar expressions to identify forward-looking statements. These forward-looking statements reflect current views with respect to future events and are, by their nature, subject to significant risks and uncertainties because they relate to events and depend on circumstances that will occur in the future. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied by these forward-looking statements.

Hence, neither the analyst persons nor Statoil assume any responsibility for statements given in this report.

Table of contents

Energy Perspectives

The financial crisis of 2008 is history. Concerns for self-regulation, stability and geopolitical sustainability are not. Efforts to bring the global economy back on track after the crisis has challenged the sustainability of economic policies. Following the policy-induced bounce-back recovery of 2010, it can be questioned whether and how global development could facilitate long-term global sustainability in different policy areas. Economic policies should aspire to a situation of strong, sustainable and balanced growth. Energy policies should aim at diversity and stability in energy supply to meet demand and welfare aspirations. Environmental policies should seek to balance the world's need for energy against the need for protection against global warming. With concerns for fiscal crisis in key economies, record-high demand growth for fossil fuels, unrest and war in important energy exporting countries, high commodity prices and lack of progress in environmental policies, achieving sustainable development is challenging.

The way our political leaders meet these challenges going forward, will determine important parts of the business context for the international oil and gas industry in the coming decades. Understanding the long-term fundamentals of economics, energy, and the environment is therefore important to business leaders and industry experts. This outlook provides a 30-year perspective on macroeconomics and market developments on the global energy scene.

Geopolitics affects global energy markets. During the last year the global interplay between economics, politics, environment, technology and energy has been clearly demonstrated both by significant, ongoing changes on the demand side and by substantial events in key supply regions. The recovery after the recession clearly demonstrates that global gravity shifts toward the East. China and India are surfacing as global giants in all markets, and in particular in global energy markets. Simultaneously, the unrest in the Middle East and North Africa signals the vulnerability of key energy supply sources in particular, and the desire for policy reforms and democratisation in many regions of the world in general. Given the importance of energy to both export and import countries, striking the right balance between the growth aspirations in demand countries and income and social aspirations in supply countries will be an important challenge in the coming decades.

This outlook projects annual growth in the world economy to average 2.9 per cent from 2010 to 2040, with emerging economies leading the way, and China and India growing roughly at three times the speed of the OECD countries. This average global growth rate is close to the rate for the previous 30-year period, but the distribution of growth is substantially different. The OECD economies will grow less, and the non-OECD countries more, in the next 30 years than in the previous 30 years. This outlook for economic growth is based on current trends and is inevitably surrounded by uncertainty.

Economic growth will continue to drive energy demand, and growth in energy consumption is a prerequisite for increased welfare in large parts of the world. However, the relationship between growth and energy is affected by industrialisation, technological progress, energy and climate policies, as well as energy prices. The combined outlook for these factors indicates that growth in global energy demand will slow over the coming three decades.

Global primary energy demand is estimated to have grown by a record 4.7% in 2010, indicating that the financial crisis did not entail a fundamental shift in world energy consumption. Demand for fossil fuels grew substantially, with global oil demand increasing by some 3.5% (2.9 mb/d). The projected average growth in total primary energy demand until 2040 is 1.3% per year. Demand for all energy carriers are expected to grow, but with significantly different growth rates.

Oil demand growth will be dampened due to environmental policies, improved energy efficiency and relatively high prices compared with other fossil fuels. The key to the level of oil demand going forward is transport, where technological development and efficiency improvements are counteracted by fast growth in demand for passenger vehicles in emerging economies. The latter factor is foreseen to dominate, so that oil demand continues to grow, but at a moderate pace. In the long term, the balance in the oil market will be determined by the relative speed of increasing resource scarcity and declining demand.

The natural gas markets will continue to be regionally differentiated, separated by geography, supply sources, market behaviour, dimensions of competition, and energy policies. However, the degree of integration is foreseen to increase, with growth in LNG, new pipelines and supply sources, and a gradual, imperfect convergence of energy policies. The shale gale ensures that the US will be well-supplied by domestic gas for a long period. The future may prove the availability of shale gas reserves in other regions, but Europe and Asia will for a long period depend on imports from Russia, the Middle East and Australia. Global gas demand is projected to be around 50 per cent higher in 2040 than last year.

The development of new renewable energy is high on the agenda in key demand regions, in part due to climate and environmental sustainability concerns, but also as part of energy security concerns. This outlook projects significant growth in new renewable energy towards 2040. Due to the low starting level for many of these sources of energy, it will, however, take decades before they constitute a significant portion of energy demand in many countries.

A growing and ageing global population poses key challenges for the world in the coming decades. Welfare aspirations and demand pressures from 9 billion people will put both non-renewable and renewable resources under stress towards the middle of the century. The world's collective innovative ability will be tested when ageing populations will be asked to increase productivity sufficiently to ensure growth and availability of resources for a larger total population. This challenge becomes even tougher when continued growth must be combined with efforts to dampen the increase in the emission of greenhouse gases, which is foreseen to continue towards 2030, with a gradual stagnation thereafter.

Eirik Wærness
Chief analyst

Acknowledgements

The analytical basis for this outlook is long-term research on macroeconomics and energy markets undertaken throughout the Statoil organisation during the winter and spring 2010/2011.

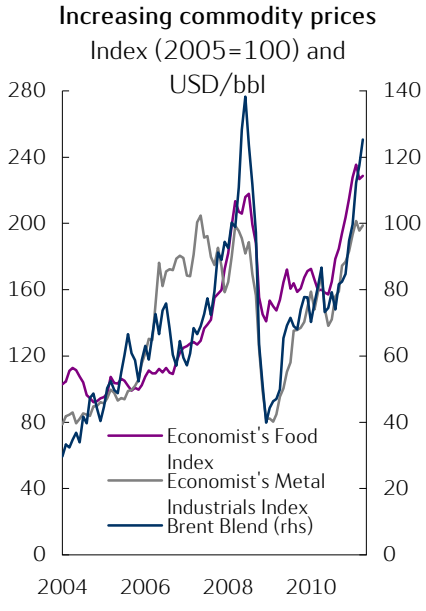
The research process has been coordinated by CFO Macroeconomics and Market Analysis, with crucial analytical input, support and comments from various parts of the company, including but not limited to market analysts and policy analysts in the business areas and staffs (MPR SBD MA AN, CSO CLI, and CCOM PPA).

Joint efforts and close cooperation between the above units and other resources in the company have been critical for the preparation of an integrated and consistent outlook for total energy demand and for the projections of future energy mix.

This report has been drafted and edited by CFO Macroeconomics and Market Analysis in Statoil. We hereby extend our gratitude to everybody involved.

Geopolitical outlook

Recent events have shown the importance of geopolitics for energy markets



Source: Reuters EcoWin

A year of fiscal crisis, natural disasters and unrest

During the last year the global economy has shown increasing signs of recovering slowly from the financial crisis. Energy demand growth has been strong, evidenced in particular through record high growth in oil demand. At the same time, the world has experienced a series of events and developments underlining the importance of geopolitics for future development in energy markets and other areas. The intersection of geography, economics and politics has again offered an important signpost for potentially important future developments.

Government finances in key OECD countries are under serious pressure after being stretched to the limit in order to dampen the damage of the financial crisis. Rebalancing is now required, but spending cuts and tax increases are unpopular, and could also produce lower growth and higher unemployment in the medium term. Improving competitiveness in peripheral countries in the EU is an inescapable, but painful and lengthy process affecting growth, unemployment and overall demand. Striking the right balance between short- and long-term government priorities continues to be a pressing task for OECD finance ministers in the years to come.

Natural disasters and weather have also been in the headlines and fuelled geopolitical concern about long-term consequences and sustainable development. Fires and draught brought havoc to Russian grain exports and contributed to inflationary pressure in India and China. Storms and flooding choked Australia's coal exports and tourist industry. And, worst of all, the triple earthquake-tsunami-nuclear disaster in Japan demonstrated the vulnerability of modern societies when nature strikes.

The ongoing unrest in North Africa and the Middle East has uncertain, but potentially considerable implications for long-term energy market developments. Therefore, spot crude prices have risen and become increasingly volatile.

All these geopolitical developments and future events of similar character and impact will continue to drive global economic development and energy markets.

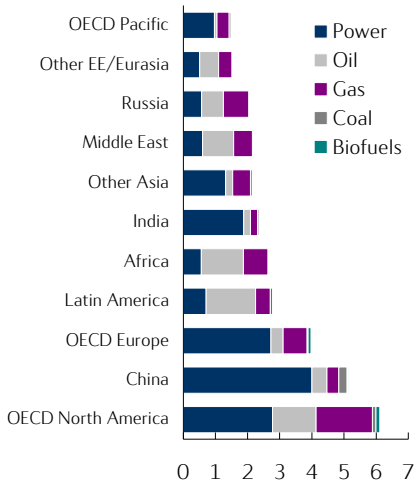
The geopolitics of energy

MENA unrest signals need for democratic reforms in resource rich nations

The events and underlying drivers in North Africa and the Middle East (MENA) clearly signal important risks for the long-term sustainability of the current "global order". They also highlight the interlinkages and inherent vulnerability in a globalised world with large import countries depending on a well-functioning and sustainable export ability of a few large export countries.

In this respect the triple sustainability dimensions of economics, energy and environment must also be interpreted to involve sustainability of the domestic economic development in important regimes. The unrest in MENA could be a signal that no regime is immune to popular movements driven by frustration against economic disparities, corruption, governance failures, and repression of the freedom of expression. For emerging economies elsewhere the developments in MENA should serve as a timely warning of the need to balance overall growth with a reasonable concern for distribution of wealth, institutional development and democracy.

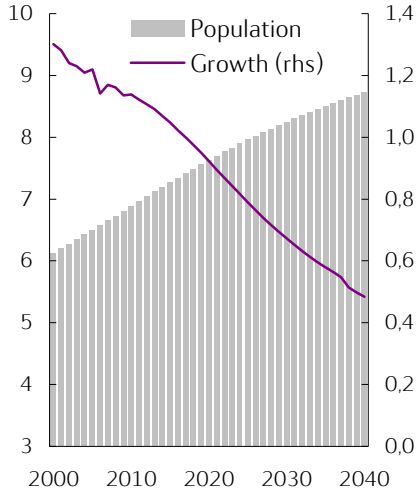
Energy supply investments
2010-35, USD-2009 trillion



Source: IEA WEO 2010 New Policies scenario.

Economic growth and its corollary, welfare development, require energy, and energy drives growth. Investing in future availability of productive energy is therefore a necessary requirement for continued welfare growth in large parts of the world. With global population potentially growing above 9 billion people towards the middle of the century, ensuring affordable, available and sustainable energy to a larger share of world population is a central political, economic and environmental challenge. A key challenge going forward is to ensure that sufficient capital is available for giant investments in energy extraction facilities and energy distribution infrastructure in parallel with capital available for reducing the environmental implications of energy consumption.

World population
Total (bn) and growth (%)



Source: IHS Global Insight and Statoil.

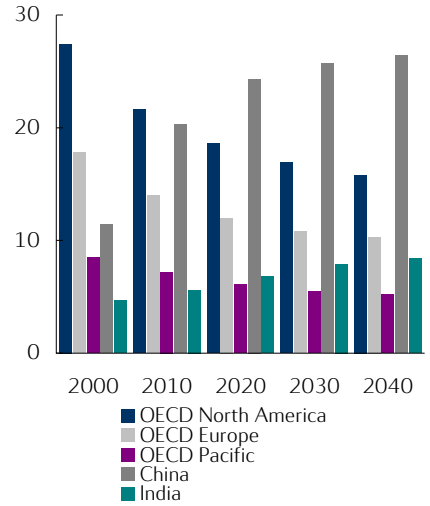
Economic gravity shifts towards the East...

...affecting international politics and trade

The macroeconomic outlook in this publication implies that Asia gradually will reinstate its position as one of the most important regions of the world, in terms of share of GDP and share of energy demand. The giants China and India will play an increasingly important role as consuming and producing countries, with their share of global GDP increasing to 2.5 times the relative size of today towards 2040. How this increasingly important role will be coupled with priorities in international economic policies and participation in the global trade game is a key uncertainty for the energy game. New powers will justly demand a say in international politics, trade negotiations, climate policy negotiations etc. Agreeing on collectively rational rules of play for trade, financial regulations, currency regimes and climate regulations will be even more of a challenge as Western

Shifting energy demand

Share in global energy demand (%)

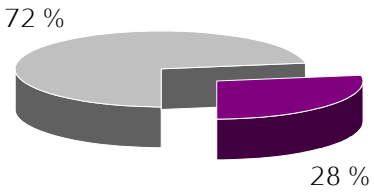


Source: IEA (history), Statoil (projections)

Global oil reserves

Total: 1,470 bn bbls

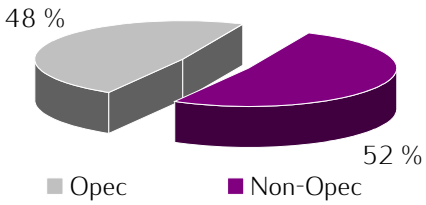
(+8.5% from 2010)



Global gas reserves

Total: 188,233 bcm

(+0.6% from 2010)



Source: Oil and Gas Journal.

Opec's dominance likely to increase

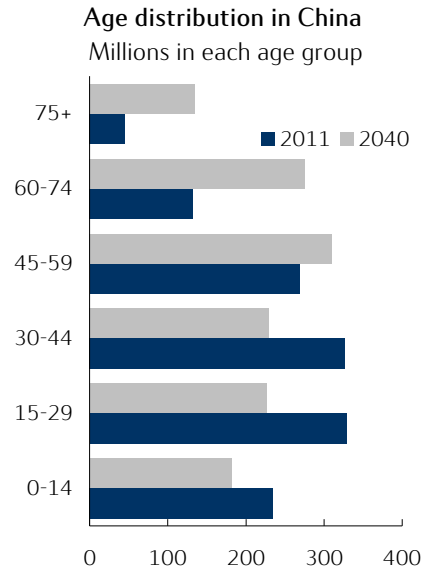
dominance fades with slowing economic weight, and their current role in defining such rules cannot longer be justified.

An implication of the increasing importance of Asia in global GDP is a similar and even more rapid change in distribution of energy demand. By 2040, this outlook forecasts that China's share of total energy demand will be 26.4%, up from 20.3% today, and only about 5%-points lower than total OECD demand. It seems reasonable to assume that influence in energy and environmental policies going forward also will reflect different regions' relative importance in the energy markets.

Global energy and climate policies will therefore develop in the interplay between key regions' preferences, where security of supply, ability to pay, availability of affordable technology, and local, regional and global environmental concerns are drivers. Policies aimed at higher energy efficiency and lower emissions could take different forms and mainly be driven by the economic priorities of countries like China and the US, and not necessarily by a global agreement on CO_2-reductions. However, the impact of such policies could well be reduced energy and CO_2 intensity. How these policies will be designed and implemented will impact total energy demand, relative prices, inter-fuel competition, and fuel market shares.

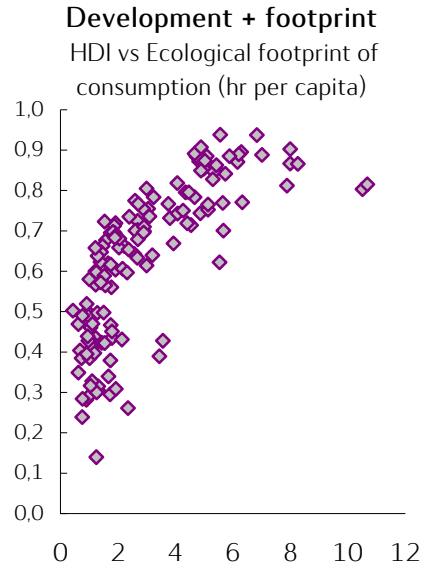
In parallel with regional shifts in energy demand, we will also see regional shifts in energy supply. Important non-Opec oil producers will be less important as their resource bases are exploited, while new countries such as Brazil and Canada become more important on the global oil scene. Overall, however, Opec's dominance, and in particular that of Saudi Arabia and potentially Iraq, is foreseen to increase. Conventional gas giants like Qatar and Russia will be joined by Australia and potentially other countries. Unconventional gas could gradually become a more important domestic resource not only in the US, but also in Latin America and China, modifying trade patterns for global gas transport.

Barring a fundamental breakthrough in unconventional oil and gas, carbon capture and storage (CCS) technologies for coal and electricity use in the transport sector, the general tendency is however that an increasing number of nations will become increasingly important in terms of fuel imports. This will contribute to reshuffle income and wealth from importing to exporting nations, with possible changes and challenges in political clout and priorities. Continued stability and security of supply will also depend on the ability of resource-rich nations' ability to manage their financial wealth in a well-functioning system of global international trade and capital flows.



Source: US Census Bureau.

China's dependency ratio will grow from 36% to 60% by 2040



Source: www.footprint.org (2007 data), Human Development Reports, 2010.

Among the countries with a sustainable ecological footprint, Peru at 0.723 has the highest HDI

Swans of different colours may come and go

Over the next 30 years we will be facing new challenges. Some of these are known, but it is unclear what the impact will be. Others are unknown and must be handled as black swans once they become reality.

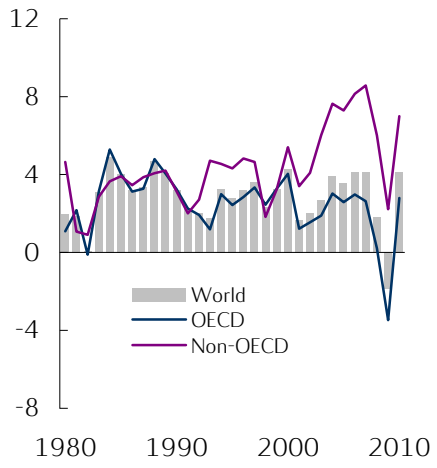
A key challenge will be to sustain productivity growth in a growing population, so that welfare development can continue. Furthermore, the dampening growth of global population over time entails new challenges for emerging economies experiencing ageing populations. Reduced growth and increasing pressure on public finances must be addressed in key emerging economies, and not only in the OECD countries. In particular, the demographic outlook for China represents unfamiliar territory, both in terms of absolute numbers and the speed at which the change must be handled. With more than 400 million people above 60 years of age in 2040 (30% of the population), challenges for economic growth, public finances and income distribution will be very different from today.

Another important issue is to what extent the composition of growth and economic development can be adjusted to improve the balance between resource availability and resource consumption. Measures of so-called ecological footprint including carbon footprint vary, but the overall conclusion is that the world is faced with substantial tasks ahead. All 40+ countries that are classified as having very high human development, and many countries with lower human development, have an ecological footprint too burdensome to be sustainable (around 2 hectares per capita), and in many cases much higher. Can we find a way out of this maize, achieving growth and productivity development and at the same time improve sustainability in resource use? How will lifestyles change if we achieve this – and does it imply that all those in emerging economies currently aspiring to Western lifestyles will be disappointed? What type of distributional conflicts will arise if we are not able to ensure sustainable growth?

In the remainder of this outlook we focus on what we think is the most likely development in macroeconomics and key energy markets, realising that one cannot exclude surprising trend breaks and very different developments in some dimensions. Given that it is inherently difficult to predict the unknowns, we refrain from incorporating them into our forecasts, but remind our readers that some of the most likely developments in the following pages are surrounded by substantial uncertainties, both on the upside and on the downside.

The global economy

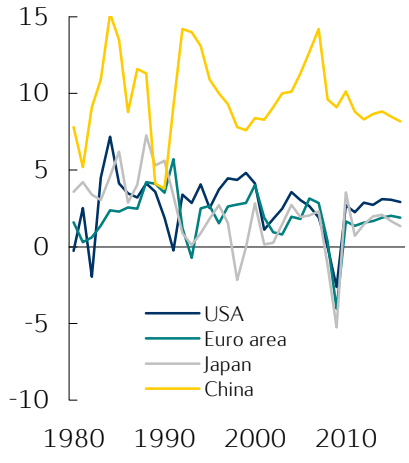
Global economic growth
Annual change in GDP (%)



Source: IHS Global Insight.

Moderation in the 1980s and 90s followed by financial crisis

Global economic growth
Annual change in GDP (%)



Source: IHS Global Insight.

Retrospect, status and analytical approach

Retrospect and status

Over the last three decades, global energy demand has been fuelled by robust economic growth. The world economy has expanded by 2.9% per year on average over the 30-year period up to 2010. The pace has declined somewhat during this period, from an average of 3.2% in the 1980s to 2.6% in the 2000s. With annual average growth of 2.5% since 1980, the OECD countries have grown nearly half the pace of the non-OECD area. Whereas OECD trend growth is declining, the non-OECD area has experienced an increasing growth rate during the last 30 years, boosted by China and also India. This pattern has supported global growth and is well explained by cross-country variation in labour market development, capital accumulation, and productivity growth. State-dependent growth performance and catch-up mechanisms also suggest that industrialised countries should grow less rapidly than emerging economies.

Political efforts in the Western world to stem inflation and fluctuation in key macroeconomic variables paved the way for a period known as "the great moderation" with fairly stable and solid growth in the 1980s and 1990s. The relatively mild recession of 2001-2002 was followed by a 5-year period of strong economic growth. Energy and commodity prices escalated, capital markets flourished and risk premiums in financial markets declined. At the same time, imbalanced regional capital and trade flows began to widen. USA is a prominent example of how politicians in many OECD countries allowed unsustainable public deficits to emerge. The Chinese entrance to the World Trade Organisation in 2001 was an extra catalyst for its exports, state savings and economic growth. Emerging economies, especially in South-East Asia, also altered their policies in the wake of the crisis in 1998-99, to reduce dependence on debt and international financing. Imbalances were building with this flow of goods and capital to the West.

This development formed the backdrop for the 2008 financial crises. Plunging asset prices caused heavy losses in financial institutions, with the collapse of Lehman Brothers as climax. This had repercussions on the supply of capital and the crisis spread

The financial crisis took the world economy into the worst recession since 1930s

rapidly across the globalised world. Collapsing confidence, consumption, investment and production took the world economy into its worst economic recession since the 1930s, with a sharp increase in OECD unemployment as a result.

Robust non-OECD economies and policy responses stimulated the recovery...

...but also added to the challenge of rebalancing public finances in OECD

The risk of a severe recession triggered a resolute and coordinated monetary and fiscal policy response from governments all over the world. This resolve in policy response was not in vain, and the world economy picked up speed during 2H 2009 and 1H 2010, driven by restocking, continued policy stimulus and a gradual pick-up in private demand. Strong growth in emerging economies fuelled the recovery, whereas the uplift in major OECD economies growth has been moderate. After this initial rebound, the pace of growth has abated somewhat as private demand struggles to overtake fading government stimulus. This outlook suggests a gradual recovery for the world economy, where the short- to medium-term outlook in advanced economies is constrained by high debt. On the other hand, emerging markets will drive growth as they are generally in better macroeconomic shape. In the longer term, robust growth in the non-OECD area will support global macroeconomics, but maturation of these economies and slowing demographics will eventually imply a gradual slow-down in these economies and hence also in global economic growth.

Long-term growth determined by labour, capital and productivity:

$$Y_t \equiv S_t = F(K_t, L_t)$$
$$Y_t = A_t K_t^{\alpha} L_t^{\beta} e^{\gamma t}$$
$$\dot{y}_t = \dot{a}_t + \alpha \dot{k}_t + \beta \dot{l}_t + \gamma t$$

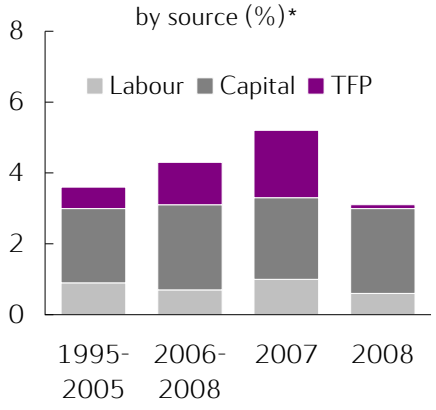
Analytical approach

Whereas the short- to medium-term analysis is based on a business cycle and demand-oriented approach, a 30-year time horizon requires a different approach to the development of economic growth assumptions. The longer-term production potential of individual economies is determined by the economies' resource and input endowments, i. e. the supply-side, and by the way these inputs are combined to produce output.

