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China's Expanding Overseas Coal Power Industry:

New Strategic Opportunities, Commercial Risks,
Climate Challenges and Geopolitical Implications

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The European Centre for Energy and Resource Security (EUCERS) was established in the Department of War Studies at King's College London in October 2010. The research of EUCERS is focused on promoting an understanding of how our use of energy and resources affects International Relations, since energy security is not just a matter of economics, supply and technological change. In an era of globalization energy security is more than ever dependent on political conditions and strategies. Economic competition over energy resources, raw materials and water intensifies and an increasing number of questions and problems have to be solved using holistic approaches and wider national and international political frameworks.

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Foreword

It is our pleasure to introduce the eleventh EUCERS Strategy Paper titled 'China's Expanding Overseas Coal Power Industry'. This is the third EUCERS strategy paper that focuses on the geopolitical dimensions of coal. Previous papers have assessed the future of clean coal, as well as long-term trends for the coal industry in light of international market realities and climate protection policies.

The eleventh EUCERS Strategy Paper evaluates the strategic implications of China's expanding overseas coal power industry. China is the world's largest coal producer, providing more energy to the world's economy than all of Middle Eastern oil production. It is also the largest energy and coal consumer, using nearly as much coal as the rest of the world combined. According to the 2015 BP Statistical Review, Chinese coal demand absorbs over 50 per cent of global coal consumption, which makes China the world's largest coal importer.

Against the backdrop of the December 2015 COP21 United Nations conference on climate change, this paper analyses China's mostly overlooked overseas investments in coal mining and coal power projects. In particular, it examines new strategic business opportunities, commercial risks, climate challenges, and geopolitical implications for European and global energy markets.

I would like to take the opportunity to thank our Research Director of the European Centre for Energy and Resource Security (EUCERS), Dr Frank Umbach, for writing this very important and insightful study and EUCERS' Research Associate, Mr Kaho Yu, for his contribution.

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Professor Dr Friedbert Pflüger

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Summary

China is the world's largest energy consumer overall and the largest coal consumer in particular, using nearly as much coal as the rest of the world combined. It is also the largest coal producer, providing more energy to the world's economy than the entire Middle Eastern oil production. Since 2011, it has also become the world's largest importer of coal.

But in contrast to China's oil and gas investments abroad, Beijing's expanded investments in foreign coal mining and coal power projects have failed to garner much international attention. This lack of interest exists, presumably, because the West does not see comparable geo-economic and geopolitical implications in these investments, even if said investments cast a shadow over on-going energy policy and emission reduction debates at the global climate summit in Paris and beyond.

This perception continues despite emerging and visible China-backed changes to the current international economic and geopolitical balance and infrastructure. Chief among these moves are both Beijing's new economic and diplomatic project One Belt, One Road (OBOR), as well as the developing world's mounting dissatisfaction with the West's refusal to providing financial support to coal projects in developing countries, where coal remains a key energy resource for economic growth. In this context, these countries have now turned to Chinese and new institutions such as the Asian Infrastructure Investment Bank (AIIB) for their financing needs. In addition, China may triple its global offshore assets and thus become the world's largest overseas investor in the next decade.

The limited debate on Chinese coal investments abroad also overlooks several factors. First, China and other countries are actively and increasingly exploring new coal options – in particular the gasification of coal. Second, as part of its official strategy, Beijing has continuously increased its overseas investment in coal mining and power projects during the last decade. Third, China may have the third largest coal reserves behind the United States and Russia, but it may last a decidedly low 30 years, which helps explain the Chinese search for coal import supplies and investment abroad. Finally, China is currently restructuring its own coal industry by closing many smaller, inefficient mines and companies.

Moreover, two other factors need to be considered in the context of China's current efforts to restructure its coal industry. First, it is important to question whether China may be merely following the U.S. and European examples of favouring foreign rather than domestic investment in energy intensive industries. Such a move would, in turn, have the added benefit of reducing domestic greenhouse gas emissions (GHGE), but at the cost of so-called carbon leakage by merely transferring CO₂ emissions to other countries and leading to even higher global GHGE.

Second, the weakening Chinese economic growth and recent stock market meltdown has triggered considerations to relocate foreign and Chinese production facilities elsewhere. But this situation might also constrain future investments at a time when the Chinese government has initiated a new geopolitical investment strategy. Likewise, it may also decrease China's foreign investment in coal mining and power projects.

Against this background and the recent global climate summit in Paris of last December, this study analyses China's overseas investments in coal mining and coal power projects. It sheds light on China's new business opportunities and risks, as well as on the geopolitical implications for European and global energy markets. By analysing developments in world markets and the major directions of China's future climate, energy and coal policies, the study reveals the following:

Global Coal Markets: Shifts in Production and Demand Patterns

- With a reserve-to-production (R/P) ratio of 110 years, coal will be available for much longer than conventional oil or natural gas reserves – 52.5 and 54.1 years, respectively –; while global coal reserves have been halved during the last decade due to rising coal demand particularly in Asia and China. Future technology and better prices could grant access to currently unusable coal concentrations that are 20 times larger than existing coal reserves.
- After oil, coal is currently still the second most important energy resource for global energy consumption. It is cost-competitive and not limited to any regions and countries. Coal is not just used as a fuel for coal-fired electricity generation and heat, but also to make steel, cement, fertilisers, and is a feedstock for the chemical industry.
- For more than 20 years, global growth in absolute volumes in coal-fired generation has been greater than that of all non-fossil fuel sources combined – including during the last few years.
- Almost all international energy organisations and experts expect global energy demand to continue climbing through 2040, with Asia experiencing the largest growth in energy needs.
- Similarly, coal is expected to continue to play a major role in global energy supply during this period; hence, global coal trade is expected to grow up to 40 per cent through 2040, mainly because of rising coal imports from China and India.
- Even though India is not expected to also replace China as the world's largest coal consumer after 2025 or 2030, its coal demand growth will have far-reaching consequences

given that Indian CO₂ emissions per capita are eight times lower than China's and thus have more room to grow.

