Research Paper

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Energy, Environment and Resources | June 2015

# Enhancing Engagement Between China and the EU on Resource Governance and Low-Carbon Development

E3G

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The Royal Institute of International Affairs

# Contents

# Summary


- China and the European Union (EU) are the world's largest importers of natural resources. They will rely on imports for 80 per cent of their oil supply by 2030, mainly from the Middle East and Russia. Chinese growth over the past decade has transformed global resource markets, driving up prices and raising fear about the impacts of resource scarcity and the environmental sustainability of production. Competition for resources such as Russian gas also makes EU sanctions against Russia less effective. The EU and China are also vulnerable to climate change, and both have experienced a rise in extreme weather events in recent years.
- The EU and China have recognized at the highest level that their future security and prosperity require effective responses to the linked challenges of resource security, environmental degradation and climate change. It was on this basis of common interests and growing economic interdependence that the 2007 report *Changing Climates*[1] – jointly published by Chatham House and E3G – suggested that cooperation between China and the EU should be deepened in a range of areas, including strategic and long-term clean energy research, development and demonstration; joint standard-setting; green trade; and investment liberalization. The aim was to make the EU–China economic relationship the *de facto* engine of global clean energy transformation.
- Progress has been slower than expected on some policy and cooperation recommendations made in *Changing Climates,* but clean energy market integration has accelerated. China's domestic reforms on clean energy have exceeded all expectations, driven by concerns about security, pollution and climate change. As recommended in *Changing Climates*, low-carbon zones have been established at several levels in China, covering 350 million people. Carbon-emission trading pilot projects have been established and supported by European technical assistance.
- Demand created by European renewable energy policies kick-started Chinese renewable energy industries and exports; and this has brought major reductions in global costs, especially for photovoltaics and light-emitting diodes. China has rapidly increased its domestic renewable energy targets and is now the world's largest national investor. Policy cooperation has grown by way of a suite of cooperative agreements in areas such as urbanization and energy security, as agreed at the 2012 EU–China Summit with the then vice-premier Li Keqiang.
- However, this progress on green economic reform and integration has not been reflected in the practical politics of EU–Chinese relations, which have ebbed and flowed considerably since 2007. The mutual benefits from the clean energy trade have been overshadowed by EU complaints about artificially low prices for Chinese exports of efficient light bulbs and rare-earth minerals and about solar power subsidies. China's position at the Copenhagen Climate Summit in 2009, and its aggressive opposition to the inclusion of aviation in the EU Emissions Trading System, has raised serious doubts among European policy-makers about its commitment


[1] B. Lee, A. Froggatt et al. (2007), *Changing Climates: Interdependencies on Energy and Climate Security for China and Europe*, Chatham House/E3G Report, November 2007.

to climate action. This rising distrust is one reason behind the enthusiasm of many of those policy-makers for the Transatlantic Trade and Investment Partnership agreement. They see a reinvigorated transatlantic partnership as a way to set *de facto* global norms and standards for Chinese exports and investors.

- At the same time, broader shifts in geopolitics after the 2008–09 financial crisis, and also changes in Chinese diplomatic priorities, have reduced the EU's importance to China. President Xi Jinping has given higher priority to China–US 'great power' relations and China's neighbourhood. He has downgraded the focus on multipolar multilateralism that made the EU a strategic priority in Beijing. The EU remains a vital economic partner for China, but its political relationships now focus on bilateral ties with Berlin and London and on stronger economic integration with eastern and southern Europe.
- A distrustful and less confident EU and a distracted China are a weak basis for rebuilding a productive EU–China relationship on climate change and resource scarcity. But the authors of this paper believe that the core analysis of mutual interest laid out in *Changing Climates* still holds and that China and the EU need to work together better in order to achieve their national objectives.
- China faces a daunting challenge in national economic reform and mass urbanization. Its current cities are wasteful, unsustainable and in many parts unliveable. The country faces huge costs in adapting to climate change, water scarcity and land degradation. If China carries on building the same type of infrastructure for the next 200–300 million urban inhabitants, it will lock itself into the middle-income trap. Europe, at its best, has technology and development models that China needs. And as it deepens its own domestic low-carbon and resource-efficient reforms, it remains the best partner for China to co-develop effective solutions in areas such as energy market regulation, electric mobility, clean finance markets and climate resilience.
- Europe and China still look to the US for global diplomatic leadership and security. But as US domestic energy production increases, Washington is less interested in supporting stability and security in resource-producing areas such as Africa, Central Asia and the Middle East. Europe and China need to work together better in order to protect their vital interests in these regions.
- Europe is already seeing weather extremes linked to climate change cause serious instability in its neighbourhood. To preserve European climate security, the EU needs China to commit itself to greater domestic decarbonization before 2030. Given China's high climate vulnerability, the necessary cuts are objectively in its domestic interest. However, it has traditionally been reluctant to move faster than the US on climate action, as shown by the 2014 joint US–China climate change pledge. If China maintains this implicit political linkage, the world is likely to exceed the agreed 2°C threshold because the US is far from having a domestic consensus on keeping climate risks below this level.
- Just as Europe reassesses its internal relations on key issues, such as the development of the Energy Union, Europe and China need to forge a new understanding of their relationship if they are to preserve their core interests. Relations with the EU cannot be treated as just an economic interest by China, and China's strategic relationship with the EU is even more important as it embarks on a peaceful transition to a middle-income economy. Its effort to build a coherent and cooperative international framework, including its ability to operate in global markets, depends in part on European views of its actions as well as its intention on issues

such as climate change. The EU cannot form an exclusive partnership with the US to attain its interests because its members' priorities are too divergent on energy security, clean technology, climate change and resource scarcity.

- A rebooted EU–China relationship must reflect post-financial crisis political realities and move beyond the multiplication of announcements that has characterized past summits. The European Commission has said that domestic EU policy should be 'bigger on big things and smaller on small things'. This principle should be applied to external relations too. China should help this adjustment of priorities by being clearer on those areas in which partnership with the EU can help to bolster and accelerate its domestic economic and market reforms. The EU and China must have a frank discussion about their expectations and objectives for the outcome of the UN Framework Convention on Climate Change (UNFCCC) negotiations in Paris in December 2015 and for the continued evolution of the broader international climate regime.
- A positive agenda for the EU–China Summit in 2015 would:
  - **Focus the EU–China relationship** with an agreement to concentrate collaboration on key existing partnerships: the Partnership on Urbanization; the Energy Security Dialogue; resource scarcity; energy market reform; and clean technology cooperation (Horizon 2020 etc.). Specifically, closer collaboration on energy security can elevate the relationship to a more strategic level.
  - **Deepen EU–China economic integration and reform through green growth** by sharing experience. A joint working group could create a domestic investment environment conducive to green growth. Agreement on a list of bilateral initiatives (see Table 2) could accelerate the creation of green growth areas in both the EU and China.
  - **Work towards a strong climate change regime** by way of an agreement on core elements for the climate change negotiations in Paris in 2015, and the establishment of an EU–China working group on climate change governance. Such a group could look at the role of the UNFCCC, international development institutions (including the New Development Bank), the G20, disaster responses etc.

# Introduction

Cooperation between the European Union (EU) and China on energy and climate change has strengthened significantly over the past decade. However, the development of formal processes of cooperation has been outpaced by increased EU–China trade in low-carbon goods, driven by domestic policies and, for a number of years, by higher global oil prices. Increased trade and investment has benefited both sides by depressing prices, increasing energy security, creating export opportunities and accelerating the development of new technologies. But it has also brought trade tensions and concerns about fair competition.

The growing global appetite for natural resources is presenting unprecedented challenges to future economic security, especially for major consumers such as China and the EU. Global consumption of coal, palm oil and iron ore grew by between 5 per cent and 10 per cent per annum between 2000 and 2010, during which the consumption of oil, copper, wheat and rice increased by 2 per cent annually. Also, many producers have found it difficult to boost output owing to long lead times, declining ore grades and growing competition for water and land. Price volatility has emerged as a major threat to the economic security of import-dependent countries.

> Climate change is likely to put additional stresses on water and land resources, thereby destabilizing already stretched production systems, especially agriculture but also fossil fuel production and mining.

The challenges of environmental sustainability and resource insecurity are mutually reinforcing. They are creating new geopolitical tensions and conflicts that neither China nor the EU can afford to ignore. Climate change is likely to put additional stresses on water and land resources, thereby destabilizing already stretched production systems, especially agriculture but also fossil fuel production and mining. These factors in turn have complex knock-on effects on global food security, trade and diplomatic relations, e.g. over export bans and land-grabbing, and they aggravate the destabilization of geopolitically important regions such as South Asia, Central Asia and the Middle East. The United Arab Emirates, as a case in point, has warned that the already unstable Middle East could face acute water shortages as early as 2025.[2]

The events in Crimea since early 2014 have renewed the emphasis on energy security within the broader EU energy debate. Russia supplies approximately 30 per cent of the EU's gas, of which half is transported through Ukraine. The May 2014 European Commission communiqué on a 'European Energy Security Strategy' sets out proposals for actions to limit major disruption in the short term, alongside a set of longer-term proposals related to demand management, infrastructure, technology, supply diversification and country coordination.[3]

[2] Government of the United Arab Emirates (2011), *Food Security and Water: G20 White Paper*. Available at www.uaeg20.ae/usr/pages/en/Food%20and%20Water%20Security%20policy.pdf.
[3] European Commission (2014), 'Communication from the Commission to the European Parliament and the Council, European Energy Security Strategy', COM/2014/0330 Final, 28 May 2014.

Developments in Ukraine have also changed the political dynamic between Russia and China regarding the supply of natural gas. In May 2014, after years of negotiations, Russia's Gazprom and the China National Petroleum Corporation finally completed a deal for the supply of gas to China. The $400 billion deal is said to initially provide for the supply of 38 billion cubic metres per year (bcm/y) of gas by pipeline to China. This is equivalent to about one-fifth of the volume of gas now exported via pipelines from Russia and is equivalent to a quarter of current Chinese consumption. Thus the arrangement not only is important in terms of the quantities but also could pave the way for additional pipelines and the further opening of the Asian market to Russia.

Against this backdrop, it is critical for China and the EU, both major consumers that are projected to stay import-dependent for the coming decades, to examine the sustainability of high carbon import dependence as well as global resource insecurity and competition. In 2007 the report *Changing Climates* argued that together, China and the EU could become the *de facto* engine of the transformation of the global energy regime.[4] The two sides were economically entwined and also had similar, and similarly ambitious, policies to improve energy security by using energy more efficiently and setting targets for renewables. Both needed to manage the impacts of climate change, notably water stress, shifting agricultural zones and extreme weather. The EU and China's combined economic resources could, it was argued, yield unprecedented opportunities to find new benefits of scale and advance low-carbon innovation.

Despite the imperative for closer collaboration on energy and climate change, EU–Chinese relations have ebbed and flowed much since 2007. Progress has been slower than expected on many of the recommendations made in *Changing Climates*, including setting world-class standards for energy efficiency and increasing cooperation on technology. This has been due in part to EU concerns over trade and competitiveness, which have dogged efforts to scale up collaboration. Specific EU complaints have arisen about Chinese export restrictions, discriminatory internal taxation, technical regulations and the uneven playing field that China offers foreign companies, especially in the services sector.[5]

Trade spats also continue to strain relations: the latest ones involve disputes over solar panels, rare-earth minerals and Chinese subsidies on high-tech exports. Other *Changing Climates* proposals, among them the development of low-carbon economic zones and a low-carbon investment regime, have been more successful. The area seeing the most impressive growth has been cooperation in the renewable energy sector, thanks to the rapid escalation in the use of wind and solar power in China and the EU.

For the future, the twin imperatives of environmental sustainability and resource security demand a new phase of EU–Chinese cooperation on energy and climate security. The 16th EU–China Summit in November 2013 and the subsequent EU–China High-Level Meeting in March 2014 strongly reaffirmed the EU–China strategic partnership, reiterated the two sides' commitment to significantly cut greenhouse gas (GHG) emissions and emphasized the need in meeting that commitment to advance an ambitious legal instrument for adoption in December 2015 at the Paris Conference of Parties. The High-Level Meeting was particularly important because it was the first visit by a Chinese president to the EU and thus marked a clear strengthening of bilateral ties. Both parties used the occasion to reiterate the importance of presenting 'intended nationally determined contributions'

[4] B. Lee, A. Froggatt et al. (2007), *Changing Climates: Interdependencies on Energy and Climate Security for China and Europe*, Chatham House/E3G Report, November 2007.
[5] See, for example, European Commission (2014), 'Global trade increasingly obstructed, EU Report says', press release, 17 November. Available at http://europa.eu/rapid/press-release_IP-14-1683_en.htm.

well ahead of Paris 2015 and agreed to cooperate 'on taking domestic action to avoid or reduce the consumption of HFCs [hydrofluorocarbons] and to work together to promote a global phase-down of these substances'.[6]

China's urbanization over the past three decades has been unprecedented in scale: an estimated 260 million migrants have moved to cities from rural areas.[7] The UN estimates that by 2050 an additional 292 million people will have moved into urban areas.[8] These trends have distinct impacts on resource consumption, both in the construction of infrastructure and in its use. It is recognized that in China, the type of infrastructure that is created will be the defining factor for future resource consumption patterns; and in the EU, the renewal of infrastructure offers a similarly important opportunity for changes in direction. Furthermore, participation by EU member states in the Asian Infrastructure Investment Bank (AIIB) presents new opportunities for Europe and China to jointly promote more sustainable and resource-efficient development throughout Asia.

China and the EU share challenges related to energy security and climate change, in particular the imperative of balancing policies designed to meet rising demand for energy with those conducive to meeting present and future emission-reduction targets. Achieving security of supply will be complicated by rising import dependence: imported oil is forecast to account for 80 per cent of the total oil supply in China and the EU by 2030. This will increase the onus on their foreign policy to promote political stability in resource-exporting countries.

In a speech in Brussels in January 2015, Yang Yanyi, head of the Chinese mission to the EU, said that the EU and China will discuss 'coordination on major international issues and global governance, including climate change, efforts to formulate and implement the post-2015 development agenda and sustainable development goals'.[9]

With climate scientists reaffirming the urgency of climate action in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)[10], governments of major economies are likely to face renewed pressure to take a more ambitious line on climate change. This will require unprecedented media coverage, advocacy by NGOs and the political attention of heads of state. Even then, it may not provide enough momentum to enable negotiators to overcome the political barriers to comprehensive climate action in Paris in 2015. Thus key parties must also take practical steps, through bilateral initiatives, to identify common ground and opportunities.

However, even the spate of extreme weather events in recent years has not yet resulted in more aggressive goals to reduce carbon emissions. In many countries, a business-as-usual approach would result in enormous costs: weather-related disasters, rising fossil fuel imports, costly energy subsidies, reduced competitiveness and lower qualities of water, land and air.[11] Insurance companies, pension funds and national security advisers are among those pushing for climate-smart policy and business practice.

[6] European Commission (2014), 'Joint Statement: Deepening the EU–China Comprehensive Strategic Partnership for mutual benefit', 31 March. Available at http://europa.eu/rapid/press-release_STATEMENT-14-89_en.htm?locale=en.
[7] The World Bank and the Development Research Center of the State Council, the People's Republic of China (2014), *Urban China: Toward Efficient, Inclusive, and Sustainable Urbanization*. International Bank for Reconstruction and Development/The World Bank and the Development Research Center of the State Council, P. R. China.
[8] UNDESA (2014), *World Urbanization Prospects: The 2014 Revision*, United Nations Department of Economic and Social Affairs, 10 July.
[9] Mission of the People's Republic of China to the European Union (2015), 'Speech at the European Parliament on China–EU Relations by H.E. Ambassador Yang Yanyi, Head of the Chinese Mission to the EU', Brussels, 21 January. Available at www.chinamission.be/eng/mh/t1230950.htm.
[10] IPCC (2014), 'Summary for policymakers', in *Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, C. B. Field, V. R. Barros et al. (eds), Cambridge University Press, Cambridge, pp. 1–32.
[11] Ibid., p. 8.