With economic growth being the result of input growth and technological progress, both capital accumulation and labour force growth will normally contribute favourably to the long-term growth rate of a country. The same goes for R&D investments, which may enhance the rate of technological progress, or total factor productivity growth (TFP). This approach also implies that GDP growth can be decomposed into specific contributions from the above constituents.

This outlook is based on data and analytical input from a variety of external sources, including multinational institutions, public and private research institutions, consultancies and investment banks. All country weights applied in regional and global aggregates are based on market-based exchange rates.

Global GDP growth
by source (%)*



*) Contribution from labour, capital, and total factor productivity (TFP) growth.
Source: The Conference Board.

Medium-term outlook: Uneven and unbalanced

The roots and scars of the financial crisis portray the medium-term outlook...

...but robust non-OECD growth lifts prospects

The global economy has shown signs of a more broad-based recovery over the last year. Still, the roots and scars of the financial crisis portray the medium-term outlook, and the recovery continues to be uneven across regions, unbalanced between sectors and to some extent unsustainable as fiscal deficits need to be rebalanced. OECD economies are projected to grow 2.2% on average towards 2015, which is lower than the years prior to the crisis and cause concerns over a prolonged elevated unemployment rate. On the other hand, led by China and India, emerging markets are foreseen to grow robustly at 5.9%, somewhat lower than pre-crisis years as well.

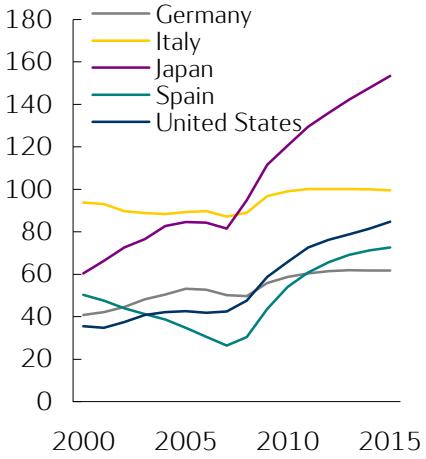
Monetary and fiscal stimulus spurred last years' economic recovery. OECD countries now need to cope with their deficits and get public finances on firmer footing. This is a challenging task and few economies have sketched out a credible plan for the restoration of public finance. A complicating factor is that the tightening should not choke an already fragile recovery. The highly indebted OECD household sector also faces a challenge to reduce leverage at a backdrop of high unemployment and muted growth in wages and income. The corporate sector is in better shape overall, and holds an upside potential, but the financial sector's need for more capital to lift robustness may dampen the ability to supply credit in the years to come.

Non-OECD economies are now facing increasing pressures as output gaps are gradually closing. Policy actions in these countries aim to curb inflation and stem rising asset and house prices. There is also a shift in policies to spur domestic demand and development, at the expense of exports. Still, global imbalances in capital and trade flows will prevail as only marginal adjustment is expected. To reduce domestic risks, some non-OECD economies also opt to dampen a stronger foreign exchange rate through market regulation, as a response to the "currency war", which holds a potential to increase tension in international trade and capital flows. In addition to such downside risk, growth in these emerging economies could be higher than expected, with strongly needed rippling effects to debt-ridden advanced economies.

Rising food and commodity inflation, especially oil, and ever-prevailing geopolitical tensions add tension and potential downside to the medium-term outlook. As policies already are stretched in key OECD countries, policy-makers have limited policy ammunition to handle new, major shocks. The long road to fiscal consolidation and recent geopolitical tension imply that risk to the economic outlook is slightly tilted to the downside.

Net government debt

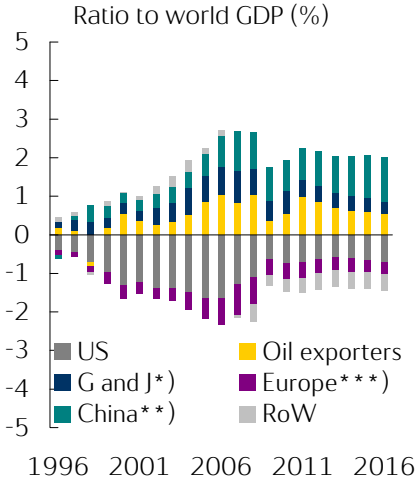
Ratio to GDP (%)



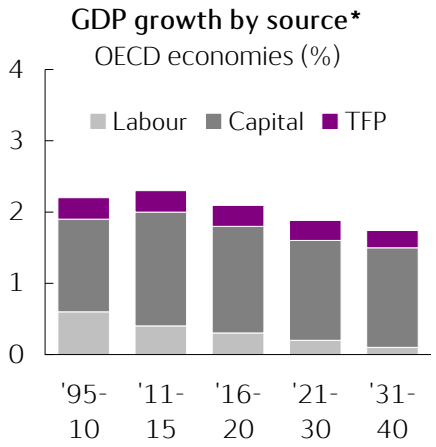
Source: The International Monetary Fund.

Global imbalances

Ratio to world GDP (%)



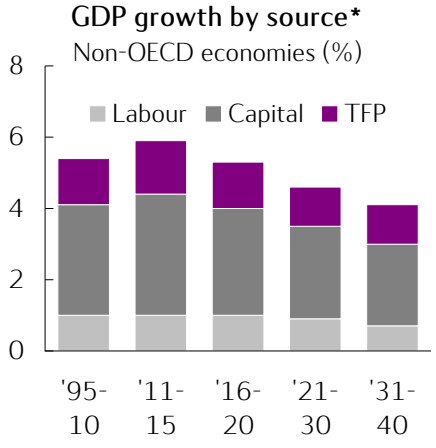
Source: The International Monetary Fund.
*) Germany and Japan
**) China including Emerging Asia
***) Europe excluding Germany



*) Contribution from labour, capital, and total factor productivity (TFP) growth.
Source: The Conference Board and Statoil.

Capital formation, employment and productivity important for economic growth

Higher growth in emerging economies catching up



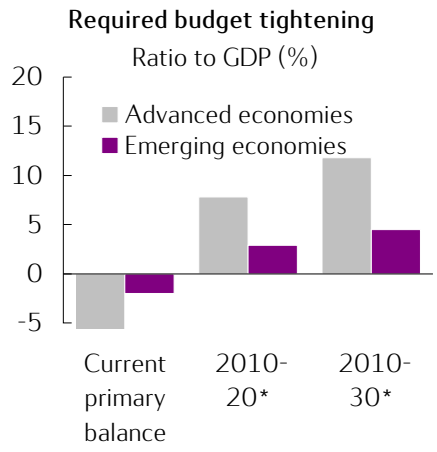
*) Contribution from labour, capital, and total factor productivity (TFP) growth.
Source: The Conference Board and Statoil.

Long-term growth: Capital, labour and productivity

Effects of short-term events normally diminish over time and long-term economic growth is determined by an economy's resource and input potential, as well as its capability to combine these inputs to produce outputs. In economic theory, this relationship between inputs and output is usually described by a production function. A classic representation of this function can be viewed as an economic outcome due to an intentional intended combination of capital, labour, natural resources and energy under a specific set of framework conditions (e.g. market and regulatory environment). Countries that extract the full potential of these variables tend to grow at a higher pace and could also sustain growth over time, provided they adopt prudent policies along with necessary institutional changes. Nevertheless, the convergence theory implies that as an economy becomes industrialised and matures, the rate of economic growth will dampen. In addition, already elevated debt levels, increasing age-related costs and global imbalances could disturb international capital markets and reduce market efficiency in channelling savings and investments. This may be prolonged and also affect growth beyond the short and medium term.

As stated by renowned economists such as Robert Barro and Xavier Sala-i-Martin, a standard model of long-term growth predicts the conditional convergence of income between countries, i.e., a developing economy starting with an initial low level of income relative to its long-run potential will tend to grow faster than a mature industrialised economy. A lower level of both physical and human capital, as well as inferior technological capacity, increases the catch-up potential to the long-run capabilities. Therefore, there is greater room to improve the use of such resources in order to accelerate the growth in total output. Accommodative stabilisation, prudent regulatory regimes, and a sound institutional framework could expand the long-run potential for economic activity. Hence, the twin challenges for the global economy are to bridge the gap between current output with that of the long-run potential and consequently apply technological changes to enlarge the latter.

In a perfect world, the analytical approach stated above would be embedded in a rigorous model which then could be cascaded down to each and every country in the global economy. However, this exposition is rather meant to illustrate a way of thinking when it comes to long-term projections of economic growth, due to resource constraints. Nonetheless, in combination with professional judgments, the above mindset is consistently applied to regions and countries in this outlook.

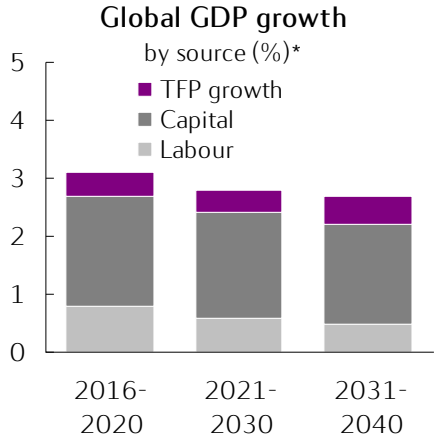


*) Adjustment strategy required to bring down debt-to-GDP ratio by 2030.
Source: The International Monetary Fund, Fiscal monitor April 2011.

Normally, public and private finances do not impact longer-term growth prospects. Nevertheless, current record high debt in major OECD economies could have an impact beyond the short term as rising interest rates and debt payments could crowd out the economy's ability to nurture both capital accumulation and technological growth. Academic research suggests that public debt above 90% of GDP could result in a significant decline in growth for both advanced and emerging economies. The impact is more profound if a majority of the debt is owned by foreigners as distortions to the domestic economy are more profound.

The policy response to the financial crisis may have longer-lasting implications. The increasing worries of debt default in OECD economies could cause risk premiums to increase, even in a long-term perspective as age-related costs also add pressures. Moreover, the dampening effects of planned and necessary fiscal consolidation may well prevail beyond 2015. The unusually fragile point of departure implies that the world economy is entering uncharted territory, and the financial sector's role in channelling savings and investments could be challenged.

Capital accumulation boosting growth over the last decades



*) Contribution from labour, capital, and total factor productivity (TFP) growth.
Source: Statoil.

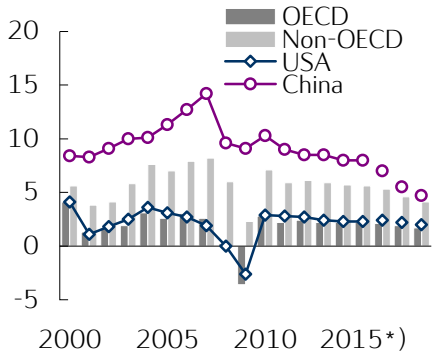
Over the last fifteen years, the contribution from capital to global economic growth has hovered around 2%, whereas labour contribution to growth for the same time period was just over 0.5%. Up to 2005, about one-fourth of this contribution stemmed from capital related to information and communication technology (ICT). However, over the last few years traditional machinery and equipment has been more important as emerging economies have dominated growth. Capital contribution to growth for OECD economies has diminished in the recent years, while it has boosted growth in non-OECD economies. More specifically, the Asian economies such as China, South Korea, Singapore and Malaysia, have all prospered due to capital accumulation over the last two decades. Other nations such as India, Indonesia, and Brazil could be the next beneficiaries of such a growth pattern.

Demographics, labour market conditions and education influence labour's contribution

The contribution from labour to economic growth differs across different economies depending on their demographic developments, labour market participation rates, hours worked, and labour-specific productivity gains (e.g., levels of education). In the last decade or so the factors' contribution towards OECD growth has faded subtly, while the contribution from labour to non-OECD growth has remained stable. One of the core reasons behind a fall in the labour contribution is stagnant populations and a consequent stagnation in the labour force. Key elements for long-term growth will therefore be the participation rates and labour productivity. As labour market participation and education levels are already high in most OECD countries, the potential for further enhancement going forward is limited. Still, retirement age

Economic growth

Annual change in GDP (%)



Source: IHS Global Insight and Statoil.
*) Three last data points are annual average for 2016-20, 2021-30 and 2031-40 respectively

Productivity key to enlarging mature economies' growth potential

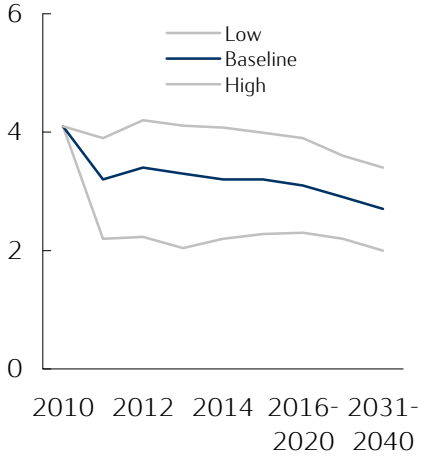
seems to be part of a solution which will also improve public finances, in addition to giving a permanent shift in the labour force. The opposite is true for those non-OECD economies that have burgeoning population growth and consequently higher potential to tap. As economies mature over long-term, labour contribution towards growth usually follows a declining trend.

Nobel Laureate Paul Krugman states that "productivity isn't everything, but in the long run it is almost everything". Productivity is important for all economies and reflects how efficient production inputs such as labour and capital are being used to produce output. The economic term is total factor productivity (TFP) and it accounts for contributions to total output which cannot be attributed to input growth. Empirical analysis suggest that TFP growth is mostly pro-cyclical and tends to be the driver for mature economies over the long-run as they are constrained by diminishing growth in capital and labour. Lower income countries have a greater catch-up potential and can therefore apply policies that induce increases to both human and physical capital. Over the longer term the contribution from TFP to global economic growth is assumed to moderate slightly to 0.5%, due to gains in non-OECD countries of 1.1%, whereas it is expected to be lower at 0.25% in OECD economies. Policy shifts, especially with respect to investments to stem global warming and persistent high oil prices, could have a dampening effect on TFP growth. Economies adapt to such changes, but they are nevertheless foreseen to have a moderating effect on TFP growth compared to historical rates.

This forecast combines the above mindset with current economic trends, geopolitics, technical innovations, and climate policy assumptions. For the next 30 years, economic growth is projected to grow by an annual average of 1.9% in the OECD area, which is 0.6 percentage point less than for the 30-year period up to 2009. The corresponding rate of growth for non-OECD countries is foreseen at 4.7%, which is 0.4 percentage point higher than the previous 30-year period. This translates into 2.9% average annual growth in the world economy over the next 30 years, which is well in line with the growth performance of the last 30 years. The main reason why the world economy holds up well is that fast-growing non-OECD countries increase their weight in total global economic activity.

Forecast and uncertainty

Annual change in world GDP (%)



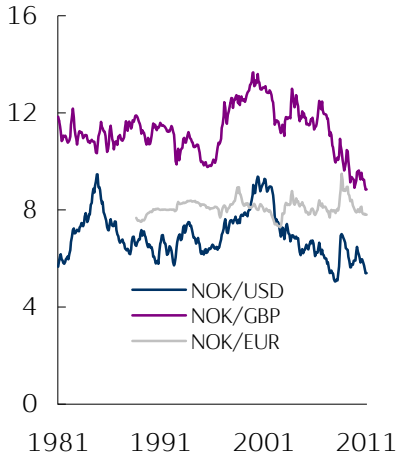
Source: Statoil.

This outlook for economic growth is based on current trends and is inevitably surrounded by uncertainty. In the short and medium term risks are tilted to the downside due to the fragile point of departure, whereas risks are more equally balanced around the projected slowing growth path in the long term.

Key currencies: Beyond short-term fluctuation

The relationship between the NOK and USD is important for Norway's oil and gas industry

Key currencies vs. NOK
Monthly exchange rates



Source: Reuters EcoWin.

For the Norwegian oil and gas industry the relationship between the Norwegian krone (NOK) and the US dollar (USD) is especially important to the long-term market prospects. Over the last decades, the NOK/USD has varied substantially, from 9.5 in the mid-1980s and during the turn of century, to recent lows of close to 5. Over the last decade NOK has averaged 6 vs. USD, supported by robust energy prices, which also have fuelled the Norwegian economy and petroleum investments. Technically, the short- to medium-term outlook for the NOK/USD exchange rate is formed indirectly. The market for NOK/USD has a long history and is liquid and efficient. Still, the close relationship between the NOK and the Euro (EUR), as well as analytical and capital resources of international markets centred on the big global currencies like USD, EUR, and JPY, suggests that a method where expectations are formed for USD/EUR and NOK/EUR as a basis for the deriving the NOK/USD exchange rate is appropriate.

Market sentiment important in the short term, macro-economics in medium term

In the short to medium term exchange rate fluctuations are above all a result of expectations for macroeconomic fundamentals. Financial market sentiment, terms-of-trade changes, and interest rate differentials may cause shifts and changes from day to day and from month to month. Over the medium-term, however, there is a more prominent role for general indicators of macroeconomic performance, like productivity, price stability, and sound macroeconomic policies.

Purchasing power parity dominates in the long term

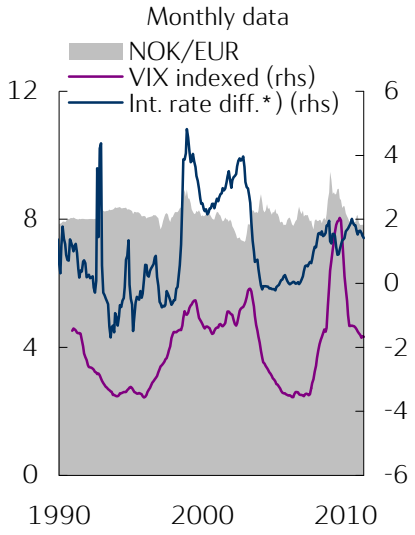
Academic research on long-term exchange rate formation suggests that currency movements tend to even out cross-country variation in price levels over time. The hypothesis of purchasing power parity (PPP) prevails as the dominant explanation for exchange rate formation in the long term. In relative terms, the PPP hypothesis implies that long-term exchange rate drift will reflect differentials in consumer price inflation. An implication is limited drift in exchange rate between countries with similar monetary policies and inflation targets.

Despite policy efforts, the NOK is vulnerable in times of turmoil

Economic policies in Norway have for many years aimed at providing a nominal anchor for the exchange rate. Stable inflation as the objective of monetary policies and tight economic, trade and political links to Europe have ensured that the NOK largely has remained stable against the EUR. Still, with Norway being a small, open economy, the NOK is vulnerable in periods of commodity and financial market turmoil. During the Asian crisis in the late 1990s NOK depreciated sharply on weak oil prices and high risk premiums. Following an increase in the oil

Short-term driving forces

Monthly data



Source: Reuters EcoWin.
*) Difference between NOK and EUR 3-month money market interest rates.

price, a relatively strong Norwegian recovery, and significant interest rate differentials to the rest of Europe, the NOK had however recovered by 2002. More recently, a similar pattern emerged as NOK again fell victim to increasing risk aversion and general flight to safety during the 2008 financial crisis. The depreciation vs both EUR and USD was however relatively short-lived due to a relatively moderate Norwegian down-turn, solid state finances, and improvement in financial conditions. The NOK regained strength and now re-approach its historical levels against the euro, whereas the ratio to USD has touched historical records partly due to the general weakening of USD. Going forward, a sound Norwegian economy and widening interest differentials vs the EUR and USD are expected to lend support to NOK. This should facilitate a path for NOK/EUR in alignment with history and the PPP hypothesis.

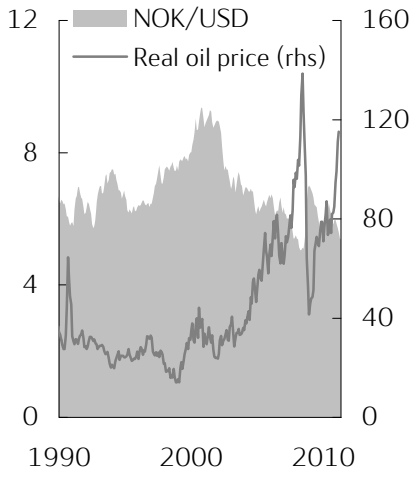
USD historically a "safe haven" currency...

In contrast to the Norwegian currency, the USD has historically enjoyed status as a "safe haven" currency, and therefore tends to prosper on financial and commodity market turmoil. Fuelled by favourable investment returns, the USD strengthened in the late 1990s, until the IT bubble burst at the turn of the century. The USD then embarked on a weakening trend during the subsequent period. Factors such as low financial market volatility, low interest rates and robust economic growth led investors' focus to shift away from "safe haven" to search for yield. The imbalances in the US and global economy consequently widened and was an important factor to the financial crisis in 2008, which also was the culmination of the weakening trend. Global investors sought cover from the crisis that swept world financial markets. However, after the initial rebound, USD has weakened over the last year, reflecting low interest rates and increasing US debt concerns, resulting in its "safe haven" status being questioned.

... but its status has been questioned recently

NOK/USD and oil price

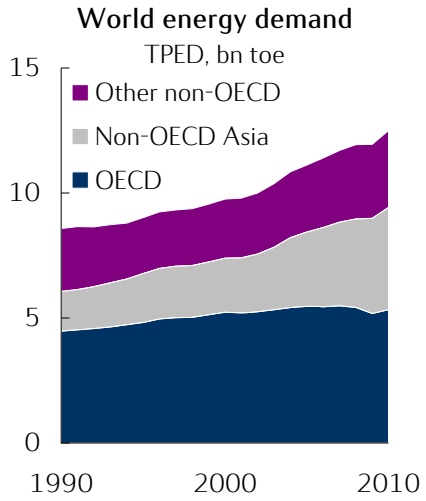
Monthly data



Source: Reuters EcoWin and Statoil

Still, the USD is likely to gain support over the coming years. The more prosperous macroeconomic outlook than in Europe would imply an interest rate differential in favour of the USD. Without significant deviation in inflation rates over the longer term, the USD/EUR is likely to hover around historical levels, and in alignment with the PPP hypothesis. Moreover, fluctuations in the USD currency tend to be accompanied by compensating movements in the oil price, thus limiting the real exchange rate exposure to oil and gas companies. Whatsoever, the above line of reasoning for NOK/EUR and USD/EUR implies that the NOK/USD should also settle at a level in line with history. As monetary policies aim at consumer price convergence between USA, Europe and Norway, the PPP hypothesis suggests that NOK/USD is less inclined to drift away from its historical level, even in the longer term.

Overall energy market outlook



Source: IEA (history), Statoil (projections).

Energy demand and energy intensities

Introduction

Statoil's focus in the field of energy forecasting is the outlook for oil and gas supply and demand. However, oil and gas demand scenarios are contingent on a context, and this context should include not only macroeconomic assumptions, oil and gas price assumptions and a geopolitical setting, but also perspectives on the fuels that compete with oil and gas for market shares, and a view on the entire energy demand side. Oil and gas demand scenarios developed in isolation from the rest of the energy landscape may imply less realistic outcomes for the inter-fuel competition and/or scenarios for total energy demand.

An economy's primary energy demand is the sum of its demand for coal, oil, gas, nuclear energy, hydro energy, wind, solar and other renewable energy sources. Electricity and heat are not included in the primary energy definition, but the fuels burned in power and combined heat and power (CHP) plants to generate electricity and heat are.