- In addition, Southeast Asia energy demand is expected to grow by 80 per cent, while regional coal demand is forecasted to increase at the fastest rate among all energy sources and reach a level equivalent to India's present demand for the resource; all in all, Southeast Asia will remain a net coal exporting region.
- In the United States, the recent decline in domestic coal consumption and the growth of the natural gas industry have contributed to a reshaping of global and European coal markets.
- The global growth in demand for coal owes as much to Chinese and Indian energy development, as to coal's status as an inexpensive resource for energy generation in many other developing countries; as long as there are no viable cheap alternatives, coal consumption – and with it GHGE – may further increase in the years to come.
- Nevertheless, even a rapid expansion of renewable energy sources (RES) will fail to tackle the huge demand and supply problems, as reliable energy storage technologies are currently unavailable and the costs of a renewables-only electricity system is prohibitive for most developing countries.
- Coal remains an important option particularly for developing countries, given that it can sustainably meet their growing energy demand amid global population trends that point to a hike from the current seven billion people to over nine billion after 2040; in addition, almost one-third of humankind still lacks access to electricity.
- In this context, expanding both RES electricity generation and clean coal technologies may hold the potential of helping the world cope with its rising energy demand, while also providing a future perspective for countries' economic development.
- This reality, however, clashes with Western policies that make investment in new coal plants and mines exceedingly complicated, if not outright impossible; ahead and even in the aftermath of the Paris global climate summit, the energy schism between the West and the largely coal-dependent developing world has only grown larger.
- While countries had adopted new important national initiatives for the global climate conference last December, it appeared that the Paris summit would agree either on a less ambitious binding global agreement or a more ambitious non-binding agreement. Despite the much celebrated outcome, there are still fundamental uncertainties and differences of opinion regarding the implementation of the mostly unbinding final product.
- China's electricity demand has grown faster than in any other country in the world during the last decade, and may even double between 2012 and 2040; although this growth in demand is expected to decline in the future, Beijing needs to duplicate the entire U.S. electricity system between now and 2030.
- Most Chinese and international energy experts agree that China's coal consumption cannot be realistically replaced fully by gas, renewables and nuclear power before 2040; coal will remain the country's most reliable resource to guarantee base-load stability and energy supply security.
- China – together with Australia, the world's largest exporter of hard coal – has become itself a leading nation in promoting clean coal technologies, including carbon capture and storage and coal-to-liquids.
- At the same time, the Chinese government hopes to raise its non-fossil fuel share – nuclear, hydropower and other renewables – to 15 per cent of the national energy mix by 2020, and reduce its CO₂ emissions by at least 40 per cent between 2005 and 2020.
- Chinese demand for oil, gas, hydro, wind, and solar electricity generation is estimated to grow faster than in any other country; China is already the world's largest producer of renewable electricity and, together with Australia, has become a leading nation in promoting clean coal technologies.
- China's efforts to increase domestic shale gas production have faced a variety of complications – including insufficient investment and geological, technical, infrastructural, technological and topographical hurdles –, and the government thus had to revise its 2020 forecast from the previous target of 60-100 bcm to just 40 bcm.
- Declining oil and gas prices have also made any investments in often expensive gas projects even more uncertain, while the present coal oversupply and falling coal prices make any investments in new, more efficient coal power plants with less emissions equally more difficult.

Global Dimensions of Chinese Coal Imports

China's Energy Mix and Coal Policies

- China alone will account for around 40 per cent of the world energy demand rise from 2011 to 2025 and for some 31 per cent between 2011 and 2035.

- In 2014, China once again was the world's largest coal producer; however, its coal production and consumption declined for the first time – between 0.7 and 2.5 and by 2.9 per cent, respectively.
- Coal power plant capacity is projected to further rise by 420-600 GW by 2040, with plans to build an additional 50 modern coal plants; after 2030 at the latest, however, China's coal use may begin to decline as officially declared.
- The above mentioned plants would still produce an estimated 1.1 billion tonnes of CO₂ per year, leading to a drop in pollution in the largest cities that may, in reality, merely represent a shift to other regions; at the same time, the government plans to cap coal consumption and increase the country's coal plant fleet's energy efficiency standards (more details in the following section).

- As long as China remains heavily dependent on coal for more than 50 per cent of its primary energy mix, its remaining coal reserves may rapidly decline further and force the government to rely on increasing coal imports to satisfy national demand; in turn, this reality calls for the government to encourage and support the interests of its coal firms in foreign market, and to make the national industry more efficient at home and abroad.
- In the meantime, international coal prices have fallen to 12-year lows as a result of soaring global production, oversupply, and drop in demand – including from China and India; given China's structural economic crisis, this drop in global prices may prove not to be temporary.

Restructuring of the Coal Industry: More Energy Efficiency, Slower Growth in Demand