The essential point is that economics will continue to dominate political discussions in major economies, among them China and the EU. With countries looking to export-led manufacturing to maintain growth in the short term, many opinion-makers are likely to consider climate policies solely through the prism of competitiveness. Heightened concerns over higher and volatile resource prices, rather than over environmental sustainability, will likewise dominate policy discussions.

In recent years, many EU–China collaborative projects have focused on technical aspects of low-carbon policy: how to scale up energy efficiency, to create joint technology energy-efficiency standards, to finance renewable energy and to manage intermittent power generation. Less attention has been focused on resolving the political and institutional barriers to a more ambitious climate agenda in EU–China cooperation. As has been seen in Germany and Japan after the Fukushima nuclear disaster, when political incentives change, the engineers will quickly be put to work. China, too, has shown that it is possible to roll out renewable energy at an impressive speed, but this was initially a response to concerns about energy security rather than climate change.

Critical barriers are often rooted in domestic challenges and politics. China is a case in point. The 12th Five-Year Plan (2011–15) contains a host of major reforms cutting across energy, finance, industry and city planning, and affecting all major commercial interests in the country. China has made mixed progress in implementing these reforms. Although there has been some success in making the transition away from carbon and in expanding the renewable energy sector, total energy consumption has accelerated at a rate that could surpass the 2015 target.[12] As with the 11th Five-Year Plan (2006–10), however, it is likely that progress has varied geographically and will accelerate towards the end of the 12th Five-Year Plan period.[13]

Discussions of China's 13th Five-Year Plan (2016–20) suggest that it will focus on increasing energy output, restructuring energy supply and accelerating the development of renewables. The Plan will at the very least double the 12th Five-Year Plan's target for total wind-power capacity, aiming to bring it to 200 gigawatts (GW) by 2020.[14] Solar power capacity is also set to increase, with deployment accelerating rapidly and exceeding targets; 10 GW was already deployed by 2014. The greatest difficulty will probably be in curtailing energy consumption, which is projected to reach 4.8 billion metric tonnes per annum of standard coal by 2020.[15]

> Notably for climate change, the perception that other countries are not doing enough, or are not providing the support they promised, is a particular barrier to more ambitious policies in developed and developing countries alike.

The scope and speed of the reform process is more likely to be shaped by priorities other than the assessment of climate needs alone. In any event, incentives for sustainable growth and low-carbon development need to be incorporated into the basic structure of the reform process. Such an approach can prevent short-term political interests from swamping long-term ambitions for managing climate change.

[12] China Greentech Initiative (2013), *The China Greentech Report 2013: China at a Crossroads*. Available at www.china-greentech.com/report.
[13] N. Aden (2014), 'China's "New Long March" through the UN Climate Summit: Context and Opportunities', World Resources Institute, 22 September. Available at http://www.wri.org/blog/2014/09/china%E2%80%99s-%E2%80%9Cnew-long-march%E2%80%9D-through-un-climate-summit-context-and-opportunities.
[14] China Climate Change Info-Net (2014), 'New 5-year plan to raise goals for renewables', 10 October. Available at http://en.ccchina.gov.cn/Detail.aspx?newsId=48754&TId=96.
[15] Idem.

But the domestic barriers to energy reform typically have important international implications too. Concerns about industrial competitiveness or the impact on specific industries all too often spill over into the formulation of climate and resource policies. Fears of resource scarcity can encourage governments to adopt beggar-thy-neighbour policies, often in reaction to short-term supply bottlenecks or to perceptions of scarcities rather than actual ones.[16] Notably for climate change, the perception that other countries are not doing enough, or are not providing the support they promised, is a particular barrier to more ambitious policies in developed and developing countries alike.

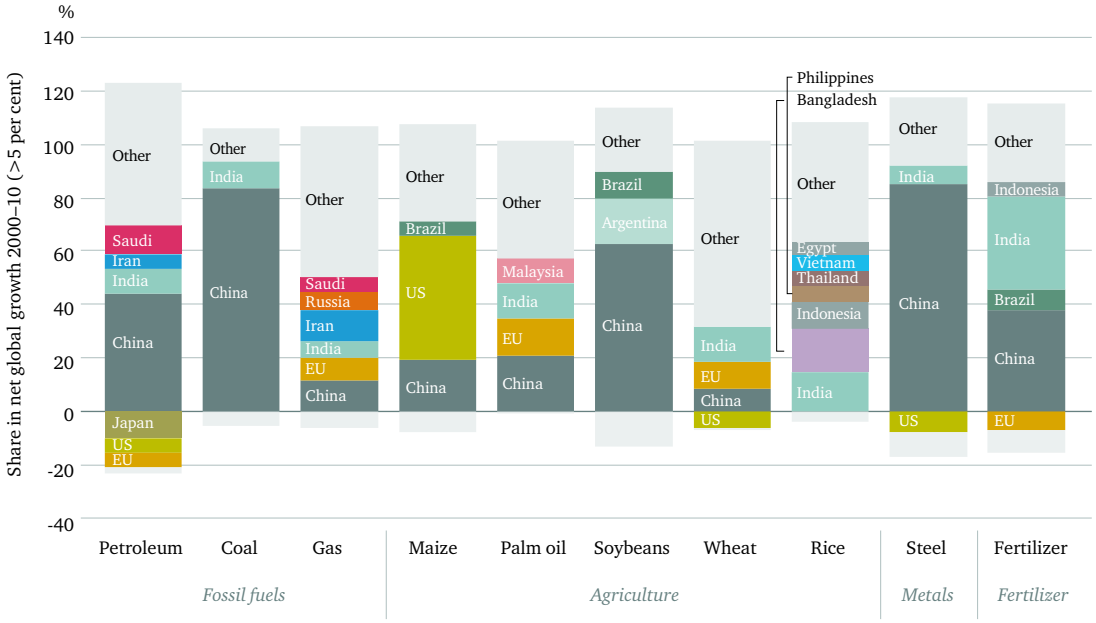
The focus of this paper is on the changing global resource landscape and how this has affected the EU–China resource and sustainability agenda since 2007. Section 2 shows how China's demand for resources has reconfigured global patterns of resource demand, production and consumption. It highlights the parallels between growing resource import dependence in the EU and in China, with a focus on new interdependences and competition. How these emerging resource challenges intersect with the impacts of climate change, and how these issues feed into the political, economic and social conditions for greater climate change ambitions, are addressed in sections 3 and 4 respectively. The recommendations outlined in Section 5 promote renewed China–EU cooperation and are intended to provide pathways that will accelerate green growth and progress towards low-carbon, resource-efficient and resilient economies.

[16] B. Lee, F. Preston, J. Kooroshy, R. Bailey and G. Lahn (2012), *Resources Futures*, Chatham House, December.

# China and the New Resource Landscape

China's demand for resources has reconfigured the political economy of global commodity markets. A decade ago, advanced economies accounted for nearly four-fifths of metal imports, more than two-thirds of agricultural imports and more than three-fifths of oil imports. Today, their share of imports has dropped to less than half for metals, less than three-fifths for agricultural goods and just over half for oil.[17] Much of this change stems from growth in emerging markets. As Figure 1 shows, China was responsible for major amounts of the growth in demand for coal (83 per cent), soybeans (63 per cent), petroleum (44 per cent) and maize and palm oil (20 per cent). Between 2000 and 2010, China emerged as the second-largest net importer of natural resources, closing the gap with the EU (see Figure 3). It is now the largest metals importer, buying more than the US, Japan, Germany and South Korea combined.[18]

**Figure 1: Share of global consumption growth by country, 2000–10 (>5 per cent)**



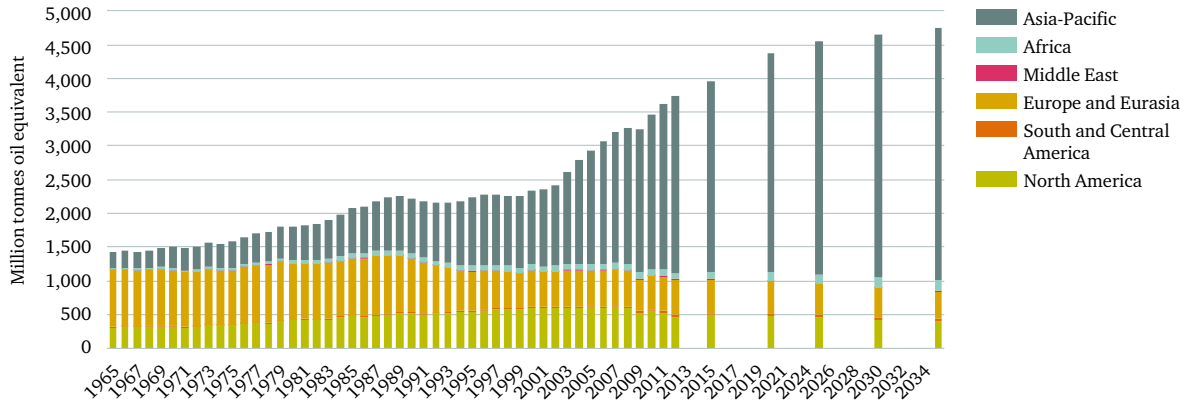

Source: Chatham House analysis of data from the Food and Agriculture Organization, the US Energy Information Administration and the World Steel Association.

The case of coal (see Figure 2) best illustrates the changing roles of emerging and developed economies. China and India lay claim to the world's third- and fifth-largest coal reserves respectively but they are consuming coal faster than they can develop domestic mines. China has gone from being a significant exporter of coal to a net importer in less than a decade.[19] In 2013, its coal imports grew by 13.2 per cent to 341 million tonnes, making it the world's largest importer; of that amount, 264 million tonnes were imports of thermal coal for power production.[20] However, figures suggest that in 2014, its coal imports

[17] B. Lee, F. Preston, J. Kooroshy, R. Bailey and G. Lahn (2012), *Resources Futures*, p. 32.
[18] Chatham House Resource Trade Database, UN Comtrade (2015); metals and ores imports by weight, 2012.
[19] This was due mainly to the closure of several domestic mines owing to unsafe conditions.
[20] International Energy Agency (2014), *Medium-Term Coal Market Report.*

fell by about 11 per cent[21] owing to lower demand and higher import tariffs. The resurgence in demand for coal, as a result of increasing coal-fired power generation in Asia, has driven investment in new mining in Australasia and Southeast Asia as well as in India and China. The other important trend is that of increasing US shale gas production displacing coal in the US domestic energy mix, thus increasing the availability of coal for export.

**Figure 2: Coal consumption in major world regions, 1965–2035 (million tonnes of oil equivalent)**

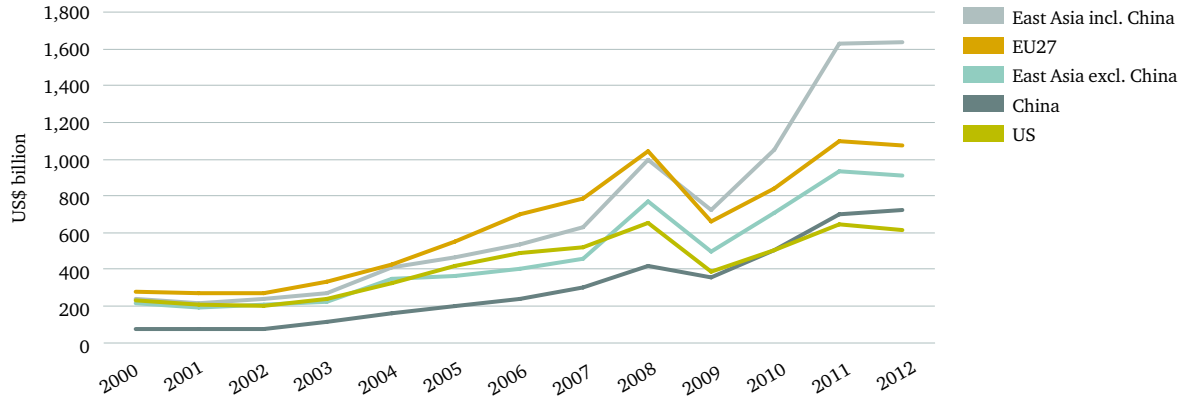



Source: From *BP Statistical Review of World Energy 2014* and *BP Energy Outlook 2014*.

## Growing resource import dependence in China and the EU

East Asia (i.e. China, Japan, South Korea and Taiwan) is today the top importing region for natural resources, followed by the EU, China and the US (see Figure 3). China's main resource imports are fossil fuels (mainly crude oil but also coal and natural gas), metals (iron ore, steel products, copper, aluminium, nickel, gold and chromium), oilseeds (soybeans and palm oil), forestry products (wood pulp, wood chips and other wood waste products, logs and sawn wood) and other raw materials (leather, cotton and wool).

**Figure 3: Comparison of natural resource imports by value, 2000–12 (US$ billion)**



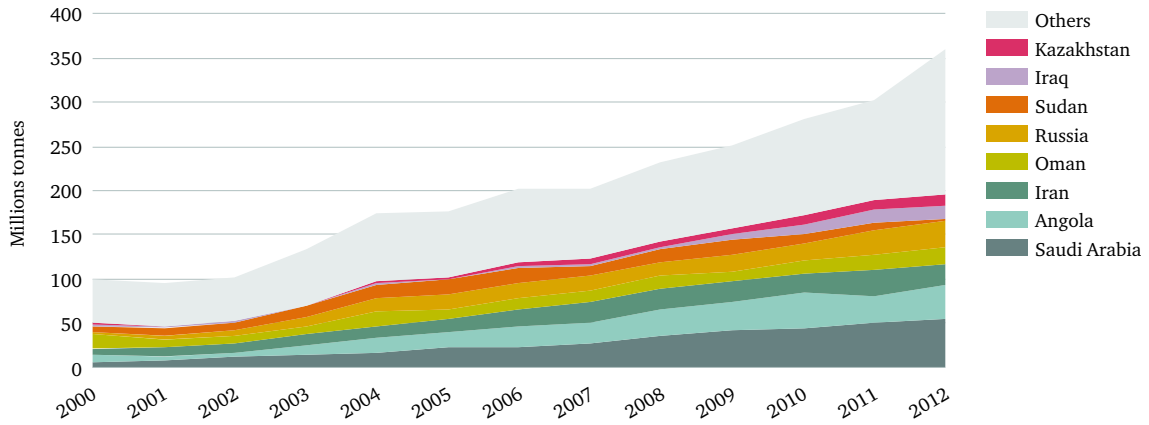

Source: Chatham House Resource Trade Database, UN Comtrade (2015); total resource imports by country and region, 2012; China (China, Hong Kong, Macau, excluding intra-regional trade); EU27 (excluding intra-EU trade).

[21] Dale, K. (2015), 'Why China's coal imports are declining', Market Realist, 16 February 2015. Available at http://marketrealist.com/2015/02/chinas-coal-imports-declining/.

## Energy challenges

Rising fossil fuel demand in China will increase the country's import dependence over the next 20 years unless domestic production of unconventional energy sources markedly exceeds current expectations. This in turn will heighten China's geostrategic interest in the Middle East and encourage stronger relations with other exporting countries and regions such as Russia, Central Asia, West Africa, East Africa, South America and Australia. Its increasing dependence on foreign oil can be seen in Figure 4, which shows that crude oil imports have increased by approximately an order of magnitude since 2000. Today, as a result, oil accounts for more than one-third of China's resource imports by value.[22] In the medium term, growth in its oil demand has the potential to much reduce, if not wipe out, China's trade surplus.