Outlook for energy intensities key to future energy demand

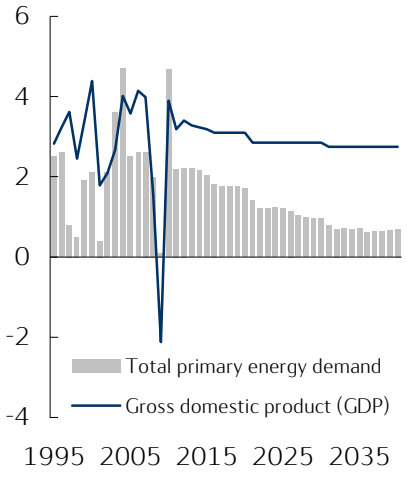
The energy intensity of a country – i.e., the amount of energy required to produce a unit of its GDP – has become a popular indicator of the sustainability of its economic priorities and a widely used indicator for the design of energy and climate policies. If a country's energy intensity is viewed as too high relative to a common standard, and unlikely to decline under current energy and climate policies, the government will be called on to tighten its policies accordingly with consequences for oil and gas as well as for other fuel demand. Evaluating the development in the energy intensity of a country is thus important for establishing plausible scenarios for a country's total energy demand.

The bottom-up and top-down perspectives complement each other

As such, single fuel demand scenarios reflecting a bottom-up perspective, and total energy demand scenarios reflecting a top-down approach, complement each other and should be developed in an integrated iterative process to secure a result where both the parts and the sum are credible.

Energy efficiency is one of several factors that influence energy intensity

Economics and energy
Annual global change (%)



Source: IEA, IHS Global Insight, Statoil.

Rebound and backfire effects could dampen net reductions in energy demand

Policy makers have many tools to influence energy efficiency

Energy intensity drivers

A country's energy intensity may change in response to politically induced improvements in energy efficiency, but also as a result of autonomous technological progress, changes in industry structure, and market signals. In addition it is sensitive to changes in people's income and preferences, and to changes in the availability of energy and affordability of different energy consuming goods. Such changes are not easily enhanced, suppressed or redirected by political fiat. Thus energy intensity developments may be influenced but not determined by governments.

One school of thought argues that the scope for managing energy intensity developments is limited also because of so-called rebound and backfire effects. The idea – launched in 1866 by a British economist, William Jevons, who wrote on coal – is simply that achieving efficiency gains in energy production and/or consumption will reduce the implicit price of energy, with income and substitution effects boosting energy use to offset some of the initial decline, or even raising energy use above its original level. The rebound concept refers to the first of these responses. Backfire implies that the entire initial gain is wiped out. Researchers believing in this theory have estimated that implementation of the "no regrets" energy efficiency measures recommended by the IEA and adopted by the International Panel on Climate Change would produce rebound effects eliminating half of the initial gains. These effects are not easily documented or predicted, however, and other researchers consider the warnings about rebound and backfire largely unjustified and a diversion of the overall energy and climate policy debate. In any event, promoting efficient use of energy and avoiding waste should be an aim, in order to promote resource efficiency.

In order to dampen energy demand growth governments may set and progressively tighten energy efficiency standards, offer tax breaks and other incentives for investments in energy efficiency. In addition they can impose fuel and/or fuel consuming equipment taxes, introduce carbon pricing or carbon taxes, support energy R&D and new technology deployment, inform the public on the consequences of profligate energy use and advise on how to cut consumption.

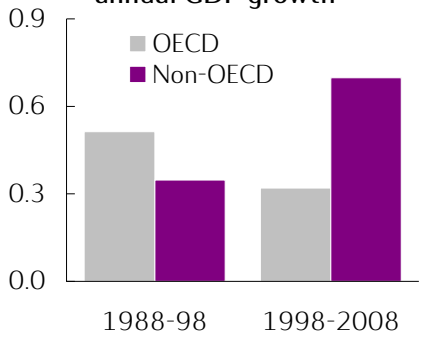
Recent developments

The ratio of average annual growth in world primary energy consumption to average annual growth in world GDP in the two decades between 1988 and 2008 was 0.6. In three regions did energy consumption increase faster than GDP. Eastern Europe went through extreme economic upheavals in this period, with unrepresentative energy intensity changes as a result. However,

Ratio of annual primary energy demand growth to annual GDP growth
(1989-2008)

Source: IEA.

Ratio of annual primary energy demand growth to annual GDP growth



Source: IEA.

In 2010, global growth in energy demand exceeded global GDP growth...

... boosting energy intensities and further complicating climate policies

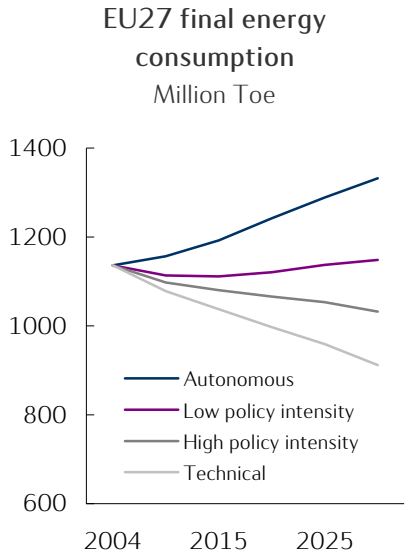
the Middle East's score had structural and policy reasons. Many countries in this region are in the process of establishing large petrochemical and other energy intensive industries, and they are subsidising fuel and electricity consumption to underpin local competitiveness. Such policies inevitably lead to high energy intensity.

A breakdown of the 1988-2008 period into two decades shows that in the OECD area the ratio of average annual energy consumption growth to average annual GDP growth declined from the first to the second decade. In other words, not only did the energy intensity of the OECD area continue to decline, it declined at an accelerating pace. In the rest of the world the ratio increased from the first to the second period. Although it remained below 1, so that the energy intensity of the non-OECD world continued to decline, it declined at a decelerating pace, thus testifying to the energy intensive nature of the very rapid economic growth accomplished by China and other emerging economies in the 2000s.

2009 was highly unusual by historical standards also in energy terms. For the first time since the early 1980s global energy demand actually declined. Available data indicates a ratio of world energy growth to world economic growth of 0.56. This fairly "normal" ratio was however the result of two negatives, with global energy consumption apparently declining less (1.1%) than GDP (1.9%).

The first consolidated energy demand statistics for 2010 will become available only later in 2011. Still, available estimates and guesstimates indicate a strong rebound in demand. The French energy consultancy Enerdata puts world energy consumption growth in 2010 at more than 5%. Coupled with a 4.1% increase in world GDP in 2010, Enerdata's estimate implies a ratio of world energy consumption growth to world GDP growth of some 1.2. According to the IEA the ratio has been this high only in 2003/2004 since the Agency started to compile energy statistics in the early 1970s. It was mainly fossil fuel demand that bounced back last year. Renewables increased too, but more sluggishly than typical for the latter 2000s. Last year thus highlighted the elusiveness of the CO_2 emission reduction targets considered necessary to contain global warming.

Visions and targets - achievable or wishful thinking?
The scope for further energy efficiency improvements is considerable across sectors and countries. IEA's "Energy Technology Perspectives 2010" focuses on a scenario where fuel use efficiency improvements account for 38% of the cuts in



Source: EU Commission: Data Base on Energy Saving Potentials; Under different policy assumptions

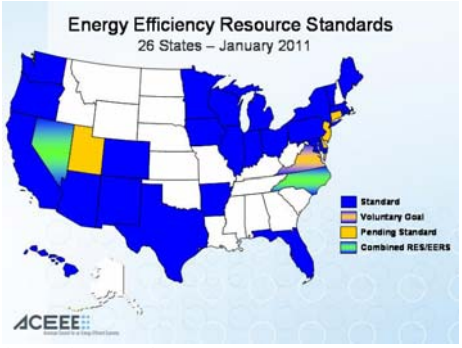
CO_2 emissions considered necessary by 2050. Final energy demand by 2050 is 31% lower in this scenario than in IEA's baseline scenario, and the latter scenario already incorporates considerable efficiency growth. Aware of this potential, most countries aim for energy efficiency improvements, and many have also published specific targets for energy intensity.

A 2009 study by the EU Commission concludes that while the EU27 final energy consumption is headed for a 15% increase between 2010 and 2030, it is technically possible to reduce it by 15% over this period. Some of these possibilities are – at least for now – irrelevant to private market actors because of their costs, but those left would if implemented cut final energy consumption by 6%. However, this potential requires what the authors identify as "high intensive energy efficiency policies" to be realised.

The technical possibility scenario is around 20% below the business as usual scenario by 2020, and the EU has included in its 20-20-20 vision an intention of 20% reduction in primary energy consumption by 2020. But whereas the EU's renewable energy targets have a legal status, the energy intensity target is merely a recommendation. In March 2011 the Commission noted that member countries were headed for only a halfway realisation of the energy intensity target, and called for stronger efforts. It has asked member country governments to submit indicative national targets with a view to assessing the compatibility of these targets with the EU-wide 20% ambition and, if there is a mismatch, send revised targets back to the governments. The Commission further suggests that these targets are made legally binding. Member governments' preparedness to give up sovereignty in this field, and – most importantly – take the necessary steps to reach the targets, remains an open question.

EU on track to deliver only half of the 20-20-20 energy intensity target

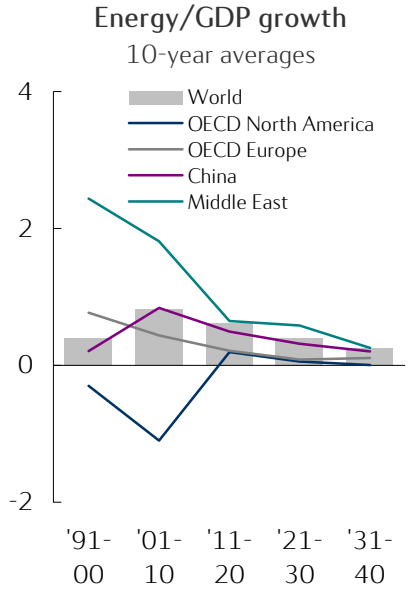
The US lacks a federal target, but has sector and state level targets



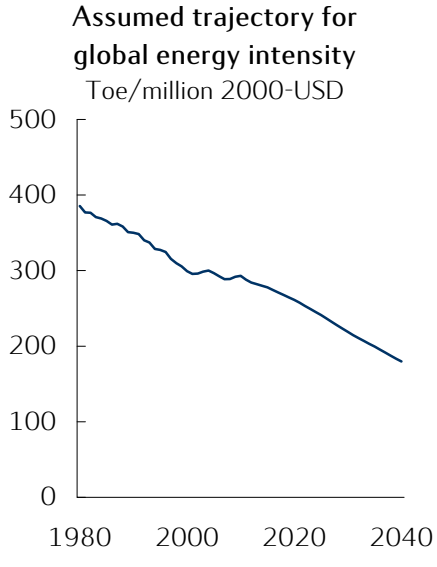
Source: American Council for an Energy Efficient Economy.

The US does not have a federal, all inclusive energy intensity target, but rather an array of sector and state level standards. The best known sector targets are the Corporate Average Fuel Economy (CAFE) standards requiring US automakers to progressively increase the miles per gallon performance of US cars and trucks. Indicating a will to extend the use of sector targets, president Obama recently revealed an ambition to improve the energy efficiency of US commercial buildings, which account for roughly 20% of total energy consumption, with 20% by 2020. Meanwhile a number of states have adopted so-called Energy Efficiency Resource Standards (EERS) which require state electricity and gas utilities to reduce their energy use by specified and increasing percentages or amounts per year.

Chinese provinces met their energy intensity targets by closing down old mines, power plants and industry



Sources: IEA, IHS Global Insight, Statoil.



Sources: IEA (1980-2008), Statoil.

China's 12th Five Year Plan covering the period from 2011 to 2015 targets a 16% reduction of the country's energy intensity by 2015. The 11th Five Year Plan aimed for a 20% reduction over the 2006-10 period, and provincial governments managed 19.1%, though only after having resorted to tough measures towards the end of the period. The new target is slightly less ambitious than the previous one, possibly because Chinese authorities do not want a re-run of the economic and social problems and unrest affected by the struggle in 2010 to deliver on targets: Moreover, economic growth is expected to be lower in the years to 2015 than between 2006 and 2010.

Energy intensity expectations

In IEA's New Policies scenario covering the 2009-2035 period, the ratio of average annual growth in the world's total primary energy demand to average annual growth in the world's GDP is 0.38, implying a substantial, gradual reduction in global energy intensities. OECD Europe and the US are assumed to use the same amounts of primary energy in 2035 as in 2008, giving ratios of 0.00. At the other end of the scale, energy demand is assumed to grow at about half the pace of GDP in the Middle East, India and Latin America, resulting in ratios of around 0.5. For China IEA suggests a ratio of 0.37.

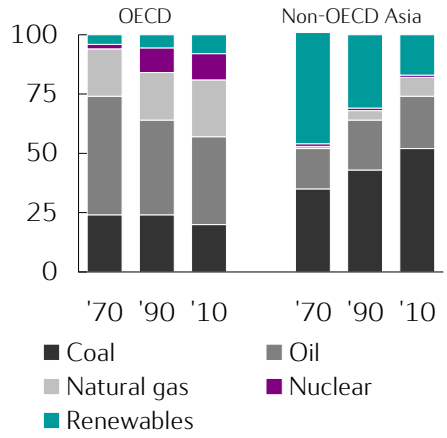
In the US Department of Energy's Reference Scenario covering the same period as IEA's scenarios, world primary energy demand increases at a ratio of 0.54 to world GDP. Enerdata forecasts a world ratio for the 2010-40 period of 0.50. It thus takes a middle position between those of the IEA and the US DOE.

This outlook assumes a growth in world primary energy demand of 1.3% a year between 2010 and 2040. We see the OECD countries' energy use increasing by 0.3% a year and the non-OECD countries consumption growing by 1.9% a year. These assumptions in combination with the macroeconomic outlook in this report translate into an expected ratio of annual average world primary energy demand growth to annual average world GDP growth of 0.44, which is above IEA's New Policies case, but below the US DOE's and also Enerdata's assumptions.

Global energy mix: Gradual transition to non-fossil energy

Regional energy fuel mix

Share of TPED (%)



Source: IEA, Statoil

Over the last four decades the fuel mix of regions and major countries have changed significantly. The OECD economies have become less oil-dominated, but remain dependent on fossil fuels. In the OECD countries the share of oil fell from 51% in 1970 to 37% in 2010. In non-OECD Asia, including China and India, the trends have been almost opposite. Biomass and waste, which accounted for almost 50% in 1970, have been replaced by coal (52%) and oil (22%). In China, coal has bounced back after a decline in relative terms in the late 1990s, with coal use in 2010 at around 2/3 of total primary energy demand.

Oil has lost market shares since 2000...

The most striking change in the global fuel mix since 2000 has been the decline in the oil share of primary energy consumption and the rise of the coal share. The latter change is mainly due to the strong expansion of coal for power generation in China and India. But oil products have also lost market shares in the OECD countries. The shares of nuclear power, hydro power, biomass and waste, and other renewable energy (wind and solar) have hardly changed since 2000.

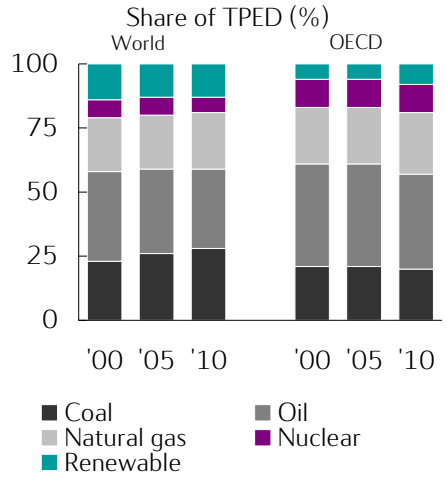
... while coal has gained shares

Moderate greening has emerged in OECD countries

In the OECD countries the most significant change since 2000 has been the steady gains of natural gas from a share of 19% in 1990 to 24% in 2010. Also biomass and waste, as well as wind and solar, have seen moderate increases, with combined shares rising from 3% to 6% during the previous decade. Oil products and coal both lost market shares in the OECD economies, 3 and 1 percentage points respectively. Thus, the first signs of a greening of the OECD fuel mix have emerged.

Global energy mix

Share of TPED (%)



Source: IEA (history), Statoil (projections).

Future drivers - policy, technology and relative prices

The future energy mix will continue to be fundamentally driven by the level of development of the various regions. Income also influences the fuel mix because it is a key driver behind the demand for mobility and electricity. Inter-fuel competition in transportation, power generation and other sectors will reflect three main forces. The first is the relative tightness of the various primary energy markets, especially the natural gas market vs. the coal market. The second is the aggressiveness of future regional energy and climate policies. The third is technological improvements in the consumption and production of energy, and in carbon capture and storage (CCS) technology.

Power sector – the expansion of gas may be dampened by nuclear

In the power sector, coal, natural gas and nuclear will in the short to medium term be main competitors, with select new renewables gaining importance in the long term. In the North American power market the combined effect of tighter environmental regulations and the ageing of the coal fired power plants suggest that natural gas should take significant market shares towards 2020. However, beyond 2020 the expected tightening of US climate legislation may start to erode the competitive strength of natural gas.

Positive outlook for gas in the US power market...

...but nuclear may later return as a stronger competitor

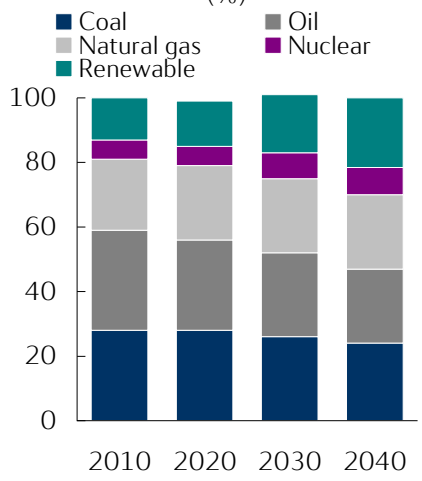
Further growth in natural gas as a power sector fuel may be expected also in OECD Europe and OECD Asia, not because of low gas prices, but driven by rising CO_2 prices and generally tighter climate policies. Nuclear capacity in Europe is expected to remain roughly at current levels, even if Germany and Switzerland act on their plant shut-down announcements. In OECD Asia, on the other hand, we will probably, after a temporary setback, triggered by the collapse of the three nuclear plants in Japan, see a more moderate expansion. In China, and to some extent also in India, energy, climate and local pollution concerns require rapid growth in both nuclear, wind and solar power generation. These countries' aggressive expansion plants are therefore expected to be implemented - with some delays.

Political uncertainties in the European market

In the passenger car segment of the transportation sector the competition between liquids and other fuels is expected to intensify. Aggressive energy policies in all major regions, progress in battery technology and relative high oil prices are expected to lead to a historical break-through for electricity and a steady erosion of the position of oil products. A rapid shift to natural gas fuelled trucks is, however, not expected.

Global energy mix

Share of total energy demand (%)



Source: IEA, Statoil.

Based on these assessments, the following key expected changes could occur in the global energy mix over the next 30 years: First, nuclear power and renewable energy will increase their combined share from 19% in 2010 to 30% by 2040. Nevertheless, fossil fuels will overall maintain their dominant position for many decades to come. Second, gradual electrification of the transportation sector will erode the relative position of oil, with shares falling from 31% in 2010 downwards to 23% by 2040. Third, coal falls from 29% last year to 24% by 2040. At the same time, the position of natural gas is set for a modest improvement, from 22% in 2010 to 23% in 2040. The greening of the fuel mix is most evident in the OECD economies. Non-fossil fuels and natural gas reach 36% and 27%, respectively, by 2040, while coal's share falls to only 14%. Similarly, China becomes less dominated by coal, with a market share falling from a peak of 67% in 2009 to a projected share of 50% by 2040.

Further greening of the OECD fuel mix...

... and China becomes less dominated by coal

The transportation sector - oil under heavy pressure

Rising mobility, higher efficiency and potential electrification are crucial

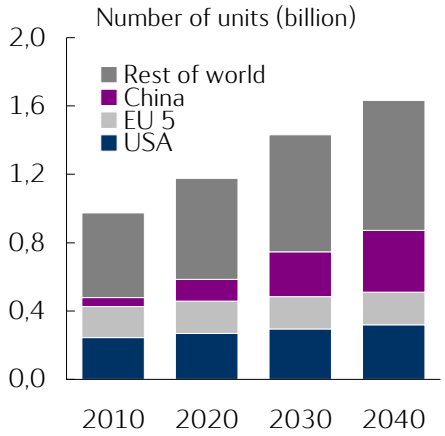
Three main driving forces

Energy demand and the fuel mix of the transportation sector will be determined by three key forces: The first is the overall demand for mobility and goods transportation, especially in the emerging economies. The second is the energy efficiency of the various modes of transportations (road, rail, air, sea) and of individual/public means of transportation. The third is the competition between oil products and alternative fuels, especially in the light duty vehicle segment. Given the dominant role of oil in road transportation, the outcome of these three partly opposing forces will be crucial for oil demand growth, both in the sector and overall.

The demand for mobility grows strongly

On a global basis energy consumption in the transportation sector accounts for 28% of total final energy consumption. However, the shares vary markedly between regions. In the OECD countries this proportion has been constant around 30% for several decades. However, in non-OECD Asia and other non-OECD regions which are at the lower part of the development curve, energy demand in transportation has grown significantly stronger than total final energy demand. Looking forward, rising demand for mobility in emerging economies is expected to lead to relative strong energy demand growth in the transportation sector. How this demand is allocated between modes, including various types of vehicles in the emerging economies, are among the key uncertainties of this outlook. Most emerging economies face continued urbanisation, but many lack consistent plans for regional development, which could lead to capacity problems in roads and other modes of transportation. A high level of congestion and road pricing should encourage individuals to choose public means of transportation. These broader prospects influence the outlook for both car ownership and car use.

World passenger vehicle fleet



Source: IEA, Statoil.

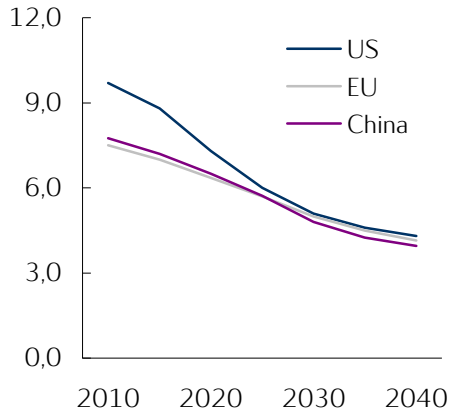
China contributes 1/3 of the rise in the car fleet, but car usage is uncertain

Rising income levels normally leads to rising car ownership and a growing passenger vehicle park. In China there are currently only 30 cars for every thousand people, compared to around 700 in the US and almost 500 in Europe. Thus, China's vehicle fleet is projected to increase very strongly - from 52 (2010) to more than 360 million in 2040. Car sales in China will contribute roughly 1/3 of the overall rise in the global vehicle fleet, which is expected to reach 1.600 million vehicles in 2040. Car usage, in terms of miles driven, in China and other regions, given the prospects of sustained congestion and high population density, is one of the main uncertainties.

Fuel efficiency on the rise...

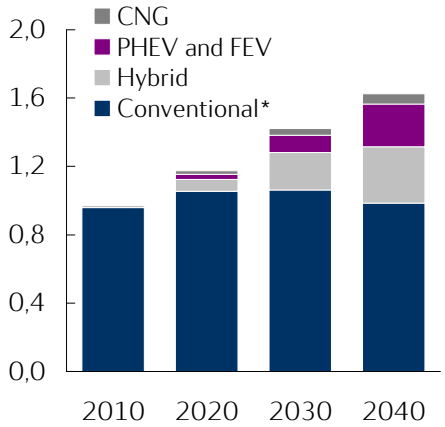
... and CO_2 emission standards will be continuously tightened

Fuel efficiency
Fleet average (litres/100 km)



Source: IEA, Statoil.

