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US Energy: the New Reality

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Summary points

- The trend of rising US dependence on imports of foreign oil and natural gas has been abruptly reversed, as a result of falling domestic demand for oil and increasing domestic supplies. This trend is likely to continue until at least 2020.
- There are significant transitional challenges. The main sources of US shale gas and 'tight' oil are distant from existing infrastructure. The new oil mainly replaces light African and Atlantic crudes, rather than heavier Middle East oil for which refineries were designed.
- Low natural gas prices have expanded the domestic gas market and enhanced the competitiveness of US industries.
- US developments will create an economically sustainable surplus of natural gas. North American producers are competing to develop liquefied natural gas exports to Asia.
- The aggregate of 'energy self-sufficiency' is superficial. While its crude oil imports from outside North America will diminish, the United States will continue to trade oil and gas with Canada and Mexico.
- 'Energy security' is losing strength as a policy justification. The United States will, however, remain a substantial oil importer for at least a decade, and cannot be indifferent to the stability and security of global oil markets.

Introduction

In 1973, in response to the first oil shock and the Arab oil embargo, President Richard Nixon announced a major initiative – 'Project Independence' – to achieve US 'energy independence' by the end of the decade. All US presidents have since lamented the increasing share of foreign oil in US consumption and the prospect of an increasing share of gas imports from outside North America.

Most recently, President George W. Bush repeated the call for energy independence in promoting the Energy Policy Act (2005) and the Energy Independence and Security Act (2007). These combined energy security and climate change objectives by attempting to reduce oil consumption and mandating the use of non-petroleum fuels. In 2008 the federal government rescued the US automobile companies from collapse on condition that they made more fuel-efficient vehicles. The Obama administration followed through in 2011–12 with executive action, through the Environmental Protection Agency (EPA), to accelerate and strengthen automobile fuel-efficiency standards.

The result of this last set of policy initiatives has been that, following the financial crisis and recession, consumption of oil has not recovered to the peak of 2005. However, while the turnaround in US oil demand over the past few years may be attributed to policy, it is the private sector that bears most responsibility for increasing US oil and gas production. The number of new leases on federally owned shale has actually fallen over the last five years, as have drilling and production. Meanwhile, many private landowners – who under US law own the subsoil mineral resources of their land – have been eager to offer land for exploration in areas not previously identified as having oil and gas potential.

With lower demand and higher production, the United States' dependence on foreign oil suppliers has been reduced. This is a profound change from the environment in which policies have been set over the last four decades. US 'energy independence' has been mooted as a real possibility in the relatively near term. Some have presented this possibility as an opportunity for the United States to retrench from some of its global security commitments. Others have viewed it as the beginning of a second US industrial renaissance, or as the counterargument to suggestions of the country's decline from a current position of global political pre-eminence.

Indeed, 'energy independence' has lost none of its power as a rhetorical device in the United States. But declarations of independence remain rhetorical. The reality is that interdependence – rather than independence – will continue to define how the global energy system works. What the revolution in US energy has done, and will continue to do, is greatly to increase US freedom to determine energy, economic and foreign policy without the constraints that increasing import dependence has for so long placed on policy.

There is undoubtedly a US energy revolution under way – but where that revolution will lead is not yet clear. This paper sets out to explain what is currently happening in the North American energy landscape, and how this is likely to evolve over the next decade or more.

The vanishing US dependence on imported oil

US dependence on imported oil has declined rapidly in recent years, squeezed by rising domestic production and falling domestic consumption. Since 2008 a decades-long decline in domestic oil production has been reversed, with output in 2012 some 30 per cent above its 2008 low point. The fuel supply has, furthermore, been supplemented by increasing production of liquid biofuels. Simultaneously, oil demand has fallen – by 17 per cent since 2005 – partly because of the global financial crisis and subsequent recession, and partly reflecting the use of more fuel-efficient vehicles in the transport sector. As a result, US oil imports declined to an average of 7.8 million barrels per day (mbd) in 2012, representing 42 per cent of daily US oil consumption. In 2005 oil imports supplied 60 per cent of US consumption of liquid fuels. US Department of Energy forecasts for domestic oil production in 2013 and 2014 have been continuously revised upwards, further offsetting US import dependence (although still falling far short of its elimination).

The shale gas 'revolution'

For US natural gas, the turnaround in production began a little earlier, in 2006. From a low point of 18 trillion cubic feet (tcf) in 2005, natural gas output increased by one-third, to 24 tcf, by 2012. Unlike for oil, US consumption of natural gas continued to rise more or less on trend, by 14 per cent over the same period. However, the faster rise in domestic production allowed US natural gas imports to fall by nearly two-thirds overall, to 1.6 tcf (mainly from Canada), representing 6 per cent of consumption.