- Over the last 15 years, China has continuously tried to restructure its coal sector and industry, which is beset by about 10,000 small local and often inefficient coal mines with out-dated equipment and insufficient investment; additionally, they are beset by dismal safety records – 7,500 of these mines produce 20 per cent of national output yet represent 70 per cent of mine accidents.
 - Accordingly, Beijing has pushed through major structural reforms in the form of mergers and acquisitions in order to create 10 large coal companies, accounting for about 60 per cent of the country's total coal production, and reducing the overall number to 4,000 mines by 2015 (but failed to implement it).
 - Additionally, there is impetus for rationalizing and stabilizing national coal production capacity – originally planned in 2013 to decrease from its present 5.1 billion tonnes to 3.6 billion tonnes –; consequently, the government capped coal consumption at 4.2 billion tonnes and set a coal share of no more than 62 per cent of the primary energy mix for 2020.
 - In parallel, Beijing aims to further enhance the energy efficiency of the country's coal fleet, which at 37 per cent is already higher than the world's average of 33 per cent.
 - Equally important, in January 2013 the government fully liberalized the coal sector in order to promote competition and improve market functioning.
 - These efforts notwithstanding, the government has faced difficulties and encountered widespread opposition to the closure of small mines; in addition, consolidation is a longer-term process considering that the 10 top producers account for no more than 45 per cent of national output.
 - Coal production itself is moving westwards – to the cheaper, but more politically unstable Xinjiang province –, following depletion in old mining areas.
- cent more CO₂ than the United States, while in 2014 it outstripped those of the EU and United States combined; coal alone is believed to contribute to at least 60 per cent of airborne pollutant emissions.
- This situation has caused serious domestic environmental problems such as air and soil pollution; according to various independent estimates, China's air pollution leads annually up to an estimated 1.2 million premature deaths from coal-related respiratory diseases and air pollution, and it costs about 3.5 per cent of national GDP.
 - With huge state and foreign subsidies, China has overtaken the rest of the world as the biggest investor in wind power and other clean RES, yet it is still doubtful whether Beijing can meet its own energy efficiency and GHGE reduction targets by 2020.
 - In the spring of 2014, China declared a 'war on pollution,' with plans to improve air quality and reduce CO₂ emissions per capita by 40 to 45 per cent by 2020 from 2005 levels – in 2014, cuts were equivalent to 33.8 per cent vis-à-vis 2005. In 2014, for the first time, a record of additional renewable capacities may have surpassed the additional capacities of coal with its lowest increased level since 2004.
 - Despite new energy efficiency and climate mitigation policies in place and the reconfiguration of the Chinese growth model, China could still produce up to 50 per cent more emissions by 2030.
 - While the objectives of the U.S.-China Joint Announcement of November 2014 are relatively modest and in line with current policy priorities in both countries, it is significant in two respects: first, the world's two largest emitters added important political momentum ahead of the Paris summit, and, second, it highlights China's preference for cooperation with Washington over Brussels despite a proliferation of bilateral EU-China environmental and climate initiatives.
 - Going further, China unveiled new pledges on climate change for the medium term in June 2015, including the goal to cut CO₂ emissions per unit of GDP by 60 to 65 per cent by 2030 from 2005 levels.
 - To this end, China intends to expand its use of non-fossil fuels to around 20 per cent by 2030 from 11.2 per cent in 2014 by significantly expanding its capacity for hydro, wind, solar, and nuclear power by 2020; in turn, the country will need to make huge investments in new green infrastructure such as smart power grids, high-speed rail networks, and urban recharging systems for electric vehicles.
 - Furthermore, China has also announced changes to its statistics calculations in order to increase credibility and transparency, and it also launched the first carbon index of its kind in October 2015 in order to track and identify the carbon efficiency of companies.
 - These moves come amid ongoing scepticism regarding official government statistics and actions on coal

Chinese Climate and Environmental Policies

- Already in 2006, Beijing became the world's largest polluter – in 2012, for instance, it emitted some 60 per

consumption; in 2015, for example, newly released official data revealed that gaps in data collection had underestimated Chinese coal-related GHGE during the last years by about 17 per cent – an increase equivalent to more than Germany’s annual emissions –, which in turn has considerable implications for the level and credibility of China’s emission reduction pledges in Paris.

- In light of its present economic, energy and climate policy challenges, there are doubts that China may still make further commitments – particularly because of continued difficulties to push through and implement the current climate and environmental targets in its federal provinces and local administrations; as long-time observers have pointed out, Beijing lacks the tools to ensure long-term implementation at the local level.
- In the end, China’s decarbonisation strategy remains largely dependent on the effective expansion of its non-fossil fuels, which is still in doubt – the implementation targets for the expansion of conventional and unconventional gas by 2020, for instance, is already facing numerous problems and uncertainties.

Scenarios for a Peak in Coal Consumption and Emissions

- Before the release of China’s newly revised coal data and given the country’s flurry of climate policy activity, observers had started to wonder whether Beijing’s officially declared peak of GHGE and coal consumption by 2030 could take place even by 2020; these discussions were further fuelled by China’s falling GDP growth, the relocation of Chinese manufacturing companies abroad, and by low oil and gas prices.
- Nevertheless, this speculation may still fail to reflect the economics of coal and China’s energy reality; in fact, despite the drop in coal prices and the problems of Chinese coal mining firms, coal still retains a cost advantage of 40 to 50 per cent relative to gas.
- Likewise, lower GDP will admittedly reduce growth in energy demand and related emissions, yet lower international coal prices also make coal imports considerably cheaper – even when taking the devaluation of the renminbi into account.
- Furthermore, a peak in coal consumption does not necessarily correlate directly with a peak in emissions as long as China’s oil and gas demand keeps rising.
- By the same token, growth in new coal production capacity in 2014 was massive and dwarfed that of renewables – solar, wind, and hydro by 17, four, and more than three times, respectively.

Growth of Overseas Coal Investments

- Estimating China’s public financing of new coal power plants abroad is problematic given the overall opacity of Chinese statistics. Beijing, like other developing countries, is not required to provide information on loans,

guarantees, and insurances by export credit agencies or aid agencies, in contrast to OECD member countries.