World passenger car fleet
Number of units (billion)



*) Includes gasoline, diesel, flex fuel and LPG
Source: IEA, Statoil

Oil demand in transportation will continue to grow

...but gradually more slowly

Driven by concern about oil security and visions for a low carbon economy all major regions are expected to step up their efforts to raise energy efficiency, both in the transportation sector and other sectors. The joint corporate fuel efficiency and emission standards for both low and high duty vehicles is expected to be further tightened during the next decades - in line with the potential for further technological improvements. A high oil price level encourages households to choose smaller cars and to the implementation of tighter standards. The theoretical limit for CO_2 emissions from conventional internal combustion engines (ICE) have been assessed to be about 105 g/km (or 4.5 litres/100 km), which means that electrification of the vehicle fleet is required to reduce average fuel efficiency further.

Prospects for electrification of the car park
The sales of hybrids experienced a moderate setback in the US and Europe in 2010, but rose further in Japan to a ratio of 11% of total car sales. The sales of hybrids are projected to increase steadily during the next decades. While hybrids may raise the fuel efficiency, only the plug-in hybrids (PIH) and full electric vehicles (FEV) have the potential of changing the fuel mix in favour of electricity. The attractiveness of FEVs is currently at a disadvantage relative to ICE due to their restrained range, small size, lack of a recharging infrastructure, uncertainty about the battery life and the car economics, where the current high cost of the battery is weighing heavily. However, there is scope for improvement in battery technology, industrial rationalisation and lower battery costs. China's ambitions to be the global leader in FEVs may prove very important in this respect. Furthermore, rising governmental incentives and high oil prices will increasingly make both PIHs and FEVs economically more attractive. Based on these prospects it is assumed that the shares of hybrids, PIHs and FEVs will grow only moderately up to 2020, but increasingly stronger over the subsequent decades.

The wide divergence between oil and gas prices in the US suggests that there is potential for more use of natural gas in the truck segment in the US transport market. However, the task of developing a proper gas supply infrastructure is still seen as a major challenge.

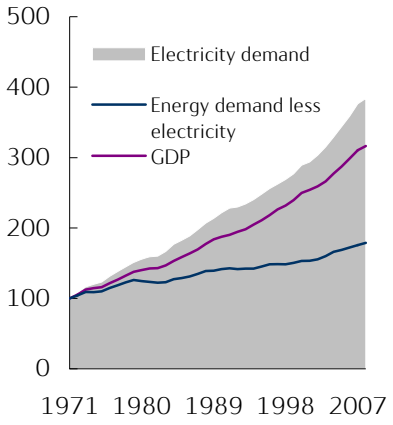
Overall, the projected fast growth in new passenger vehicle sales in the emerging economies will probably more than compensate for the worldwide fuel efficiency gains and the penetration of PIHs and FEVs - leading to continued increase in global oil demand until the mid 2030s, although at a decelerating pace.

Inter-fuel competition in power generation

Increasing share of coal and gas in OECD power sector

The power sector's input decisions are crucial to a wide range of energy technology and fuel suppliers. Because of the levelling out of industrial, commercial and residential energy consumption in maturing economies, coal and gas demand is becoming more and more concentrated to the power sector. In 1978 roughly one quarter of the gas burned in the OECD area went to power generation. In 2008 the share was 44%. The world's uranium vendors and nuclear, windmill and solar power station builders are of course 100% dependent on power sector demand.

Electricity and energy demand, and GDP
(Indices, 1971=100)



Source: IEA.

Fuel availability is the most basic driver of inter-fuel competition...

Electricity demand has historically increased faster than GDP and much faster than other energy demand. Between 1988 and 2008 annual average growth in world electricity consumption was 3.1% against a growth in the other components of world final energy consumption of 1.3%. Whether electricity demand will continue to grow 2.4 times faster than other final energy demand is debatable, but it is in any case expected to capture market shares. The industry and services sectors are pursuing substitution from other fuels to electricity. The consumer electronics market seems almost insatiable. Road transportation is expected to become increasingly electrified as well. This implies that although coal and gas demand is becoming less diversified, the remaining playing field is at least a dynamic one.

The most basic of all the parameters determining the power generators' technology and fuel choices is the physical availability of individual technologies and fuels. Some countries have no hydro resources. In other countries nuclear energy are, for safety and "not in my backyard" reasons, not considered an acceptable option. In yet other countries gas supply is too limited to support power generation.

... and relative costs are the next

Power generators compete on costs and prioritise among technologies and fuels accordingly. In the short term they may switch between technologies and fuels if their plants have dual firing capacity and/or if they have different plants that can be dispatched according to price signals. In the long term generators face a wider range of options, including new plants. The key cost elements going into investment decisions are capital costs, fuel costs and operating costs. Options like nuclear and to some extent coal power plants have been characterised by large upfront investment costs but relatively low fuel and operating costs. Gas power plants have typically been faster and cheaper to build, but more expensive to run. Estimates of so-called levelized costs are an attempt to put all costs on an equal footing for comparison purposes, to gain an understanding of the cost competitiveness of different technologies and fuels.

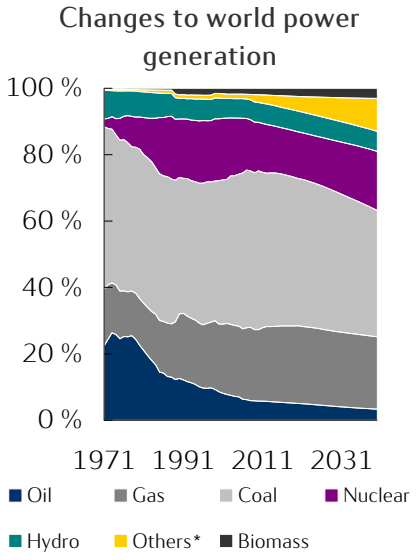
Estimated levelized costs in the US for power plants entering service in 2016

2009-USD/MWh

Coal	
Conventional coal	94.8
Advanced coal	109.4
Advanced coal with CCS	136.2
Natural gas	
Conventional combined cycle	66.1
Advanced combined cycle	63.1
Advanced combined cycle with CCS	89.3
Conventional combustion turbine	124.5
Advanced combustion turbine	103.5
Advanced nuclear	121.4
Wind	
Onshore	97.0
Offshore	243.2
Solar	
Photovoltaic	210.7
Thermal	311.8
Geothermal	101.7
Biomass	112.5
Hydro	86.4

Source: US DOE EIA: Annual Energy Outlook 2011.

Energy, climate and fiscal policies are important factors in the competition



*)Others represents geothermal, solar and wind Energy. Source: US DOE EIA, Annual Energy Outlook 2011, Statoil.

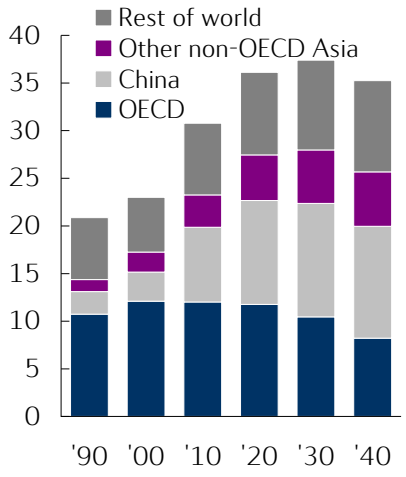
Fuel costs are not a matter of market price formation only. Fuel/CO_2 taxes and carbon emission costs established through cap-and-trade regimes may unlevel the playing field to the disadvantage of the more carbon intensive fuels. Given current energy policies and plans, carbon pricing is foreseen to be introduced across the OECD area around 2020.

Capital costs are also sensitive to shifts in attitudes to local environmental problems. New regulation requires US coal power plants to be fitted with flue gas desulphurisation equipment, filters etc. aimed at reducing emissions of SO_2, NO_x, mercury and coal ash. These costs will likely put quite a few of them out of business.

Relative costs is however not the only factor other than availability and supply security driving inter-fuel competition in the power sector. Flexibility of operations and regulatory certainty are other key parameters. Flexibility to vary capacity utilisation on demand, and start and stop operations on short notice will become increasingly important as intermittent wind and solar power gain market share. Flexibility is seen to favour gas. Regulatory uncertainty with future restrictions and cost elements up in the air has recently disfavoured coal.

In this outlook, oil is further marginalised as a power sector fuel both within and outside the OECD area. The most intensive inter-fuel competition is likely to be seen between coal and gas, with the pace of growth of renewables dictated largely by politics. Gas gains power sector market share in North America on the back of supply-driven soft gas prices and an increasingly tough regulatory environment for coal, but levels out in the late 2020s. We see gas gaining some market share also in Europe until the mid 2020s, but then go into decline in relative terms because of growth in renewables. Coal loses market share all over the OECD area and eventually also outside the OECD. Hydro retains its current position while wind, geothermal, biomass and eventually solar increase their combined share to some 13% globally. Nuclear increases its market share significantly outside the OECD area, implying first a further decline and then a slight increase in the nuclear share at a global level as a result. The outlook for nuclear energy after the Fukushima disaster is however a wild card.

Global CO_2 emissions
(Giga tonnes)



Source: IEA, Statoil.

Global CO_2 emissions start to level out around 2030

The growth in emissions of CO_2 and other greenhouse gases (methane, nitrous oxide, and ozone) are widely assumed to be the main reason behind the historical rise in global temperatures and expected climate change. Global emissions of CO_2, which represent the largest volumes, have steadily increased over the last two decades, from 20.9 (1990) to 29.2 Giga tonnes (Gt) in 2008. Stagnant global energy consumption prevented emissions from rising in 2009, but the 4.7%, coal intensive increase in energy consumption in 2010 raised CO_2 emissions to an estimated 30.8 Gt. Emissions grew in all regions, with the strongest rise in the coal-driven Chinese economy.

Key drivers – fuel switching, non-fossil energy and CCS
In addition to the development in energy consumption, incl. improvements in energy efficiency, regional CO_2 emissions are driven by the fuel mix and beyond 2030 directly by an expected increase in CCS investments. Both the share of nuclear and renewable energy relative to fossil fuels, and the fossil fuel mix in itself, is important for the development in CO_2 emissions. All these drivers are again affected by regional energy policies and regulations, technology improvements and the relative strength of the markets for fossil fuels.

OECD emissions may already have peaked

Based on the projected growth in energy consumption and energy mix, OECD CO_2 emissions may well have peaked last year. Moderate overall growth in energy demand, fuel switching from coal and oil to natural gas in North America, the foreseen gradual expansion of nuclear power in North America and OECD Asia Pacific, and the steady growth of renewable energy, will all contribute to a steady decline in emissions. Beyond 2030 moderate implementation of CCS plants in most regions of the world is assumed to reduce emissions further. By 2040 emissions in OECD North America, OECD Europe and OECD Asia will be reduced by around 35% compared to current levels.

Gradual implementation of CCS technology from 2030

Beyond 2030, nuclear power and CCS contribute significantly

However, the rise in CO_2 emissions in non-OECD Asia, driven by the coal fuelled economies of China and India, and in other non-OECD regions will continue to grow up to about 2035, before they stabilise. In aggregate global CO_2 emissions are expected to peak at around 37 Gt in 2035. Further expansions of nuclear power and investments in CCS lead to a moderate decline in emissions towards 2040. These projections are mainly in line with International Energy Agency's (IEA) New Policies Scenario, which sees global emissions at 35.4 Gt in 2035.

The global oil market

From resource complacency to capacity concern

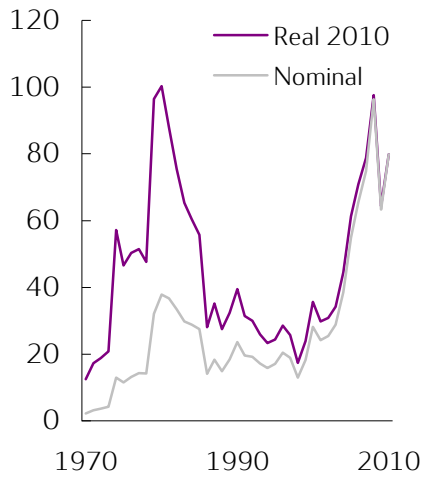
Basic change in perceptions

2003-2004 represented a turning point
Since the 1970s the global oil market has been through changing phases of market tightness. With the exception of the period with oil price shocks (1973-74, 1979-80), resource complacency was up to about 2003 the dominant market perception. Opec's ability to manage the market was the main driver during this period. However, behind the surface, solid economic growth in emerging economies increasingly gave global oil demand a more solid underpinning.

The rise of China and other emerging economies was a turning point

The combined expansion of the Chinese economy and the rest of the world economy led to a huge boost in global oil demand in 2004, which for the first time since 1980 forced Opec to produce at full capacity. These new trends gradually shifted the traditional perception – from resource complacency to perception about capacity concern– and also revitalized the heated debate about peak oil. The growing concern about future capacity additions and a rising upstream cost level were the two main drivers behind the strong upward trend in crude oil prices in the years prior to the 2009 recession.

Oil prices
Brent blend, USD/bbl

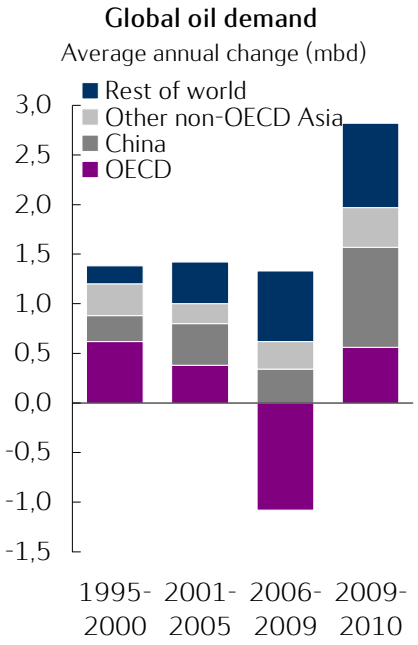


Source: Reuters EcoWin

The growing concern about future capacity additions meant that the market has become increasingly more forward looking, which was clearly visible through the recession. When the first green shoots of economic recovery occurred in the spring of 2009, crude oil prices almost immediately recovered from the lows of 40 USD/bbl. Of less importance were the record high oil stocks and the spare Opec production capacity of more than 5 mb/d. The market instead focused on the prospects of gradual tightening over the years to come – based on the belief that the world economy was on a recovery path - and prices strengthened and ended the year at about 70 USD/bbl.

Record high demand growth in 2010

2010-2011– Another demand shock and MENA uprising
The same underlying market dynamics also prevailed throughout 2010 and into 2011. However, prices started to strengthen considerably from September last year as it became increasingly evident that the market was heading for another demand shock of 2.8 mb/d, driven by the robust economic growth in most



Source: Statoil.

regions. China and other emerging economies contributed to the growth with 1.0 mb/d and 1.3 mb/d, respectively, while the North American market grew by 0.6 mb/d, which was the first increase since 2005.

In mid-December 2010 – prior to the democratic uprising in Tunisia (and in other countries in the region) – crude prices had increased to about 90 USD/bbl. Fears that the unrest may spread to several oil producing countries in the MENA region raised the market's concern for supply disruptions. Most important was the shut-in of Libyan oil production of 1.6 mb/d. About 0.5 mb/d of the loss has been replaced by Saudi production, although of lower quality. The combination of lower Saudi spare capacity and an elevated risk premium has kept oil prices mainly in the 110-120 USD/bbl range in the second quarter of 2011. Other important events through 2010-2011 have been the Macondo disaster - which has led to moderate project delays and lifted upstream costs – and the technology revolution in US shale gas and shale oil production, which have significantly changed the outlook for US oil production.

Medium-term outlook – Towards lower spare capacity

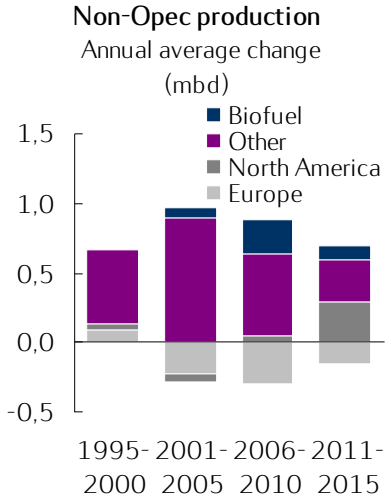
The uprising in the MENA region lifted oil prices significantly

Historical experiences suggest that crude prices at the 100-130 USD/bbl level should give significant feedback effects to oil demand, and with a time lag, to oil supply. There is currently a large uncertainty in the market about the size of future demand destructions. If the price-induced slowing of demand growth turns out to be moderate, and if the market remains concerned about potentially further supply disruptions in the MENA region, the historical link between oil price and demand reduction may be modified.

Slower economic growth and higher oil prices dampen oil demand growth

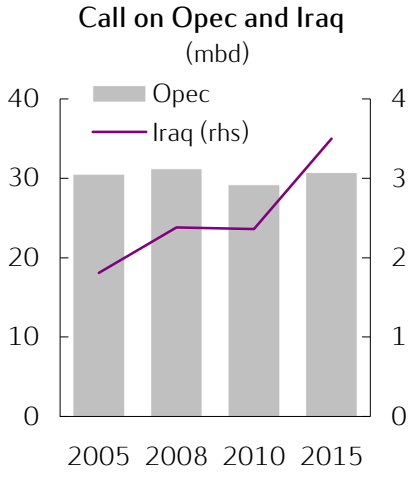
After the oil demand shock in 2010, global oil demand is expected to moderate over the coming years. A slowing of the hectic growth pace of the Chinese economy and other emerging economies should partially dampen the demand increases in these regions. In addition, high crude oil prices, which gradually will filter into (regulated) end-user prices, are expected to bite significantly. Governments of most major economies have in recent years adopted tighter fuel efficiency and CO_2 emissions standards. The combined effects of these tighter standards and high fuel prices could be forceful. These effects will be increasingly more important over the longer term. Overall, these forces imply growth levels in line with the trends seen over the last five years; OECD oil demand, which reached a peak in 2005 at 49.9 mb/d, will most likely decline moderately, while oil demand in emerging economies is foreseen to expand by 1.3-1.5 mb/d annually.

OECD oil demand will continue to decline....



Source: IEA, Statoil.

Further reduction of Opec's spare capacity



Source: IEA, Statoil.

Two major opposing trends

Slower demand growth...

Higher oil prices will support non-Opec production

Over the last four years non-Opec production has increased by about 0.5 mb/d annually, including 0.2 mb/d of global bio-fuels production. Although North Sea production has slowed and North American production been flat, rising production in Russia and in the Caspian and Brazil have more than compensated for the decline in the mature regions.

Prior to the sharp rise in oil prices, non-Opec production was expected to be stagnant over the medium term. The further expansion in Canada (oil sand), Brazil, Russia and Kazakhstan, and a global bio-fuel production would just replace the further decline in the North Sea and Mexico. However, the recent high oil prices, should strengthen the revenue position of the industry, lead to higher capital expenditures in exploration and production, and eventually also lift production. Thus, the prospects for overall non-Opec production have been raised to an annual growth of 0.3-0.4 mb/d. Opec NGL/condensate production, which has increased by almost 0.5 annually since 2008, is expected to moderate somewhat over the next few years, but still add 0.3-0.4 mb/d annually.

Further reduction of Opec's spare crude capacity

Given these prospects, the demand for Opec crude oil should rise steadily over the medium term. A large share of the additional supply should potentially come from Iraq, where the government in agreement with international oil companies has the intention to undertake a massive expansion of its oil production. However, mainly due to persistent bottlenecks in the pipelines and export terminals, the expansion is still expected to fall short of the Iraqi government's ambition. A production level around 3.5-4 mb/d in 2015 seems realistic. Based on the risk of only a partial recovery of Libyan capacity and the outlook for only minor additions in other member countries, Opec crude capacity excluding Iraq will only rise modestly. This means that Opec spare capacity, of which the lion's share is concentrated to Saudi Arabia, will stay low and potentially decline towards 2015.

2015-2030: Demand destruction vs. resource depletion

Main trends and price formation

The tightness of the oil market towards 2030 will be critically dependent on two major opposing trends. On the demand side the combined effect of a more aggressive energy and climate policy and continued technological improvement should increasingly restrain the underlying growth in global oil demand. On the supply side, the depletion of resources in several more regions will be felt more strongly. Still, further technological

... and resource depletion

progress and a constructive crude price level should give the industry incentives to step up the search for new opportunities in shale oil, unconventional production, bio-fuels and in other supplies like gas to liquids. Furthermore, oil companies should be encouraged to "maximise" recovery rates.

Level of oil prices eventually secures the alignment of supply and demand

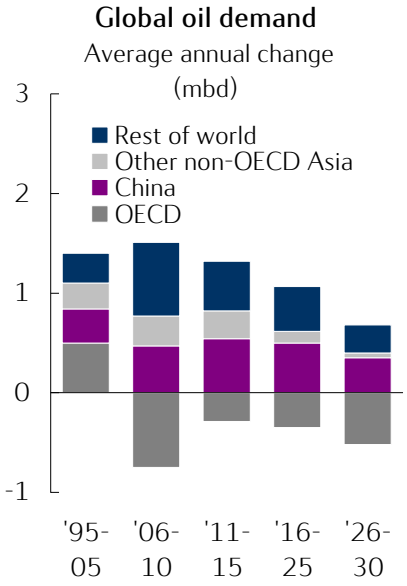
The alignment of demand and supply will be settled by the pace of improvements in all these drivers, but the level of oil prices will remain a key determinant. Access to oil resources, the fiscal regimes of key resource holders and the upstream cost level will also be important. Long-term marginal cost of the production of various oil sources should continue to be an important benchmark for the level of oil prices, although changes in the size of Opec spare capacity should continue to produce price fluctuations around the long-term trend.

Long-term cost level is an important benchmark

Oil may gradually lose its dominance in transportation

Oil products have for decades had almost a monopoly position in the transportation sector. In road transportation the current oil share is more than 98%. Looking ahead, further economic growth, especially in China and other emerging countries suggests that there is a huge potential for rising mobility of individuals and thus, potentially steadily rising demand for transportation fuels. However, current energy policy trends in all major regions, recent progress in battery technology and the higher oil prices suggest that oil demand may approach a turning point. Given the outlook for steady and significant improvement in fuel efficiency and the possibility of a historic break-through for electricity and natural gas in this sector, the demand for transportation fuels could reach a peak in the late 2020s.

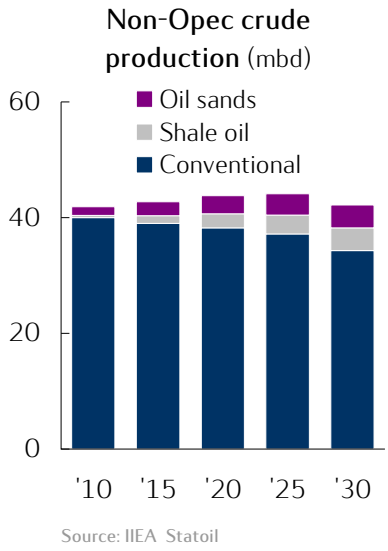
Energy policy, technology improvements and prices restrain oil demand



Source: IEA, Statoil.

Oil demand for stationary purposes in industries and households has declined over the last two decades. This trend is expected to continue, while oil use as feedstock into the petrochemical sector is expected to increase, mainly driven by the Asian petrochemical market. Based on a combined sector and regional analysis global oil demand growth is expected to decelerate during the 2020s before it levels out at 102 mb/d around 2030. This level is slightly higher than anticipated a year ago, mainly due to the more constructive outlook for oil supply. In the OECD countries, moderate economic growth and the effects of the restraining factors lead to steady reduction in oil consumption from a peak of 49 mb/d (2005) to 46 mb/d (2010) and further to 40 mb/d by 2030. In most other regions the effect of high income growth is dominant and pushes oil demand further up. The largest contributions to global demand come in China and the Middle East, which increase their oil use by 9 and 5 mb/d, respectively.