This recent expansion of US gas production is principally a story of rapid and continuous technological development over several years, rather than a single technological breakthrough. The application of a combination of horizontal drilling and – with some controversy – hydraulic fracturing ('fracking') has allowed wider access to oil and gas in shale and tight formations where the density of the rock has blocked migration of hydrocarbons to 'conventional' oil and gas reservoirs. These technologies were first applied together commercially in 1991 by a small independent company (Mitchell Energy) in the Barnett shales of northwest Texas. The practice has subsequently been developed, and has proliferated rapidly over the last few years. Since 2005 it has been applied to the large Bakken shale resources in North Dakota, the Eagle Ford in west Texas, the Marcellus in Pennsylvania, and elsewhere.

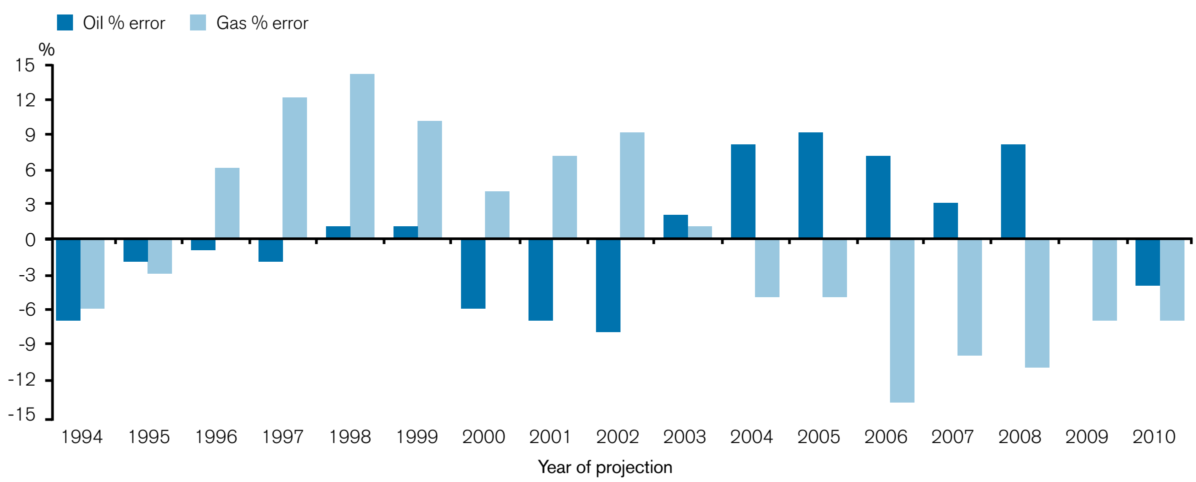
Estimates of technically recoverable oil and gas from US shale vary widely and are continually revised (sometimes downwards for individual fields). None the less, these estimates are unlikely to be a meaningful constraint on the expansion of production over the next two or more decades. Thereafter, however, although resources are potentially very large, there are uncertainties as to the proportion of those resources that can be recovered economically, as well as growing attention to other potential environmental constraints. At some point, the expansion of production is bound to slow.

The imperfections of projections

Projections of US oil and gas output have been wrong in the past. While they may offer an idea of the direction of travel, they are open to substantial error, with consequences for the extent to which policy-makers – or anyone else – should rely on them. Figure 1 shows that gas production for 2010 was underestimated by 15 per cent by the US Energy Information Administration (EIA) as recently as five years before. The unexpected surge in gas production in recent years has been the most dramatic – to the point where a surplus has developed, gas prices have fallen, rigs on shale deposits are being diverted from gas to liquids targets, and gas is being flared.

Similarly, future projections of US oil and gas production are inherently very uncertain. The key production uncertainty is the extent to which new discoveries, technology

Figure 1: EIA projections for 2010



Source: *Annual Energy Outlook Retrospective Review: Evaluation of 2011 and Prior Reference Case Projections* (US DOE 2012).

and investment will offset the inevitable and continuing decline of old reservoirs onshore, while also sustaining production of oil and gas from shale – where decline from individual wells is very rapid. At the same time, increasing attention is being paid to developing technologies to limit the environmental impact of drilling and fracturing shale, to the pricing of water and sand resources used in the fracking process, and to the damage caused by thousands of trucks travelling to and from drill sites on small country roads.

Future markets for oil and gas are also difficult to project. A large part of the puzzle for US oil and gas is on the consumption side. Projections for levelling or falling US oil consumption depend on the effects of the tightening of fuel efficiency standards for vehicles which took place between 2010 and 2012, on the likelihood of further tightening of standards in the future, and on demographic changes altering consumption patterns of US households and commercial users. Gas companies frustrated by the present low prices in the US natural gas market are investing to access the high-value transport market through developing liquefied natural gas (LNG) or compressed natural gas (CNG) networks for commercial vehicles.