- China has already risen to become the largest global provider of public financing for foreign coal power plants, with energy projects and stakes accounting for no less than two-fifths of Chinese US\$630bn in total overseas investments according to new estimates.
- New research shows that Chinese state-owned enterprises (SOEs) have already constructed, started building, or formally announced plans to build at least 92 new coal power plants in 27 countries; the combined added capacity of 107 GW would amount to a 10 per cent increase of the country’s own coal-fired electricity output. Public information available for less than a third of these plants reveals that at least US\$25 billion has come from Chinese commercial and policy banks.
- Other research suggests that China has provided financing to such projects to the tune of US\$21 to 38 billion, while another study estimated between US\$35 and 72 billion for Chinese-backed coal projects abroad at the planning stage.
- For many developing countries, Chinese terms for overseas coal investments and new finance strategies offer considerable cost advantages over Western developing banks and other international competitors; thus, Chinese coal investment has moved beyond its more traditional focus on South and Southeast Asia and reached other corners of the less developed world.
- Beijing’s finance strategies have more than a purely financial aspect and are, instead, part of an integrated geo-economic and geopolitical strategy; in this context, these strategies serve Chinese domestic energy policies and economic growth, while also bolstering the country’s geopolitical leverage and bargaining power at the regional and global levels.
- Following the Paris climate summit, China is facing increasing Western pressure to end support for coal projects abroad in order to achieve the agreed climate mitigation target of 1.5–2°C; nevertheless, Chinese implementation is far from clear and may ultimately depend on the country’s overall economic situation. Similarly, the attractiveness of overseas investments may increase in light of Chinese efforts to curb domestic coal consumption, which in turn may drive the Chinese coal supply chain to target its overcapacities abroad.

Context of Rising Dependence on Coal Imports

- The rise of coal imports has been primarily driven by China’s steady energy and coal demand growth, high domestic transportation costs, and the government’s overt efforts to boost national energy supply security.
- In this context, the following five factors stand out:
 1. High costs and bottlenecks in domestic coal transport, which make domestic production more costly

and imported coal more economically attractive, particularly in Southeast China;

2. Expansion of infrastructure, which became necessary in a context in which coal consumption was growing faster than coal production and railway transport capacity;
 3. The urge to save water for agricultural and human consumption and the need to comply with national and international environmental standards;
 4. The need to address the country's huge mining safety challenges; and
 5. The lack of specific coal resources, especially steam and coking coal.
- Going forward, in the best-case scenario, China's net imports could already peak by 2020 or even may have already peaked, although the country's electricity generation may increase up to 55 per cent that same year.
 - In the future, China will have to open new mines further west, where mining costs are lower, but transportation distance and costs are larger; in this regard and given its newly announced environmental targets, it remains to be seen whether Beijing may not only reduce its coal consumption by 2030, but also its coal import demand.
 - As part of its goals to reduce pollution, in 2014 Beijing introduced a coal-quality testing regime in order to ban coal imports with ash content higher than 16 per cent or sulphur content of more than one per cent in populous eastern cities; additionally, the government re-imposed duties on various imported coal types in order to safeguard domestic coal producers, with an emphasis on higher quality.
 - In the first five months of 2015, China's coal imports fell around 38 per cent vis-à-vis the same period of 2014; however, the decline appears mostly due to slower economic growth and lower energy demand rather than the result of its newly introduced climate policies.

Challenges, Opportunities, and Risks Ahead for Chinese Energy Firms

- Chinese SOEs still dominate many strategic industries – e.g. energy, telecommunications, transportation, and infrastructure – with monopoly benefits.
- Along with private companies, Chinese SOEs have a strong interest in foreign markets and have thus increasingly diversified their overseas investment during the last years – in 2013, they represented 63.4 per cent of Beijing's overall non-financial overseas direct investment – in response to declining profits at home and in order to acquire capital abroad, modernize supply chains, gain advanced technology, and improve management skills.
- Chinese firms have four chief criteria for investing abroad: 1) there are reliable resource supplies; 2) the project relies on Chinese equipment and technology; 3)

there may be a reasonable return on investment; and 4) the target country offers a relatively stable investment and political environment.

- The Chinese coal industry is a prominent overseas investor and has a wide international presence, particularly in Southeast and South Asia; these investments have enjoyed considerable national support in 2003, when the government started actively supporting expanded Chinese investments abroad.
- Investing abroad is the inevitable choice for the Chinese power industry if it wants to develop new markets, optimize industrial structures, and obtain high-quality resources and technologies aimed at improving international competitiveness and building a group of first-class comprehensive power companies.
- At the same time, these SOEs – irrespective of industry – still face a path full of difficulties that have led to poor performances and often to considerable financial losses; in particular, three challenges stand out:
 1. Operational transparency: in this regard, only about a third of companies understand the need for implementing transparency-related international standards or initiatives, and in general Chinese investors tend to underestimate the importance of communicating with civil society, trade unions, and NGOs.
 2. Corporate Social Responsibility (CSR): Chinese firms register, in general, low levels of CSR; this lack of awareness is only exacerbated abroad, where Chinese energy firm's CSR issues are commonly related to, among others, lack of compliance with local regulations, localization and labour practices, environmental protection, and community participation.
 3. Technical equipment issues: the Chinese coal power industry lacks an integrated global strategy and an emphasis on standards for their operations in foreign markets; therefore, in spite of the ever improving quality of China's coal and electricity equipment, failures in Chinese manufacturing technical equipment and mismanaged integration of advanced Western technologies are frequent occurrences.
- All in all, Chinese companies also have numerous new opportunities facilitated by the government's geopolitical moves as part of the OBOR Initiative (more details in the following section):
 - **SOE reform:** in an effort to boost competitiveness and increase mixed ownership structures, the reform would allow the central government to tighten its control over assets and overall strategy for macroeconomic development and direction, while at the same time loosening control over corporate governance at the micro-level.
 - **Enhanced investment opportunities in the OBOR neighbourhood:** These opportunities include regional demand for electricity, richness in resources, energy

infrastructure construction and market integration, and compatibility of regional coal reserves with available Chinese coal technology.

- Going forward, Chinese investors will have to cope with a series of risks, including those of a political, economic, and environmental nature; for instance, Chinese investment abroad has faced unprecedented opposition in light of local environmental pollution concerns, or fallen victim to the fraught security situation in some countries.