### Figure 4: China's crude oil imports by source country, 2000–12 (million tonnes)

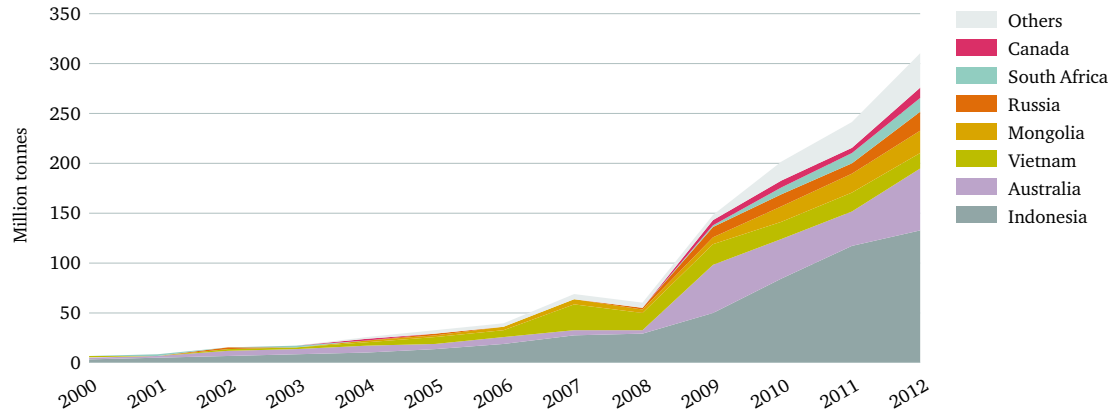



Source: Chatham House Resource Trade Database, UN Comtrade (2015); China (China, Hong Kong and Macau, excluding intra-regional trade) crude and refined oil imports, 2000–12; 2012 Sudan figure combined Sudan and South Sudan output.

The coal import profiles of China and India, respectively the world's largest and third-largest producers, have reshaped the global coal market. China became a net importer of coal less than a decade ago and overtook Japan in volume of imports in 2010. With its expected increases in coal-fired power generation, India could surpass China in volume of imports after 2025.[23] Both countries' hunger for coal has created greater demand for Australian and Indonesian exports (partially displacing US coal exports to the region). This is driving an expansion in production in countries such as Colombia and Vietnam (see Figure 5).

[22] Chatham House Resource Trade Database, UN Comtrade (2015); oil (crude, refined and unconventional) imports by value (2012).
[23] International Energy Agency (2014), *World Energy Outlook 2014*, p. 171. Domestic production and demand-side policies could have dramatic effects on Chinese and Indian import profiles, but it is likely that domestic extraction, processing and transportation constraints, coupled with major increases in coal-fired generation capacity, will lead to greater levels of coal imports to China and India between 2012 and 2035.

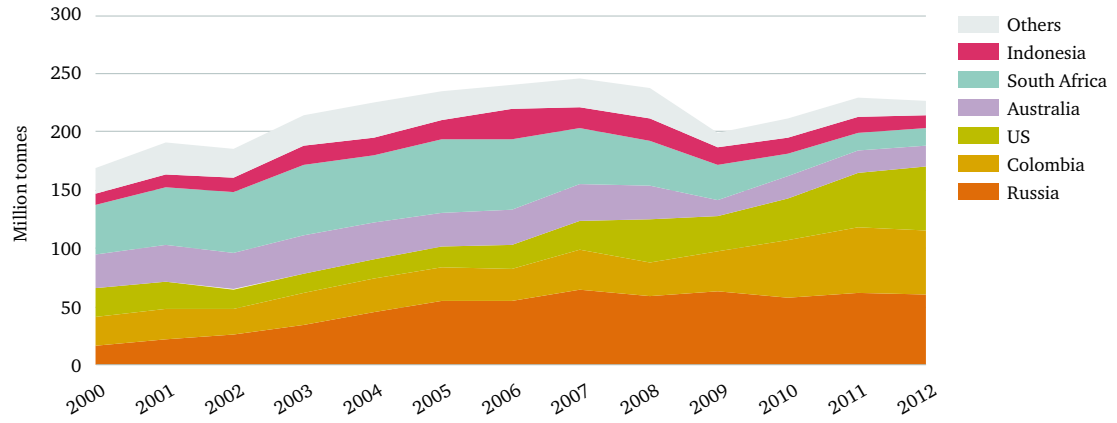
## Figure 5: China's coal imports by source country, 2000–12 (million tonnes)




Source: Chatham House Resource Trade Database, UN Comtrade (2015); China (China, Hong Kong and Macau, excluding intra-regional trade) total coal imports, 2000–12.

In the EU, the lower price of carbon in the Emissions Trading Scheme has further tipped the economic balance between natural gas and coal in favour of the latter in the power sector. It has led to an increased use of coal and, owing to lower international prices, a relative increase in coal imports in the past few years (see Figure 6).

## Figure 6: EU coal imports by source country, 2000–12 (million tonnes)




Source: Chatham House Resource Trade Database, UN Comtrade (2015); EU27 (excluding intra-EU trade) total coal imports, 2000–12.

The EU continues to face energy security challenges; and despite its 2020 goals on renewables and efficiency, it increasingly relies on imports to meet its energy needs. Energy security has risen up the political agenda because of concerns over dependence on Russia and the political situation in Ukraine, combined with price volatility in oil and gas markets. Lower energy prices in North America have focused political attention on the competitiveness of the European energy sector and its impact on the wider EU economy. This has led to calls for increased exploitation of non-conventional fossil fuels, potentially at the expense of developing renewables.

Traditionally, the EU has sought to secure its energy supply through combined negotiating positions, greater interconnectedness and exporting its norms on energy regulation and governance. This approach has had varying degrees of success. The EU has also attempted to foster relations with key countries and regions in an effort to reduce risks (again with varying degrees of success) through its Neighbourhood Policy. This strategy is intended to create a larger harmonized energy market in order to further facilitate the movement of energy supplies; to establish a more unified stance towards the major energy producers such as Russia, Norway and the Gulf states; and to increase co-operation with major consumers such as China, India and the US.

EU interest in natural gas has grown in recent years, in part as a result of the Union's increased confidence in the security of its energy supply. This is due to the diversification of sourcing by way of liquefied natural gas (LNG) and breakthroughs in the non-conventional sector and also to a reduction in European carbon emissions.

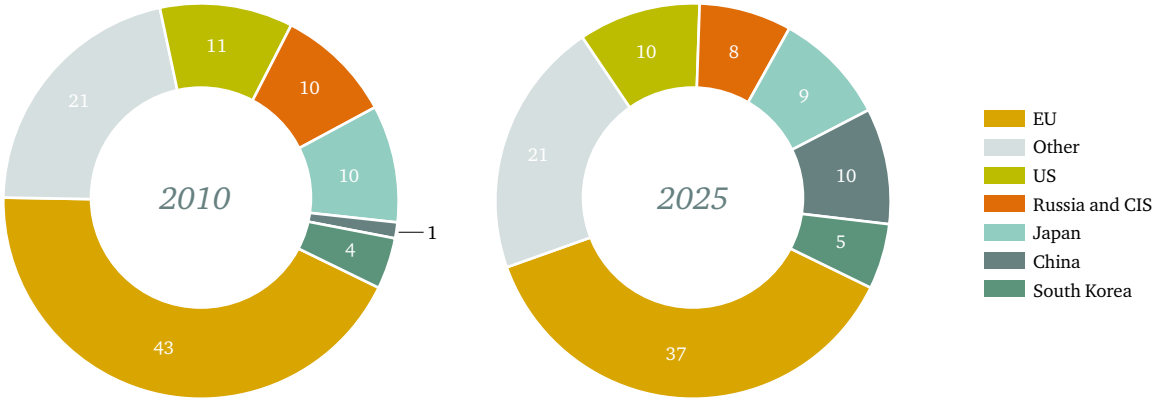
Driven by energy security concerns and a desire to displace coal, the Chinese government is pushing for a sizeable increase in natural gas consumption, which rose from 27.4 bcm/y in 2001 to 162 bcm/y in 2013.[24] Under the current, 12th Five-Year Plan, the government aims to increase natural gas to 8.3 per cent of primary energy demand, reaching 260 bcm/y in 2015. In the forthcoming 13th Five-Year Plan, natural gas consumption is likely to 'remain at double-digit percentage growth annually but at a slightly lower rate than previously experienced'.[25] In order for China to achieve its emissions target,[26] natural gas consumption needs to reach 350–450 bcm/y by 2020.[27]

Driven by energy security concerns and a desire to displace coal, the Chinese government is pushing for a sizeable increase in natural gas consumption, which rose from 27.4 bcm/y in 2001 to 162 bcm/y in 2013.

China plans to boost domestic production of natural gas in order to meet much of the rise in consumption, but it is uncertain whether this approach is feasible. Developing shale gas sources and/or increasing the output of coal-bed methane may be insufficient to generate the additional supply that China is expected to need in the coming years. As a consequence, even if the country greatly increases its gas supply from non-conventional sources, its dependence on imports will rise over the next decade (see Figure 7). To complement domestic output, China could turn to supplies delivered by pipeline from regional neighbours such as Myanmar, Kazakhstan, Turkmenistan and Uzbekistan. Another option would be to increase imports of LNG. China's interest in LNG as a source of supply is evidenced by the major infrastructure development under way: four LNG import terminals have already been built and construction of another four is in progress.[28]

[24] BP (2014), *BP Statistical Review of World Energy June 2014*, p. 23. Available at http://www.bp.com/content/dam/bp/pdf/Energy-economics/statistical-review-2014/BP-statistical-review-of-world-energy-2014-full-report.pdf.
[25] China Energy Fund Committee (2013), *China Energy Focus Natural Gas 2013*, p. 26. Available at http://csis.org/files/publication/131212_CEFC_China_Energy_Focus_Natural_Gas.pdf.
[26] China has committed itself by 2020 to reducing per GDP unit $CO_2$ emissions by 40–45 per cent from 2005 levels. Natural Resources Defense Council, 'From Copenhagen Accord to Climate Action: Tracking National Commitments to Curb Global Warming'. Available at http://www.nrdc.org/international/copenhagenaccords/.
[27] China Energy Fund Committee (2013), *China Energy Focus Natural Gas 2013,* p. 26. Available at http://csis.org/files/publication/131212_CEFC_China_Energy_Focus_Natural_Gas.pdf.
[28] D. Torney (2013), *Prospects for a shale gas revolution in the EU and China: Implications for energy geopolitics and climate security*, Europe China Research and Advice Network (ECRAN), March. Available at http://eeas.europa.eu/china/docs/division_ecran/ecran_is88_paper_68_shale_gas_revolution_diarmuid_torney_revised_en.pdf.

## Figure 7: Share of world gas imports by country/region, 2010 vs 2025 (per cent)




Source: Global Trade and Environment Model, Annex C, in Australian Government, Bureau of Resources and Energy Economics (2012), *Australian Bulk Commodity Exports and Infrastructure – outlook to 2025*, Canberra, Commonwealth of Australia.

Low Chinese shale gas production could result in higher imports of natural gas, increasing China's reliance on Russia for this commodity. Until recently, negotiations over the construction of two major gas pipelines between Russia and China had stalled. In 2014, however, Russia and China broke ground on the construction of one pipeline[29] and agreed on the construction of a second pipeline to China.[30] Under the supply contract for the second pipeline, which is set to be signed by the end of 2015, the new Altai route will supply 30 bcm of gas to China annually. But growing cooperation between the two countries is not driven entirely by economic factors. In the context of Western sanctions, Russia is likely to put expensive pipeline projects orientated towards Europe on hold while it focuses on 'friendlier' alternatives to the east.

China's growth has also reconfigured the global metals and ores trade. The value of its metal and ore imports increased tenfold between 2000 and 2012.[31] Almost 45 per cent of metals and ores traded worldwide go to China – more than the combined weight for the next 20 largest importers.[32] Yet with the Qingdao scandal in May 2014, slowing economic growth and increased refined-metal self-sufficiency, there has been a decline in this trend. While imports of refined copper have remained strong, net refined aluminium, nickel, zinc and tin imports have fallen considerably.[33] China, in fact, briefly became a net exporter of refined nickel in June–December 2014, and refined aluminium and zinc imports are unlikely to recover in the light of its growing domestic metal-processing capacity. As this capacity grows, a large and expanding share of China's imports will be made up of relatively cheap unprocessed mineral ores and concentrates.

Key metals-producing countries have become more and more dependent on exports to China, which is now the destination for more than half of metals exported by Australia, Indonesia and Peru and for well over one-third of exports from Brazil and Chile. Because these countries rely so heavily on mining, an industry that grew during the resource boom, their economic fortunes have becoming increasingly tied

[29] BBC News (2014), 'Russia and China launch gas pipeline', 1 September. Available at http://www.bbc.co.uk/news/business-29011092.
[30] Russia Beyond the Headlines (2014), 'Russia to build second gas pipeline to China after Beijing agreement', 13 November. Available at http://rbth.co.uk/business/2014/11/13/russia_to_build_second_gas_pipeline_to_china_after_beijing_agreement_41393.html.
[31] Chatham House Resource Trade Database, UN Comtrade (2015); metals and ores imports, by value, 2000–12.
[32] Ibid.; metals and ores traded by weight, 2012.
[33] Andy Home (2015), 'RPT-Column-Has China's base metals import appetite peaked?', *Reuters*, 26 January. Available at http://www.reuters.com/article/2015/01/27/china-imports-ahome-idUSL6N0V52AB20150127.

to China's import needs. Unsurprisingly, they appear particularly vulnerable in the current context of oversupplied markets and slowing demand from China.

Moreover, the emergence of new trade links between China and its suppliers has not been without friction. Japan, South Korea and EU member states are also large importers, especially in the higher-value segment of the global metals markets such as copper and speciality metals rather than simple iron and steel or bauxite/alumina.

For the EU, rapid growth in emerging economies reduced the availability of metals for its domestic industries over the past decade, while also generating new environmental challenges.[34] Should price pressures in metals markets resume, resource nationalism and tensions over the local impacts of mining activities may escalate in many mineral-rich countries. European industries could see their access to essential raw materials come under renewed strain as state-backed investors and companies, especially from Asia, attempt to lock up future supplies of resources.

Securing the supply of speciality metals such as rare-earth minerals and other 'critical' or 'strategic' metals could be a challenge for the EU.[35] Revolutions in materials science are creating new, powerful materials based on the unique characteristics of these metals, which are likely to play a transformative role in the next generation of transport, energy and communication technologies.[36] But weakly developed and politicized supply chains could lead to bottlenecks in the supply of rare earths and other metals. This could translate into international diplomatic and trade tensions, especially with China, as the rare-earth minerals dispute shows.[37] Reduced access to these metals could slow essential technological deployment and delay implementation of the European Strategic Energy Technology Plan, leaving European high-tech manufacturers at a disadvantage.