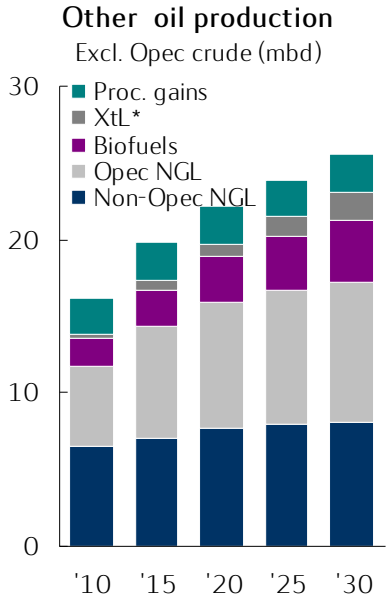
China and the Middle East contribute strongly to demand growth



Source: IIEA Statoil

Technology, policy and prices are crucial

The prospects for shale oil has improved dramatically



*) XtL = CTL+GTL
Source: IEA, Statoil .

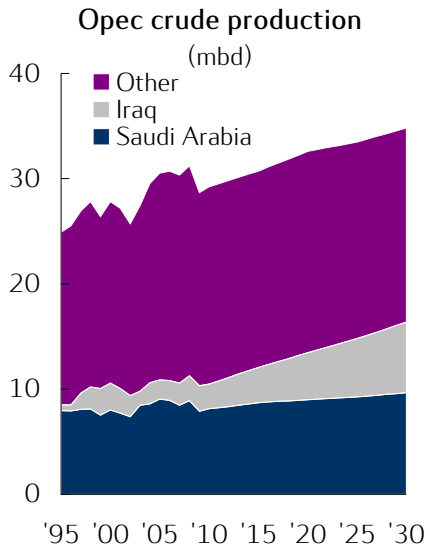
Oil resources are restrained - but production is flexible

Total oil production comes from conventional crude oil (including shale oil), unconventional oil (mainly Canadian oil sand), NGL/condensates, bio-fuels and gas and coal to liquids (GtL, CtL). The projections for conventional crude oil are based on internal and external assessments of global remaining oil resources, including estimates for reserve growth, resources yet to find, and for the recovery factor. Almost by definition the uncertainties are extremely high for all these variables, which over time have led to strongly opposing schools and views about the recoverable oil resources and the timing of "peak oil".

The recent technology revolution in US shale gas and oil and the upward revisions of the production potential in Russia and other countries are reminders about the importance of technological progress, energy policies and oil price level as drivers for future production. The forecast for non-Opec production of crude oil has been revised upwards, especially for the period 2025-2030. However, beyond 2030 the steady depletion of conventional resources is still assumed to be increasingly harder to replace. Driven by the (new) hydraulic fracturing technology, the prospects for US shale oil production have changed dramatically over the last 12 months. Production which reached 0.4 mb/d last year is expected to increase to almost 1.5 mb/d in 2015 and rise further to 2.0-2.5 mb/d in the early 2020s. The full potential of shale oil production in the US and Canada is highly uncertain. Many observers believe that there is an upside potential to the projection above. Outside North America there are also prospective shale formations, but data are currently limited and the potential therefore remains very uncertain. Based on the huge oil sands resources in Canada and the outlook for profitable operations, production could potentially grow strongly over the next decades. However, the risk for rapid local cost escalations and the broader environmental challenges suggest a continued managed and moderate expansion.

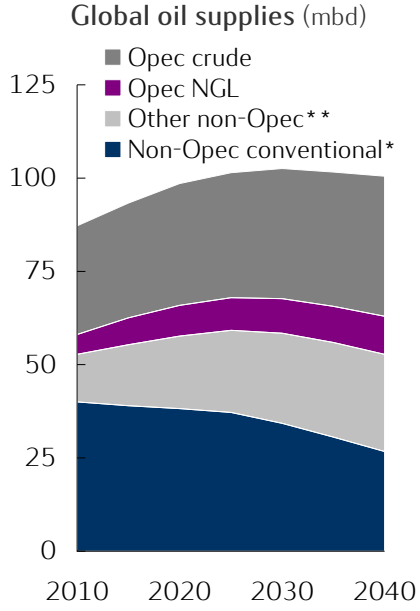
The production of NGL/condensate, Canadian oil sands, bio-fuels and other supplies are all expected to grow steadily beyond 2015. The NGL/condensate outlook is most promising. Rising natural gas production, especially in the Middle East and the US, suggests that the production of NGL will continue to grow strongly. Opec NGL/condensate production may reach more than 9 mb/d in 2030, which represents a doubling from the level in 2009. Based on the huge oil sands resources in Canada and the outlook for profitable operations, production could potentially grow strongly over the next decades. However, the risk for rapid local cost escalations and the broader environmental challenges suggest a continued moderate expansion. The outlook for bio-fuels production is critically

Expansion of bio-fuels production depends on technology improvements



Source: IEA, Statoil.

Iraq and Saudi Arabia will contribute most



*) Excl shale oil, **) Incl shale oil
Source: IEA, Statoil.

Race between declining demand and supply

dependent on technological improvements in cellulosic ethanol and other advanced production. Given such advances, global bio-fuels production may increase further from 2.4 mb/d in 2015 to more than 4 mb/d beyond 2030.

Need for more Opec crude

In order to balance the market, Opec has to step up its crude production - from 32 mb/d in 2015 to about 36 mb/d in 2030. Resource depletion suggest that the African members, Angola, Algeria, Libya and Nigeria, will struggle to maintain their production capacities. However, most of the Gulf members and Venezuela have a resource base which could allow them to raise their production capacities over the coming two decades. Although there are reasons to be somewhat sceptical to the partly politically motivated estimates for proven reserves, the major uncertainties are also related to above-ground forces, like fiscal regimes and social stability. Based on the reserve positions and likely upstream policies, Iraq and Saudi Arabia should see the largest increases in production. In order to avoid major price fluctuations, new projects have to be brought timely on stream.

Beyond 2030 - What peaks first?

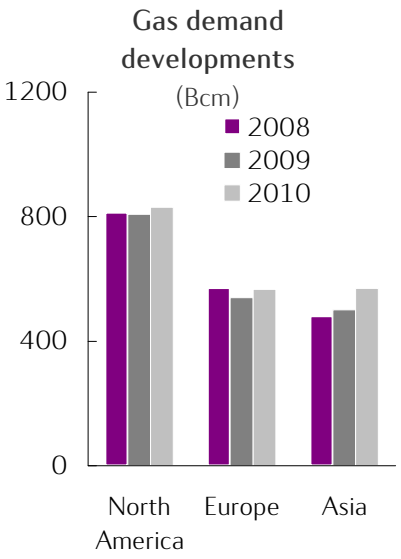
Beyond 2030 the uncertainties and lack of visibility on both the demand and supply side increase progressively. However, what seems reasonably clear is that the declining trend in the depletion of conventional oil resources will remain intact, if not accelerate. But further moderate gains in shale oil, unconventional oil, and bio-fuels may slow down the overall decline in non-Opec oil production. Moreover, by the 2030s oil production from the Arctic and other new provinces may also become more significant than anticipated today. However, the main producers of Opec have to step up production significantly beyond 2030.

Driven by energy policy and further technology gains, OECD oil demand is projected to continue to decline steadily through the 2030s. In China and other emerging countries the relative strength of the opposing forces of rising income level on the one hand, and rising oil efficiency and substitution away from oil to electricity and gas on the other, will be crucial. On balance non-OECD oil demand growth is projected to slow progressively during the 2030s to less than 0.5 mb/d per year.

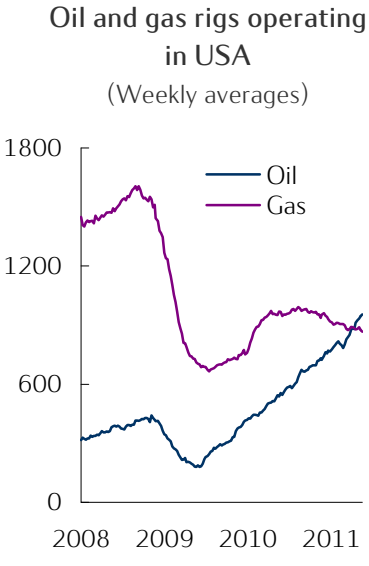
Eventually the tightness of the oil market will be determined by the race between declining oil demand and declining oil production. The oil price level will serve as the catalyst ensuring the balance of the market.

The global gas market

Record high gas demand growth in 2010



Source: Cedigaz.



Source: Baker Hughes.

Market developments since the spring of 2010

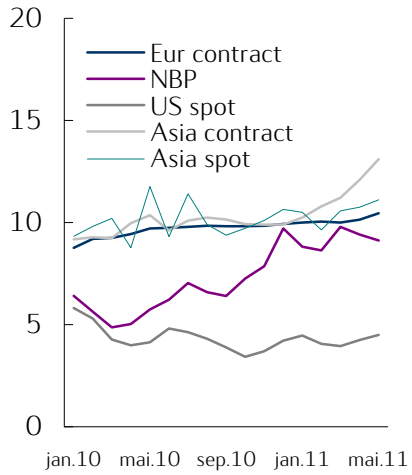
As the world economy recovered in 2010, world gas consumption increased by some 6-7%, which is faster than any time since the early 1970s, and much faster than required to compensate for the recession driven 2.3% decline in 2009. Increasing oil and coal prices and two cold winters in a row also helped. Regional gas demand growth rates varied from 2.3% in North America to 13.7% in Asia-Oceania. Europe came in at close to 5%. Globally, certain countries stood out: Brazilian gas use increased by 34%, and Chinese and Indian demand grew more than 20%.

The shale gale

The main supply side story in 2010 was the continued growth in unconventional gas production mainly in the US but also in Canada and Australia. In the US the industry continued to drill for shale gas with scant concern for price signals. Costs came down as developers increased productivity through more wells per drilling site and longer laterals with more hydraulic fracturing per lateral. Financing was available thanks to the forging of partnerships between smaller companies with acreage and expertise and majors with strong balance sheets. To an extent the partnerships were able to shield themselves from gas price downturns through hedging. Revenues from liquids helped sustain aggressive development schedules. Finally, lease-holders had to start drilling regardless of the market situation not to lose their property rights. In recent months some of the drivers behind the shale gas drilling frenzy have abated, and the gas rig count has dropped slightly. The impact on production however remains to be seen.

The US Department of Energy recently put recoverable shale gas resources in a sample of 32 countries at 186.4 trillion cubic meters. This figure, which excludes the likely shale gas endowments of the FSU and the Middle East, matches the prevailing estimates of proven, largely conventional, gas reserves world wide. Outside North America and Australia there is as yet more talk about unconventional gas than action, but drilling is underway in some European countries.

Key gas prices
(USD/mmbtu)



Source: PIRA.

Regional gas price levels were close at the end of 2009, but moved in strikingly different directions during 2010. The UK NBP price declined to below USD 5/MMBtu in the spring, but recovered in the summer and ended the year at close to USD 10/MMBtu. The prices of gas imported into Europe under oil linked contracts were above the NBP price most of the year, but the gap narrowed in the autumn. Asian LNG prices typically exceed Europe's oil linked prices because of the Asians' willingness to pay extra for supply security, and 2010 was no exception. By contrast, Henry Hub slipped below USD 4/MMBtu in April, staged only a feeble and short-lived recovery in the summer months, was consistently below USD 4/MMBtu between late September and late November and ended the year only marginally higher.

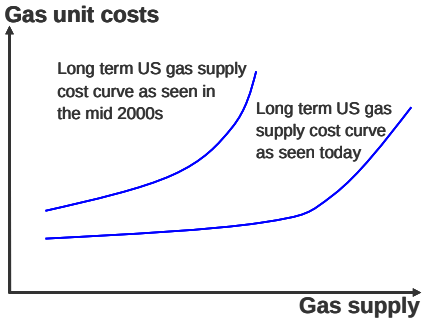
Gas price drivers

Although international gas trade is growing faster than world gas demand, there is not yet a fully integrated global gas market, only a collection of partly integrated national and regional markets. These remain characterised by different pricing mechanisms and prices.

In USA wholesale gas prices are set by gas supply and demand at major trading centres or hubs, with the trading community focusing on the Henry Hub in Louisiana. In the short term prices are heavily influenced by demand and storage fluctuations linked to the passing of the seasons, the weather, etc. In the long term, only two factors matter: The position and shape of the long-term gas supply cost curve and the pace of demand growth.

US: The shape and position of the long-term marginal cost curve is crucial

Perceptions of the US long term gas supply cost curve



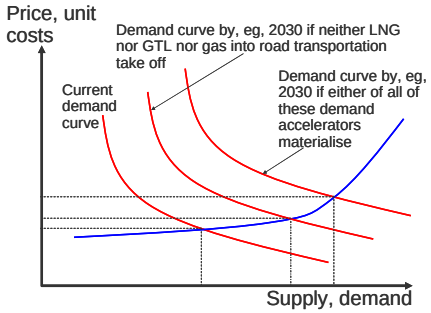
The US supply curve for indigenous gas has changed. Some years ago it was seen as tilting sharply upwards, reflecting a perception of the US running out of inexpensive gas and promising rapid growth in LNG imports. Today analysts see a flat supply curve extending into a distant future permitting years, or even decades, of production growth at moderate prices.

The current US gas price level unsustainable in the long term

On the future breakeven price path for US shale gas, the jury is still out. While depletion of the prolific core areas of shale plays will boost costs, further technological development and continued learning will dampen them. A Henry Hub price of USD 4/MMBtu or so is widely seen as falling short of the gas industry's long term replacement costs. But how much the price needs to rise to become sustainable, and how the sustainability threshold will move in the future, remain hotly debated topics.

Gas demand is driven by economic growth, structural change, technological developments, relative price signals and

US demand side uncertainties



North American LNG exports: Growing political and regulatory support, but challenging economics

Suggested locations for US LNG plants: The Freeport, Sabine Pass and Cove Point terminals

Source: Wood Mackenzie

Future energy, climate and other environmental policies will be crucial

Europe: Russian pipeline gas likely to be the marginal supply

substitution possibilities. Several of these factors are in turn influenced by energy and environmental policies. Currently, the US gas demand curve intersects with the long-term gas supply cost curve to the left, so to say, of the point where the US becomes attractive as an LNG market. This is another way of saying that the US does not need to compete for gas supply with the rest of the world, i.e., that the US gas market has de-linked from the other regional gas markets.

The links that emerged before the shale gas revolution between the US gas market and the European and Asian markets could re-emerge. Domestic gas demand in the US could continue to expand on the back of low gas-oil and gas-coal price ratios. Several proposals to build LNG plants with a view to export Canadian and US gas have been tabled and received government approval. The idea of exploiting the gas-oil price gap to build a gas-to-liquids industry is gaining momentum. Some envisage a break-through for gas as a road transportation fuel. Opening new markets for North American gas in these ways would accelerate the outward shift of the demand curve and could bring it onto the rising segment of the supply curve sooner than anticipated. However, many observers see the isolated state of the US gas market continuing for a very long time.

Both gas supply costs and gas demand will be heavily influenced by the current and future governments' energy and environmental policy priorities. Shale gas costs could receive a jolt from regulatory constraints on hydraulic fracturing. Gas demand growth will reflect future policies on energy efficiency, renewables, nuclear generation, thermal power plant emissions and carbon pricing.

Continental Europe, Japan and Korea continue to import most of their gas supply under long-term contracts at oil-linked prices. However, oil-linked pricing and spot pricing never lived completely separate lives, and the distinction is growing increasingly blurred. Buyers having access to spot gas in addition to oil linked gas, and contracts allowing them some volume flexibility, turn to the hubs when spot gas becomes cheaper than oil linked gas, and sellers may have to offer discounts or price formula adjustments implying at least partial price alignment.

Europe will become increasingly dependent on imported gas supply. LNG will play a role, but Russian pipeline gas is expected to be the marginal supply. Russia will likely continue defending oil linked pricing. Russia will also need prices covering the costs of developing the Yamal peninsula and new offshore fields that will account for the bulk of Russian gas production in the future, and building the infrastructure required to deliver it. Russian gas

Yamal gas – key to Europe's future gas supply

Source: Upstreamonline

will therefore likely be indexed to oil with base year values, slopes, etc. set to match the costs of delivery. Since rational sellers opt for the value chains offering the highest netbacks, gas price developments inside Russia, the other FSU republics and places like China will become increasingly important parameters for gas price formation also in Europe and in OECD Asia.

Asia: Costly LNG likely to be the marginal supply

Imported LNG is key to OECD Asia's gas supply and important also to China's and India. Incremental LNG supply will on present indications come largely from Australia and be high cost – Woodmac suggests an unweighted average FOB breakeven price of USD 9.10/MMBtu for the projects under construction or assumed to be close to final investment decisions. Prices will reflect this fact. Since both Europe and Asia will need to increase their LNG imports, there will be intercontinental competition for available supply. At times this could exert a strong upward push especially on European prices.

Politics matter, at least outside North America

Policy decisions could matter even more to gas market developments in Europe and Asia than in North America, considering the high ambitions of the EU in the energy and climate policy field and the ability of some Asian governments to ensure implementation of their decisions. Governmental attitudes to nuclear power, preparedness to subsidise renewables, will to constrain coal use through tough emission regulations, views on carbon pricing and/or fuel taxation and emphasis on energy efficiency will frame both gas consumers' and gas producers' decisions.

Rest of world: Mixed pricing principles with large elements of subsidisation

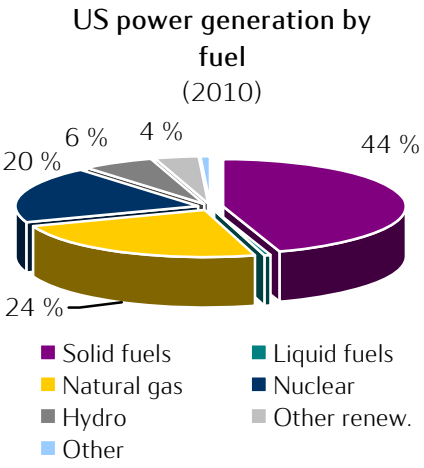
Outside the OECD area a wide range of gas pricing principles is in use. Many non-OECD countries practice heavy-handed regulation with governments determining prices on the basis of social and political considerations. Utilities may have to charge prices that do not even cover their short-term operating costs. Fuel subsidisation encourages wasteful energy consumption habits and drains state budgets. Many subsidisers including Russia, China, India, Egypt and Iran have therefore taken steps to wean their citizens off cheap fuels. If successful these steps will dampen local gas demand and boost indigenous gas supply with consequences for exportable surpluses and international gas prices.

Reforms underway but will take time

Medium-term outlook

North America

Views on US gas costs going forward differ. The IEA sees in its New Policies scenario costs giving rise to a price of 2010-USD 10.60 by 2035. At the other end of the spectrum, CERA



Source: US DOE EIA.

expects costs to remain in the USD 4.40-5.00 range all the way to 2035.

US gas consumption was basically flat between 2000 and 2009 before jumping by almost 5% in 2010. The outlook is for further demand growth, but views on how fast this growth may be differ. The power sector represents by far the biggest demand growth potential. The current cheapness of gas relative to the alternatives – mainly coal – provides strong stimulus to power sector gas demand, and the theoretical scope for substitution is huge with coal power plants supplying around 45% of US electricity. On top of market signals, more restrictive regulation of the power industry's emissions of local pollutants will likely require the scrapping of too much coal generation capacity for renewables and/or nuclear to fill the void.

This outlook projects North American gas demand to increase by 1.6% a year to 2020.

Europe and Asia

Market tightness in Europe and Asia last winter affected by weather

In these regions markets have already started tightening, as witnessed by signs of price recovery. The end 2010 gas price level received strong support from the onslaught of cold winter weather already in November. Up to around 2015, European and Asian gas markets and prices will likely fluctuate according to short-term variation in demand.

Moderate demand growth expected for Europe

European gas demand is assumed to increase by around 1.5% per year over the next five years. Northwest Europe will need additional gas for power generation. It will not be possible to replace all nuclear and coal fired capacity set for retirement by renewables. Outside Northwest Europe, all sectors will see increased gas penetration. As for indigenous supply, above ground constraints – high population densities, a fragmented land ownership structure, limited incentives for land owners to allow drilling on their properties, and environmental considerations – will likely limit the medium-term contributions from shale gas.

China and India will drive demand in Asia...

Asian gas demand is expected to increase by 5-6% per year between 2010 and 2020, driven by rapid economic growth, policies favouring gas and a gradual removal of the supply bottlenecks that have constrained Chinese, Indian and other Asian emerging economies' gas consumption. Since possibilities for economic set-backs, policy revisions and supply project delays exist, there is downside risk to this projection. On the other hand, the Fukushima disaster has created upside risk with various governments in the region revisiting their nuclear ambitions.

... and Fukushima will contribute

Long-term outlook

Gas demand growth rates will moderate everywhere due to lower economic growth and market maturation

In North America, shale gas costs are eventually seen to edge upwards. US gas demand could receive a boost from a renewed emphasis on climate policy and the launching of a country wide carbon cap-and-trade system from around 2020. This outlook still assumes very limited growth in gas demand after 2020. We see LNG exports taking off on a modest scale with only 2-3 projects materialising in the forecast period. The road transportation sector may eventually emerge as another growth factor, but we expect this sector to consume only some 20 bcm per year by 2030.

Policy, and the pace of development of CCS, will frame market growth

European gas consumption growth is expected to moderate to 0.6% per year between 2020 and 2030. Demand in the 2030s and beyond will depend on the EU's resolve to implement its plans to cut CO_2 emissions by 80% by 2050. Towards the end of the outlook period CCS emerges as a major gas demand uncertainty factor both in North America and in Europe. A breakthrough for capturing and storing carbon from exhaust gases, and economics favouring the fitting of CCS to coal rather than gas plants, could tilt the inter-fuel competition in favour of coal. However, the uncertainty, also around the ability to undertake the substantial investments associated with large scale CCS for coal, is considerable.

Shale gas production will only dampen, not eliminate, Europe's and Asia's gas import needs

Asian gas consumption growth is assumed to slow to 2.5% per year between 2020 and 2030 and 1.6% per year after 2030, reflecting slower economic growth and market maturation. China plans for strong indigenous gas production growth, and so does India. Everywhere, shale gas expectations run high, and resource estimates indicate possibilities for significant long-term production growth in particular in China. These countries will nevertheless like Europe remain dependent on imports.

Long-term outlook for LNG: Many supply side challenges need to be cleared away

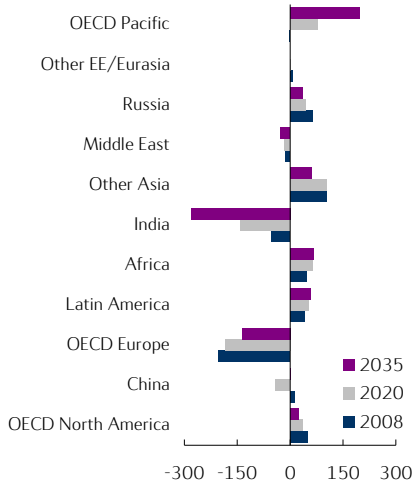
Russia and the world's LNG exporters have sufficient gas reserves to accommodate any conceivable growth in European and Asian gas import demand, but access, costs and investment capabilities remain open issues. Rapid growth in LNG supply presupposes among other things that Australia finds solutions to its skilled labour shortage problems, that Nigeria stabilises and enacts viable petroleum legislation, that possible new supply sources like Cameroon and Brazil go forward with their plans, that floating LNG succeeds and in the longer term probably that Iran realises at least part of its LNG potential.

