

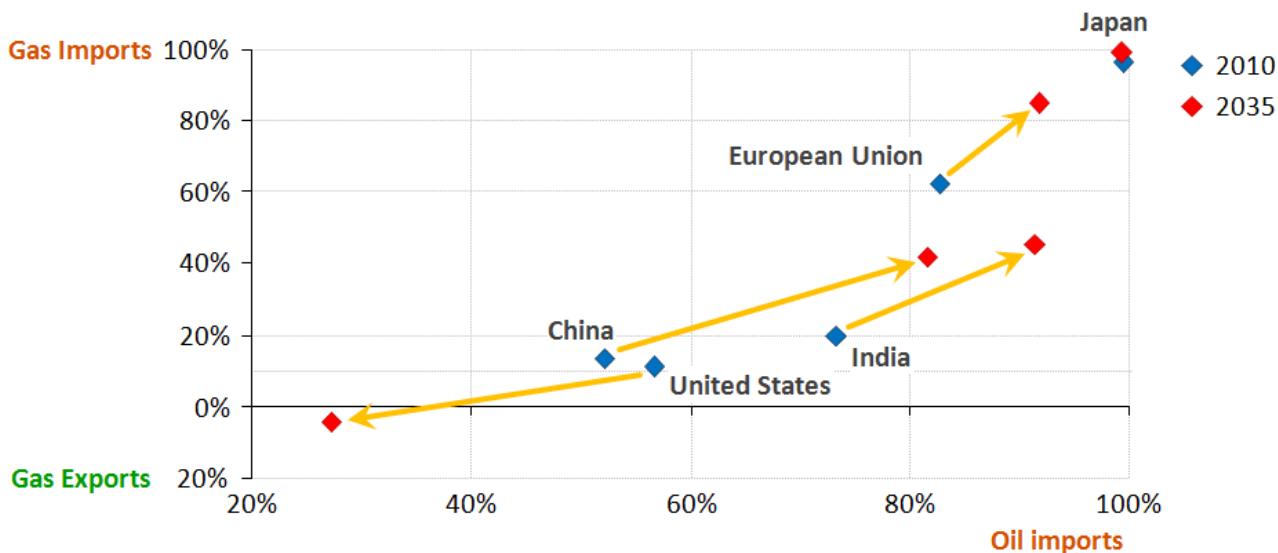


Emerging bilateral oil and gas relationships

Key judgements:

- **China and India are likely to be the key centres of oil and gas import growth over the next two decades.** Figure 1 shows expected changes in the balance of energy import dependencies. Between now and 2035, Chinese imports are forecast to account for 50% of the global increase in oil demand and 40% of the rise in inter-regional gas trade. While the total demand of some developed regions, such as the EU, is likely to stagnate or decrease, import dependency will remain substantial or increase, due to falling domestic production. Growth in US domestic tight oil and shale gas production is leading to a decrease in imports as North America becomes an energy island.

Figure 1: Net oil and gas import dependency in selected countries



Source: IEA WEO 2012

- **Shifting energy import dependencies are creating a new set of bilateral relationships, which have wide-reaching implications beyond just energy markets** (see figures 2 and 3). In many cases a country's energy interests will increasingly influence their foreign policy positions and relations. In addition to having implications for the functioning of global energy markets, this will affect the UK's commercial and foreign interests.
- **Energy consumers are directing their diplomatic efforts to establish new relationships with emerging energy producers.** This trend has lead to new pipelines (e.g. Turkmenistan) and LNG export plants (e.g. Australia) alongside increased exploration in emerging producers (e.g. East Africa) following enhanced engagement from China and India. Additionally, diversified supply options have dampened the negative economic impact from the withdrawal of Iran oil exports due to international sanctions.
- **Energy consumers are also looking to guarantee consistent supply by deepening existing relationships through two-way investment and loans.** These countries are using a range of diplomatic tools to increase bilateral engagement, e.g. strategic partnerships and dialogue, to secure supply. Additionally,

Chinese and, to a lesser extent, Indian companies are directing their investment across oil and gas fields, refineries and pipelines. For example, Saudi Aramco has a stake in a US\$5bn refinery in Fujian, while Sinopec is investing in a US\$8.5bn refinery on the Red Sea companies. Furthermore, China has provided loans in return for access to resources, including US\$39bn to Venezuela.