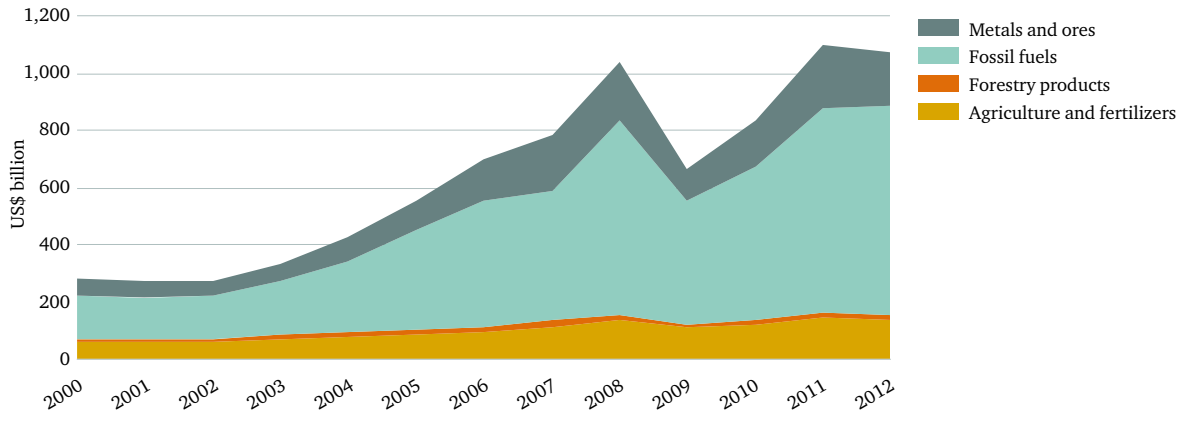
## Interdependences and competition

EU member states, along with other players in the Organisation for Economic Co-operation and Development (OECD), have expressed concern about the erosion of their share in commodity markets, and especially the implications for future access as well as for affordability and sustainability. China has already replaced the EU as the dominant global player in a wide range of commodity markets, among them iron ore, copper, chromium, logs, wood pulp and chips, leather, wool, cotton, palm oil, soybeans, cassava and thermal coal. Figures 8 and 9 illustrate the rise in European and Chinese resource imports between 2000 and 2012. They show the importance of energy sources (fossil fuels) relative to all resource imports and, in the case of China, the rate of increase in imports of metals and ores.

[34] D. Giurco, T. Prior, G. Mudd, L. Mason and J. Behrisch (2010), *Peak Minerals in Australia: A Review of Changing Impacts and Benefits,* prepared for CSIRO Minerals Down Under Flagship by the Institute for Sustainable Futures (University of Technology, Sydney) and the Department of Civil Engineering (Monash University).
[35] H. Sievers and L. Tercero (2012), *European dependence on and concentration tendencies of the material production*, Polinares working paper no. 14, March. Available at http://www.polinares.eu/docs/d2-1/polinares_wp2_chapter2.pdf.
[36] G. Angerer, L. Erdmann, F. Marscheider-Weidemann et al. (2010), *Rohstoffe für Zukunftstechnologien: Einfluss des branchenspezifischen Rohstoffbedarfs in rohstoffintensiven Zukunftstechnologien auf die zukünftige Rohstoffnachfrage*, [Resources for future technologies: the influence of industry-specific resource needs in resource-intensive future technologies on future resource demand]', Munich, Fraunhofer Institute.
[37] International tensions have repeatedly risen in relation to China's rare-earth export quotas. Following a sharp reduction in China's export quotas in 2010, the US, EU and Japan accused China of forcing up global prices, and brought the case to the WTO. The WTO ruled against China in 2014, and China subsequently dropped its restrictions on rare-earths exports in January 2015. For background on the rare-earths dispute, see US Department of Energy (2010), *Critical Materials Strategy*, Washington, DC; and R. Moss, E. Tzimas, H. Kara, P. Willis and J. Kooroshy (2011), *Critical Metals in Strategic Energy Technologies – Assessing Rare Metals as Supply-Chain Bottlenecks in Low-Carbon Energy Technologies*, EU Joint Research Centre, Brussels.

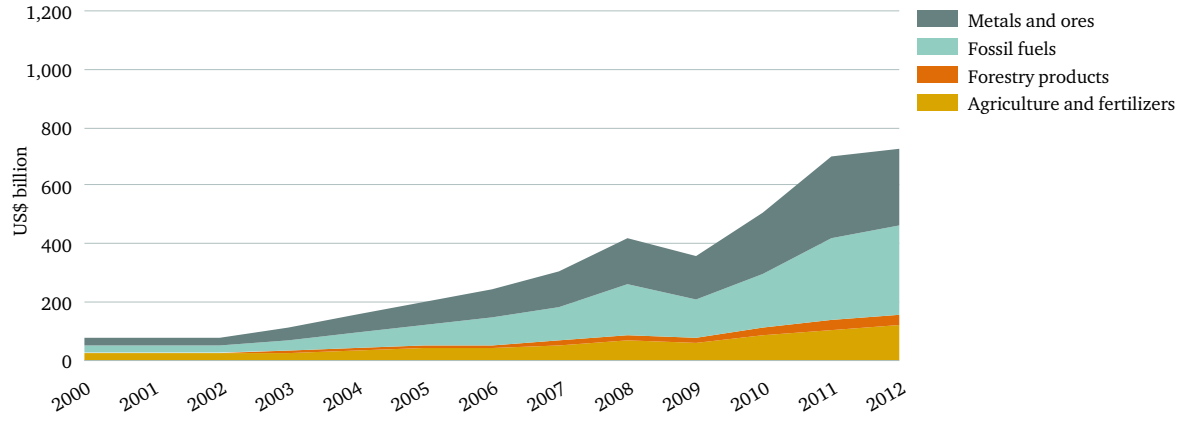
With diversified supply chains, China and the EU have found themselves to date in direct competition for the same supplies in only a few countries. Copper is one example, notably in the Andes and the African copper belt, where China has overtaken Europe as the largest customer. This follows similar patterns in several agricultural markets, notably for soybeans (Latin America) and palm oil (Southeast Asia).

### Figure 8: The EU's resource imports by type and value, 2000–12 (US$ billion)




Source: Chatham House Resource Trade Database, UN Comtrade (2015); EU27 (excluding intra-EU trade), total resource imports by type, 2000–12.

### Figure 9: China's resource imports by type and value, 2000–12 (US$ billion)




Source: Chatham House Resource Trade Database, UN Comtrade (2015); China (China, Hong Kong, Macau, excluding intra-regional trade), total resource imports by type, 2000–12.

# Shaping the Future Resources Sustainability Nexus

Challenges over resources and the mounting impacts of climate change will become more interlinked. This will have unpredictable global consequences, potentially increasing economic pressures, contributing to social tensions and unrest, and heightening interstate political tensions and other political risks.[38] Specific threats already identified in China encompass changing growing seasons for key staples such as wheat and maize. In addition, strains on the water supply are likely to occur as a result of runoff, declining soil moisture and changes in glacial ice.[39] Elsewhere, dwindling water resources may, besides their fundamental impact on water security, threaten energy production in regions that rely heavily on hydropower. Latin America, South Asia and sub-Saharan Africa are all vulnerable to such pressures.[40]

Power generation and heavy hydrocarbons production, especially of coal and tar sands, are likely to compete with water resources in already water-stressed areas by 2030 (e.g. in India, China and South Africa).[41] Extreme weather-related events may become more frequent, damaging energy infrastructure and thus compounding pressures on supply. Higher water and ambient air temperatures affect the efficiency of power stations, which will reduce efficiency and therefore raise the cost of electricity production.

In looking to 2030, the EU, China and other import-dependent countries will need to tackle supply challenges. In addition to promoting efficiency measures or increasing domestic production, many governments are seeking to gain greater influence over extractive industries abroad in order to secure supplies. Emerging-economy governments, for example, are supporting their strongest domestic producers while also investing heavily in extractive sectors abroad through state-owned enterprises and sovereign wealth funds.

The greater prominence of the Arctic in competition for resources is a striking example of the changing commercial and geopolitical landscape in the context of climate change and commodity supply concerns in China and the EU. This competition is facilitated by the melting of the ice cap, which is making it feasible to extract previously inaccessible hydrocarbons and minerals and, more widely, is affecting the economics of resource industries by opening up new maritime supply routes (and in turn reducing transit distances between Europe and Asia).

There is much interest in the Arctic from extractives companies both in the EU and elsewhere. And if the development of gas reserves in the Russian Arctic, such as the Yamal Peninsula and the Shtokman Field, meets its potential, resource markets in Europe would have access to a substantial new source of supply. One of the uncertainties in all this, however, is the impact of the fall in oil and gas prices since

[38] G. Grevi, D. Keohane, B. Lee and P. Lewis (2013), *Empowering Europe's Future: Governance, Power and Options for the EU in a Changing World*, Chatham House, ESPAS (European Strategy and Policy Analysis System) and FRIDE (Fundación para las Relaciones Internacionales y el Diálogo Exterior).
[39] World Bank (2014), *4°c Turn Down the Heat: Confronting the New Climate Normal*, A report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics.
[40] Grevi, Keohane, Lee and Lewis (2013), *Empowering Europe's Future*.
[41] Idem.

mid-2014. Lower prices may render exploitation of Arctic deposits commercially unviable, especially as the technical demands of Arctic drilling may require higher break-even hydrocarbon prices than in more accessible regions. This suggests that some planned projects are likely to be cancelled or delayed, although there are reports that other projects are going ahead.[42]

China and the EU will remain key actors in global resource markets, as they are major consumers with huge market power. Both are projected to increase their reliance on foreign supplies for many critical energy and mineral resources. Their intensifying global resource dependence will require them to invest extensively in producer countries. The two economies will also need to develop expensive and strategically vulnerable infrastructure, including pipelines, deep-sea ports, oil and gas terminals and storage facilities, and to ensure secure sea lines of communication. The actual or threatened closure of key 'choke points', such as the straits of Malacca and Singapore, the Bab al-Mandab, the Suez Canal, the Turkish straits and the Strait of Hormuz, would raise resource prices. Pipelines such as those under discussion between Russia and China also present vulnerabilities owing to their physical inflexibility.

The fall in oil prices in 2014 illustrates the volatility of resource markets, but this benefits both the EU and China in macroeconomic terms. In Europe, consumers stand to gain from cheaper fuel, and the hope is that this will result in greater spending.

Price volatility has increased substantially in numerous commodity markets in recent years. For China and the EU, as for other major resource consumers, this has potentially negative implications for the future security of supply, as price uncertainty makes extractive projects riskier and is liable to discourage investment in them. Capital-intensive resource investments usually have long lead-in times, but increased volatility in commodity prices could spell more immediate trouble too. Sudden spikes in prices, for instance, can rapidly increase inflationary pressures in consumer countries, above all those heavily dependent on imported resources, and can spill over into cross-border trade and investment disputes. The modern system of stretched global supply chains can increase market vulnerability to events such as labour unrest and extreme weather because supply is only as secure as the weakest link in the chain. Moreover, price fluctuations tend to have a disproportionate impact on the poor. They can stoke social and political tensions that may increase pressure on governments to adopt protectionist trade policies or to support fiscally unsustainable fuel and/or food subsidies.[43]

The fall in oil prices in 2014 illustrates the volatility of resource markets, but this benefits both the EU and China in macroeconomic terms. In Europe, consumers stand to gain from cheaper fuel, and the hope is that this will result in greater spending. For businesses, cheaper oil will have a positive effect.[44] Overall reliance on supplies from outside the EU remains high; and given the long lead times needed to build energy infrastructure, no short-term fix for security and diversity is on the horizon; the shift towards a more environmentally sustainable energy system will need prolonged investment.

[42] T. Macalister and D. Carrington (2015), 'Shell determined to start Arctic oil drilling this summer', the *Guardian*, 29 January. Available at http://www.theguardian.com/business/2015/jan/29/shell-determined-arctic-oil-drilling-summer.
[43] B. Lee (2013), 'The Geopolitics of the Modern Resource Boom', *Americas Quarterly*, Winter. Available at http://www.americasquarterly.org/content/geopolitics-modern-resource-boom?.
[44] Sarah Gordon (2014), 'Oil price fall offers more good than bad for Europe', *Financial Times,* 17 December. Available at http://www.ft.com/intl/cms/s/0/676e5c86-8536-11e4-bb63-00144feabdc0.html?siteedition=uk.

In some respects China, the world's largest oil importer, is among the biggest winners from reduced oil prices. This has dampened inflationary pressures – although the benefit to Chinese consumers in terms of transport costs is less pronounced than in many other countries, as fuel subsidies in China already artificially depress such costs. Plummeting global oil prices have also enabled China to increase imports – which surpassed 7 billion barrels per day for the first time in early 2015 – and boost strategic oil reserves.[45] At the same time, the value of major Chinese overseas resource investments, such as the China–Kazakhstan pipeline for the Kashagan Field in the Caspian Sea or the Canadian oil company Nexen (which was wholly acquired by CNOOC in 2013), is correspondingly reduced. However, the negative impact on asset values may potentially benefit some Chinese firms by opening up new and cheap opportunities in which companies with the requisite capital can invest. None the less, China still faces energy security risks relating to shifting geopolitics and high import dependence. Strategic competition among countries in Asia could lead to increased tension. Disputes in the South China Sea in which energy resources are a central factor are just one example.

In any event the long-term drivers of price volatility remain and may be exacerbated by a period of low prices. Over time, the combination of increasing demand and fluctuating prices will make resource-importing countries more anxious than ever to secure stable sources of supply at a relatively stable cost and, correspondingly, will make exporting countries more eager to extract maximum economic and political leverage from their resource endowments. It is already evident that many governments in producer countries are aggressively seeking to strengthen their control over resource projects and to secure a greater share of the revenue streams from them. They have cancelled contracts, nationalized resource assets and used investment by favoured state-owned enterprises to control projects. Principal suppliers of raw materials are also beginning to use export controls to ensure that resource production is able to support the growth of in-country value addition and wider domestic industries. All these pressures, if not countered by demand and supply policies, are likely to intensify international resource competition and make resource diplomacy more confrontational.[46]

Resource production will depend even more upon countries that are vulnerable to political, environmental and economic uncertainty. Sizeable investment in agricultural land and resource extraction is now occurring in countries with weak governance, underdeveloped economic institutions and serious climate vulnerabilities. There is an opportunity to harness this investment for low-carbon development and green growth (see Box 1) while boosting and diversifying global resource production. However, serious political, environmental and social risks remain.