Other energy carriers

The coal market

Net coal trade

Million tons coal equivalents



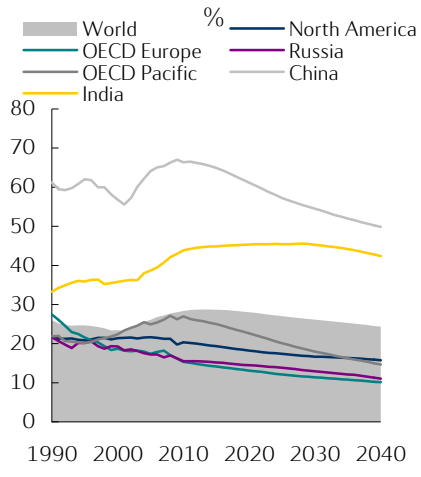
Source: IEA WEO 2010

Coal is still the fuel of choice in more than one dimension. It is available in close proximity to some of the largest markets in the world. For this reason international coal trade is only 16% of total primary coal demand, significantly less than the 44% and 21% trade shares for oil and gas, respectively. For many consuming countries coal is affordable relative to imports of other fossil fuels, in particular when considering security of supply issues. Moreover, it is sustainable in the meaning of being available for a long period – IEA (WEO 2010) argues that proven reserves could sustain current production for another 150 years.

On the other hand, coal burning is a very large source of CO_2 emissions and potential global warming. The local environmental effects of coal extraction, transport and burning are also considerable. The future of coal as an energy source is therefore closely associated with technological development of, and associated costs of, carbon capture and storage (CCS).

Very large demand growth in 2010

Coal share of TPED

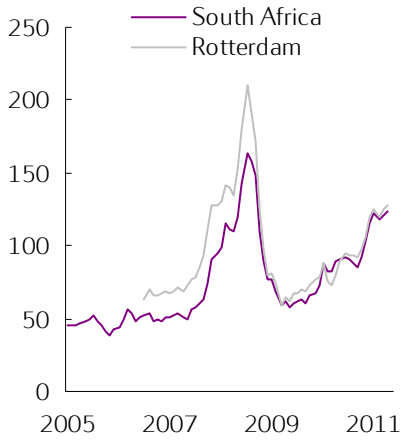


Source: IEA (history), Statoil (projections).

Demand growth from emerging economies contributed to very high growth in global coal demand from 2009 to 2010; almost 6% according to this outlook. This entails that coal demand has recovered and bounced back after the financial crisis, which only grew by some 1% from 2008 to 2009, due to considerable demand reduction in the US and Europe. Going forward, we expect global coal demand to grow only moderately, by some 0.8% p.a. until 2040, which is considerably slower than total energy demand. Thus, the coal share in total primary energy demand will go down from around 28% last year to some 24% in 2040. Coal demand in mature economies, i.e. OECD and Russia, will be between 50 and 90% of current levels. In India, on the other hand, we expect demand in 2040 to more than double from current levels.

International coal prices have over the last 5-6 years shown much of the same cyclical movements as other fossil fuels, with a peak in 2008 followed by a 60-70% reduction from the summer of 2008 till the spring of 2009. Thereafter, prices have again picked up, partly driven by the general growth in demand

Coal prices
USD/metric ton



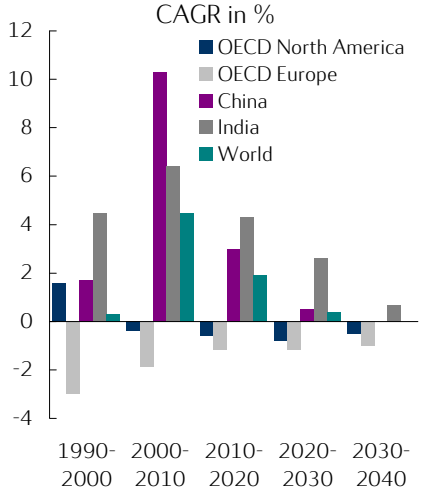
Source: Reuters EcoWin.

Coal's competitiveness depends on CCS technology...

...which could be available in the long term,...

...but which requires substantial infrastructure investments once the technology is in place

Regional growth in coal demand
CAGR in %



Source: IEA (history), Statoil (projections).

for commodities and energy, and partly by weather related bottlenecks in key export countries.

Coal reserves are abundant and marginal production costs are moderate. Long-term demand for coal is therefore not restrained by availability or affordability, but rather by the sustainability of continued use of coal in power production. The deciding factor is how much coal and CO_2 the politicians allow to be emitted to the global atmosphere, and what policies are put in place to restrict these emissions. Environmental policies will in turn affect the price of coal relative to the price of natural gas and other energy carriers such as nuclear energy and renewables. Coal's competiveness and attractiveness will be determined in the interaction between these market and policy factors.

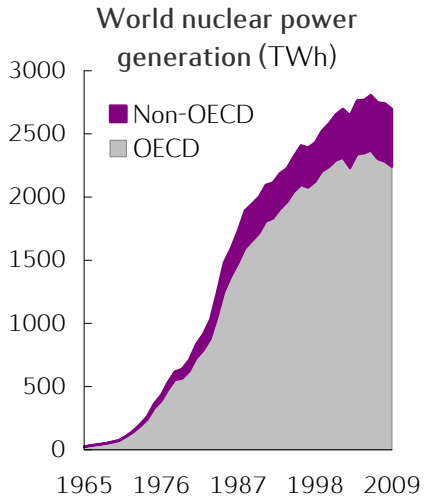
Based on our view that more comprehensive and consistent regional climate policies gradually will be implemented over the next 20 years, also in emerging economies like China and India, coal's competitive position will be reduced. Relative to last year's outlook, however, it seems that development of climate policies in different regions probably will take longer than assumed then. Policy induced demand reductions will therefore have limited effect on coal demand before 2020.

On the other hand, it also seems that implementation of large scale CCS technologies also takes more time, so that the potential effect of these on coal demand before the 2030s are negligible. When the technology is developed, the *implementation* of large scale CCS will require substantial infrastructure investments. According to a 2007 MIT study of the *Future of Coal*, transporting CO_2 emissions from all coal-fired coal plants in the US for storage implies transporting the equivalent of 3 times the weight, and 1/3 of the volume, of all natural gas transported annually in the US gas pipeline system. 60% of these CO_2 emissions would, if captured and compressed to liquids, constitute a volume equal to the total US consumption of oil. And US is not the only country in the world – China currently constructs the equivalent of two 500 MW coal-fired power plants *per week*. Securing coal's future as a sustainable energy carrier therefore requires huge and unprecedented investments in infrastructure across the globe.

Overall, therefore, the assumption is that global coal demand growth will continue to slow beyond 2015, with the bulk of demand growth still driven by the large economies in the East. In the very long term, after 2030, we expect coal demand growth to dwindle towards 0 also in China, while growth will still be positive in India.

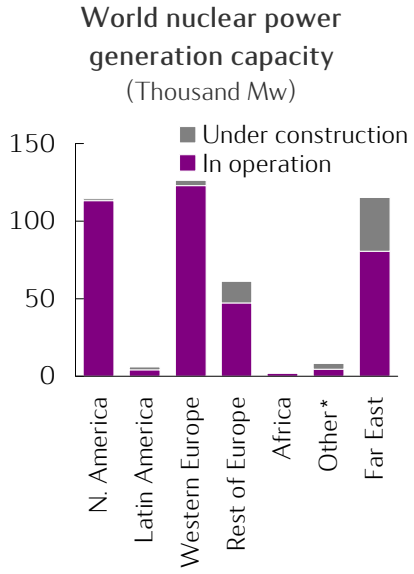
Nuclear energy – a bumpy road, but growth ahead

Ups and downs for the nuclear industry: Generation down...



Source: BP.

...but growing interest in the nuclear option, and many plant approvals, outside OECD



*) = Middle East and South Asia.
Source: EIA.

Status

The nuclear industry is on a rollercoaster. In the 1990s interest in this technology seemed to wane, and in 2006 world nuclear power generation went into decline. Costs remained high, and the industry's image problems lingered on. The global warming threat had provided some tailwind to nuclear as a zero carbon option, but in most OECD countries people considered that upside too small to compensate for the downsides.

However, outside the OECD area perceptions were changing. In China, India and other emerging economies rapid economic growth bred explosive electricity demand growth. This in turn contributed to an escalation of fossil fuel costs, supply security challenges and local air pollution problems. Nuclear power came to be seen as one of several possible solutions, alongside gasification, renewables and energy efficiency improvements, and these countries could not afford to be choosy. Thus, while in 2008-09 only two new nuclear reactors were completed, 22 projects – most of them in China – were approved.

Nuclear power also started to look better in cost terms, especially with fossil fuel use becoming exposed to carbon taxes, carbon prices or CCS requirements. Recent estimates, e.g., those in the table on page 31, show advanced nuclear power plants to be uncompetitive with modern gas power plants and also with conventional coal, hydro and onshore wind power plants, but on a par with advanced coal power plants without CCS, and cheaper than solar, offshore wind and coal plants with CCS.

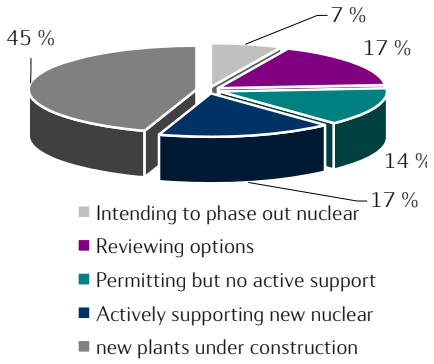
By early 2011, 29 countries operated 441 nuclear power plants with a global capacity of 375 GW. A further 60 units with a total capacity of 59 GW were under construction. Many more projects are scheduled for final investment decision and construction start-up over the next few years. China is the powerhouse of the nuclear power sector with 14 units with a total capacity of 10.2 GW in operation, 26 units with a total capacity of 25.3 GW under construction and another 28 units in the planning phase.

During the 2000s nuclear power regained favour also with many OECD country governments. The French, Japanese and Finns were always in favour of nuclear. In 2010 Chancellor Merkel extended the lifetime of Germany's oldest nuclear power plants. In the US, president Obama has offered loan guarantees and promised a smoother regulatory process. UK leaders have urged the power industry to accelerate its nuclear expansion plans.

Too early to assess the long-term fallout from Fukushima

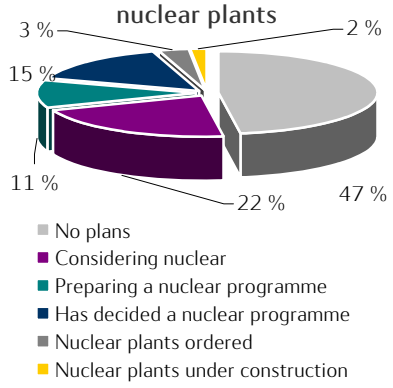
Anti-nuclear demonstration in Germany after Fukushima

Attitudes to new nuclear in 29 countries already having nuclear plants



Source: US DOE EIA.

Attitudes to new nuclear in 65 countries not having nuclear plants



Source: US DOE EIA.

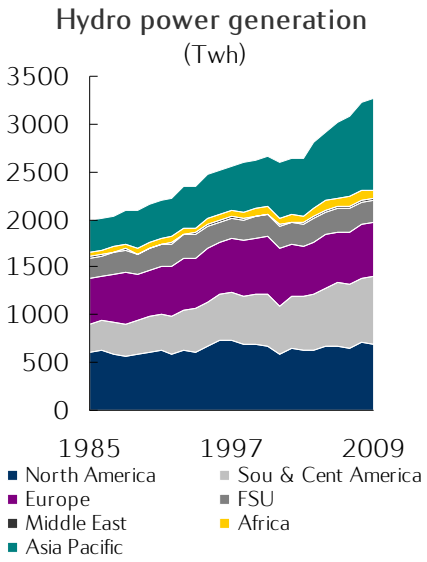
The outlook for nuclear power has however been clouded by the Fukushima accident this spring. On 11 March the combination of an exceptionally strong earthquake and a tsunami put around 10 GW of nuclear capacity along the Japanese east coast out of operation and caused major damage to the Fukushima plant, damage which in turn has caused serious radiation problems. Since then most governments responsible for nuclear industries have initiated safety reviews, and some have signalled radical energy policy revisions. Thus the German government in late May announced a decision to shut down all German nuclear power plants – which in 2009 accounted for 24% of the country's electricity supply – from 2022.

However, the US and UK administrations stand by their support for nuclear, and it is difficult to see how China can afford anything but a symbolic delay of its nuclear expansion programme. Thus, although Fukushima may shift the anticipated nuclear revival out in time, and narrow the participation, we remain unconvinced that this accident alone warrants dramatic changes in the long-term outlook for nuclear. Other factors such as electricity market volatility, an abundance of cheap gas (which is holding back nuclear in the US and could affect the playing field in other countries as well) or cost breakthroughs for renewables could represent bigger uncertainties.

Outlook

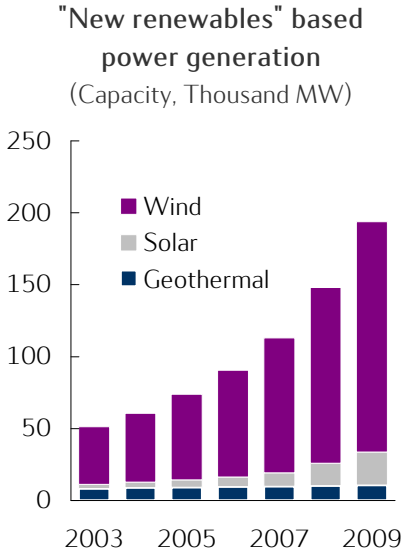
In IEA's New Policies scenario, global nuclear power generation increases by an average of 2.2% per year. OECD generation increases by only 1.1% per year and non-OECD generation by 5.3%. The US DoE is close to the IEA on this point, putting generation growth between 2007 and 2035 at 2.0% annually, with OECD and non-OECD respectively seeing 1% and 5% growth per year.

This outlook takes a slightly more bullish view. Globally, nuclear power generation is seen to increase by 2.6% a year between 2010 and 2040, with growth slowing during the 2020s as Chinese plant construction activity tapers off. Growth in the OECD countries will be minimal in the short to medium term, but is assumed to pick up in the 2020s. As for non-OECD growth our assumptions are around 8% per year to 2020 and between 4 and 5% annually for the remainder of the outlook period. Overall, these projections support the conclusion that nuclear energy will play an increasingly important role in total energy demand, even after the setback caused by the Fukushima disaster.



Source: BP.

Hydro resources are vast in theory and more limited in practice



Source: BP.

Renewables for power generation - high growth in new renewables

Renewables are widely seen as the main tool, together with energy efficiency improvements, in the global warming containment toolbox. Power generation based on renewables has increased at a fast pace (though mostly from low base year levels) and will likely continue to capture market shares. The question is if growth can be sustained at the levels and for as long as today's green scenarios envisage.

Status

In recent years the share of *hydro* power generation in world power supply has fluctuated around 16%. The global hydro power resource base could in theory support close to four times the already developed capacity, and observes do indeed expect further growth in hydro power generation, but they do not see opportunities everywhere and nothing like a quadrupling of global capacity. In most OECD countries the potential for large scale hydro power generation is almost fully exploited. Outside the OECD concerns about the environmental and socioeconomic consequences of large scale hydro are mounting. Also, the economics of changing from large to small scale opportunities, which constitute a big part of the remaining potential, could be questioned, and climate change adds risk to projects based on predictable hydrological conditions.

Since the early 1990s the *"new" renewables* (mainly wind, solar and geothermal) portion of world power generation has increased by more than 8% per year, and since the mid-2000s growth rates have attained double digits. It remains small in relative terms, though. By late 2010 global installed wind power capacity had reached 194 GW. By renewable industry standards, last year was a mixed year. Wind generation capacity increased at a slower pace than in previous years as cash-strapped governments reined in support and credit became scarce. As such, 2010 highlighted the vulnerability of industries in need of subsidisation.

Costs

Competitiveness on costs in the absence of feed-in tariffs or other subsidy arrangements may not at this stage be decisive for further growth in renewables. Most OECD and many non-OECD governments seem prepared to support wind, solar and geothermal energy in the expectation of future viability. The current standing of individual renewables in cost terms still has interest. Governments forced to deleverage and tighten budgets

may be driven to reduce subsidies and prioritise the options closest to viability.

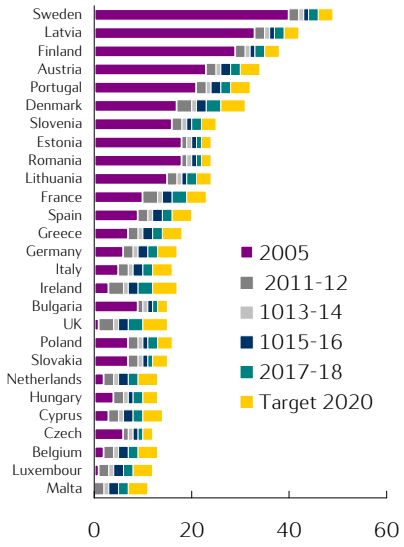
Onshore wind power approaching competitiveness without subsidisation

As the table on page 31 indicates, hydro power is an attractive option to those endowed with hydro resources. Onshore wind power is the most competitive of the other new renewables, and is also more economic than nuclear, but has higher costs than most fossil fuel based power generation. Geothermal and biomass based power are not far behind onshore wind power, while offshore wind power and all solar based options have some way to go to economic viability.

Renewable power enthusiasts note that the costs of wind and solar power have come down, and expect more of the same. This may be a robust assumption. But observers note the possibility of slower progress and suspect that potentials will be realised in leaps and bounds with set-backs in between. The likely occurrence of supply chain bottlenecks, commodity price spikes, investment dry spells and other factors make gambling on specific cost development trajectories risky.

EU renewables targets for 2020

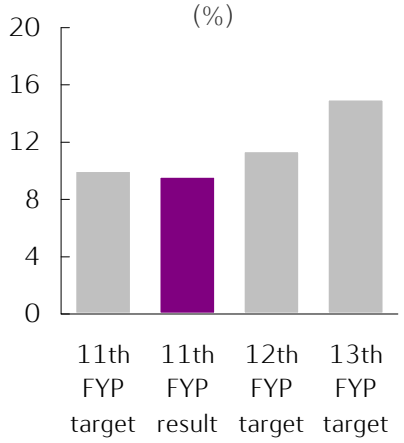
By country (%)



Source: European Environment Agency.

China five year plan targets for new energy

Share of total consumption (%)



Source: HSBC: Delivering Low Carbon Growth – a Guide to China's 12th Five Year Plan

Targets in key regions

The EU member countries in 2007 agreed to raise the share of renewables in their final energy consumption to an average of 20% by 2020. This union wide target was subsequently translated into national targets, and members were asked to submit detailed renewable energy action plans outlining their fuel mix aspirations. Taken together these plans testify to an ambition to increase EU renewable fuel use by an average of 6% per year to 2020.

In the US there are no federal targets for power generation based on renewable fuels. However, state renewable portfolio standards drive growth in US utilities' reliance on such fuels. Currently 24 states accounting for more than half of US electricity consumption have adopted renewable portfolio standards. They aim on balance for a 17-18% share of renewables in their power supply, and for full compliance around 2020. The US targets are thus less ambitious than those of the EU. California is an exception; Governor Jerry Brown in April 2011 signed a law raising the state renewables target for 2020 to 33%.

China's 12th five year plan envisages a growth in the share of non-fossil fuels and other energy sources in total primary energy supply from 9.6% in 2010 to 11.4% by 2015 and 15% by 2020. Wind-based power generation capacity is planned to go from 42 GW by the end of 2010 to 150 GW by 2020. As for solar photovoltaic energy, China is targeting 5 GW of capacity

by 2015 and 20 GW by 2020. Deployment will initially be slow while the government studies Europe's experiences, but China's longer term ambition is global leadership also in solar installation.

The new renewables are set for fast growth

Outlook – fast growth from a low base

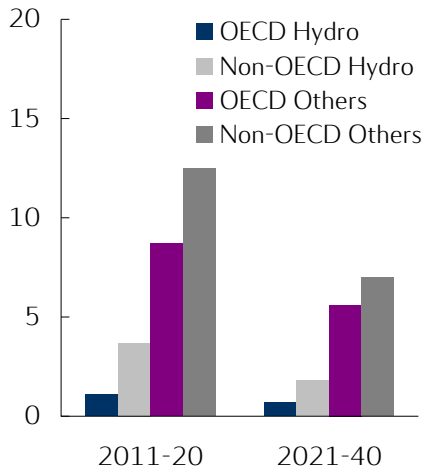
On present indications, wind and solar power will continue to see high growth rates, with wind in the lead in the short to medium term and solar gaining ground in the long term. Hydro power generation, currently the dominant component of renewable energy supply, will also increase, but not much faster than total energy supply. Geothermal energy will remain an option only at select locations.

Wind in the lead, solar will gain materiality in the longer term

It will however take strong and sustained political resolve to raise the shares of renewable energy sources in power generation to material levels. The cost gaps requiring feed-in tariffs will not any time soon narrow to the point of making the new renewables (with the possible exception of onshore wind) viable without support.

Growth in renewables

CAGR in %

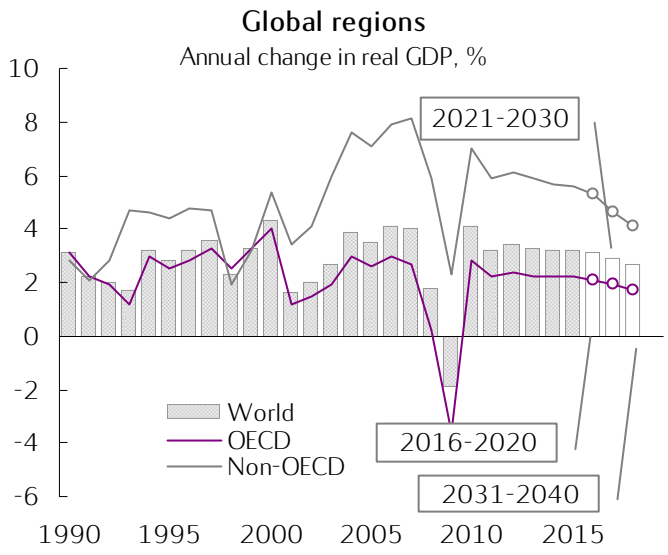


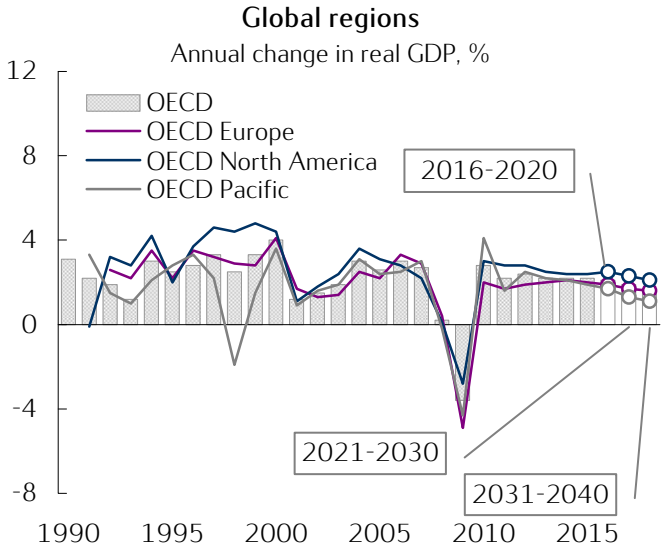
Source: IEA (history), Statoil (projections).