Growing pains for US energy

The US energy revolution involves major transitional challenges for both oil and gas, arising in the context of a global energy system in flux. Within the United States, most new supplies of tight oil and shale gas are located in different areas from conventional oil and gas production, as well as from existing oil import terminals and refineries. The speed of change is creating surpluses and shortages in oil pipelines, and redundancy in refineries that were designed to process heavy Canadian or other imported crude rather than the low-sulphur light crudes from tight oil and liquids from shale gas development. To address these anomalies, and exploit opportunities for arbitrage, companies are investing in new pipeline construction, reversing flows in existing lines, converting gas lines, expanding the use of the flexible and very competitive railway system and increasing international trade in refined products.

In the longer term, the change in logistics is likely to lead to permanent shifts in the relationship between oil and gas prices within the United States and prices in international markets. In the case of oil, the traditional premium of the West Texas Intermediate (WTI) US inland benchmark price over the global Brent price disappeared in 2008; indeed, the relationship is currently profoundly reversed. The discount for WTI is falling as the logistical problems around the main US pricing point at Cushing, Oklahoma are addressed. However, the fundamental change towards shorter, internal supply chains means that industrial consumers are likely to enjoy structurally lower oil prices at the point of consumption in the US than they are in those areas or regions of the world that depend on long-distance imports. Arbitrage will increasingly be in refineries and the product trade, and in energy-intensive industries.

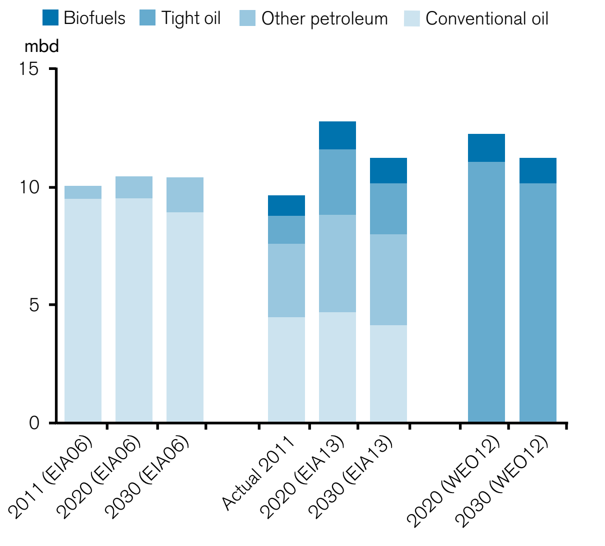
There is no global pricing structure for natural gas, most of which is produced in the countries where it is consumed. Current US prices at the major hubs are probably unsustainably low, at around $3–4 per million British thermal units (MMBtu). They are significantly below prices paid by European importers of LNG – currently around $10/MMBtu in the United Kingdom, $13–15/MMBtu in southern Europe and $17–19/MMBtu in Asia. This is encouraging US gas producers to look for means of enlarging the domestic market and/or of becoming LNG exporters. At least two export contracts are based on a small premium on the US benchmark Henry Hub plus a fixed liquefaction charge plus transport.

The current price differences between the US and the European and Asian markets are exaggerated, because the infrastructure has not yet fully been adapted to replace current and expected US imports by the new domestic sources of supply. For gas, however, the high cost of transport relative to the product value means that logistics will continue to separate markets to some degree. Therefore, even if US prices rise as predicted, restoring profitability to US shale gas producers, arbitrage is likely to take place through the export of value-added products derived from gas – such as petrochemicals – and from cheap gas-fuelled electricity, rather than through great expansion of gas exports (but see below). In the petrochemicals sector, the shift from oil- to gas-based feedstocks and the lower price of electricity cascade through the various value chains, and are reflected in the user industries' investment plans.

The changing future: oil production

Figure 2 contrasts the production forecasts for 2011, 2020 and 2030 made by the EIA in its 2006 *Annual Energy Outlook (AEO)* (left-hand bars) with the actual output in 2011 and its latest (2013) forecasts. The figure also compares the EIA projections with the International Energy Agency (IEA) 2012 *World Energy Outlook* (WEO) projections for 2020 and 2030 (right-hand bars).

Figure 2: US liquids production



Sources: EIA AEO 2006, 2013; WEO 2012.