- **The geographical proximity of China and India means they will often look to the same exporters to invest in and import from**, and for the majority of cases resources are plentiful enough to meet demand, for example gas from Turkmenistan. While battles for assets matter commercially for the companies involved, their outcome has only a low impact on the countries' energy security as the oil produced is mostly sold on the global market. Therefore there is a strong shared interest in bringing more supplies onto the market and ensuring secure shipping.
- **Shifting trade patterns could lead to an increase in shipping miles and greater volumes transported through key chokepoints, which could make oil and LNG shipping more vulnerable to disruptions.** For example, the IEA forecast 50% and 45% of the world's inter-regional oil trade to pass through the Straits of Hormuz and Strait of Malacca respectively in 2035.
- **Emerging markets are becoming more involved in energy governance.** As more marginal sources of supply are being developed, including in riskier environments, the threat of supply disruptions and consequent price impacts has increased.
- **Russia is likely to increasingly diversify its oil and gas exports towards Asia, especially China, although EU-Russia interdependency looks set to continue.** Russia and China recently signed a US\$270bn deal to double oil exports. Meanwhile, decade-long negotiations over a similar deal for gas, which could make China Russia's single biggest customer, are still ongoing. This shift could leave less Russian oil and gas to go to Europe, which would need to import from elsewhere. However, Russia-EU gas trade in particular will remain substantial.

Figure 2: Summary of bilateral oil relationships covered in this paper

Importer	Total imports (mb/d)		Import dependency ¹		Exporter	Share of imports (2011)	Trend
	2011	2035	2011	2035			
China	4.9	12.3	54%	82%	Saudi Arabia	19.8%	Broadening with two-way investment
					Angola	12.3%	Short-term increase then plateau
					Russia	7.78%	Sharp increase following \$270bn deal
					Iraq	5.44%	Production growth enables increase
					Venezuela	4.53%	Short-term growth then uncertainty
					Kazakhstan	4.41%	Rising pipeline supply and investment
					Burma	-	New transit corridor to open in 2014
India	2.5	6.9	74%	92%	Saudi Arabia	18.9%	'Strategic energy partnership'
					Iraq	14.0%	Deepening dialogue, increasing trade
					Nigeria	8.2%	India becoming largest export partner
					Venezuela	5.6%	Rising quickly, future uncertainty
EU	9.9	8.0	85%	92%	-	-	Increasing import dependence
Japan	4.2	3.0	98%	97%	-	-	Continued import dependence
US	9.5	3.4	54%	27%	-	-	Greater self-sufficiency, imports to come mainly from Americas

¹ The import dependence rate, defined as net imports divided by gross consumption, shows the extent to which a country is dependent on imports for a particular commodity.

Figure 3: Summary of bilateral gas relationships covered in this paper

Importer	Total imports (bcm/year)		Import dependency		Exporter	Share of imports (2012)	Trend
	2010	2035	2010	2035			
China	15	226	14%	42%	Turkmenistan	51.4%	Substantial long-term pipeline supply
					Qatar	16.4%	One of top two LNG suppliers
					Australia	11.6%	New LNG plants allow increased trade
					Russia	1.2%	Steep increase if price agreed
					Burma	-	New transit corridor constructed
					Tanzania and Mozambique	-	Investment indicates strong interest in future supply, from 2020
India	12	81	19%	46%	Qatar	78.5%	Main long-term LNG supplier
					Australia	-	Potential for large increase
					Turkmenistan	-	Substantial increase if/when TAPI pipeline constructed (2018 or later)
					Tanzania and Mozambique	-	Indian companies actively securing access, supply from 2020
					US	0.4%	More LNG export contracts
EU	265	454	49%	73%	Russia	31.8%*	Interdependence continues but could be mitigated by diversifying supply
					US and Canada	-	LNG exports could be significant
					Algeria	14.4%*	Important to southern Europe
					Qatar	8.6%*	Could lose out to emerging markets
					Azerbaijan	-	Alternative pipeline supply via Southern Gas Corridor from 2019
Japan	100	123	96%	100%	-	-	Heavily dependent on LNG
US	76	-34	11%	-4%	-	-	Increased domestic production allows net exports

* EU import share figures for 2010.