The integration of Asia into the global economy has further reinforced global interdependence, notwithstanding the growth in intra-Asian trade.[47] Nearly 40 per cent of goods produced in Asia are destined for the US, the EU and Japan. Bilateral trade between China and EU countries has grown fivefold between 2000 and 2012 and by more than 50 per cent since 2008.[48] The EU is China's largest export market, accounting for 17 per cent of its exports, and China is now the EU's second-largest market, accounting for 9 per cent of its exports.[49] In 2013, China exported €279.9 billion worth of goods to Europe, producing a bilateral trade surplus of €131.8 billion in favour of China. This was

[45] L. Hornby, A. Raval and N. Hume (2015), 'China's oil imports climb above 7m barrels a day for first time', 13 January, *Financial Times*, http://www.ft.com/cms/s/0/78f88222-9aff-11e4-882d-00144feabdc0.html.
[46] B. Lee (2013), 'Guest post: let's start an R30 Group to manage resources', beyondbrics, FT.com, 1 February. Available at http://blogs.ft.com/beyond-brics/2013/02/01/guest-post-lets-start-an-r30-group-to-manage-global-resources/.
[47] Nomura Global Economics (2010), *The Ascent of Asia*. Available at www.nomura.com/europe/resources/pdf/nomura%20-%20the%20ascent%20of%20asia.pdf.
[48] Chatham House Resource Trade Database, UN Comtrade (2015), bilateral trade between China (China, Hong Kong and Macau) and EU27, 2000–12.
[49] J. Farnell (2013), 'Economic relations between China and the EU show promise but more should be done', Politics in Spires, 24 May. Available at http://politicsinspires.org/economic-relations-between-china-and-the-eu-show-promise-but-more-should-be-done/.

down on the surplus in the previous two years, and indicates China's increasing importance as a destination for European exports. In 2013, EU exports to China increased by 2.9 per cent, reaching a record €148.1billion.[50] Trade between China and Europe has reached well over €1 billion a day. Their economic relationship is now the second-largest in the world.[51]

### Box 1: China–EU cooperation on overseas low-carbon zones and green growth

Trilateral cooperation between an emerging economy (China), developed countries (the EU) and developing countries (in sub-Saharan Africa, for example) could unlock a number of low-carbon and green growth opportunities. It could achieve a number of objectives: to harness the different abilities and experiences of the EU and China in low-carbon development in support of developing countries' strategic ambitions; to promote cooperation between key constituencies from within the UN Framework Convention on Climate Change on concrete activities outside the formal negotiations, thereby fostering trust and demonstrating success; and to encourage dialogue between China and the EU on climate change, and its impacts on resource supply chains, beyond their domestic spheres.[a]

China and the EU make obvious partners for African countries in pursuit of low-carbon development in view of their ambitious efforts to reduce emissions and to generate knowledge and expertise in low-carbon development. Chatham House and E3G's *Changing Climates* report in 2007 proposed 'low-carbon zones' across China, and Jilin City in northeastern China was selected as the first official low-carbon pilot zone.[b] The subsequent range of pilot programmes in China, in areas of differing levels of development, resource endowment and industrial mix, suggest that lessons learnt may be applicable domestically and overseas. Some EU member states' policies may also provide a blueprint for green growth abroad: elements of the UK Low Carbon Transition Plan, for example, could be replicable abroad.[c]

Yet despite a history of practical cooperation on climate change, from technical programmes on energy efficiency to low-carbon development planning, China–EU collaboration overseas has remained limited, in part owing to the fragmentation of the various relevant EU and Chinese institutions. Collaboration with the EU on the development of overseas low-carbon zones and green growth pathways lacks an obvious home among China's key institutions. Its Ministry of Commerce could help to advance collaboration but is unlikely to promote it without a specific mandate to do so. Meanwhile, the EU's commitment remains stymied by the absence of a single coherent policy on the promotion of overseas low-carbon zones and green growth. Instead, individual member states such as the UK and Germany are emerging as the most likely partners for collaboration.

[a] Chatham House, the Horn of Africa Regional Environment Centre and Network, and the Climate and Development Knowledge Network (2013), *Low Carbon Zones in Ethiopia: Towards Trilateral Cooperation.*

[b] Chatham House, Chinese Academy of Social Sciences, Energy Research Institute of NDRC and E3G (2010), *Low Carbon Development Roadmap for Jilin City*.

[c] N. Mabey (2013), 'EU–China Cooperation', E3G presentation, Beijing, September.

[50] European Commission (2014), 'Facts and Figures on EU–China Trade: Did you know?', Available at http://trade.ec.europa.eu/doclib/docs/2009/september/tradoc_144591.pdf.

[51] Idem.

# Understanding the Conditions for Advancing Climate Change Policy

China's leaders have recognized that following the growth path of developed countries, in particular the US, is not feasible owing to its resource needs and to corresponding economic and environmental pressures. Yet establishing a new growth model is no easy task, and there is no off-the-shelf procedure for it. The search for more sustainable growth must take place as part of China's efforts to shift to consumption-led growth, to reform its industrial make-up, to address the issue of debt-ridden local authorities and to deal with a host of other structural and systemic changes. The IMF has stressed that a new wave of reforms is needed in China in order to ensure its continued economic success.[52]

In many respects, China's ability and willingness to scale up energy- and carbon-intensity targets will depend in large part on implementing ambitious structural, financial and resource-pricing reforms. It is crucial, for example, that China's financial reform and industrial restructuring programmes give strong emphasis to environmentally sustainable growth. Delaying the shift to a low-carbon economy could lead to much higher costs in the long term. But the inevitable uncertainty about how wider structural reforms will play out is likely to encourage some officials to delay or to hold back ambition on the climate agenda. As the Climate Group noted, this is partly because institutions, both public and private, focus on enacting reforms for poverty reduction or material improvement. Environmental protection tends to rank further down the list of immediate institutional priorities.[53]

The inevitable uncertainty about how wider structural reforms will play out is likely to encourage some officials to delay or to hold back ambition on the climate agenda.

One increasingly important incentive for action on climate change has been the air pollution crisis of the past two winters and the resulting public outcry for action and transparency in this matter. In response, the 2013 Action Plan for Air Pollution Prevention and Control was developed with a list of 10 measures to reduce air pollution in major regions of China by 2017. One such measure, the Peak Coal Initiative, caps the share of coal in China's energy mix at 65 per cent. These measures have been accompanied by a surge in renewable-energy investments.[54]

Following on from the 2013 Action Plan, the joint US–China commitments announced in November 2014 offer a further sign that China is taking action on climate change seriously. China pledged to cap its GHG emissions by 2030 and to derive 20 per cent of its energy use from zero-emission sources by then. Herman Van Rompuy, the then president of the European Council, and Jean-Claude Juncker, the European Commission president, welcomed the US–China agreement and urged 'others, especially the G20 members, to announce their targets in the first half of 2015 and transparently'.[55]

[52] IMF (2013), 'China: New Round of Reforms Needed for Continued Success', IMF Survey online, 17 July. Available at http://www.imf.org/external/pubs/ft/survey/so/2013/CAR071713A.htm.
[53] The Climate Group (2013), *Shaping China's Climate Finance Policy*. Available at http://thecleanrevolution.org/_assets/files/Shaping-Chinas-Climate-Finance-Policy.pdf.
[54] China Greentech Initiative (2014), *The China Greentech Report 2014: Greener, Smarter, More Productive*. Available at www.china-greentech.com/report.
[55] European Commission (2014), 'Joint Statement by European Commission President Jean-Claude Juncker and European Council President Herman Van Rompuy on the US-China climate announcement', 12 November. Available at http://europa.eu/rapid/press-release_STATEMENT-14-1663_en.htm.

China's renewable energy industry is now a world leader, but structural factors threaten to hold back its long-term potential. Although the industry, like many others in China, is still dominated by state-owned enterprises, movements towards privatization in the industry suggest that progress is being made in developing a more comprehensive role for the private sector in sustainable development initiatives.[56] Industrial policy support has boosted the renewable sector's development, but so far production volume has outpaced quality improvements. The focus on installation rather than effective output means that much of the capacity is not connected to the grid and that operating efficiency is only half that of the US, for example. In 2013, the US had 61 GW and China had 91 GW of grid-connected wind power[57] but their effective output was 169.4 terawatt hours (TWh) and 131.9 TWh respectively.[58]

In October 2014, the European Council approved proposals that by 2030, GHG emissions in the EU should be reduced by 40 per cent. This has yet to be finally adopted by the parliament, although a resolution calling for a similar target was adopted in February 2014. Connie Hedegaard, then the EU's climate commissioner, welcomed the proposal, saying that 'we have sent a strong signal to other big economies and all other countries'. Similarly, the UN climate chief Christiana Figueres praised the agreement, claiming that it gives 'valuable momentum towards the Paris 2015 global climate agreement'.[59] Others were less positive; they noted that a number of key aspects of the deal were left open-ended and voluntary.[60]

It is important to note the EU's progress in the past decade in meeting its carbon emissions reduction targets and the impact of this on its other energy policy objectives. Currently, the EU's 2020 target for reducing GHG emissions by 20 per cent has been or is very close to being met owing to the economic downturn but also to better efficiency, to greater use of renewable energy, and to changing industrial patterns and technologies. Furthermore, the use of renewable energy is now estimated to save around €30 billion per annum in imported energy, improving the balance of payments and the security of supply. Likewise, improvements in energy efficiency have been shown to have contributed to a 1 per cent annual reduction in energy consumption in the EU since 2000.

However, a number of recent challenges have undermined prospects for a coherent EU energy and climate strategy. These take in the effects of the 2008–09 global financial meltdown and subsequent eurozone debt crisis, high and volatile resource prices (notwithstanding the sharp fall in oil prices since mid-2014), and the stalemate in global climate and trade arenas. Short- and medium-term economic imperatives have, in effect, ensured that climate change policy now takes lower priority. The alignment of the EU's climate and energy security policies has been subordinated to externally focused energy diplomacy, which gives priority to foreign trade, foreign direct investment, market access and the broader investment regime.

A divergent set of interests has limited the effectiveness of the EU and its member states' policies towards China and other main partners. The root causes lie in the different industrial and consumption profiles of member states, their location in Europe and their levels of import dependence. More coordinated external action depends in part on the EU's efforts to agree internal settlements on climate and energy policy that recognize and address these differences, but to date this has been extremely difficult.

[56] China Greentech Initiative (2014). *The China Greentech Report 2014*.
[57] Global Wind Energy Council (2014), Wind Energy Statistics. Available at http://www.gwec.net/global-figures/graphs/.
[58] BP (2014), *BP Statistical Review of World Energy June 2014*.
[59] UNFCCC Newsroom (2014), 'EU Agrees 40% Greenhouse Gas Cut by 2030', 24 October. Available at http://newsroom.unfccc.int/unfccc-newsroom/eu-agrees-40-greenhouse-gas-cut-by-2030/.
[60] Arthur Neslen (2014), 'EU leaders agree to cut greenhouse gas emissions by 40% by 2030', the *Guardian*. 24 October. Available at http://www.theguardian.com/world/2014/oct/24/eu-leaders-agree-to-cut-greenhouse-gas-emissions-by-40-by-2030.

Reaching agreement on a long-term strategic vision has become more difficult in recent years. Before 2009, climate change provided a rallying point for the EU's energy and climate policies. But this consensus is less apparent now, with a number of member states, for example Poland with its coal-based energy sector, calling for the EU no longer to take unilateral action. The consensus on nuclear power has also weakened, as the March 2011 Fukushima nuclear disaster prompted Belgium, Germany and Italy, among other EU member states, to phase out or to lower the priority of nuclear power. Other countries, however, and the UK too, have remained committed to nuclear power.

The divergence of national energy policies within the EU extends to other areas, such as support for renewables. This lack of coherence is potentially damaging for the EU at a time when regional approaches to energy and climate change are ever more important in structuring price and supply dynamics and achieving benefits of scale. The EU's difficulties on this front are amplified by the variety in the national energy mix from one member state to another. In Bulgaria, the Czech Republic, Estonia and Poland, for example, coal is the main fuel for generating electricity. By contrast, nuclear energy is predominant in power generation in France and Slovakia.[61] Even if climate change did act as a unifying principle, it would be challenging for the EU to navigate the cooperation-versus-competition inertia both within the Union and with partners in Asia given the range of export and industrial interests of member states.[62]

Despite the structural and political barriers to cohesive climate action in China and the EU outlined above, the December 2014 Lima Call for Action was an important step forward in international cooperation on climate action. This consists of two main components: a decision on how countries in 2015 will put forward their proposed actions to address climate change ('intended nationally determined contributions', in the language of the UN) and an annex of elements that will provide a basis for negotiating the final detail of any agreement at the Paris conference.

Diplomatically the US, China and India were active in shaping the final deal. US Secretary of State John Kerry travelled to the talks to reaffirm President Barack Obama's commitment to global action on climate change. However, their concern about sovereignty was an important factor resulting in the limited level of transparency in the agreement. By contrast, the EU was relatively quiet at this negotiation. Ed Davey, the then UK secretary of state for energy and climate change, was active in chairing finance discussions, but on other issues there was a sense that the EU was punching slightly below its weight. A more assertive Europe will be important to negotiations in 2015.

## Trade and competitiveness

Concerns over trade and competitiveness have always stood in the way of scaled-up ambition on climate change, but, as noted above, they have risen up the political agenda in the major economies since the start of the financial crisis in 2008. Many countries have put traditional manufacturing and existing industrial policies at the centre of their plans to escape recession.

Prospects for economic cooperation, on the other hand, have suffered, as the economic downturn has caused policy to become at least more inward-looking if not more protectionist. In the EU, investments or initiatives perceived by the public as boosting the competitiveness of emerging economies such as China have struggled for political support – a situation aggravated by popular perceptions that Chinese policies on climate change have been inadequate. Obstacles to cooperation between China

[61] G. Grevi and D. Keohane (2013), *Challenges for European Foreign Policy in 2013: Renewing the EU's role in the world*, FRIDE.
[62] B. Lee (2012), 'Asia's growing thirst for resources: a new agenda for transatlantic cooperation', in *Look East, Act East: transatlantic agendas in the Asia Pacific*, EU Institute for Security Studies (ISS), Report No. 13, December, pp. 16–23.

and the EU have increased amid a series of disputes and tensions over China's trade and investment rules and its uneven protection of intellectual property. Export restrictions, local-content requirements and preferential treatment of Chinese companies have all been contentious issues impeding bilateral cooperation. Recent trade disputes between the EU and China have involved solar panels, telecoms equipment and rare-earth minerals. Indeed, Chinese companies have been the subject of 60 per cent of EU trade defence investigations since June 2011 and were implicated in 64 per cent of seizures of counterfeit goods at EU borders in 2012.[63]

**Table 1: Percentage of people in selected European countries with a favourable view of China**

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|
| UK | 65 | 65 | 49 | 47 | 52 | 46 | 59 | 49 | 48 | 47 |
| France | 58 | 60 | 47 | 28 | 41 | 41 | 51 | 40 | 42 | 47 |
| Germany | 46 | 56 | 34 | 26 | 29 | 30 | 34 | 29 | 28 | 29 |

Source: Data from Pew Research Center (2014), Pew Global Attitudes Project. Available at http://www.pewglobal.org/question-search/?qid=827&cntIDs=&stdIDs=.

Perhaps equally unfavourable are the changing economic circumstances of the EU, which are also undermining prospects for cooperation with China. The post-2008 economic downturn has heightened worries about the region's competitiveness. These concerns, compounded by long-standing European reservations about China's human rights record, have worsened public perceptions of China: favourable views of the country have declined from their peak in the middle of the past decade (see Table 1). Prospects for cooperation between China and the EU are undermined, too, by tensions between developed and developing countries over the responsibility for tackling climate change. Developing countries' readiness to contribute to global efforts to respond to climate change are contingent on assistance from developed economies; but at a time of fiscal austerity and sluggish growth in much of the EU, it is difficult for politicians to make the case for this assistance.[64]

## Low-carbon affordability

The idea that a low-carbon transition can be affordable has not been widely accepted, especially in countries facing austerity. In many of them, the immediate costs of supporting low-carbon technology have greater political weight than the theoretical future benefits of reducing fossil fuel dependence and ultimately securing cheaper energy. In pioneering countries such as Japan and Germany, where energy prices have risen as a result of the nuclear shutdowns after Fukushima, there is a heated political battle over the potential costs of low-carbon transition.

Nor has political debate kept up with the collapse in cost of many low-carbon technologies. The reality is that after dramatic cost reductions in critical areas – especially in renewable energy, efficient lighting and smart technology – in recent years, low-carbon options are increasingly competitive, and the cost reductions are far more rapid than were predicted even a few years ago. Moreover,

[63] A. Neubacher (2012), 'A Capital Error? Germany Created Own Threat with Chinese Solar Aid', *Der Spiegel* Online, 27 February and 'The Sun Goes Down on Solar', *Der Spiegel*, 4 April; ISS (2013), *Brussels – Beijing: changing the game?* ISS, Report No. 14, February. Available at http://www.iss.europa.eu/uploads/media/Report__14.pdf?.