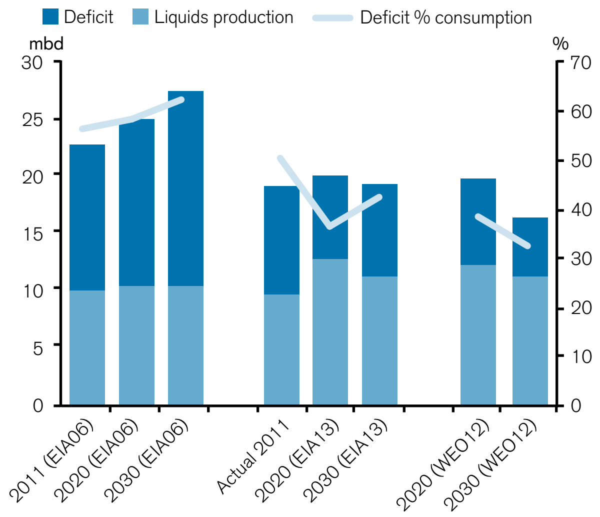
Looking ahead to 2020, the EIA – making its projections in 2013 – shows higher expectations of production than do either the IEA's WEO in 2012 or previous iterations of the EIA projections. (All these figures are from reference cases, and the WEO data have been adjusted to make their definition compatible with the EIA's more detailed numbers.) Both agencies project a decline after 2020, reflecting the expectation of continuing decline in the conventional oilfields and a plateauing and possible decline after the main expansion of production from tight and shale oil. Some other organizations, including BP, ExxonMobil and the US National Intelligence Council, anticipate a more prolonged expansion of production beyond 2020.

Understanding the reversing trend of US import dependence

The story of the reduction in US oil import dependence is not only a matter of increased domestic production, however. Reduction in demand is also important.

Figure 3 combines 2006 EIA projections of static production with projections of growing consumption, shown by the height of the bars: the deficit rises and its share of consumption increases. In 2006 this anticipated trend of increasing import dependence drove the strong rhetoric of US energy security policy.

Figure 3: US liquids balance, 2011/2020/2030 projections



Sources: EIA AEO 2006, 2013; WEO 2012 adjusted for comparability.

This figure contrasts the EIA prediction made in 2006 for 2011, 2020 and 2030 with the actual out-turn in 2011 and EIA projections made in 2013 for 2020 and 2030. In the latter, production rises to 2020 before declining; consumption starts from a much lower base than was forecast in 2006 and rises only slowly as the tighter Corporate Average Fuel Economy (CAFE) standards introduced in 2012 take effect. Additionally, the two columns on the right show the IEA WEO 2012 expectations for 2020 and 2030. Here, the projection for production is similar, but there is a significant fall in demand (and therefore deficits) under the IEA 'New Policies Scenario'. These assume that new policies will be adopted to cut fuel consumption in the transport sector further. In both the EIA and

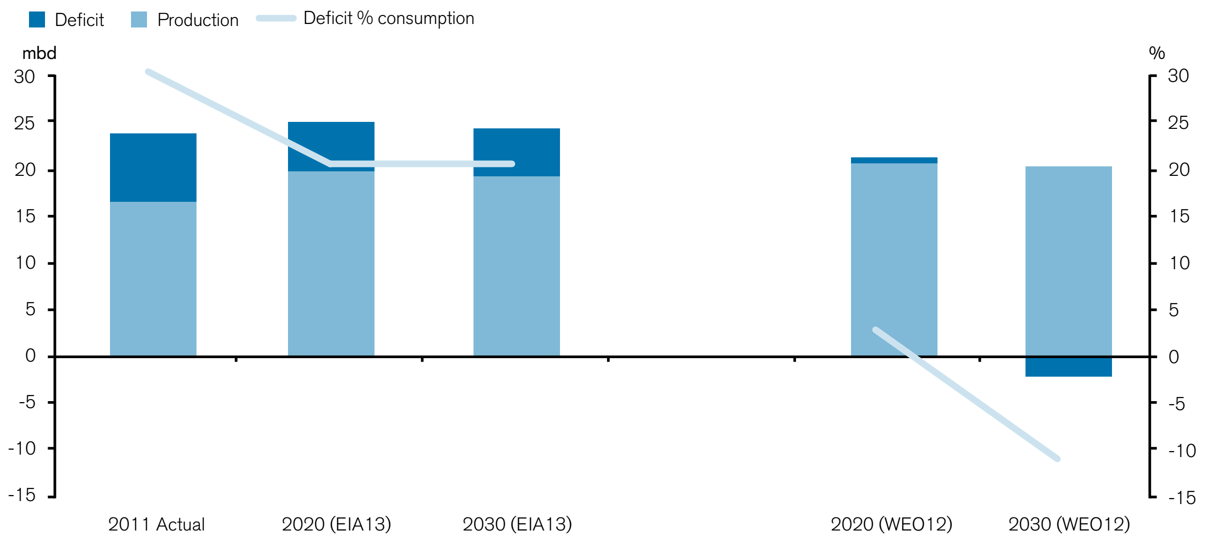
WEO projections, deficits – i.e. imports – fall sharply as a percentage of consumption over the whole period. Such projections are perceived as bringing to an end, or at least dramatically reducing, US dependence on oil imports – a sharply different picture of the future from that which prevailed just five years ago.