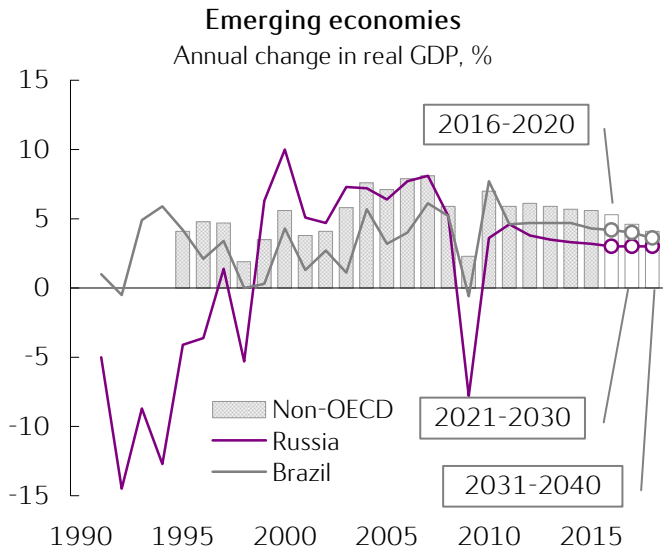
In IEA's New Policies scenario, renewable energy supply increases by an average of 2.5%, and renewable-based power generation by 4.1%, annually between 2008 and 2035. World wind power generation increases by 10% per year, and world solar power generation by 17% per year.. The hydro share of world power generation is expected to remain flat, with the wind and solar shares increasing to 8% and 3% respectively, up from 1% for wind and zero for solar in 2008. The US DOE's reference scenario is very close to IEA's New Policies scenario when it comes to renewables, with an expected growth in hydro and other renewable energy supply of 2.6% per year.

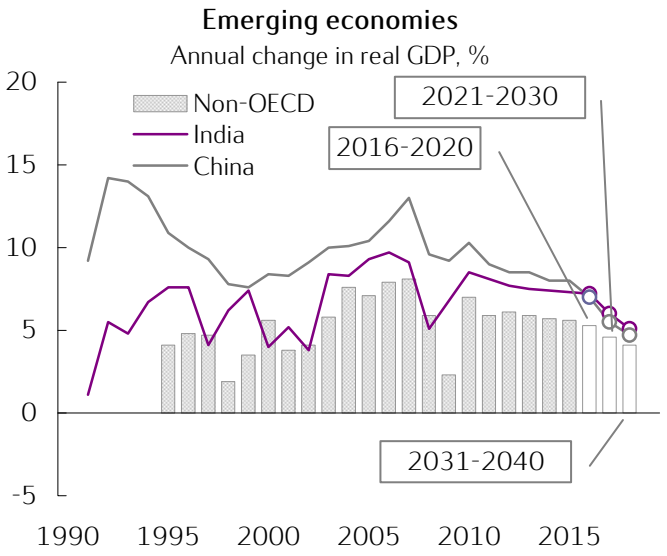
This outlook forecasts global renewable energy supply to increase by an average of some 5% annually between 2010 and 2040, with growth abating from close to 6% per year in the period to 2020 to some 4.5% between 2021 and 2040. On a regional basis the OECD countries will experience a growth of 4% per year, while the non-OECD countries will see a growth of 5.5% per year.

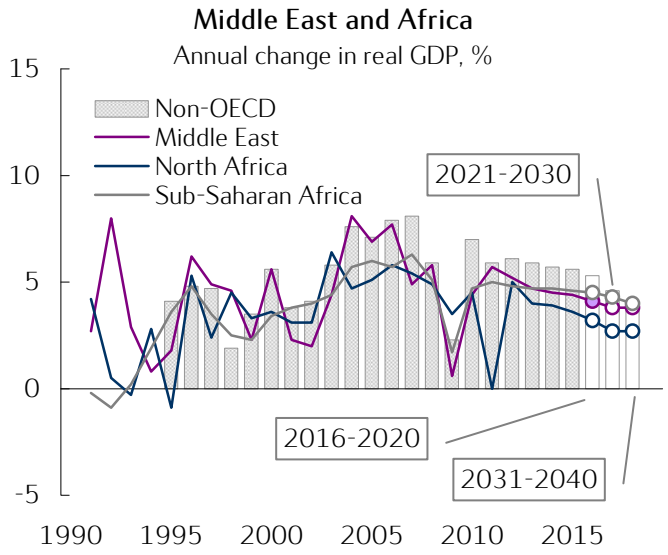
Economic growth

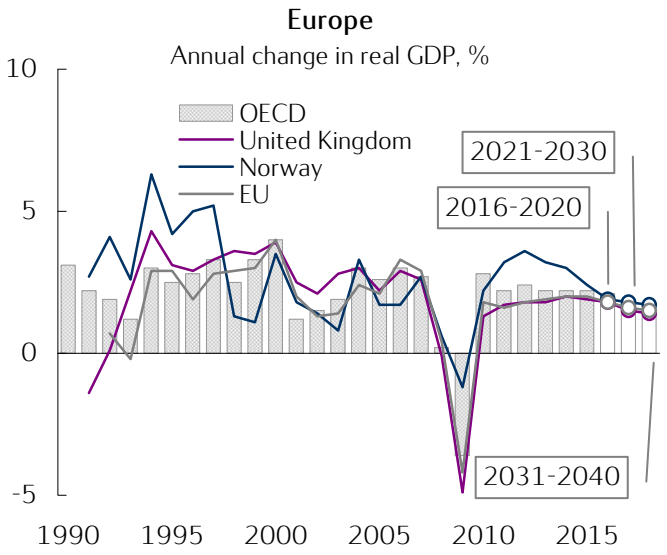










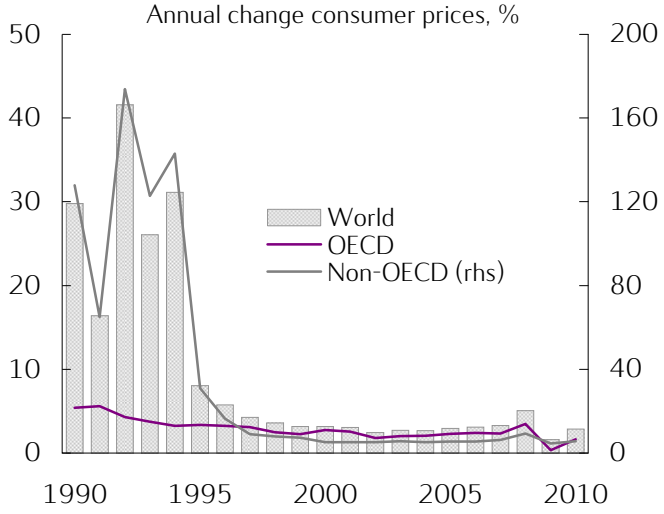


Source: IHS Global Insight, Reuters EcoWin, Statoil.

Inflation and exchange rates

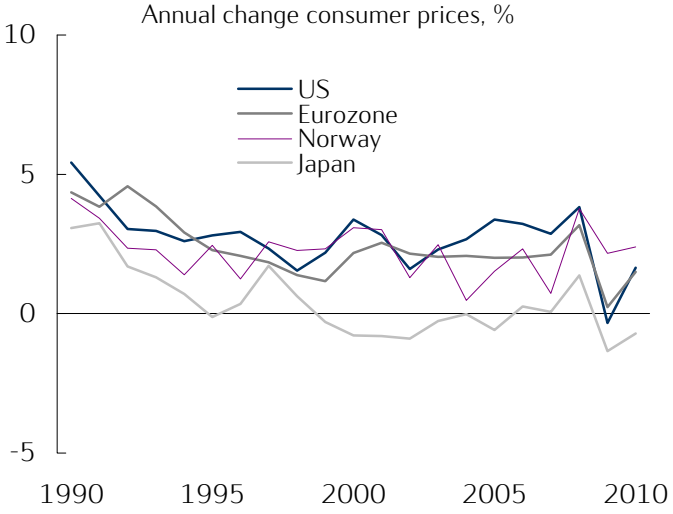
World inflation

Annual change consumer prices, %



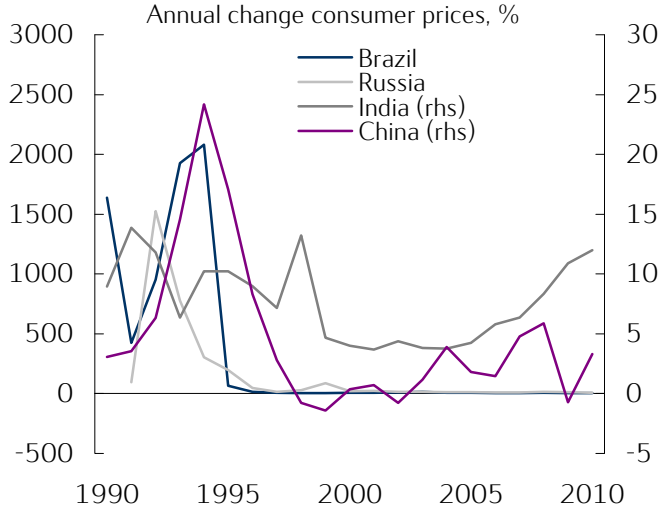
World inflation

Annual change consumer prices, %



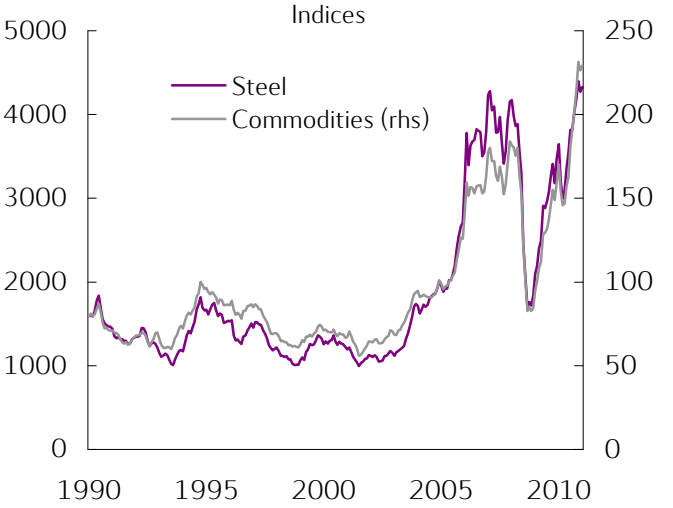
Emerging economies (BRIC)

Annual change consumer prices, %



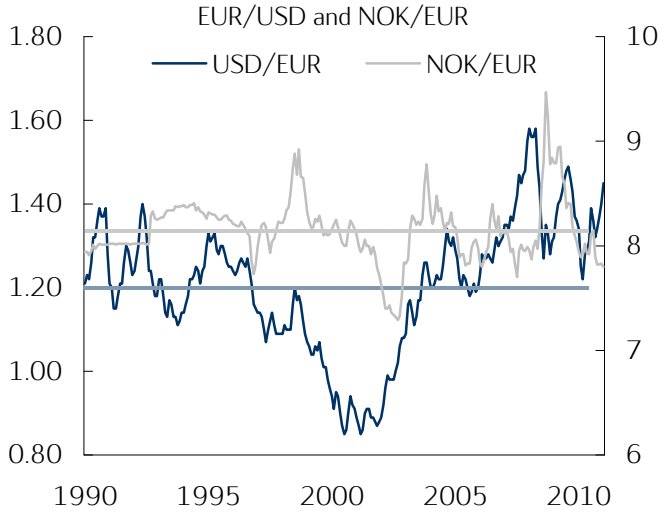
Steel and commodity prices

Indices

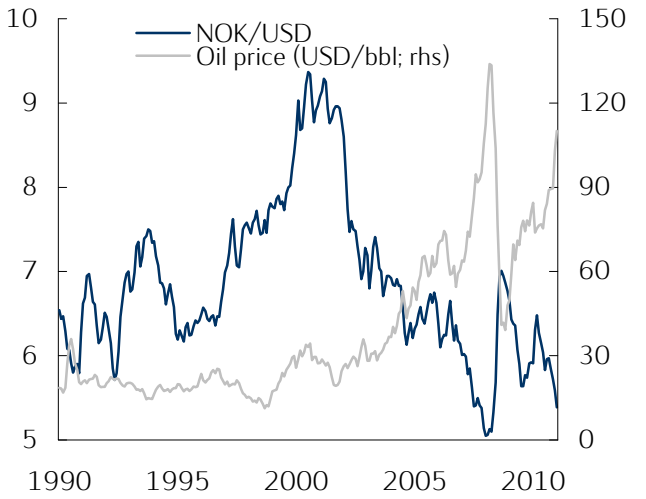


Key exchange rates

EUR/USD and NOK/EUR

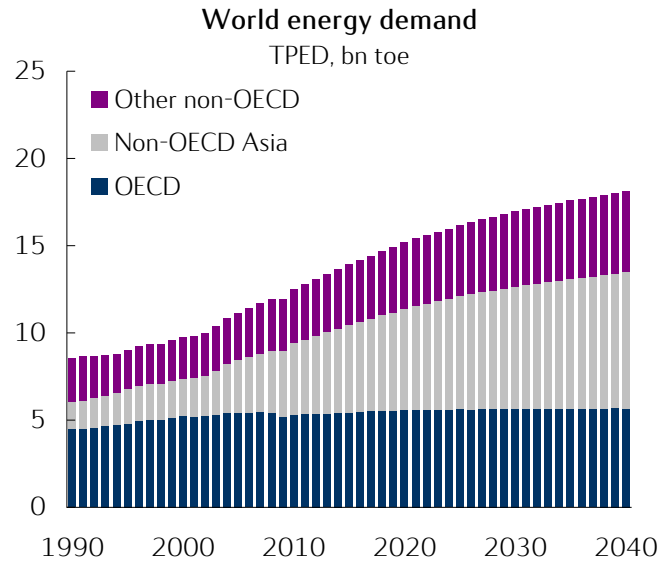


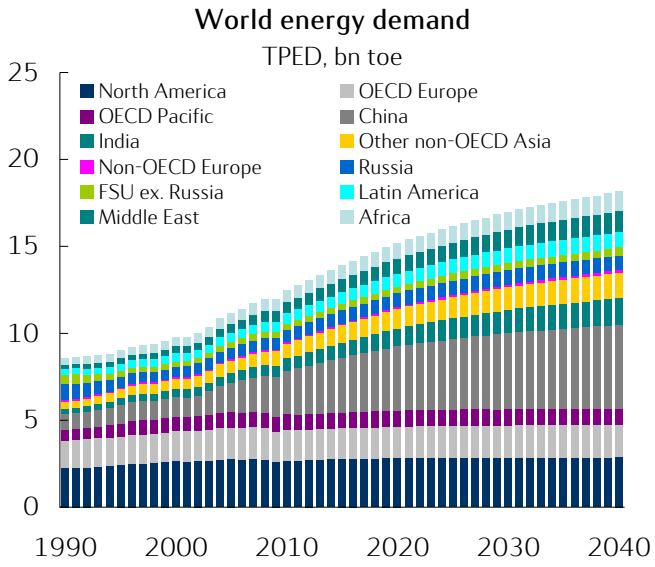
NOK/USD and the oil price

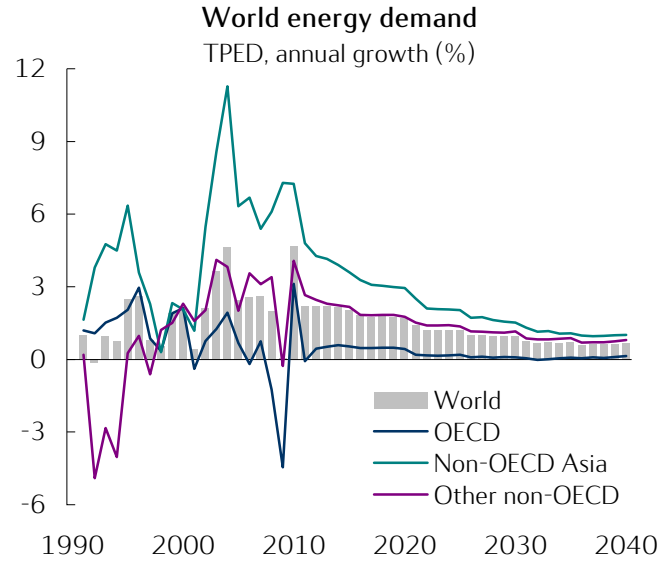


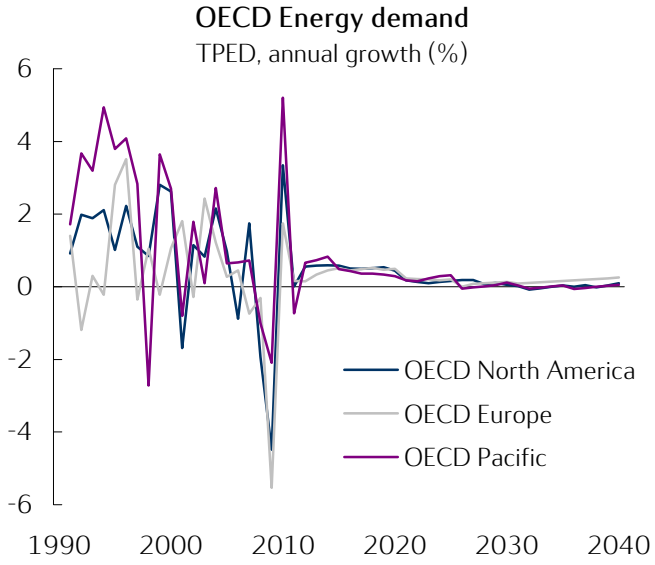
Source: IHS Global Insight, Reuters EcoWin.

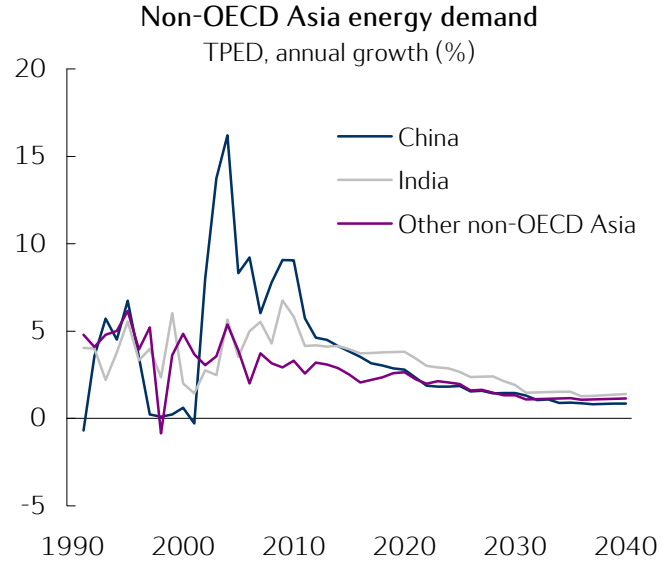
Global and regional energy demand

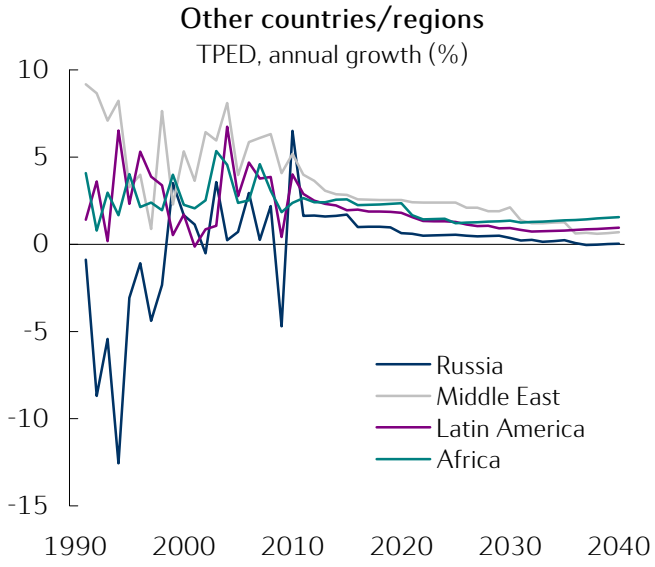






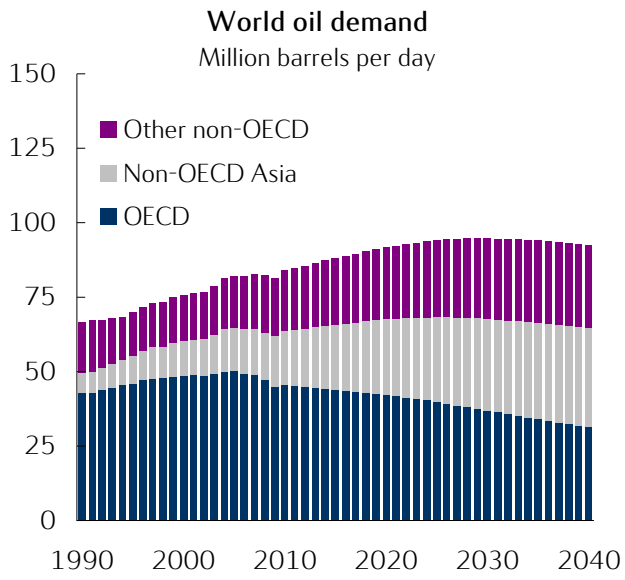


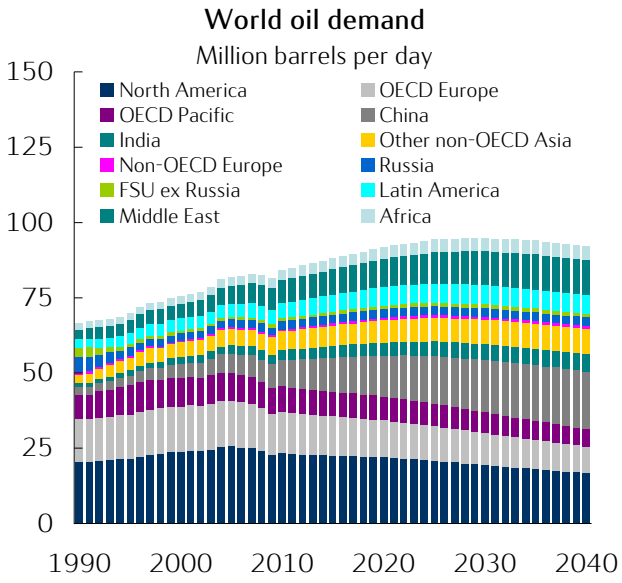


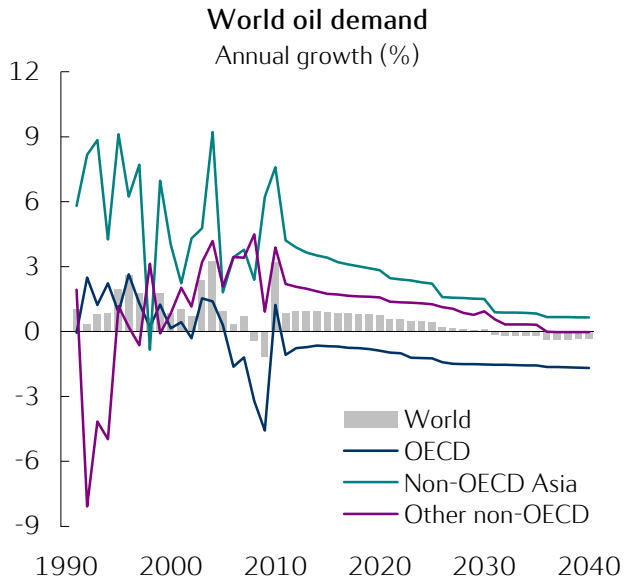


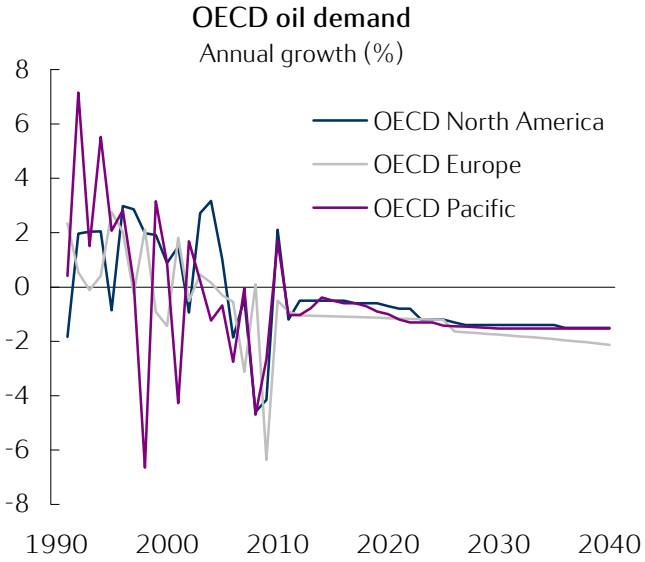
Source: International Energy Agency (historical figures), Statoil (projections).