[64] R. Falkner and B. Lee (2012), 'Introduction', in Special Issue on Rio+20 and the Global Environment: Reflections on Theory and Practice, *International Affairs*, Vol. 88, No. 3, pp, 457–62.

low-carbon manufacturing has been among the most successful economic sectors since 2008, especially in Europe. Yet discussion about international negotiations on topics such as support for technology transfer and financing to address the additional costs of climate action, among others, tends to reinforce the idea that ambitious action on climate change is expensive and will undermine growth. *The New Climate Economy Report*,[65] however, emphasizes the importance of climate change as a core economic strategic issue, arguing that action on climate change and economic growth are not mutually exclusive: 'many of the policy and institutional reforms needed to revitalise growth and improve well-being over the next 15 years can also be critical to tackling climate risk.'[66]

## Avoiding fossil fuel lock-in

Lock-in to high-carbon energy sources remains a key barrier to higher ambition in China and the EU. China generates about 80 per cent of its energy from coal and, in view of this, it is trying to shift consumption away from that fuel. The 2013 Action Plan includes the goal of capping coal's share of China's energy mix at 65 per cent by 2017. But industry analysts suggest that Chinese coal demand may peak between 2014 and 2016.[67] Chinese officials are also discussing a possible cap on energy consumption in the 13th Five-Year Plan period as part of a broader demand-side management project.[68]

The EU is also struggling to phase out coal in its power sector despite record levels of investment in renewables. In 2013 and the first part of 2014, this difficulty was caused by higher gas prices and lower coal and $CO_2$ prices, making the operation of coal plants the cheaper option. However, changes in the global and regional price of oil and gas have reduced this differential in recent months.

Gas is a double-edged sword in relation to more ambitious policies towards climate change. On the one hand, natural gas has roughly half the $CO_2$ emissions of coal, as well as much lower levels of dangerous particulate pollution. Gas is also relatively cheap compared with some renewables and nuclear power, and could play an important role as a 'bridging fuel'.

On the other hand, there are fears that the prospect of a 'golden age of gas' could inhibit investment in renewable energy.[69] Large volumes of unconventional gas in Europe, whether or not they materialize, appear to provide a cheaper route to a lower-carbon economy than higher-cost renewables. This argument has strengthened the support for those calling for slower progress on renewables in Europe given the tight fiscal position of many member states. Even though there is more uncertainty over the price of gas than over the cost of renewables, which continues to fall sharply, advocates of low-carbon energy have struggled to make this case.

In practice, although more gas can help to meet short-term emissions targets and will inevitably play an important role in the European power sector for many years, rapid decarbonization of the electricity sector in major economies will be required in the 2020s. This raises the prospect of substantial stranded assets for countries that embark on further large-scale switching to gas. The UK's Climate Change Committee warned that a renewed dash for gas could lead to much higher costs, as the UK would

[65] *The New Climate Economy Report* (2014). Available at http://newclimateeconomy.report/. The report was an output of the Global Commission on the Economy and Climate which was commissioned by seven countries – Colombia, Ethiopia, Indonesia, Norway, South Korea, Sweden and the United Kingdom – as an independent initiative to report to the international community.
[66] Idem.
[67] Carbon Tracker (2014), *The Great Coal Cap: China's energy policies and the financial implications for thermal coal.* Available at http://www.carbontracker.org/wp-content/uploads/2014/09/gcp1.pdf.
[68] China Greentech Initiative (2014), *The China Greentech Report 2014*.
[69] P. Stevens (2012), *The 'Shale Gas Revolution': Developments and Changes*, Briefing Paper, Chatham House, London.

be forced to slash power sector emissions in the 2030s in order to comply with the country's legally binding carbon reduction targets. If gas is still to be part of the energy mix, the commodity could be used only with carbon capture and storage, an option currently not being considered seriously.[70]

## Sustainable urbanization

There are strong correlations between urbanization and both economic growth and energy consumption. China's urban population increased from 40.4 per cent of the total in 2005 to 52.3 per cent in 2012 and is expected to reach 70 per cent by 2030.[71] Urban infrastructure, once constructed, can 'lock in' the use of fossil fuels, establishing emissions pathways and making it difficult to change patterns of consumption. China's rate of urbanization presents unprecedented challenges in the form of delivering improved living standards and attaining short-term climate objectives while avoiding carbon lock-in by way of the speed and scale of urban growth.

Different types of energy consumption drive urban energy demand, presenting complex short- and long-term challenges. Residential living, principally the consumption of goods, food, heating and electricity, accounts for nearly four-fifths of urban energy consumption.[72] Energy use in the construction of residential buildings is the next-largest category, followed by infrastructure and commercial buildings. The energy required to build infrastructure causes short-term energy demand spikes, with energy consumption in buildings accounting for a large share (40 per cent) of the world's total end-energy use. Transport is generally the largest user of urban energy and the main cause of GHG emissions and localized pollution in the long term. More than 90 per cent of air pollution in developing-country cities is attributed to vehicle emissions. A World Bank paper estimates that the health effects of pollution in some Chinese cities cost the equivalent of 5 per cent of GDP.[73] More generally, the IPCC has predicted declining air quality in cities and suggests that climate change could seriously degrade air quality by affecting the rate at which ozone and particle pollutants disperse.[74]

> Urbanization intensifies pressure on water resources and agricultural land: municipal water demand in China is expected to rise by 25.6 per cent between 2010 and 2025, compared with 1.7 per cent over the same period in Western Europe.

Cities also generate rising resource consumption and waste, exacerbating broader resource insecurity. Large-scale residential and infrastructure construction increases demand for metals and minerals. In addition, urbanization intensifies pressure on water resources and agricultural land: municipal water demand in China is expected to rise by 25.6 per cent between 2010 and 2025, compared with 1.7 per cent over the same period in Western Europe.[75] Resource waste is projected to increase similarly. Today an estimated 3 billion urban residents globally generate 1.3 billion tonnes of solid waste per

[70] P. Zorlu and S. Skillings (2013), *Risk managing European power sector decarbonisation: cross-cutting findings of UK, Germany and Poland case studies*, E3G, November. Available at http://www.e3g.org/docs/E3G_risk_managing_power_decarbonisation_-_cross_cutting_results.pdf.
[71] UNDP China and Institute for Urban and Environmental Studies, Chinese Academy of Social Sciences (2013), *China National Human Development Report 2013: Sustainable and Liveable Cities: Toward Ecological Civilization*, p. 3.
[72] D. Fridley (2010), 'Embodied Energy: An Alternative Approach to Understanding Urban Energy Use', posted on The Oil Drum, 12 August. Available at http://www.theoildrum.com/node/6842.
[73] H. Brecht, U. Deichmann and Hyoung Gun Wang (2013), *A Global Urban Risk Index*, Policy Research Working Paper 6506, World Bank, June.
[74] IPCC (2013), *Climate Change 2013: The Physical Science Basis. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Available at https://www.ipcc.ch/report/ar5/wg1/.
[75] McKinsey Global Institute (2012), *Urban world: Cities and the rise of the consuming class*, June.

annum, and this is expected to increase to 4.3 billion urban residents and 2.2 billion tonnes of waste per annum by 2025.[76] Climate change and social and economic inequality act as risk multipliers, with poor urban areas hit hardest by water scarcity, air pollution and other environmental challenges.

Manufacturers, governments and citizens can employ a range of policy and technology options in order to reduce the harmful impacts of urbanization. Modifying urban resource demand and consumption patterns, for example by expanding recycling and the conversion of waste to energy in order to reduce reliance on landfills, can help to offset some of those impacts. In construction, up to 50 per cent of energy can be saved by using technologies that are already available.

In reducing the use of energy by urban transport, a number of strategies can help. According to the Deutsche Gesellschaft für Technische Zusammenarbeit, these strategies fall into three categories: 'avoid', 'shift' and 'improve'. 'Avoid' involves working remotely and other logistical solutions that reduce the use of and demand for transport. 'Shift' involves policies to change transport patterns towards more energy-efficient forms, for example from personal car use to cycling or use of public transport. 'Improve' refers to policies in support of technological solutions to reduce transport-related emissions and energy consumption. Examples of this latter strategy take in the so-called CAFE (corporate average fuel economy) standards for efficient fuels and vehicles and the development of clean-diesel trucks and hybrid and electric cars.[77]

Sustainable urbanization is more and more about long-term environmental, economic and social resilience.[78] Many major Chinese cities are vulnerable to shocks owing to their location and concentration of assets and their critical infrastructure. Guangzhou, Zhanjiang, Shenzhen and Xiamen are among the world's 20 most vulnerable cities to flooding (in terms of relative risk to GDP).[79] Quantifying the importance of urban planning and a resilient infrastructure, and especially the cost of getting it wrong, is fundamental to overcoming short-sighted policy and unlocking finance for sustainable and low-carbon urbanization. Under China's 2014–20 Urbanization Plan, funding mechanisms are being developed, including reforms that will enable local governments to issue urbanization bonds. 'Greening' these bonds is essential, and institutions such as the UK's Green Investment Bank or the European Investment Bank (EIB)'s Climate Awareness Bonds could provide guidance on the development of sustainable funding mechanisms.

## Public engagement and policy support

The upsurge in concern about environmental issues in China in recent years has been caused primarily by land degradation and air and water pollution rather than climate change. Over the course of the 11th Five-Year Plan, the government received 300,000 petitions on environmental matters. The air quality issue adds momentum to local action to close inefficient coal plants and other sources of pollution, which will reduce emissions in most cases. But a coherent strategy that links addressing local pollution with national GHG emissions goals has not yet emerged.

Public support for ambitious action on climate change in Europe varies widely between countries, and it is consistently lower in Eastern Europe. A 2013 Eurobarometer poll ranked concern about climate

[76] World Bank (2012), *What a Waste: A Global Review of Solid Waste Management*, March.
[77] International Energy Agency (2013), *A Tale of Renewed Cities*.
[78] B. G. Field (2013), 'New types of urbanisation: Investment for Sustainable Cities', presented on 23 September at Counsellors' Office of the State Council/Royal Institute of International Affairs International Symposium, Beijing, China.
[79] S. Hallegatte, C. Green, R. J. Nicholls and J. Corfee-Morlot (2013), 'Future flood losses in major coastal cities', *Nature Climate Change*, Vol. 3, pp. 802–06.

change as highest in Sweden, Denmark, Germany and Austria. Concern about climate change is consistently lower in Estonia, Latvia, Portugal and Bulgaria.[80]

Public pressure on EU member state governments to take action on climate change is arguably weaker today than a few years ago because of competing economic and social pressures, which, we have observed, have resulted in giving higher priority to trade and competiveness. Concerns about the affordability of low-carbon transitions are compounded by disillusionment after the perceived failure of the 2009 UN Climate Change Conference (known as the Copenhagen Summit), a drop in media coverage and the gap between scientific evidence and public support for action.[81]

Awareness of climate change has grown in China as a result of the launch of the national programme of action in 2006. In 2013, 93 per cent of people said that they knew at least a little about climate change and 69 per cent said that people in China are already being harmed by climate change.[82] A research survey in 12 countries commissioned by Chatham House from Ipsos MORI in 2014 found that 92 per cent of participants in China agreed with the statement that human activities contribute to climate change, a percentage appreciably higher than the average of the participating countries.[83] An overwhelming majority (89 per cent) of respondents agreed and 9 per cent somewhat agreed with the statement that 'the government should pay great attention to the issue of climate change'. The environmental and social implications for China's increasing resource demand and consumption, and notably those for urbanization, will increasingly shape public engagement.

As mentioned above, the most recent policy shifts in China have largely been caused by public concern about air quality. The central government announced in 2013 that it would set aside 1.7 trillion yuan (US$274 billion at current exchange rates) to combat pollution over the next five years. The 12th Five-Year Plan, which Chinese legislators approved in March 2011, calls for a 16 per cent reduction in the economy's energy intensity and a 17 per cent reduction in carbon intensity; it also sets a target to increase non-fossil energy sources to 11.4 per cent of total energy use (up from 8.3 per cent in 2010). Progress is evident: the carbon intensity of the economy fell by 3.5 per cent in 2012, in line with the 12th Five-Year Plan.[84] The pledge to cap China's GHG emissions by 2030 and to derive 20 per cent of its energy use from zero-emission sources by 2030, along with the progress being made on shifting further away from coal, indicates the momentum that heightened public concern with climate change has injected into China's actions on this front.

## Political divergence on climate change in global negotiations

Technical cooperation between the EU and China on climate change has increased over the past decade, but similar progress has eluded climate diplomacy and political cooperation. Entrenched differences were clear in the sides' positions in formal climate negotiations, most notably at the Copenhagen Summit in 2009. This apparently irreconcilable gap reflects fundamental differences in their economic structure and agenda.

[80] European Commission (2014), *Climate Change Report*. Available at http://ec.europa.eu/public_opinion/archives/ebs/ebs_409_en.pdf.
[81] N. Pidgeon (2010), *International Dimensions of Climate Change Report 5: Public Understanding of and Attitudes Towards Climate Change*, Foresight, UK Government Office for Science, August.
[82] Yale Project on Climate Change Communication (2012), *Public Climate Change Awareness and Climate Change Communication in China*. Available at http://environment.yale.edu/climate-communication/article/public-climate-change-awareness-and-climate-change-communication-in-ch/.
[83] R. Bailey, A. Froggatt and L. Wellesley (2014), *Livestock – Climate Change's Forgotten Sector: Global Public Opinion on Meat and Dairy Consumption*, Chatham House, December.
[84] Reuters (2013), 'China's carbon intensity falls over 3.5 percent in 2012', 10 January. Available at: http://www.reuters.com/article/2013/01/10/us-china-carbon-intensity-idUSBRE9090I220130110.

For China, the principal policy imperative remains economic development, an aspiration in some respects at odds with tackling climate change despite growing domestic awareness of the issue. And efforts for a nationwide transition towards a low-carbon economy continue to encounter obstacles. Fears about the difficulties of a transition were reinforced when local Chinese governments struggled to meet the energy intensity targets of the 11th Five-Year Plan.

However, recent successes in moving away from carbon and expanding the renewable energy sector, the economic gains attributed to a reduction in carbon intensity, and increasingly ambitious actions on the part of the US and the EU have boosted China's willingness to make long-term commitments to reduce the use of carbon.

Cooperation, none the less, has been fundamentally hampered by disagreement between China and the EU over developed countries' responsibility for historical and future GHG emissions. China, in common with other peers in the developing world, consistently rejects any framework that does not take account of the differences in economic needs and historical emissions between developed and developing countries. The EU, by contrast, supports a sharing of responsibility for climate change action between developed and developing countries.

Although the Lima climate talks in December 2014 continued to be dominated by discussion about how to redefine the principle of 'differentiation' (the mechanism by which roles and responsibilities are assigned to each nation relative to its historical emissions and stage of development), China's 'pivot' on the issue led to an important breakthrough in this long-standing dispute. With the US–China deal and its language of 'common but differentiated responsibilities and respective capabilities, in light of different national circumstances', China set the tone for a redefinition of differentiation, to have greater scope for developing countries to shoulder climate responsibilities. References to 'common but differentiated responsibilities and respective capabilities' and to 'loss and damage' to compensate vulnerable countries for the impacts of climate change still made it into the final Lima text after a strong push from many developing countries, especially India. Resolving countries' remaining disagreements over differentiation will be one of the key diplomatic challenges for 2016.

China, in common with other peers in the developing world, consistently rejects any framework that does not take account of the differences in economic needs and historical emissions between developed and developing countries.