North American oil independence?

These new projections still do not add up to US oil independence. However, about half the US oil deficit shown in the EIA projections could be met by imports from Canada and Mexico. This leads to the possibility that North America will eliminate oil imports over this period and could become a net exporter by 2030. Figure 4 illustrates that scenario, based on IEA WEO projections. The export possibility signalled by the IEA's chief economist[1] is due more to the lower demand assumed by the WEO than it is to higher production.

In the short term, the new US production of light, low-sulphur oil is replacing imports from African and Atlantic sources. In 2012 US oil imports fell by about 1 million bpd, while imports from Saudi Arabia and Middle East increased slightly, partly to support increased exports of products. This will change as US refineries adapt to the new US supplies. Although some future imports from the Middle East may continue, as Saudi Aramco may still supply its US refineries (about 1.5 million bpd), the larger picture[2] shows that, from about now, surpluses of oil available from the Middle East will be insufficient to supply the imports that Asian markets need. Any North American deficits will be supplied from Africa or South America. Thus not only is US oil import dependence declining, but North American dependence on Middle East oil is also on the way out.

Figure 4: North America liquids balance, 2020/2030, based on 2012/2013 projections



Source: EIA AEO 2006, 2013; WEO 2012 adjusted for comparability.

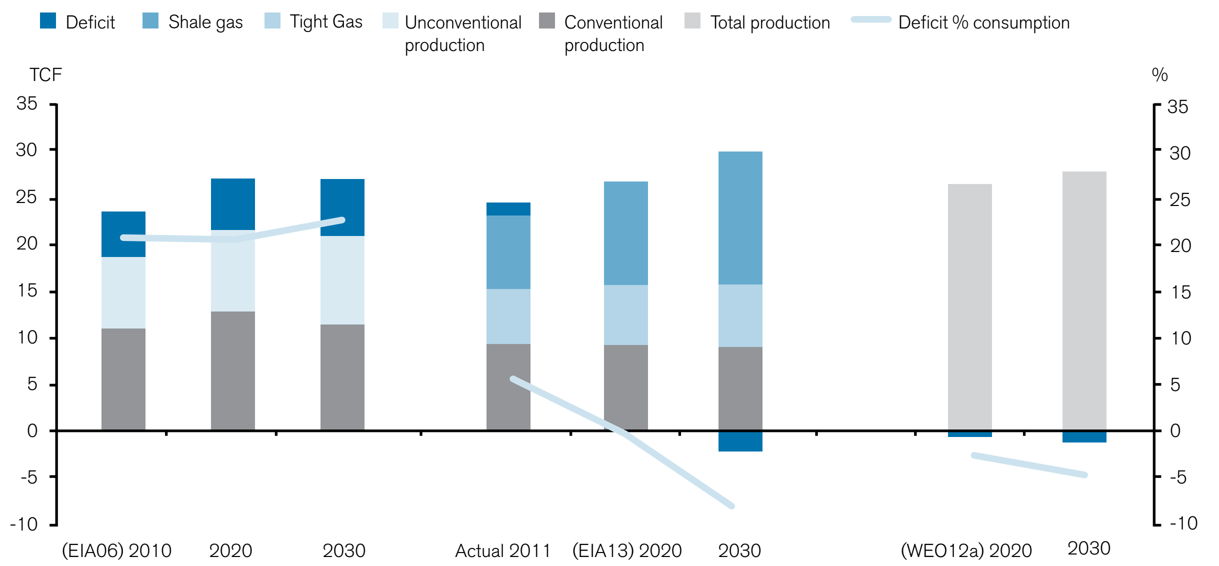
Natural gas: from imports to exports

The case of US natural gas is even more dramatic. Figure 5 shows how perceptions have turned from the 2006 expectation of gas imports increasing to 20 per cent of consumption (shown in the three left-hand bars) to the current anticipated probability of gas exports by 2020.

1 Address to the School of Education and Communication and Engineering Science, Stockholm, 17 December 2012, http://www.kth.se/en/ece/nyheter/energieffektiviseringar-ar-klimatets-hopp-1.354330.

2 See John Mitchell et al., *What Next for the Oil and Gas Industry?*, Chatham House, 2012.

Figure 5: US gas supply



Sources: EIA AEO 2006, 2013; WEO 2012 adjusted for comparability.

Under the 2013 EIA projections (the three central bars of the figure), an increase in shale gas production supports expansion of demand and still allows for exports by 2020, expanding through to 2030. The IEA WEO 2012 similarly projects exports by 2020, expanding thereafter.