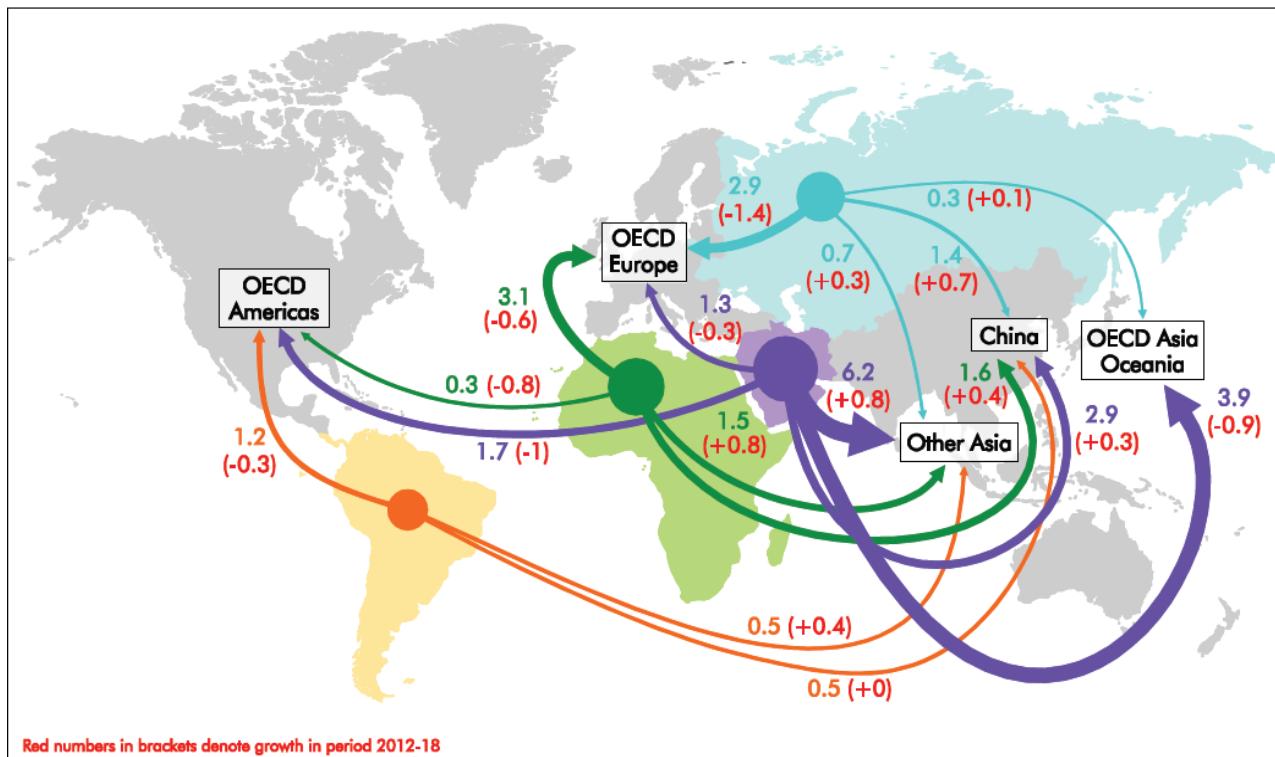
Sources: IEA, EIA, Indian government data, BP Statistical Review 2013, Eurostat

Background

Oil: Trends in supply and demand

- IEA forecasts suggest that global oil production is likely to be able to meet demand to 2035, due to applications of new technology. According to IEA projections, increased oil production in the Americas (US, Canada and Brazil) as well as Iraq and Kazakhstan is likely to ensure that global supply is sufficient to meet demand over the next 20 years, increasing from 86.6 mb/d (million barrels per day) in 2011 to 99.7 mb/d in 2035. With a comfortable outlook for supply, shifts in demand, particularly to emerging economies will become an increasingly important element of oil market dynamics. While OECD demand for oil is forecast to decrease by 8.8 mb/d to 2035, Asian demand grows by 12.6 mb/d alongside smaller rises in the Middle East, Africa and Latin America.