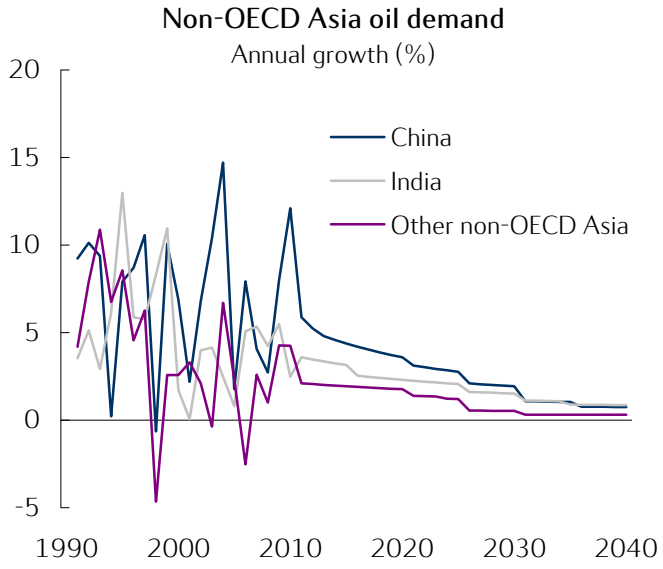
Global and regional oil demand (excl. bio fuels)

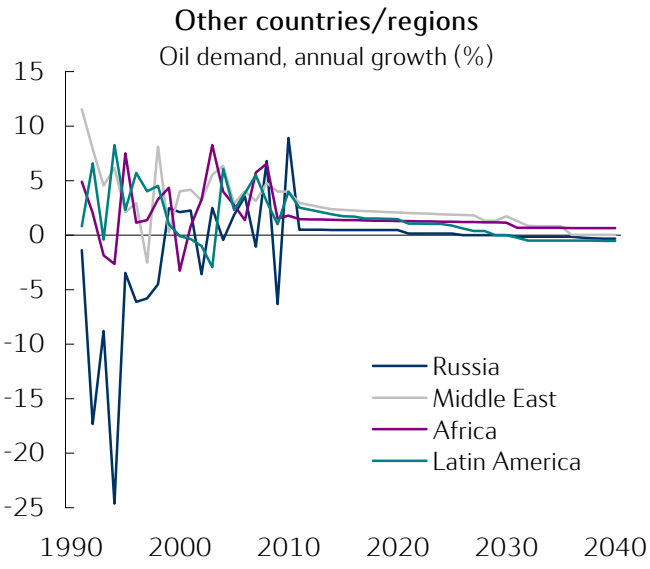






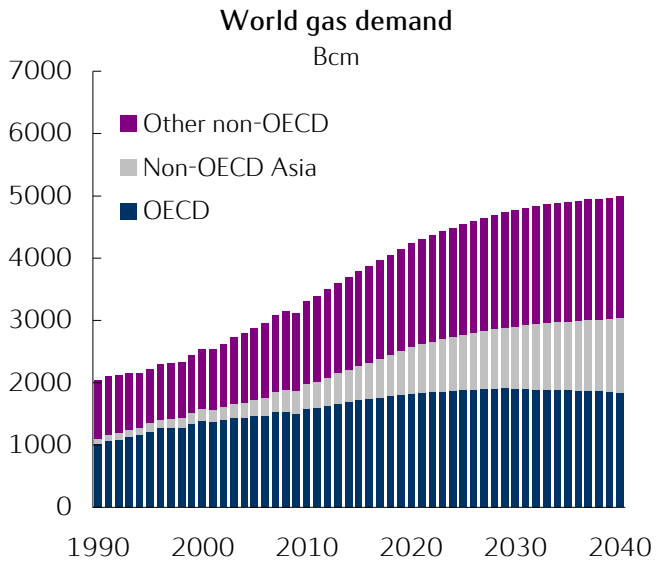


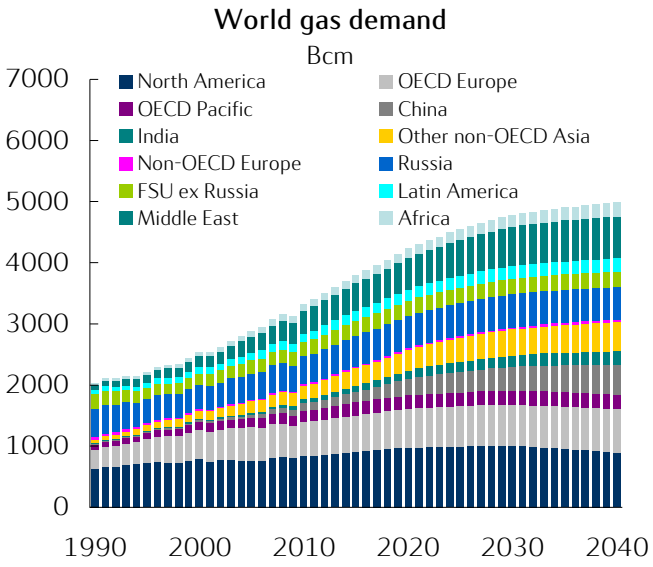


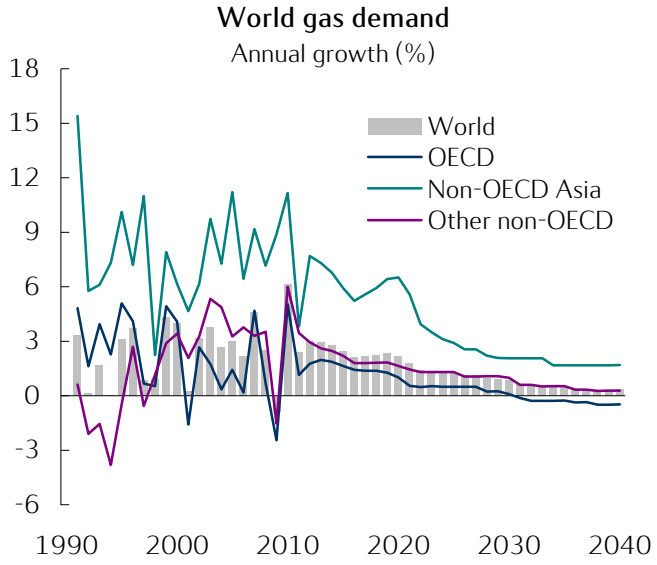


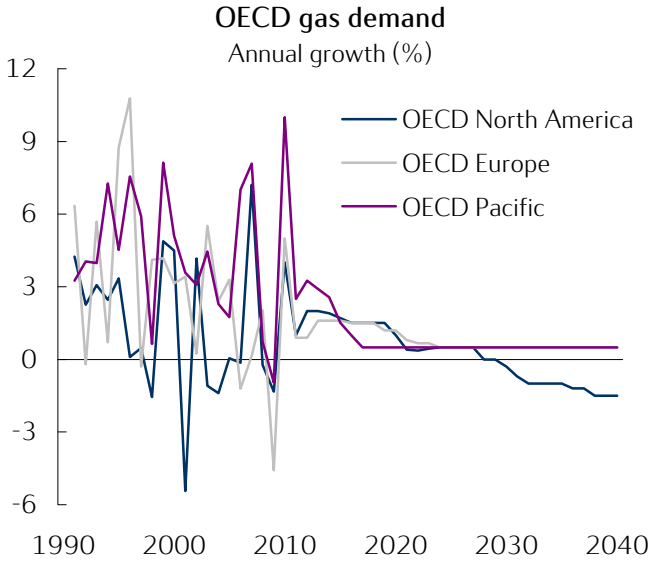
Source: International Energy Agency (historical figures), Statoil (projections).

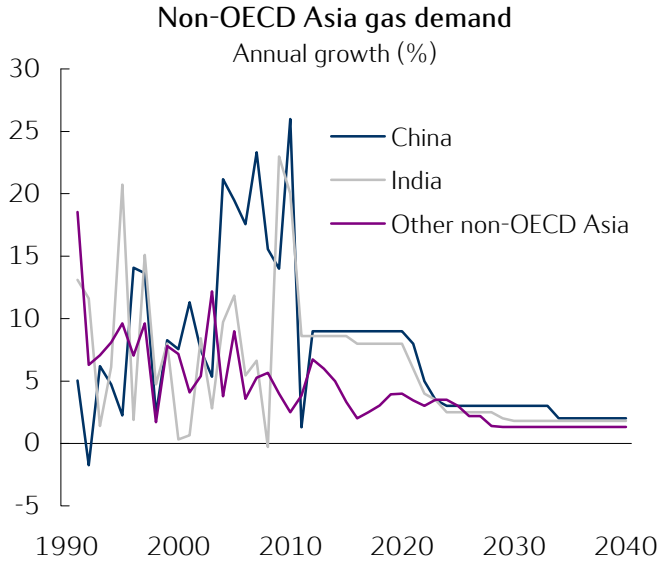
Global and regional gas demand

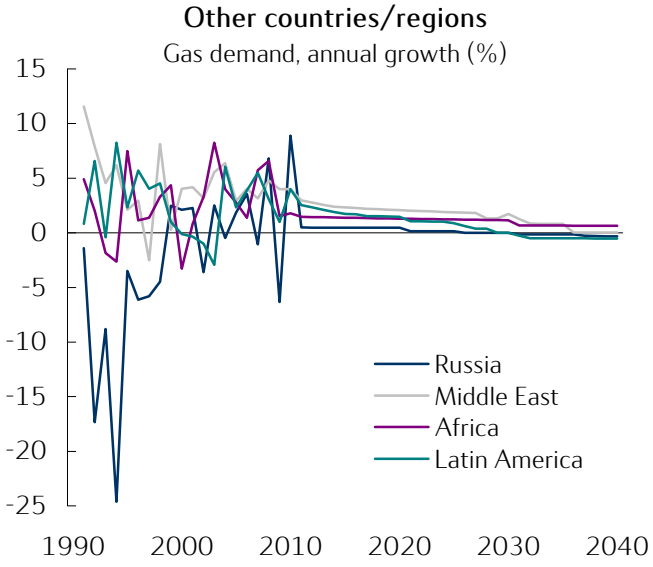










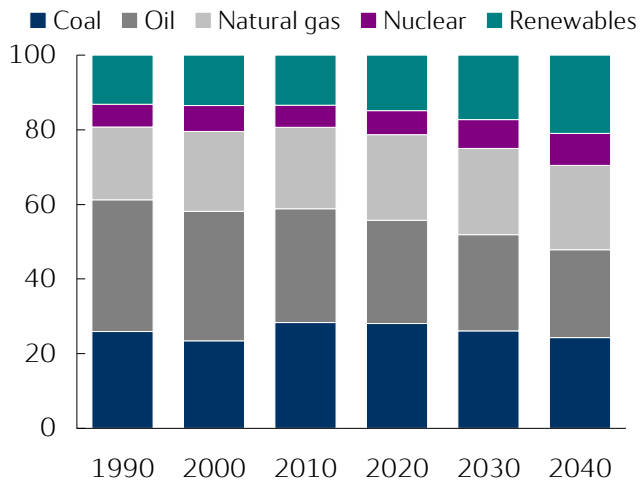


Source: International Energy Agency (historical figures), Statoil (projections).

Global and regional energy mix

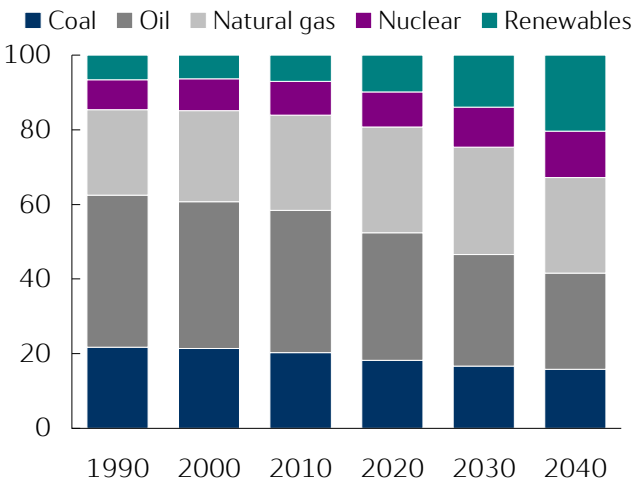
World energy mix

Share of total energy demand (TPED), %



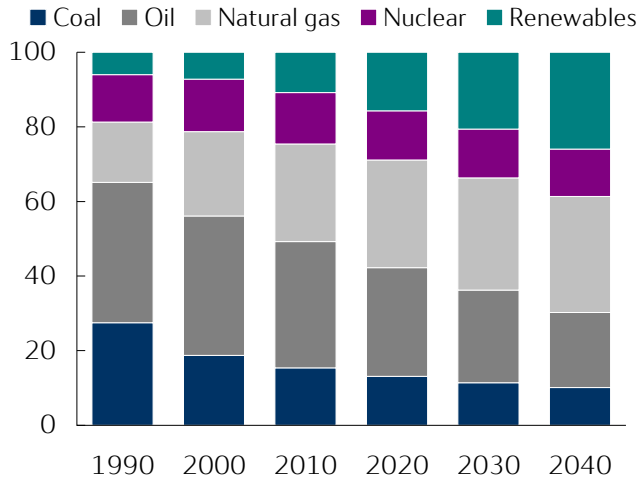
North America: Energy mix

Share of total energy demand (TPED), %



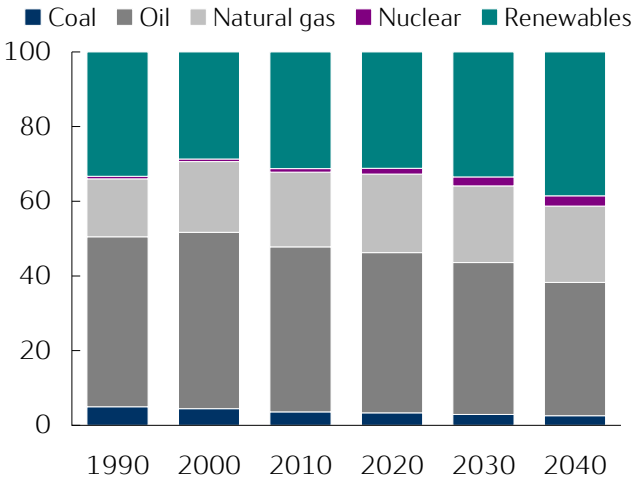
OECD Europe: Energy mix

Share of total energy demand (TPED), %



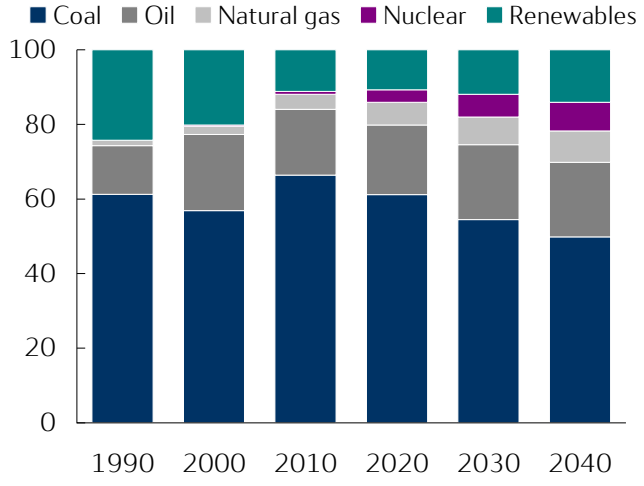
Latin America: Energy mix

Share of total energy demand (TPED), %



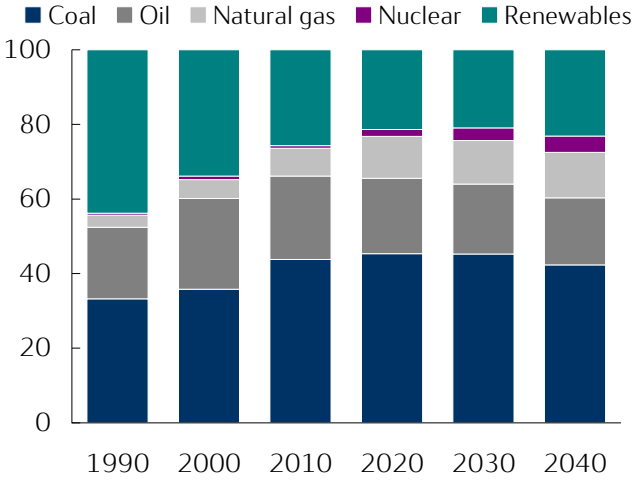
China: Energy mix

Share of total energy demand (TPED), %



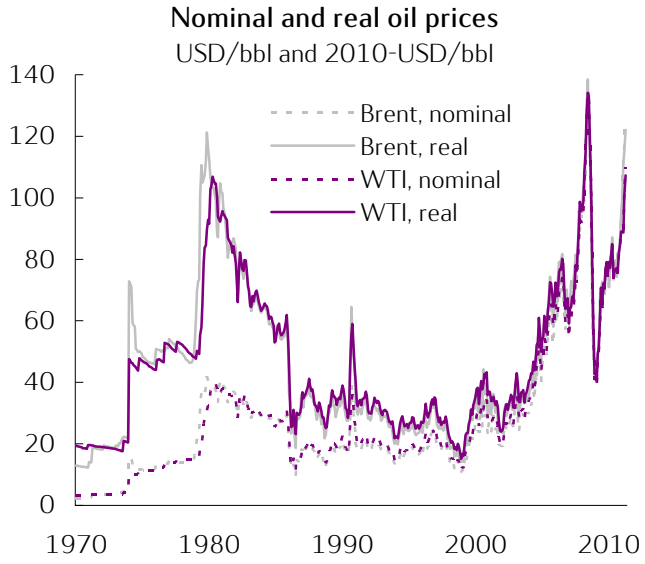
India: Energy mix

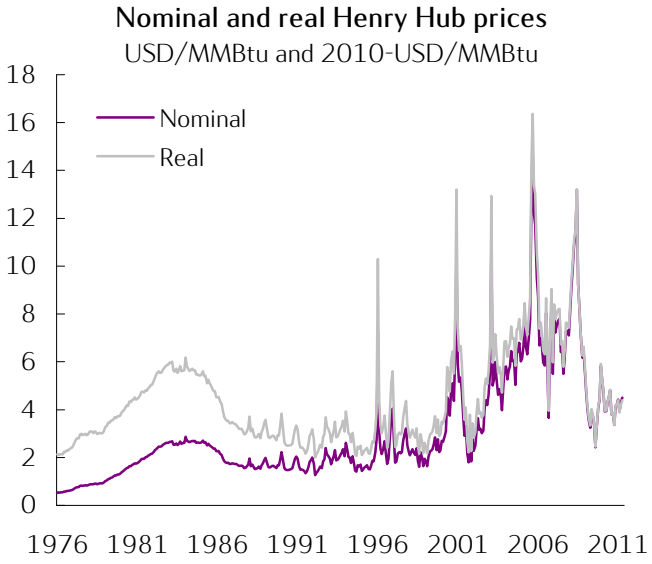
Share of total energy demand (TPED), %

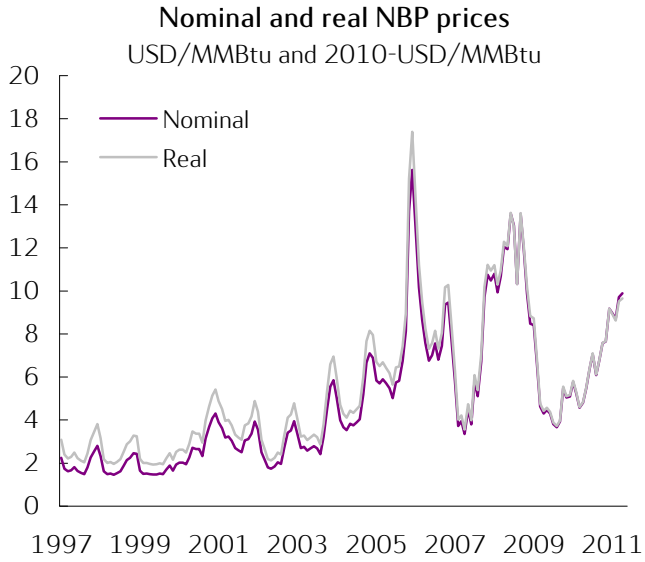


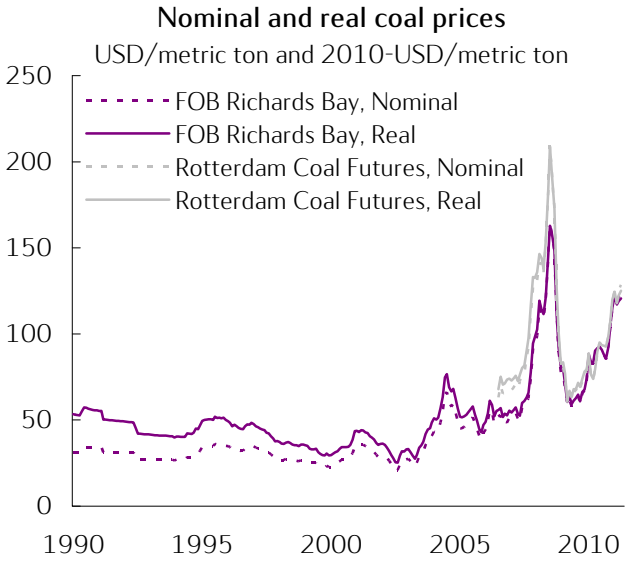
Source: International Energy Agency (historical figures), Statoil (projections).

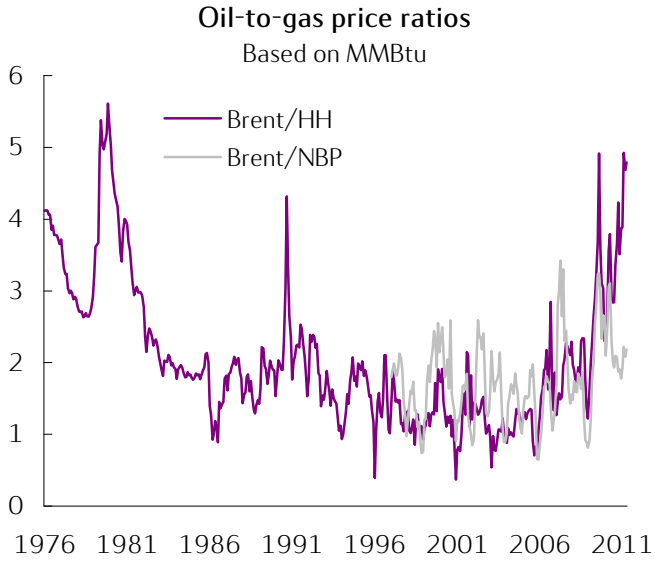
Historical energy prices











Source: International Energy Agency (historical figures), Statoil (projections).

Statoil ASA
NO-4035 Stavanger
Norway
Telephone +47 51 99 00 00
www.statoil.com