Partly as a result of its domestic agenda, notably the transition between the 11th Five-Year Plan and the 12th Five-Year Plan, China has made concerted efforts to improve its environmental image. This has been more than just posturing, as it has more confidently demonstrated its progress in implementing policies and technology that aid the transition towards a lower-carbon economy.[85] In the fourth quarter of 2014 alone, the Chinese clean energy sector received $17 billion worth of investment, compared with $8.2 billion received in the same quarter by the US clean energy sector.[86]

China's accession to the Durban Platform for Enhanced Action (ADP) at the Durban Conference in December 2011 provided the first indication that China might shift its position on differentiated responsibilities. The Durban Platform was a breakthrough in efforts to secure cooperation between

[85] G. York (2011), 'China emerges as rock star at Durban climate summit', the *Globe and Mail* http://www.theglobeandmail.com/news/world/china-emerges-as-rock-star-at-durban-climate-summit/article4180299/, 5 December.
[86] Bloomberg (2015), *Global Trends in Clean Energy Investment*. Available at http://about.bnef.com/presentations/clean-energy-investment-q4-2014-fact-pack/content/uploads/sites/4/2015/01/Q4-investment-fact-pack.pdf.

developed and developing nations over the drafting of a new climate change agreement by 2015. The ADP, notable in omitting mention of 'common but differentiated responsibilities', extended the Kyoto Protocol into a second commitment period (ending in 2017 or 2020) and established a track for the drafting of an agreement under which countries would face binding commitments after 2020. China agreed for the first time to negotiate emissions reductions 'with legal force' once the second Kyoto commitment period ends.

This apparent success was tempered by China's subsequent clarification of its position at the May 2012 Bonn intersessional meeting of UNFCCC committees. Fundamental differences between China and the EU on countries' climate change responsibilities were reflected in its insistence on the separation of discussions of pre- and post-2020 commitments (in order to allow negotiations to continue on developed countries' climate actions for the remainder of the Kyoto commitment period). China expressed concern about the omission of language on 'common but differentiated responsibilities' from the ADP, implying that this could allow developed countries to avoid binding commitments.[87] At the Warsaw Conference in November 2013, Su Wei, one of China's main negotiators, pointed out that he harboured 'serious concerns about the word "commitment"', which, along with support from other countries, had led to a focus on intended nationally determined contributions instead.[88]

However, China's increasing emissions and greater concern about issues such as resource security and air quality have brought it into closer alignment with the EU and the US on this front. The joint US–China announcement on climate change in November 2014 was a historic moment. It provided a major diplomatic boost to facilitate meaningful negotiations in the run-up to Paris 2015. But difficult obstacles remain in securing a new global deal, in particular the legal form of the Paris agreement (whether or not it will be a protocol), and the level of monitoring of country actions is an area of contention between the EU, China and the US.

[87] Su Wei, chief negotiator for China, named the United States, Europe, Japan, Canada, Australia and New Zealand as among countries abusing the Durban Platform 'to jump from the legally binding system' established under the UN Framework Convention on Climate Change (UNFCCC). See B. Lee, 'The EU and China: Time for a strategic renewal?', in G. Grevi and T. Renard (2012), *Hot Issues, Cold Shoulders, Lukewarm Partners: EU Strategic Partnerships and Climate Change*, European Strategic Partnerships Observatory, November. Available at http://fride.org/download/RP2_EU_Strategic_Partnerships_and_Climate_Change.pdf; and AFP (2012), 'China hits back at claims it is blocking climate talks', 24 May.
[88] See Bloomberg (2013), 'Climate Talks Near Impasse as China, India Seek Changes', 23 November. Available at http://www.bloomberg.com/news/2013-11-23/china-india-reject-durban-platform-text-at-un-climate-talks.html.

# Revisiting the EU–China Resource and Sustainability Agenda

The EU and China face big challenges to economic growth and stability. Specific risk factors include their growing reliance on imports of fossil fuels, their exposure to the impacts of climate change, increasingly volatile international commodity markets, and domestic environmental pollution and resource degradation. The pressure from these factors will increase in the coming decades.

This pressure can be successfully addressed only through increased bilateral and multilateral cooperation. Participation by EU member states in the new China-led multilateral institution, the Asian Infrastructure Investment Bank (AIIB), will allow the two sides to work towards building sustainable pathways for global development. And there are important strategic benefits from enhanced cooperation to create a stable, rules-based multilateral system that can underpin the development of a sustainable, prosperous and secure economy and society.

China and the EU can greatly increase their cooperation in promoting green growth and moving towards low-carbon, resource-efficient and resilient economies. This cooperation could involve continued market integration, policy coordination and consultation, and stronger practical cooperation on regulation and technology development, among other recommendations (see Table 2).

## Maximizing mutual benefits from enhanced market opportunities

Solar photovoltaic (PV) module prices have fallen by 80 per cent since 2008, by 20 per cent since the beginning of 2012 and by 12 per cent in 2014 alone.[89] This has been made possible by a combination of factors, among them the EU's commitment to renewable targets and China's manufacturing prowess, notwithstanding the recent trade dispute between the two sides. The fall in prices has also brought measurable benefits to the EU and Chinese economies. For China, the manufacturing of solar panels has increased export earnings and created a wide variety of applications and potential spin-offs, especially from solar PV, a high-tech sector.

For the EU, the low cost of producing solar panels in China has enabled a more rapid decrease in the prices paid in national renewable energy-support schemes. In Germany, for example, the support schemes for renewable energy such as the feed-in tariff have a six-monthly review based on technology costs and the volume of deployment. Thus falling technology costs directly affect the final consumer bill. Decreasing solar panel prices have also reduced overall system costs and supported European domestic jobs in the installation and maintenance of solar systems.

Both sides have already taken important steps towards greater resource efficiency, an area ready for further collaboration. Ongoing activities encompass sharing best practices in the collection and treatment of waste, improving the availability of waste and materials flow statistics, and increasing collaborative research on economic incentives for recycling. The development of a 'circular economy'

[89] Bloomberg (2014), 'Solar Boom Driving First Global Panel Shortage since 2006'. Available at http://www.bloomberg.com/news/articles/2014-08-18/solar-boom-driving-first-global-panel-shortage-since-2006.

– reforming industrial structures along ecological lines (with, for example, waste from one factory becoming a useful resource for others) – could help manufacturers to adapt their production to a resource-constrained world. Progress is evident: the efficient use of resources and the development of a recycling economy are prominent in China's 12th Five-Year Plan, and the European Commission launched the Strategic Implementation Plan of the European Innovation Partnership on Raw Materials in September 2013.

Building on the principles and priorities of the 2006 memorandum of understanding establishing an EU–China task force for sustainable trade, both sides should agree to intensify cooperation so as to maximize mutual benefits for sustainable development from enhanced trade and investment. They should:

- Agree to maintain, and to consider lowering, current levels of Chinese and EU applied tariffs on a mutually agreed list of low-carbon and environmental goods and services, and to work together to pursue further liberalization through the Asia-Pacific Economic Cooperation forum and World Trade Organization (WTO) processes.
- Recognize that the legitimate and continuing role of proportionate government support in promoting green growth must be balanced with the need to avoid barriers to trade. The two sides should agree to work proactively through a new working group on green growth under the EU–China High-Level Economic and Trade Dialogue (HLETD) in order to avoid unnecessary trade disputes in these fast-growing sectors by strengthening 'early warning' and other mechanisms for bilateral dialogue in advance of initiating formal WTO procedures on anti-dumping and subsidies. This would include working to enhance the mutual transparency of direct and indirect subsidies and support mechanisms, and to further the sharing of economic and industrial plans and policies in low-carbon and environmental sectors.
- Agree to give priority to the 'early harvest' of the liberalization of investment and services in the low-carbon and environment sectors in the EU–China investment agreement negotiations. This process will accord priority to areas relevant to green urbanization such as urban design services, environmental services, infrastructure, construction, professional services and industrial supply chains.
- Agree to identify a range of priority environmental and low-carbon sectors for the reciprocal liberalization of public procurement and to develop stronger facilitation procedures to ensure that these opportunities are more easily accessible by companies, including small and medium-sized enterprises.

## Promoting stronger EU–China cooperation on green growth

Europe and China have strongly increased bilateral cooperation on energy and climate change issues over the past decade. However, growth in formal processes has been outpaced by increased EU–China trade in low-carbon goods and in technology that encourages resource efficiency. Increased trade and investment in these goods and services has brought benefits to both sides in terms of lower prices, greater energy security, faster technology development and growing export opportunities.

Using scrap metal instead of ores for metals production also offers large resource-efficiency gains: carbon emissions and the use of energy and water in mining are reduced while most of the resource-intense processing and refining steps can be avoided. Producing aluminium, nickel, lead and tin from

scrap rather than through mining and refining reduces energy consumption by more than 90 per cent. For copper, the savings exceed 60 per cent. The size of carbon reductions is also large, with steel recycling, for example, generating less than half the carbon emissions of iron ore production. The metals recycling industry has grown rapidly over the past decade but the mining sector has grown even faster. Even for aluminium, one of the most intensely recycled metals, end-of-life ('old scrap') recycling accounts for less than a fifth of total supply, and this share has not increased since the early 1990s. For most other metals, the extent of recycling is much lower.

The European Commission has given priority to advanced manufacturing, which will involve establishing a public-private partnership on the sustainable-process industry through resource and energy efficiency and programmes on factories of the future, photonics and robotics. It will also involve upgrading innovation capacity and increasing the competitiveness of Europe's manufacturing sector.[90] Further cooperative measures could take in the following:

- Strengthening and enhancing the efficacy of the EU–China Partnership on Urbanization in helping to support China's internal reforms and mutual economic integration. Time-limited senior-level task forces could be created to outline the strategic context for long-term cooperation and to co-develop reform proposals based on best practice in China and the EU. These proposals could have lessons from existing city-level partnerships in priority areas such as urban governance and planning, smart- and resilient-infrastructure regulation, accelerated deployment of 'near-zero energy buildings' in China, decentralized green financing solutions and climate risk management, insurance and adaptation. The findings of these task forces would inform priorities in other areas of practical cooperation such as collaboration in developing and applying technology and the development of joint standards.
- Establishing effective mechanisms to link concrete cooperation on the ground, such as city-level partnerships, with strategic cooperation on energy, trade, investment and finance. This would include a coordination mechanism between the EU and China and also between the EU and member states/EU institutions, e.g. the EIB.
- Agreeing to establish an EU–China green growth forum. The forum would convene government and non-governmental stakeholders, among them businesses, think-tanks, academics and civil society, from China and Europe in order to deepen mutual understanding of the green growth process and to identify opportunities for enhancing practical EU–China collaboration. Its activities would take in:
    - Examining how better to align the ambition and focus on green growth issues of the Chinese 13th Five-Year Plan and the EU's 2020 Resource Efficiency Plan, 2030 Energy and Climate Package and proposed Energy Union.
    - Co-developing new approaches to domestic green and low-carbon finance instruments and institutions in order to accelerate the shift of public and private investment towards efficient, clean and low-carbon investment. Maximizing the value of European and EU member state public financial institutions (the EIB, the European Bank for Reconstruction and Development, the KfW [formerly the KfW Bankengruppe] and the Green Investment Bank) in supporting the reform and modernization of the Chinese financial system.

[90] European Commission (2014), 'Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions For a European Industrial Renaissance', January.

- Working to improve, align and ensure the better compatibility of low-carbon and green regulation for greater harmonization, mutual recognition and joint development of dynamic standards in key low-carbon and environmental-product areas; and also agreeing to give priority to collaboration on building standards, electrical appliances, car emission performance, alternative fuels and electric vehicle systems.
- Collaborating on approaches to reduce domestic environmentally damaging subsidies in ways that appropriately manage social and economic transitions.

## Urbanization and building standards

Urban areas account for 60 per cent of the total global population but are expected to record 90 per cent of future growth. Consumption of energy in urban areas accounts for between 50 per cent and 90 per cent of the final energy consumed in each country. In China, it accounts for about 65 per cent and in the EU 81 per cent.[91] China's new urbanization strategy proposes to increase the percentage of residents in urban areas from 54 per cent today to 60 per cent by 2020. According to some estimates, an additional 350 million people will be added to the Chinese urban population by 2030. This will require much new transport infrastructure, vast numbers of new buildings and a revision of the residency registration system. And without changes away from current practices in the construction, design and operation of these new cities and towns, achieving China's energy, environment and resource objectives will be severely challenged. The Chinese government has recognized this; and since 2012, the piloting of low-carbon provinces and cities has laid the groundwork for the development of a blueprint for future sustainable urban growth.[92]

China's new urbanization strategy proposes to increase the percentage of residents in urban areas from 54 per cent today to 60 per cent by 2020. According to some estimates, an additional 350 million people will be added to the Chinese urban population by 2030.

Measuring energy consumption in cities is complex, but the two major direct forms of consumption are the heating and cooling of buildings and personal transport. Among other important areas of consumption are infrastructure and the production of materials, most notably food, which are then imported into the city and consumed. Creating higher energy-efficiency standards in new buildings has been identified as a priority for reducing the GHG emissions associated with urbanization. In the EU, 40 per cent of final energy is consumed in buildings. The 2010 Energy Performance of Buildings Directive requires that all buildings constructed from 2021 should be nearly zero-energy buildings.[93] There is an earlier target date, 2019, for buildings that will be owned and occupied by a public authority.[94] Similarly, in the US, California's 'Title 24' building code mandates net zero status in all new residential buildings by 2020 and in commercial buildings by 2030.[95]

[91] International Institute for Applied Systems Analysis (2012), *Global Energy Assessment: Toward a Sustainable Future*.
[92] Chinese Government (2013), *White Paper on Developing Low-carbon Pilot Projects*. Available at http://www.china.org.cn/government/whitepaper/2013-11/10/content_30554712.htm.
[93] A nearly zero-energy building is defined as 'a building that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby'.
[94] *Official Journal* (2010), Directive, 2010/21/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast), L153/13, 18 June.
[95] R. Pernick, C. Wilder and J. Belcher (2014), *Clean Energy Trends 2014,* Clean Edge, March. Available at https://cleanedge.com/sites/default/files/CETrendsReport%20%28Globe14%29_0.pdf.

In China, where an estimated 1 billion square metres of new buildings are constructed each year, setting and enforcing higher efficiency standards will have a major impact on GHG emissions and energy consumption.[96] An increasing trade in services related to climate change adaptation and emissions reduction (e.g. building design and energy-efficiency management) could provide real benefits for EU companies and increase know-how and management skills in China. In 2012, China and the EU established the Partnership on Urbanization to tackle challenges through cooperative efforts. The following are options for further cooperative measures:

- Establishing an EU–China sustainable urbanization policy platform. This would work both bilaterally and with third parties, such as the International Energy Agency, to accelerate co-operation to facilitate the rapid introduction of policies and standards to reduce the resource consumption and pollution resulting from urbanization. The platform could initially focus on three main areas:
  - Establishing channels for collaboration on innovative and sustainable funding mechanisms for green infrastructure and urbanization, and drawing on the experience of institutions such as the EIB, leading to the establishment of a green urbanization investment agreement.
  - Enhancing cooperation on the development of zero-energy buildings and the systemic implications of larger penetrations of household-scale electricity generation technologies, in particular renewable energy and the need for energy storage and smart grids. Cooperation could be enhanced on defining and improving common performance and technical standards for low-carbon white goods.
  - Developing new methodologies and processes to enable greater public participation in infrastructure decision-making and urban planning.
- Deepening the engagement of the Partnership on Urbanization and ensuring that the proposed joint areas of work identified in the EU–China 2020 Strategic Agenda for Cooperation are undertaken and communicated.
- Accelerating joint research into the impacts of a changing climate on localized air pollution and the implications for a requirement for extremely rapid changes in behaviour, such as vehicle rationing and the retrofitting of buildings.
- Conducting more joint research into alternative metal alloys, composite materials and glass-reinforced and fibre-reinforced polymers, which are becoming more common in commercial construction, where they could displace concrete and steel.