Figure 4: Crude exports in 2018 and growth over 2012-18 for key trade routes (mb/d)



Source: IEA Medium Term Oil Market Report May 2013

2. **Trading relationships between exporters and emerging consumers are likely to become more important.** Figure 4 shows IEA projections suggesting that, while oil imports into OECD Europe, the Americas and Asia Oceania are likely to decrease to 2018, China and the rest of developing Asia are expected to import more. Oil trade flows from Middle East and Russia to OECD countries will remain important despite substantial falls. Nonetheless, oil trade dependencies will increasingly involve countries like China and India, rather than the US, which is likely to rely on domestic production and imports from elsewhere in the Americas.

Oil: Important relationships

3. **China:**

China's energy security is becoming increasingly important for the country's prosperity. Used to being energy self-sufficient, China now finds itself in the position of relying on imports. The IEA expect Chinese import dependency for oil to rise to 82% by 2035, up from 54% in 2011.

Saudi Arabia: Saudi Arabia is China's most important supplier and the countries now engage in two-way investment. Saudi Arabia is the biggest supplier of oil to China, accounting for 20% of total crude imports in 2011 with over 1 mb/d. Oil exports doubled between 2006 and 2011 and the relationship is broadening into refining, with two-way investment. Sinopec is building a major oil refinery on the Red Sea at Yanbu with Saudi Aramco, which is expected to be able to process 400 kb/d (thousand barrels per day) by 2014, while Saudi Aramco owns a refinery in Qingdao province.

- a) **Angola: Trade is likely to increase in the short term but plateau in the medium term due to production constraints.** Angola is the second largest supplier of oil to China, accounting for 12% of imports in 2011. Bilateral trade in oil is increasing as US demand for Angolan oil decreases and China imports less from Iran, a trend likely to continue in the short term. Chinese companies are active and Sinopec recently paid US\$1.5bn for an offshore field. However, potential for growth could be limited as the IEA expect Angolan production to remain steady to 2035.

- b) **Russia: Recent deals suggest Russia is likely to diversify its oil exports towards China.** In June 2013, Russian oil giant, Rosneft, agreed to more than double its exports to China in a deal worth US\$270bn over 25 years. There is a good chance this could be achieved, given the success in increasing trade from a trickle in 2010 to almost 500 kb/d by mid-2013. In addition, the Chinese are engaged in developing reserves in East Siberia and state owned oil companies have indicated that they would be interested in acquiring a share of blocks in both Siberia and the Arctic.
- c) **Iraq: Iraq will be in an increasingly strong position to contribute to China's import needs as production increases.** Iraq is currently a relatively small supplier to China, with 310 kb/d in 2012, but recent increases are replacing imports from Iran. By 2035, the IEA projects that Iraq will produce more than 8 mb/d, and a quarter of that could be exported to China. Chinese companies have invested heavily in the country. CNPC has been awarded the contract to develop the al-Ahdab field and is also involved in projects to develop the Halfaya and Rumailah fields (with BP). According to BP, the Ramailah site produces £1bn of supply chain trade for the UK aside from the oil itself
- d) **Venezuela: China's trade with Venezuela, backed up by investment and loans, is likely to continue to rise for now but future production growth is uncertain.** Chinese imports from Venezuela have grown from very little in 2005 to 10% of total oil imports today. Venezuela recently secured an extra US\$4bn of credit from China for oil field development to add to the US\$35bn already provided, to be paid back through oil exports. Growing ties are also reflected in Chinese investment such as CNPC's 40% stake in the 400 kb/d Junin-4 project. The IEA expect oil production to rise by only 200 kb/d by 2025. If accurate, this would potentially limit the potential for trade growth, though, if the Venezuelan government is able to deliver planned new investment, production increases would be substantially higher than that figure.
- e) **Kazakhstan: Kazakhstan is likely to increase its supplies via pipeline, especially as China invests in the giant Kashagan field.** In 2011, Kazakhstan was China's ninth biggest supplier with 224 kb/d. The countries have recently agreed to expand oil cooperation, agreeing to increase the capacity of the China-Kazakhstan oil pipeline to 400 kb/d by 2014 and extend it to reach large oil fields in the Caspian. Reports suggest CNPC is likely to purchase an 8.4% stake in the Kashagan field, securing the agreement ahead of a rival bid from Indian company ONGC after intervention by the government of Kazakhstan.
- f) **Burma: The Shwe transit pipeline from the west coast of Burma to China will allow oil to bypass the Strait of Malacca, reducing pressure on the chokepoint.** Currently 80% of China's oil imports come through the Malacca Strait. This dependence on the strait could be reduced by 30% by the Shwe oil pipeline, which has the capacity of supply 440 kb/d, and is set to open at the end of the year.