The changed expectations of the future of US natural gas since 2006 are entirely due to tight and shale gas. Conventional gas production in 2011 was actually below the forecasts made five years previously and does not increase in the EIA's new projections for the future. Consumption of natural gas has expanded in recent years, and is expected to continue to rise strongly; imports, mainly from Canada, have fallen.

The EIA projections are more bullish about both consumption and supply in the United States than are those in the WEO, for which projections were made about a year earlier. The EIA assumes that prices will grow slowly, to $4/MMBtu by 2020 and $5.4/MMBtu by 2030. However, it is not clear that this price increase will be sufficient to sustain the investment required to achieve the production increases projected.

The shift in expectations of the future US natural gas position has been rapid. Policies designed to facilitate the import of LNG are now obsolete, as are the import terminals themselves. LNG originally intended for the United States is now affecting prices and expanding markets elsewhere, bringing about greater integration of global gas markets. Changes in the US domestic gas market have had far-reaching, and sometimes unexpected, consequences – both for other energy sources and beyond the United States. For example, natural gas companies have increased their share of the US electricity market by 5 per cent, partly at the expense of coal (which has lost 3 per cent of the electricity generation market). Coal producers have replaced this loss (about 50–60 million short tons) by exporting to growing markets in the power sector in Asia and in Europe (the latter reflecting the phasing-out of nuclear power in Germany).

The gas export rush

Given domestic market conditions, price differentials with Asia and the possibility of a widening North American gas surplus, producers in North America are keen to develop facilities to export natural gas from the United States and Canada. For Canada, exports to the Asian market are the obvious alternative to the markets it stands to lose in the United States. However, to develop these markets would require new facilities and pipelines, which may have controversial environmental effects and incur local or national opposition. In the United States there are proposals for terminals on the Pacific coast to export

Table 1: North American LNG exports

Change 2011–20		TCF
Improved US gas balance		3
Increase Canadian production		2–3
Increase Mexican/Canadian consumption		2–3
LNG export potential		≈3
Projects	Kitimat	1.0
	Sabine	0.5
	Freeport	0.7
	Lake Charles	0.4
	Corpus Christi	0.9
	Others	8–9

Sources: Author's estimates; based on EIA, Natural Resources Canada and WEO reports and press reports.

natural gas to Asia's high-priced markets or allow exports from future development of Californian shale deposits. The US LNG import terminals that are being converted, or are proposed for conversion, to export are situated on the Gulf of Mexico and on the Atlantic coast – pointing towards export to Europe – but may also be competitive in Asian markets after the widening of the Panama Canal in 2015.

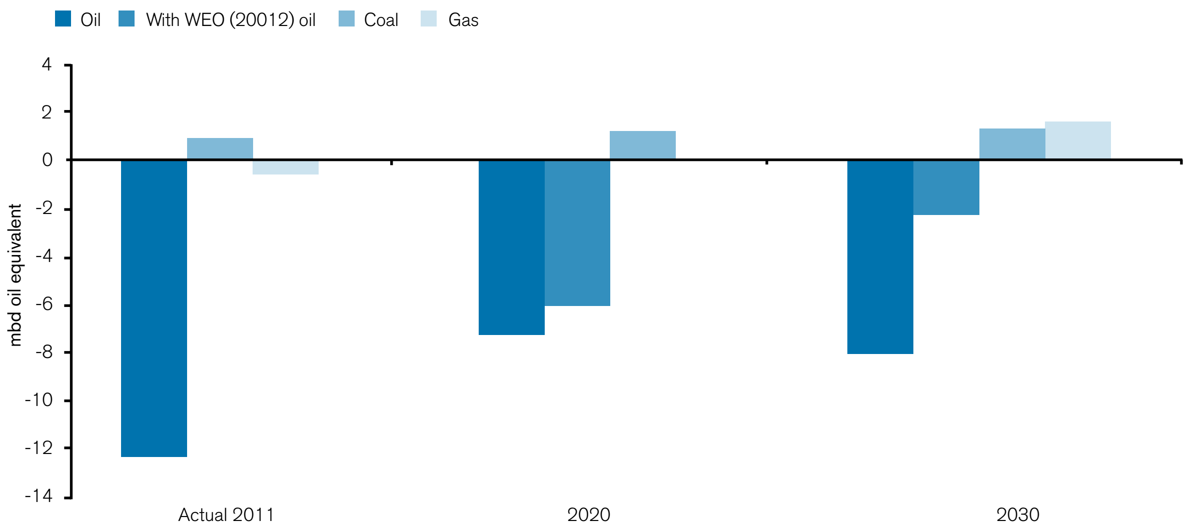
Table 1 is an attempt to assess the potential for LNG exports from both the United States and Canada by 2020. Higher numbers are possible beyond that point. Very broadly, an export potential of 3–5 tcf by 2020 is possible as a result of the lower US gas deficit, and higher production in Canada and Mexico (these last partly offset by their increased consumption). Far more projects are proposed than such availability would support. In effect, therefore, it is a race between competing projects: there are more than 20 proposals for the US export terminals (some converted from terminals built for LNG imports) and a further six new Canadian export projects, together amounting to almost 35 bcfd (13 tcf per year in export projects from North America. However, only a small number of these proposals will be approved and developed. So far, around 1 tcf (2.95 bcfd) of exports have been licensed in Canada, in two projects involving multinational companies (Shell and Chevron); and around 0.8 tcf (2.2 bcfd) in the United States.