## Getting the price right: obstacles and reforms

As in many countries, the pricing of energy in China remains a barrier to consumer-led investments in efficiency. A study of potential energy-efficiency measures in Jilin City in 2009 showed that about 0.5 million tonnes of $CO_2$ per year could be saved by 2020 by improving building standards. Yet owing to the low energy prices charged to consumers in the city, it would take about 30 years for consumers to recover their costs of investment.

[96] United Nations Environment Programme (2011), *Buildings: Investing in energy and resource efficiency*. Available at http://www.unep.org/greeneconomy/Portals/88/documents/ger/ger_final_dec_2011/9.0-BUI-Buildings.pdf.

Allegations of 'green protectionism' still undermine the fossil fuel subsidy-elimination agenda in many developing countries, as does the fear of detrimental effects on export competitiveness and foreign investment. As part of ambitious plans to address energy inefficiency in China since 2006, the government has been exploring ways to reduce subsidies and to incorporate environmental costs in the price. Price reform is key to changing incentives in all consumer bases, especially now that many of the larger opportunities for targeted measures in heavy industry and the power sector have already been realized.

The 12th Five-Year Plan has introduced several essential reforms to energy pricing, but further steps are needed before prices can reflect actual costs, especially those paid by the energy-intensive sector. Low resource prices contribute to high energy and water consumption in the short term and also discourage investments in efficiency. These distortions could also dampen the impact of a future price of carbon. The current energy-price reforms also have upper price limits that could be unsustainable if international oil or coal prices rise steeply.

China's tentative approach to reforming retail petrol prices exemplifies the concerns about the social and political impact of rapid changes in energy prices, especially among urban consumers. The duel aim of price controls introduced in 2009 was to limit the exposure of state-owned refiners to international oil markets while protecting consumers from price swings.

A variety of well-known political economy challenges make it difficult to push for ambitious domestic action – even, perhaps especially, in countries with ambitious goals. Energy-intensive companies constitute powerful lobbies in favour of the status quo and use all these challenges to defend their position. Many governments consider these industries, which are heavy users of fossil fuels, to be central to industrialization and competitiveness. Revenues from these sectors are critical for treasuries and grease the wheels of finance.

Incentives on the production side have encouraged excessive energy consumption. Faced with rapidly growing domestic consumption of energy and other resources, China has actively encouraged domestic production over the past decade. As is the case in many producer countries, this has led to strong lobbies in favour of maintaining production incentives, price support and other trade-related measures – the coal and steel sectors are two obvious examples. The International Energy Agency's most recent estimates show that fossil fuel consumption subsidies around the world amounted to $548 billion in 2013, albeit a $25 billion drop from 2012.[97] Subsidies to oil products were more than half the total. In 2009, the G20 called for its members to 'rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption', but a recent Overseas Development Institute study suggests that there has been little progress on this front.[98]

The Energy Union project put forward by Jean-Claude Juncker, the president of the European Commission, suggests that the EU may take more concerted action on energy reforms in future. Speaking at the European Commission in January 2015, the vice-president for Energy Union, Maros Sefcovic, said that the project would ensure 'that house heating prices are affordable to all and remain stable regardless of geopolitical instabilities around the world'.[99] The Energy Union is aimed at securing energy supply, building a single internal energy market, increasing energy efficiency, boosting renewable energies and furthering decarbonization. The success of this scheme will

[97] International Energy Agency (2014), *World Energy Outlook 2014*.
[98] E. Bast, S. Makhijani, S. Pickard and S. Whitley (2014), *The fossil fuel bailout: G20 subsidies for oil, gas and coal exploration*, Overseas Development Institute and Oil Change International, November. Available at http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9234.pdf.
[99] European Commission: DG Communication (2015), 'Concept of Energy Union framework – introductory speech at ITRE meeting', 26 January. Available at http://europa.eu/rapid/press-release_SPEECH-15-3700_en.htm.

depend on whether or not member states are convinced that such an ambitious project is necessary and whether or not there is a sufficient level of trust.

Strong interest groups have started to form around capturing low-carbon opportunities and avoiding climate insecurity. However, they are weaker, more dispersed and more poorly organized than the well-entrenched carbon-intensive lobbies. The low-carbon economy may have huge potential to generate employment and growth in a few years' time, but it is easier to mobilize political action around jobs that could be lost tomorrow.

New business models are needed, but so far few large carbon-intensive companies have made a commitment to a low-carbon future. The reality is that most governments and large companies are hedging their bets rather than pushing for transformation, including those in countries with the most ambitious low-carbon plans. In other words, they are trying to develop low-carbon sectors while also protecting traditional energy-intensive interests. Overcoming this stasis will require that stakeholders in China and the EU take the following steps:

- Establish a strategic dialogue on resource security, which would facilitate the introduction of national-level policy incentives, government procurement rules, market-creation schemes and pricing structures that reflect the full environmental and social impacts of energy use.
- Work together to reduce domestic environmentally damaging subsidies. It will be essential to set out clear timelines for this process and to create effective channels that allow parties to share technical expertise and ways of managing social and economic transitions.
- Recognize the importance of incumbent industries in policy-making and highlight the opportunities of technology or system change. There should be agreement to share experiences of low-carbon pilot areas and new systems analysis in the EU, China and third countries.
- Expand and enhance the scope of the recommendations of the OECD's 'Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence' to include G20 countries so that they help to ensure that projects financed by export credit agencies foster transparency and comply with minimum standards of environmental and social assessment.

## Working together in multilateral forums

As resource producers, consumers, exporters and importers of systemic significance, the EU and China can help to steer multilateral action on resource governance and low-carbon development. Both sides are heavily exposed to resource and climate insecurity, yet aligning policy objectives and scaling up collective ambition has been problematic. Concerns about competitiveness and repeated trade disputes have undermined trust at the political level, and meaningful collaboration has been restricted largely to the technical sphere. For example, the future supply of speciality metals such as rare-earth minerals and other 'critical' or 'strategic' metals has been a contentious issue in EU–China relations. Improving bilateral transparency, strengthening early-warning mechanisms and developing export-related disciplines in bilateral, regional and multilateral arenas will be central to maintaining trade and competiveness while facilitating more ambitious climate change commitments.

Several major economies are showing signs of taking a more resolute approach to stronger climate action, thereby improving the prospects for EU–China cooperation. In the US, for example, after a time in which climate change was regarded as a political unmentionable, the US–China announcement was unveiled in November 2014; and in his State of the Union Address in January 2015, President Obama

spoke of the threat from climate change.[100] Both these events have helped to smooth the way for a raft of joint climate initiatives at the political level between the US and China in areas such as hydro fluorocarbons, heavy-duty vehicles, industry and buildings, and carbon capture and storage. Similarly, they encouraged agreement in October 2014 on the EU 2030 Climate and Energy Policy Framework, the goal of which is to reduce GHG emissions by 40 per cent by 2030 compared with 1990.

The new Beijing-based AIIB provides an opportunity for Europe and China to work together to promote more sustainable and resource-efficient development. The AIIB, with authorized capital of US$100 billion, will invest in infrastructure projects encompassing railways, roads, airports, ports, telecommunications, water and urban resilience across Asia.[101] The bank will play a vital role in funding China's 'One Belt and One Road' strategy, with an estimated investment of US$1.6 trillion over 10 years coming from China alone.[102] With the UK, France, Germany and Italy joining as founding members of the bank, Europe can work with China to ensure that it adheres to higher standards on governance and to environmental and social safeguards.[103]

There are a number of other ways to further increase cooperation in multilateral forums. These include:

- Exploring new mechanisms, led by the EU and China, with which to reduce the impacts of short-term commodity price shocks in existing international institutions or newly formed multilateral groupings of governments; and enhancing transparency on production, trade and stock levels for energy and metals to help mitigate short-term commodity supply gaps and price shocks.
- Highlighting the co-benefits of low-carbon transition in different regions. In China and parts of the EU, a key co-benefit in view of the level of pollution and public concern is clean air; in the EU, it is energy security. These are both catalysts for very rapid changes in policy and investment, which in turn would also push forward the low-carbon agenda in existing China–EU partnerships such as the Partnership on Urbanization or the Working Group on Energy Security.
- Recognizing that the legitimate and continuing role of proportionate government support for green growth must be balanced with the need to avoid barriers to trade. There should be agreement to work proactively to avoid unnecessary trade disputes in these fast-growing sectors by strengthening early-warning systems and other mechanisms for bilateral dialogue in advance of initiating formal WTO procedures on anti-dumping and subsidies.
- Agreeing on the early completion of negotiations on the proposed EU–China Investment Agreement that aims to open up the markets for investment in both directions as well as increase the volume of bilateral investment between the two parties, with an emphasis on promoting sustainable and inclusive investment that respects environmental standards, especially for extractive industries.
- Agreeing to vigorously collaborate to help achieve an ambitious and credible international climate agreement at the UNFCCC negotiations in Paris in late 2015, thereby setting the international context for domestic green growth and facilitating the faster growth of global markets and investment.

[100] The White House (2015), 'Remarks by the President in State of the Union Address', 20 January. Available at http://www.whitehouse.gov/the-press-office/2015/01/20/remarks-president-state-union-address-january-20-2015.
[101] Caixin (2015), 'Expansion of AIIB Touches the Nerves of America and Japan'. Available at http://datanews.caixin.com/2015-03-18/100792401.html [Chinese].
[102] Sina Finance (2014), 'Planning for One Belt One Road Entering Final Phase with an Estimated Investment of US$1.6 Trillion'. Available at http://finance.sina.com.cn/china/20150107/013921238369.shtml [Chinese].
[103] BBC News (2015), 'France and Germany Join UK in Asia Bank Membership', 17 March. Available at http://www.bbc.co.uk/news/business-31921011.

- Establishing a working group tasked with informing and aligning China and EU policy objectives on collaboration on low-carbon zones and/or green growth overseas. This group should also investigate where responsibility for overseas collaboration would be best placed in China's and the EU's political and administrative structures.

## Strengthening common approaches to climate change and energy security

In the context of deepening areas of agreement on their climate change and energy security policies in the year of the 2015 Paris Climate Summit, China and the EU, along with other parties, should:

- Establish a joint EU–China working group on climate change governance that looks at the forward development of the international climate regime. Part of this would be the sharing and co-development of analysis of future climate scenarios and impacts and a discussion of the future role of the UNFCCC, international development institutions (including the New Development Bank), the G20 and disaster response and humanitarian systems.
- Agree to elevate the current official-level Energy Security Dialogue to ministerial level in order to facilitate discussion of forward policy development in the context of the proposed Energy Union and China's 13th Five-Year Plan. This dialogue, which could form part of the HLETD, would agree to focus on creating a 'consumer alliance' (instead of the conventional supplier-focused approach) for accelerating energy demand reduction through energy efficiency and the switch to domestic renewable energy sources. The dialogue would also agree to explore options for strengthening international rules governing trade and investment in natural resources, energy and raw materials in order to identify opportunities to improve the function of markets, reduce price volatility and reduce environmental impacts.[104] This process would also cover government support to resource trade and investment through export guarantees and public banks etc.[105] In addition, the dialogue could focus on internal energy reforms in the EU and China, especially with respect to the role of renewables and smart infrastructure involving fuels.

[104] This reflects elements of the EU objectives under a Transatlantic Trade and Investment Partnership on raw materials and energy. Available at http://trade.ec.europa.eu/doclib/docs/2013/july/tradoc_151624.pdf.
[105] This would build on recent European and Chinese action to apply environmental guidelines to overseas investments though public and private sector banks.

## Table 2: Key China–EU cooperation in climate change and resource security policy goals

| | Leadership for initiative | | |
|---|---|---|---|
| | China | EU | Cooperation |
| **Maximizing mutual benefits from enhanced market opportunities** | | | |
| EU and China signed up to declaration at Davos on market-liberalizing low-carbon and environmental goods | | | ✓ |
| Establish early-warning systems to avoid low-carbon trade disputes in new and rapidly expanding sectors | | | ✓ |
| Enhance dialogue within EU–China investment agreement negotiations on 'early harvest' of investment in low-carbon and environment sectors | | | ✓ |
| Give higher priority to environmental and low-carbon sectors in reciprocal public procurement liberalization, and strengthen facilitation procedures for clean urbanization | ✓ | | |
| **Green growth** | | | |
| Facilitate stronger dialogue and cooperation through a new green growth working group under the HLETD | | | ✓ |
| Expedite cooperation on innovation for advanced materials through cooperation on technology and existing dialogues | | | ✓ |
| Step up recycling rates through policy commitments and technical collaboration with the launch of the European Innovation Partnership on Raw Materials | | ✓ | |
| Deepen mutual understanding and help to identify opportunities for collaboration through an EU–China green growth platform | | | ✓ |
| **Sustainability of urbanization** | | | |
| Increase cooperation on defining common objectives and improving performance and technical standards for low-carbon white goods and lighting | | | ✓ |
| Encourage greater public understanding and support, crucial for wider climate and resource security | ✓ | ✓ | |
| Explore accelerated implementations of zero-energy buildings across climatic zones, building on experience in EU | ✓ | ✓ | |
| Define mutual outcomes for the Partnership on Urbanization | | | ✓ |
| **Getting the price right** | | | |
| Share experiences of carbon pricing and trading | | | ✓ |
| Conduct joint reviews of developments in resource taxes, introduced in China in 2011 but not yet in EU, and landfill taxes | ✓ | | |
| Share methodologies and increase transparency on environmentally harmful subsidies; China and US to make simultaneous review of energy subsidies | ✓ | ✓ | |
| Agree to cooperate on pilot areas and new systems analysis, in particular an assessment of the benefits of decentralization on efficient use of resources | | | ✓ |
| **Working together in multilateral forums** | | | |
| Strengthen international rules governing trade and investment in energy and natural resources in order to improve the function of markets, reduce price volatility and reduce environmental impacts | | | ✓ |
| Encourage the G20 to play a greater role in energy governance | | | ✓ |
| **Building common approaches to climate change and energy security** | | | |
| Facilitate ambitious climate change commitments such as the UNFCCC agreement in Paris 2015 | | | ✓ |
| Raise Energy Security Dialogue to ministerial level in order to facilitate discussion of forward policy development in the context of the EU's proposed Energy Union and China's 13th Five-Year Plan | | | ✓ |

# Conclusion

Over the past decade, the political and public priority of energy and climate change issues has waxed and waned as a result of national and international security events, technological developments and changing perceptions of the science related to climate change. The 2009 Copenhagen Climate Summit resulted in the setting of national and regional climate and energy objectives that many, certainly China and the EU, have used to frame their subsequent policies. On both sides, energy policies, combined with economic downturns, have contributed to emissions reductions being on track or even exceeding Copenhagen commitments.

However, the pledges made at Copenhagen, even if globally met, are likely to result in a global temperature rise that exceeds the 2°C target. In consequence, a more ambitious set of targets and associated measures will be needed for the post-2020 period, and they are expected to be agreed in Paris in late 2015.

Reducing dependence on high-carbon and, increasingly, imported energy resources remains a critical priority for both China and the EU. This involves, for example, clear policy incentives, government procurement rules, market-creation schemes and pricing structures that reflect the full environmental and social impacts at the national level in order to incentivize higher resource productivity and efficiency. The benefits of these approaches will multiply if large economies such as the EU and China work to establish common approaches.

There is still much work to be done in stepping up climate ambitions, but there are important lessons to be learned from the energy and climate fields for the wider issues of resource and environmental security. They include an understanding of the impact of resource prices on the economy, the role of international supply chains, the need for international cooperation and the importance of aligning domestic policies and measures across China and the EU. Well-functioning global resource markets will remain a prerequisite for the future growth and prosperity of China and the EU.

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This paper is based on work carried out as part of a research project undertaken jointly by Chatham House and E3G, with financial support from the UK Foreign & Commonwealth Office.

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ISBN 978 1 78413 069 5

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