4. **India:**

India currently depends heavily on Middle East countries for oil but is now looking to diversify its supply. Oil imports accounted for 75% of demand in 2012 (90% of India's trade deficit) and the IEA project imports to rise from 2.5 mb/d in 2011 to 6.9 mb/d in 2030. In 2012, 61% of India crude came from the Middle East, but recently India has seized on reduced US imports from Latin America and West Africa to diversify its supplies, while decreasing imports from Iran due to sanctions pressure.

- a) **Saudi Arabia: India and Saudi Arabia are making a concerted push to increase oil trade alongside deepening diplomatic links.** Saudi Arabia is India's largest supplier with 19% of imports in 2012 and trade is currently increasing as India looks to make up for the loss of supplies from Iran. This change is part of a wider trend towards closer relations initiated in 2006, when King Abdullah became the first Saudi head of state to visit India. Both countries are working to broaden their seller-buyer relationship into a 'strategic energy partnership' which could include a 30-year oil supply contract.
- b) **Iraq: Deepening dialogue, including a joint commission on energy, is likely to underpin increasing trade and investment flows between Iraq and India.** Iraq is now the second largest oil supplier to India,

overtaking Iran in 2012, while India was the joint top destination for Iraqi crude, alongside the US with 19% each. A bilateral commission looking at expanding cooperation in the energy sector recently discussed proposals for cooperation including knowledge sharing and Indian participation in refinery and petrochemical plant construction. Iraq's foreign Minister has encouraged Indian companies to invest in infrastructure and Jindal SAW has won a US\$198m contract to build a factory for manufacturing pipelines in Southern Iraq.

- c) **Nigeria: India is overtaking the US as Nigeria's most important export market.** US imports of Nigerian oil have decreased 63% in five years to 405 kb/d in 2012, but this has been partly offset by demand from India, which has increased rapidly over the past year. India imported 17% of Nigeria's oil in May 2013, up from 12% in 2011.
- d) **Venezuela: Venezuelan exports to India are increasing quickly as they are diverted away from the US market.** Indian imports from Venezuela have increased threefold since 2011. Indian company Reliance has signed a 15-year deal for 300-400 kb/d of oil, although it depends on production targets being met.