In both the United States and Canada regulatory policies require licensing of gas export projects. The United States automatically grants licences for exports of gas to countries with which it has a free trade area agreement: in Asia, this means South Korea and Singapore. The situation is continually evolving, and more approvals are likely. In addition to export licences, the construction of the terminals and pipelines requires environmental permits. In Canada projects also require consent from First Nations if their land is utilized. (Haisla First Nation is notably a participant in one of the Kitimat LNG projects.)

Moving some of the North American gas surplus abroad would have some impact on prices both in North America and in recipient markets – but less than many expect, and asymmetrically. A study for the US Department of Energy has advised that the effect on gas prices in the United States would be minimal.[3] US prices set by competition in the large domestic gas market will affect export markets far more than the oil-related foreign prices will affect the United States. Exports of around 3 tcf would represent less than 5 per cent of North American gas consumption.

3 EIA, Effect of Increased Natural Gas Exports on Domestic Energy Markets, January 2012.

Figure 7: US energy 'self-sufficiency'



Source: EIA AEO 2013.

A wide range of projections has been made for the size of the global LNG market in 2025. If directed to Asian markets, however, potential North American LNG exports might amount to 10–15 per cent of Asian gas consumption and about 30 per cent of the Asian LNG market in 2025. Asian prices would be substantially affected. North American gas would be likely to displace higher-cost LNG from Australia.

The present rigid structure of LNG prices in Asia would also have to change. To some extent, this is already happening. Prices for the LNG contracted from the Shell project at Kitimat are said to be related to the US benchmark Henry Hub price, rather than the crude oil indexes typical of current Asian LNG import contracts. All the same, the indexing to oil prices of a large part of the Asian LNG trade is likely to continue. Combined with the higher costs of Asian LNG suppliers, this means that gas-based petrochemical and electricity-intensive industries in the United States will continue to benefit from cost advantages that are beginning to approach those enjoyed by Middle East petrochemicals industries with oil-related (though discounted) input costs.

Self-sufficiency and independence: rhetoric and reality

'Energy independence' and 'energy self-sufficiency' are sometimes used interchangeably to indicate the possible future for the United States. But these terms do not mean the same thing, and each has its limitations. 'Energy self-sufficiency' means an overall balance between imports and exports of different fuels: it does not mean security from disruption of supply for a particular fuel (such as oil, which will continue to be imported) for which it may be difficult or impossible quickly to substitute another fuel. 'Energy independence', a much more emotive term, is often taken to mean something considerably stronger: an ability to act freely without reference to the rest of the world.

Figure 7 indicates what is implied by the current set of projections. The figure measures 'energy' by a thermal-equivalence to oil. Even on this basis, the United States is not fully energy self-sufficient by 2030. EIA reference projections for 2030 do not bring about US energy self-sufficiency, even on a thermal-equivalent basis. Oil imports continue, although they are partly offset by exports of gas and coal. There would be a net energy deficit of about 5 per cent. Even the WEO projections of lower oil demand, under the New Policies Scenario, leave the United States with a small net energy deficit in 2030. Only if potential surpluses from Canada and Mexico are included can one project the idea of North American energy self-sufficiency.

Economically, however, the thermal-equivalence measurement is misleading. The value of energy in different fuels derives from their final use. The energy embodied in oil (mainly used for transportation) per Btu in US projected 2030 prices is worth about $24/MMBtu, compared with the projected price of $5.6/MMBtu for delivered gas and $2.52/MMBtu for coal to power stations. Adjusting for the relative values per Btu would increase the percentage measure of US energy deficits by 1.5–2.5 points. Even if the United States were to achieve 'self-sufficiency', energy prices in the rest of the world would continue to affect the country through its trade in oil, gas and coal.