Strategic Perspectives for China's Overseas Coal and Energy Investments

- In OBOR, Beijing has merged previous policy tools and developed a new foreign policy concept with strong geo-economic dimensions; it makes China's neighbourhood the "top strategic priority for the first time" and places the country at the centre of an area that stretches over 65 countries – and includes 4.4 billion people – in Asia and Europe.
- OBOR is based on a pro-active engagement approach that foresees turning bilateral relations into more of a regional economic, foreign, and security engagement strategy underpinned and bolstered by multiple strategic initiatives; it envisions six corridors across Eurasia, which have often combined overland and maritime infrastructures.
- The Chinese government also regards OBOR as an instrument to tackle its currently worsening economic problems – recently, it officially linked OBOR to its domestic economic development strategy and views its activities as a new driver for future growth; at the same time, it is also a vehicle to strengthen the central government's direct control over China's economy as part of a more conservative economic policy.
- The present investment strategy focuses on six of the country's regions in the shipping, construction, energy, commerce, tourism, and comparative advantage manufacturing sectors; authorities also consider these investments as safeguards for social stability and lasting political order in China and its neighbouring regions.
- China's provinces will have to play a major role in the OBOR strategy, but will try to follow their own specific interests and further increase their influence on China's international economic and foreign policies.
- Beijing has at its disposal a significant number of investment instruments to support the implementation of OBOR:
 - In 2012 and with an overseas investment stock of US\$170 billion, it announced its intention to boost its direct investments up to US\$390 billion over the next five years.
 - The AIIB – created in 2013 and with 57 founding members – aims to expand road, rail, maritime transport links between China, Central Asia, the Middle East and Europe, and to support energy projects within the OBOR region; it was launched at the end of 2015 with a capital of US\$100 billion – 75 per cent of which came from Asian countries.
 - The New Development Bank (NDB), created by Beijing and the other so-called BRICS nations – Brazil, Russia, India, and South Africa –, will have an initial capitalization of just US\$50 billion, but its funding is set to double to US\$100 billion in the coming years.
 - A further US\$40 billion in a so-called Silk Road Fund will finance future infrastructures and transportation networks.
- The scope of these activities notwithstanding, the new economic difficulties in China may constrain the government's future investment plans and capabilities; furthermore, while the BRICS share some common interests, there are also diverging priorities, and neither Russia nor Brazil is in the economic position to contribute more heavily to the NDB.
- In the context of these investments and as China's future coal production continues moving westwards, the country's (politically unstable) Xinjiang region stands as particularly important; it is a major gas and crude oil region and home to the huge Tarim Basin.
- Currently, China is heavily investing in its partnerships with Turkmenistan and Pakistan; in the case of Pakistan, China has already announced a US\$46 billion infrastructure plan, with a large part of this money – US\$37 billion – going into various energy projects – mostly new coal plants.
- Western response to OBOR has been mixed: while some observers see a geopolitical tectonic shift in Eurasia, others interpret it as a reaction to a similar Obama Administration initiative from 2011; nevertheless, although both initiatives share broad similarities, the U.S. strategy was more limited in scope and was unable to commit sufficient economic, financial, and diplomatic resources.
- To Beijing's disappointment, the EU had initially largely failed to pay proper attention to OBOR; yet, a large number of European countries – including 14 EU Member States – have joined the AIIB, and Beijing has also increased its cooperation with Central and Eastern European countries in the so-called '16+1 Framework' in order to boost European support for OBOR.
- The OBOR initiative and future Chinese investments are highly dependent on a stable and politically safe region; China's border areas and neighbouring regions, however, have relatively low degrees of political stability, and as a result Beijing may have to increase security in its own border regions and in neighbouring Eurasian countries.
- Beijing's primary security concerns are linked to Afghanistan and its peace process, as it views Kabul's

porous border as a safe haven for insurgents from its Xinjiang region; China has consequently devoted more energy to the Afghan reconciliation negotiations.

Conclusions and Policy Recommendations

- Growing global and Asian demand for coal, depressed international coal prices, and limited investment opportunities for European coal power companies pose both risks and new strategic opportunities for Chinese and European energy companies.
- By the same token, this situation also provides new strategic perspectives for Chinese-European cooperation, which may in turn boost both energy efficiency standards and GHGE reduction efforts.
- Such an enhanced cooperation framework could provide tangible benefits to Chinese companies, for example, in the areas of energy efficiency and environmental technology, business know-how, and integration of environmental, CSR, and public image considerations into their operations.
- Western countries, however, have largely overlooked the geo-economic and geopolitical opportunities and implications of OBOR, as well as the prospects for common enhanced political and economic cooperation and joint business strategies.
- Limited or absent government and industry involvement by Europe and the United States may not only be economically counterproductive, but it also has the potential of undermining their own strategic influence; more worryingly, however, their lack of engagement may even negatively impact global climate and energy policies.

Introduction

China is the world's largest energy consumer overall and the largest coal consumer in particular, using nearly as much coal as the rest of the world combined. It is also the largest coal producer, providing more energy to the world's economy than the entire Middle Eastern oil production.¹ China is currently building 48 Gigawatt (GW) of new coal capacity and has approved almost 50 million tonnes (Mt) of new annual coal mining capacity last year, which will offset the planned closure of hundreds of smaller mines.² Since 2011, it has also become the world's largest importer of coal.³

In contrast to China's overseas oil and gas investments abroad, however, Beijing's expanded investments in foreign coal mining and coal power projects have failed to garner much international attention – presumably because the West does not see comparable geo-economic and geopolitical implications in these investments. China's increasing resource exploitation in Asia, Eurasia, Latin America, and especially in Africa, however, has often been called 'new colonialism'.⁴

This apparent disregard for the geostrategic implications of Chinese coal investments abroad exists in spite of Beijing's new diplomatic and economic project One Belt, One Road (OBOR) and mounting dissatisfaction in the developing world with U.S. and European energy policy. This discontent originates in the West's refusal to providing financial support to coal projects in developing countries, where coal remains a key energy resource for economic growth. Given the West's position, these countries have now turned to Chinese and new institutions such as the Asian Infrastructure Investment Bank (AIIB), which have stepped in to fill this financing vacuum.⁵ The AIIB

and the newly created BRIC-backed New Development Bank (NDB) stand as "perhaps the biggest challenge yet amounted to the Bretton Woods international financial architecture established in 1944."⁶ Furthermore, China may also reassess its array of investments given the expectation that it may become the world's largest overseas investor by 2020.⁷