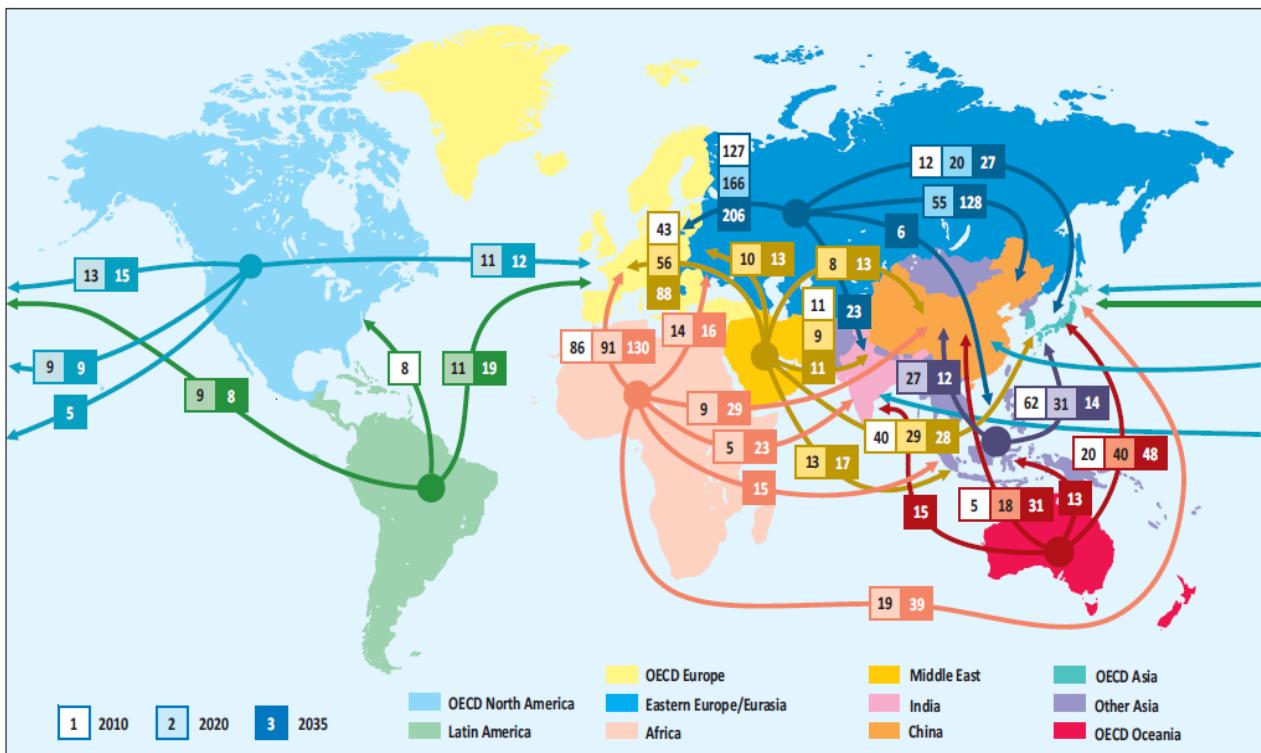
5. **European Union:**

The EU's dependency on imports is likely to increase, as production falls faster than demand. The IEA expect the EU's oil import dependency to increase by 2035 despite a decrease in demand over the period from 11.6 mb/d to 8.7 mb/d. 34.5% of Europe's oil came from Russia in 2010, but as exports have been oriented towards Asia, it has led to gradual price increases for European consumers, particularly in the Baltic. Future imports are likely to come from a range of established and emerging producers.

Natural gas: Trends in supply and demand

- 6. **Rapid production growth in a number of countries is forecast to meet rising global demand, as liquefied natural gas (LNG) trade increases.** Gas supply is expected to increase in a diverse range of countries, with high production growth in the US, Russia, China, Qatar and Australia among others. The IEA forecast global demand to increase from 3284 bcm (billion cubic metres per year) in 2010 to 4955 bcm in 2035. While gas demand is forecast to increase in every region, 79% of growth to 2035 is expected to come from non-OECD countries. LNG trade is likely to double to 575 bcm by 2035 according to the IEA, while the share of inter-regional gas trade via pipeline is set to drop from 58% to 50%. In the second half of this decade, new LNG export facilities could create a buyers' market as exporters battle for market share, though there is uncertainty over the construction of some LNG plants as costs escalate.
- 7. **Gas trade is expected to increase almost everywhere, particularly into China, India and Europe.** Imports are expected to account for a greater proportion of gas supply in many countries; the IEA expect dependence on imported gas to increase between 2010 and 2035 from 14% to 41% in China; 19% to 46% in India; and 47% to 68% in Europe. In contrast, some regions, such as North and South America are expected to become net exporters while exports from Russia, Australia and Africa increase (see figure 5).

figure 5: Net inter-regional natural gas trade flows between major regions (bcm/year)



Source: IEA WEO 2012

Natural gas: Important relationships

8. China:

China is likely to massively increase imports more via both pipelines and LNG and become the world's second-largest importer, after Europe. According to IEA forecasts, Chinese imports will grow from 15 bcm in 2010 to 226 bcm in 2035, accounting for 40% of the rise in global inter-regional gas trade. LNG imports from Qatar, Australia and East Africa are set to supplement cheaper pipeline supply from Turkmenistan and possibly Russia. By 2015, China is expected to have fourteen LNG import terminals sufficient to import more than 40 bcm. Chinese LNG demand growth could be an opportunity for UK companies - BG have now become the biggest supplier of LNG to China