The United States will undoubtedly gain economic advantages from reducing its dependence on petroleum imports: in 2011 just over 20 per cent of the value of US goods exports went to pay for the deficit on petroleum. Halving, or eliminating, this net deficit would benefit the balance of payments and add to the net national income. All things being equal, the dollar might strengthen. This would in turn produce winners and losers in the United States, while the net effect would depend on a variety of macroeconomic responses to this and other trends. Exporters might benefit from the lower domestic costs of energy (reflected through price differentials described above), but could lose out because of the appreciation of the dollar.

The real point, from which such statistics digress, is the trend away from increasing energy dependence – and the perception that this enables US energy policy to concentrate on economic and climate change priorities, rather than on the apparently evaporating problem of energy security. The new situation may not achieve any meaningful 'energy independence', but it does create vastly greater latitude for US policy. This could open the way to discussion of the optimum use of resources and coordination of depletion, trade and industrial policies, which have not been characteristic of the interest-driven debates so far. At the same time, the nature of this turnaround takes away the 'national security' argument from the oil and gas industry's demands for further tax breaks and access to environmentally sensitive areas on- and offshore.

Conclusions

The trend of increasing US dependence on oil imports has been reversed. This is due to a fall in domestic oil demand and increases in production driven by the growing application of horizontal drilling and hydraulic fracturing.

Oil imports are predicted to decrease for at least a decade, reflecting continuing falls in consumption driven by recent tightening of CAFE standards for automobile fuel efficiency, as well as further development of the oil accessed by new technologies. Beyond 2020, there is the possibility of another round of stricter fuel efficiency standards. Oil production may continue to increase, but it may also reach a plateau or fall.

There has been a similar shift in the prospects for US gas. While consumption has continued to rise, domestic production – from shale resources – has increased dramatically. As a result, the United States is preparing to export, rather than import, natural gas.

The speed of these changes has created transitional problems: the new US oil supplies are replacing light and low-sulphur crude from the Atlantic region, while refineries designed and located to process Middle East crude are continuing to import it – often in order to export products to external markets.

There is a surplus of natural gas, which is depressing prices to the point where gas companies are delaying investment. Meanwhile, companies are developing new markets for natural gas in the transport sector, while the electricity sector and the petrochemical industries are investing in expanding the use of gas.

Even when US prices do recover, the higher gas prices in Asia and Europe are a powerful long-term driver for expanding exports. Companies are competing to build export terminals on the Pacific coast, as well as converting terminals on the Gulf and Atlantic coasts originally intended for the import of LNG.

These changes in trend, and transitional disruptions, have several consequences:

a) The United States is moving from a long history in which its energy system has been an economic and security liability to a situation in which it will be a source of economic strength and geopolitical security.
b) There are problems for Canada. Canadian exports of oil from the Athabasca tar sands are being substituted

with light sweet crude produced in the United States. Canadian gas exports to the United States will also lose markets. There is competition between Canadian and US gas producers and terminal developers to build pipelines and terminals to take gas to the Pacific coast for exports to Asia. There, the impact of North American gas exports on the pricing structure for LNG will be considerable, even though the volumes involved will have little effect on US prices.

c) The new sources of US oil and gas are located inland. Even when the transportation system has been reconfigured, the logistical costs will create a wedge between lower US prices and international prices for oil and LNG. US industrial consumers will enjoy a competitive advantage in global markets, and electricity generators will have access to cheap fuels.

d) US imports will be falling at the same time as imports from the Middle East are being absorbed by Asian markets. This means that not only is US dependence on imports decreasing, but the Middle East element in US imports will eventually either disappear or be limited to Saudi Arabia's supplies to its own refineries in the United States. As a consequence, US commitments to defence of Middle East export routes come into question. Lower imports by the United States will also reduce its obligations to hold strategic stocks within the IEA regime; some of these may be sold off, reducing the stocks available to the IEA Emergency Response Mechanism.

e) The United States will continue to have an economic interest in global energy security. It is likely to remain an oil importer – if only from Canada and Mexico. US oil prices will spike or fall when global prices change as a result of exogenous events. Exports of natural gas and coal will not compensate in value terms, and prices may not adjust to match increases in global oil prices.

Taken together, the changes in US energy are profound: energy policy may now concentrate on economic and climate priorities, rather than security. 'Energy security' is no longer a strong argument for leasing environmentally sensitive acreage for new oil and gas drilling. This will affect companies that have focused their future plans on such areas offshore, in wilderness areas and in the Arctic.

John Mitchell is an Associate Fellow of the Energy, Environment and Resources Department at Chatham House. He acknowledges the helpful comments by Christopher Allsopp, Guy Caruso, James Jensen, Robert Skinner and Philip Verleger on the substance of draft texts. The conclusions, errors and omissions are those of the author alone. Charles Emmerson helped draft the final version of this paper, which was edited by Joanne Maher, and production was overseen by Margaret May.

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