To be sure, coal remains an important energy generating resource – both in the developed world and in developing nations. Indeed, even in Europe, the U.S. shale gas revolution has triggered a surge in European use of coal during the last years, with the International Energy Agency (IEA) forecasting in 2012 that coal may even rival oil as the world's top energy source as early as 2017.⁸ Worldwide, more than 2,300 coal-fired plants are currently operated – 620 alone in China.⁹ Since 2000, coal-fired electricity generation increased by 52 per cent up to 9,100 terawatt-hours (TWh). Moreover, the worldwide growth in absolute volumes in coal-fired generation has been greater than that of all non-fossil fuel sources combined since more than 20 years.¹⁰ In addition, global use of coal has even grown four times faster than renewables; only in 2014 did global coal consumption increase modestly.¹¹

In turn, reliance on coal poses a challenge to climate protection efforts, as the resource produces much more carbon dioxide, or CO₂, than oil and gas. Consequently, environmental NGOs have increasingly criticized it as a major roadblock for keeping the increase of average world temperature below 2°C, and have therefore demanded the end of all state-backed support to coal projects.¹² As the second most important energy resource in the global

1 See International Energy Agency (IEA), 'Cleaner Coal in China' (Paris: IEA/OECD, 2009), p. 3.

2 See IEA, 'Energy Technologies Perspectives 2014' (Paris: IEA/OECD, 2014), p. 74 and 'China Approves Nearly 50 Million Tonnes of New Coal Capacity', Reuters-Inside Power, Gas & Carbon, 7 August 2015.

3 In 2013 alone, China imported 264 Mt, ahead of 142 mt in Japan and 139 mt in India – see Jamie Smyth, 'Australian Miners Cry Foul over China Coal-Testing Regime', The Financial Times (FT), 5 July 2015.

4 According to this view, Beijing's overseas energy and mineral policy would trigger the so-called Dutch disease by importing resources and dumping cheap manufacturing goods, which would destroy domestic markets and increase environmental degradation in many developing countries – see also Yao Yang, 'Chinese Investment: A New Form of Colonialism', East Asia Forum, 24 July 2012.

5 In July 2013, both the World Bank and the European Investment Bank published their new lending strategies, which ended de facto any lending to greenfield coal power projects, except in "rare circumstances" (World Bank). Those banks have supported coal power plants in developing countries with more than US\$10 billion in the past five years. In December 2013, the European Bank for Reconstruction and Development (EBRD) also vetoed against any lending to coal projects, except equally for "rare and exceptional circumstances" – see F. Umbach, 'The Future Role of Coal: International Market Realities

vs. Climate Protection?', EUCERS-Strategy Paper Six, King's College, London, May 2015, and idem, 'Coal Ban Could Backfire on West and Impact Developing Economies', Geopolitical Information Service (GIS), 11 June 2015.

6 China's present global offshore assets might triple from US\$6.4 trillion to almost US\$20 trillion by 2020. Shawn Donnan, 'White House Declares Truce with China over AIIB', FT, 27 September 2015.

7 See Jamil Anderlini, 'China to Become World's Biggest Overseas Investor by 2020', FT, 25 June 2015.

8 See IEA, 'Coal's Share of Global Energy Mix to Continue Rising, with Coal Closing in on Oil as World's Top Energy Source by 2017', IEA News, 17 December 2012, and Javier Blas, 'IEA Expects Coal to Rival Oil by 2017', FT, 18 December 2012.

9 See Ailun Yang and Yiyun Cui, "Global Coal Risk Assessment: Data Analysis and Market Research," WRI Working Paper, World Resources Institute, Washington D.C., November 2012.

10 See the annual statistical analyses by BP, "Statistical Review of World Energy 2014", 64th Edition, June 2015 and the older annual versions.

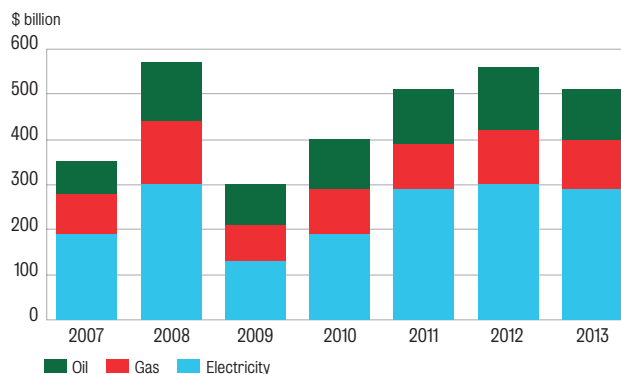
11 See BP, 'BP Review of World Energy 2015, June 2015, p. 5, 30 ff.

12 Climate activists argue that coal is not cheap, as its external costs – e.g. damage to the environment and public health – are currently not taken into account. See F. Umbach, 'The Future Role of Coal: International Market Realities vs. Climate Protection?'