- Turkmenistan:** Turkmen gas currently accounts for the majority of China's pipeline gas imports and, with more investment likely, this could guarantee a long-term supply of energy to China. TurkmenGas are supplying around 20-25 bcm to China through the China-Central Asia pipeline, a figure which could rise to 65 bcm by 2020. Two branches of a natural gas pipeline via Kazakhstan are already in operation, a third is under construction and discussions around building a fourth are underway. Statements from both sides support the establishment of a long-term strategic energy partnership.
- Qatar:** Qatar is likely to remain one of the top two suppliers of LNG. Qatar overtook Australia as China's largest LNG supplier in 2012. China has an investment presence in Qatar; CNPC is working with Shell to explore for and produce gas in the North, while Cnooc has a separate 25-year agreement to search for gas.
- Australia:** Australia is a major supplier of LNG and trade is likely to expand further as more LNG export plants are built. According to a deal signed in 2009, Exxon will supply US\$41bn worth of LNG over 20 years from the large Gorgon LNG project, possibly from 2015. The IEA forecast Chinese LNG exports from Australia could rise to 18 bcm by 2020, accounting for 14% of net imports. However, there is uncertainty around the construction of some planned LNG plants given cost escalations.
- Russia:** Negotiations for a Russia-China gas deal have continued for more than a decade but progress has accelerated over the last year. In March 2013 a memorandum of understanding was signed to supply 38 bcm from Russia's East Siberian fields for 30 years from 2018, which would make China Russia's biggest

customer, although smaller than the EU as a bloc. However, a complete deal including an agreement on price is yet to be signed. A second, 30 bcm pipeline linking west Siberia and western China is also being discussed.

- e) **Burma: A new gas pipeline, parallel to the oil pipeline, has started to carry gas produced in Burma to southern China.** The Shwe pipeline project link from Burma, constructed by CNPC with a capacity of 12 bcm, has begun operations. , though trade could increase substantially in future as Burma opens up to foreign investment and offshore gas fields are developed.
- f) **Tanzania and Mozambique: Investment by Chinese companies signals strong interest in future supply.** East African countries potentially have the same size gas resource as Australia with up to 7 tcm in total. In an indication of this interest, in early 2013 CNPC agreed to buy a 20% stake in a block off the coast of Mozambique for US\$4.2bn. However, LNG is not expected to come online until 2020.

9. **India:**

India increasingly relies on imported LNG for its gas needs and this trend is likely to continue despite new pipelines. Indian gas production is falling, while demand is expected to increase by 178% between 2010 and 2035, meaning import dependence will rise substantially. India is planning more than double its current 25 bcm LNG import capacity to 61 bcm by 2018.

- a) **Qatar: Qatar is India's main long-term supplier of LNG and new deals will increase trade further pending agreement on price.** The countries have two contracts for a total of 10.1 bcm and India is also active on the spot market for immediate delivery of shipments from Qatar.
- b) **Australia: India's supply from Australia is currently relatively small but there is potential for more.** India has a contract for 2 bcm of LNG annually from the Gorgon Project in western Australia for 20 years. The IEA project gas trade to increase to 15 bcm by 2035.
- c) **Turkmenistan: A major pipeline could become operational in 2018 and boost imports, although it is likely to be delayed.** The proposed TAPI (Turkmenistan, Afghanistan, Pakistan, India) pipeline could have a capacity of up to 33 bcm, with India receiving 14 bcm. Discussions have been ongoing for a decade but major geopolitical risks, particularly instability in Afghanistan, and technical challenges have prevented the project, which could cost US\$10-12bn, from starting properly.
- d) **Tanzania and Mozambique: Mozambique and Tanzania are in a prime location to export to India and Indian companies are actively securing access.** For example, ONGC and OINL are currently negotiating a deal to pay US\$2.5bn around the end of 2013 for a stake in a natural gas field off Mozambique.
- e) **US: India is keen to secure further export contracts for LNG exports from the US.** The Indian Ambassador to the US wrote an op-ed in the Wall Street Journal in April urging the US to approve LNG exports to India. Indian company GAIL already has a contract for LNG from Cheniere Energy's Sabine Pass terminal for 4.8 bcm from 2017-18, and also has a stake in the Cove Point terminal.

10. **EU:**

The EU will continue to depend on some established relationships, while also trying to diversify to emerging suppliers. EU imports are expected to increase from 302 bcm in 2010 to 525 bcm in 2035 but will still be less attractive than faster growing markets in Asia which offer higher prices. The EU will mainly depend on established relationships, especially with Russia and the Middle East. However, Europe's import channels have become more diversified as it trades with other exporters including, in the medium to long term, the US.

- a) **Russia: EU dependence on Russian gas remains important** Russia has been the EU's primary gas supplier for decades, and, although imports fell 12% in 2012 due to decreasing demand and a switch to Norwegian gas, this could reverse as Gazprom provides greater price flexibility. In the long term, this is

likely to remain one of the biggest gas trading relationships, though pipeline and LNG supply from other exporters could reduce Russia's share of the EU market. In addition, potentially lower European gas prices relative to China means current levels of Russian supply into Europe may be diverted to China, although Russia's geographic size means that supply to China and Europe will often come from different reserves.

- b) **US and Canada: Uncertainty remains about the scale and destination of US LNG exports but they could be significant to the EU gas market.** North American LNG exports to OECD Europe could reach 11 bcm by 2020 (see Figure 5) but the magnitude is uncertain due to the slow process of export permit approval. There is strong interest in LNG import deals; Exxon and Qatar Petroleum have already agreed a deal to import LNG from Texas to south Wales, although the exports still require US government approval.
- c) **Algeria: Algeria is likely to remain an important supplier to southern Europe through both LNG and pipelines.** Algeria is currently the third-largest supplier of gas to the EU with 9 bcm. State-run company Sonatrach supplies gas to Europe via three pipelines to Spain and Italy and aims to expand LNG export capacity.
- d) **Qatar: LNG from Qatar is likely to be an important source of gas for the EU, although the gas exporter may orient itself towards emerging markets, where prices are higher.** Qatar currently has the largest LNG export capacity, with 105 bcm, but this is increasingly committed through sales and purchase agreements (SPAs), mainly to Asia Pacific and South America. The proportion of capacity accounted for by SPA contracts is expected to rise from 73% in 2012 to 84% in 2014, and while some SPAs are with EU countries, this will leave less gas to be bought on the spot market for immediate shipping to Europe.
- e) **Azerbaijan: The Southern Gas Corridor, to run from Azerbaijan to Europe will provide alternative pipeline supply to Eastern and Southern Europe.** The Trans-Anatolian Pipeline (TANAP) across Turkey will connect with the Trans-Adriatic-Pipeline (TAP) via Greece and Albania to Italy initially carrying 10 bcm from around 2019.

11. Japan

Japan is heavily dependent on the global LNG market and is keen to sign new contracts and create an Asian trading hub. Japan is the world's leading importer of LNG, with 117 bcm in 2011. Import dependence weighs down Japan's economy; especially with increased demand after nuclear plants were shut down in 2011 and prices eight times those in the US. Imports currently come from diverse sources and Japan is keen to take advantage of new LNG supply. The Japanese government has been very active recently, seeking LNG exports from new facilities in the US and Russia. Japanese companies hope to import a combined total of 41 bcm from US projects from 2017. A major medium term goal is an Asia trading hub allowing Japan and other regional consumers to buy gas based on prices determined by Asian market fundamentals.

Vulnerabilities due to shifting trade

12. Transit:

Increasing shipping distances for oil and gas bound for China and India means greater vulnerability to piracy and a possible shift in who patrols shipping lanes. Oil tonne-miles increased by almost 10% in 2012, according to Icap, due to more oil and gas having to travel further to Asian markets, for example from west Africa.

Chokepoints:

Existing chokepoints are likely to become more important but there are schemes underway to reduce reliance on these routes. Changing trade flows are increasing the proportion of the world's oil and gas going through chokepoints – narrow routes that can cause congestion where a blockage, even temporarily, can lead to substantial increases in total cost. In addition, chokepoints leave oil tankers

vulnerable to theft from pirates, terrorist attacks and political unrest as well as shipping accidents. 25 mb/d of oil is projected to flow through the **Straits of Hormuz** in 2035, maintaining its position as the most important oil-shipping route. Two new pipelines have recently been commissioned to reduce reliance on the Straits: a 2 mb/d pipeline across Saudi Arabia to Yanbu on the Red Sea, and a 1.5 mb/d pipeline in the UAE to the Port of Fujairah on the Indian Ocean. There is also growing demand on the **Strait of Malacca**, which is only 1.7 miles wide at its narrowest point. The Shwe pipeline from Burma to Western China is one attempt to bypass this particular choke point. Although it does not account for such a large share of trade, threats to the **Suez Canal** are still taken seriously by oil markets, with recent unrest in Egypt leading to a rise in the price of oil. Pressure on chokepoints could also be eased by the gradual opening of the northern sea route to LNG tankers.