energy mix, coal is considered the most carbon-intensive resource – 44 per cent of all energy-related CO₂ emissions –, ahead of oil and gas with 35 and 20 per cent, respectively. In 2012, only in the United States and in Europe were CO₂ emissions falling – 4.1 and 1.2 per cent, respectively –, whereas those in China and India were increasing – by 3.1 and 6.8 per cent. The further rise of coal consumption stands as the major reason for an increase in emissions, but is not limited just to China and India.¹³ As highlighted in a new analysis by the leading international climate expert and Intergovernmental Panel on Climate Change (IPCC) member Ottmar Edenhofer and his colleagues, this surge in coal use has also taken place “across a broad range of developing countries, especially poor, fast-growing countries mainly in Asia” due to relatively low coal prices; as a result, “viable alternatives to cheap coal will be required to ensure the participation of developing countries in global climate change mitigation.”¹⁴ In this context and ahead of the December 2015 global climate summit in Paris, international coal policies became an increasingly controversial and polarizing issue.¹⁵ While the United States and Europe are significantly reducing their coal consumption in order to meet their announced or agreed upon climate targets, a global divestment movement away from fossil fuels has surged in popularity since 2014.¹⁶ In fact, new research on 1,400 international funds during a two-year timeframe until 2014 even concluded that green funds have outperformed so-called black funds by more than 14 per cent.¹⁷ This policy scenario is further complicated by ongoing state subsidies to fossil fuels – some US\$550 billion in 2013 for coal, but largely for petroleum products¹⁸ –, which, despite cuts, still remain significant.¹⁹

Despite some new important national initiatives, it appeared that the Paris summit would agree either on a less ambitious binding global agreement or a more ambitious non-binding agreement. The Paris conference itself witnessed fundamental disagreements on how to share out carbon emission cuts between rich nations and fossil fuel-reliant giants such as China and India.²⁰ The much celebrated

Figure 1: IEA Estimates of Fossil-Fuel Subsidies 2007-2013

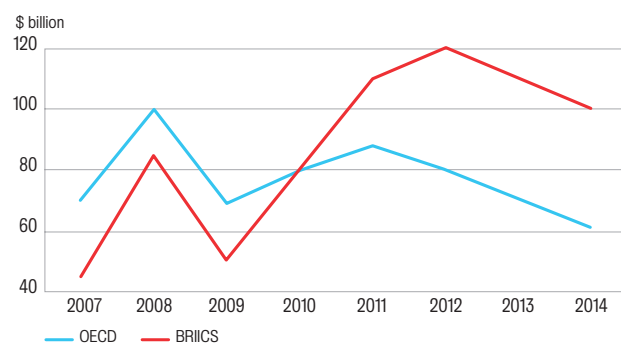


Source: www.interfaxenergy.com.

outcome notwithstanding, there are still uncertainties and differences of opinion regarding the implementation of the mostly unbinding final product.²¹ At the same time, both the United States and China seek more cooperation for finding a common vision for the climate talks in Paris by focusing on carbon trading plans in both countries. While Beijing has promised to ensure its emissions will peak around 2030, Washington has pledged to cut its emissions by 26 to 28 per cent from 2005 levels by 2025.²²

China's recent domestic and international energy moves have fuelled speculation that Beijing is already phasing out coal consumption and production as part of a green energy revolution. In this view, the landmark bilateral U.S.-China commitment has also raised new hopes of a new global deal on reducing GHGE after 2020 at the UN climate summit

Figure 2: Total Support of Fossil Fuels



Source: www.interfaxenergy.com.

13 See IEA, “World Energy Outlook (WEO) 2014” (Paris: OECD/IEA, 2014), p. 86 f.

14 Jan Christoph Steckel/Ottmar Edenhofer/Michael Jakob, ‘Drivers for the Renaissance of Coal’, Proceedings of the National Academy of Sciences, Vol. 112, No. 29, 21 July 2015.

15 See *ibid.*

16 See also Ed Crooks, ‘Fund Worth US\$2.6 trillion Pledge to Dump Coal’, FT, 22 September 2015.

17 See Chris Newlands, ‘Green Funds Beat ‘Black’ Funds over 2 Years’, FT, 20 September 2015.

18 Figure corresponds to the 34 OECD countries, as well as China, India, Brazil, Russia, Indonesia and South Africa. See IEA, ‘WEO 2014’.

19 Cuts to fossil fuel subsidies have been described as “alarmingly slow” – see ‘Progress on Cutting Fossil-Fuel Subsidies ‘Alarmingly Slow’’, Reuters – Inside Power, Gas & Carbon, 21. September 2015 and Annemarie Botzki, ‘Fossil Fuel Subsidies Staying High’, Interfaxenergy.com-Natural Gas Daily (NGD), 25 September 2015.

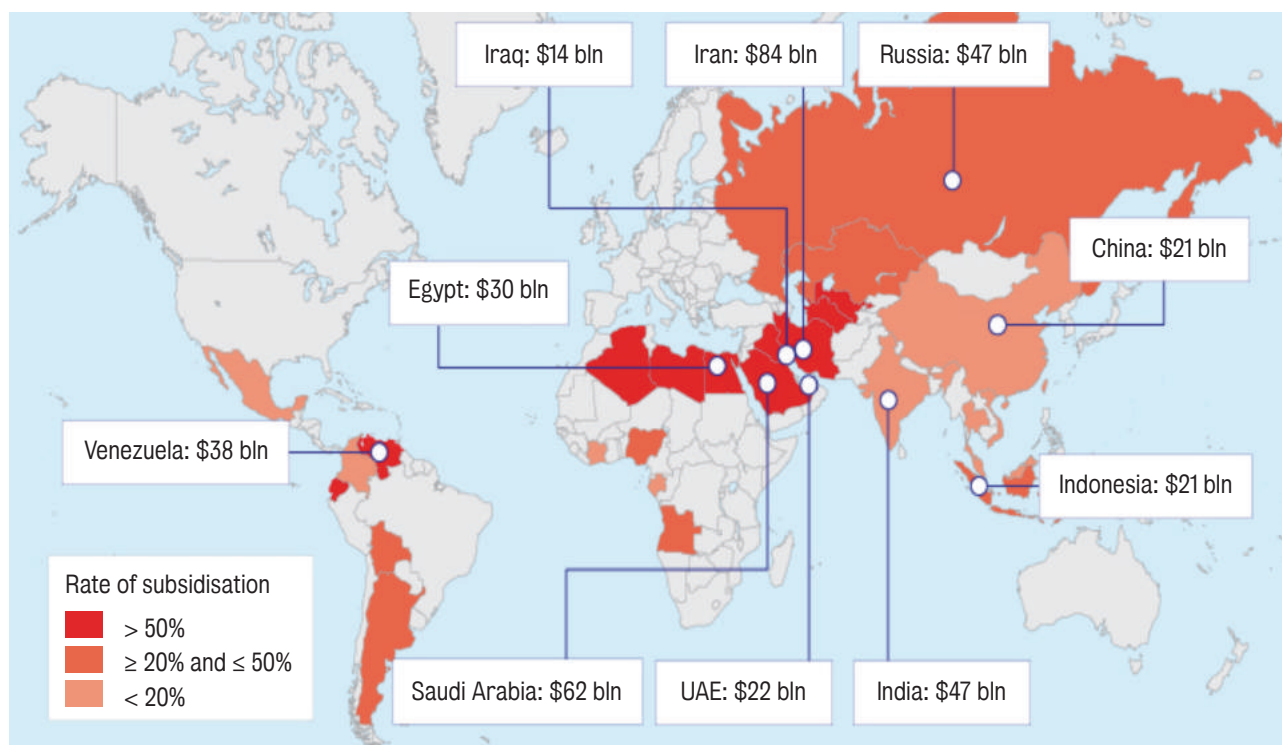
20 See also ‘New Strategy to Boost Flagging Climate Talks’, AFP, 4

September 2015; Peter Whaley, ‘COP-21: A Summary of the Pledges Made so far’’, CEEP-Report, 25 August 2015 and Pilita Clark, ‘Paris Pledges on Greenhouse Gases Still Fall Short’, FT, 16 September 2015.

21 See also Carole Nakhle, ‘After Paris Climate Deal, Major Changes are still a Long Way off’ GIS, 10 February 2016. Some countries, like India, have already declared that they will not change their initiated energy and coal policies.

22 See also Barney Jopson, ‘US Focuses on China Carbon Trading Plans’, FT, 25 September 2015.

Figure 3: Global Oil, Gas and Electricity Subsidisation Rates



Source: www.interfaxenergy.com.

in Paris.²³ Nevertheless, most Chinese and international energy experts agree that China's coal consumption – burning presently 2 billion tonnes of coal annually for power generation – cannot be realistically replaced in full by gas, renewables and nuclear power before 2040. Yet these discussions overlook three additional factors:

1. China and other countries in the world are actively and increasingly involved in new coal options – in particular the gasification of coal;
2. China has continuously increased its overseas investment in coal mining and coal power projects during the last decade as part of its announced strategy of 'supporting energy capacity going-out' of 2003; and
3. although China has the third largest coal reserves behind the United States and Russia, its production-reserve ratio (R/P) is critical with just 30 years compared with 262 years in the United States and 441 years in Russia;²⁴ it may also explain why China increasingly needs to look for new coal import supplies and overseas investment options in coal mining projects.

Moreover, two other factors need to be considered. First, it is important to question whether China may be merely following the U.S. and European examples of favouring foreign rather than domestic investment in energy intensive industries. Such a move would, in turn, have the added benefit of reducing domestic greenhouse gas emissions (GHGE), but at the cost of so-called carbon leakage, which often leads to higher global emissions.²⁵ Second, the weakening Chinese economic growth and recent stock market meltdown has triggered considerations to relocate foreign and Chinese production facilities elsewhere.²⁶ But this situation might also constrain future investments at a time when the Chinese government has initiated a new geo-economic and geopolitical investment strategy. Likewise, it may also decrease China's overseas investments in foreign coal mining and coal power projects.

²⁵ Carbon leakage occurs when, for reasons of costs related to climate policies, businesses transfer production to other countries with laxer constraints on greenhouse gas emissions and re-exports to the original production countries, which needs additional energy and produces higher emissions – see also Yuge Ma, 'Energy: China's Energy Strategy in the 'New Normal' Economy', GIS, 9 February 2015, p. 3.

²⁶ Its export-dependent manufacturing sector, which has been crucial for its past high economic GDP growth, is now facing major problems resulting from a weakening international demand, increased foreign competition, losing jobs and worsening demographic trends – see also Brendan O'Reilly, 'Economics: Rising Wages Threaten China's Vital Manufacturing Sector', GIS, 15 June 2015; 'China's 'New Normal' Showing First Signs of Strain', GIS, 23 July 2015 and Jamil Anderlini, 'China: Weakened Foundations', FT, 19 August 2015.

²³ See Li Xin, 'Next Five Years Crucial for Chinese Climate Pact', Interfax-NGD, 14 November 2014, p. 4.

²⁴ See BP, 'BP Statistical Review of World Energy 2014', 64th edition, June 2015, p. 30.

Against these background and questions, this joint study will analyse China's overseas investments in coal mining and coal power projects and shed light on China's new business opportunities and risks, as well as on the geopolitical implications for European and global energy markets. Considering that Western scholars have argued that China's overseas energy policy is largely the result of narrowing international investment markets and domestic interest group politics – i.e. state-owned enterprises, or SOEs –,²⁷ this paper will take into account both global energy and coal developments, as well as domestic factors determining China's future investment policies and strategies.

Thus, the study will begin by analysing developments in world markets and the major directions of China's future climate, energy and coal policies. It will also reflect the

present debate on whether China's coal consumption, coal imports and GHGE will have already peaked before or shortly after 2020 instead of the officially declared target year of 2030. As a next step, the paper will examine the main actors and their interests for investing in overseas coal mining and coal power projects. Then, the study will survey the risks, opportunities and challenges ahead for Chinese companies. On this basis, the study offers two examples in Indonesia and Sri Lanka by highlighting various problems of Chinese companies in implementing coal mining and coal power projects in foreign countries. Finally, the study will assess the short- and medium-term future of China's new Silk Road initiative and its geopolitical and economic implications for Beijing's future overseas investments in coal-mining and coal-power projects.

27 See Yao Yang, 'Chinese Investment: A New Form of Colonialism'.

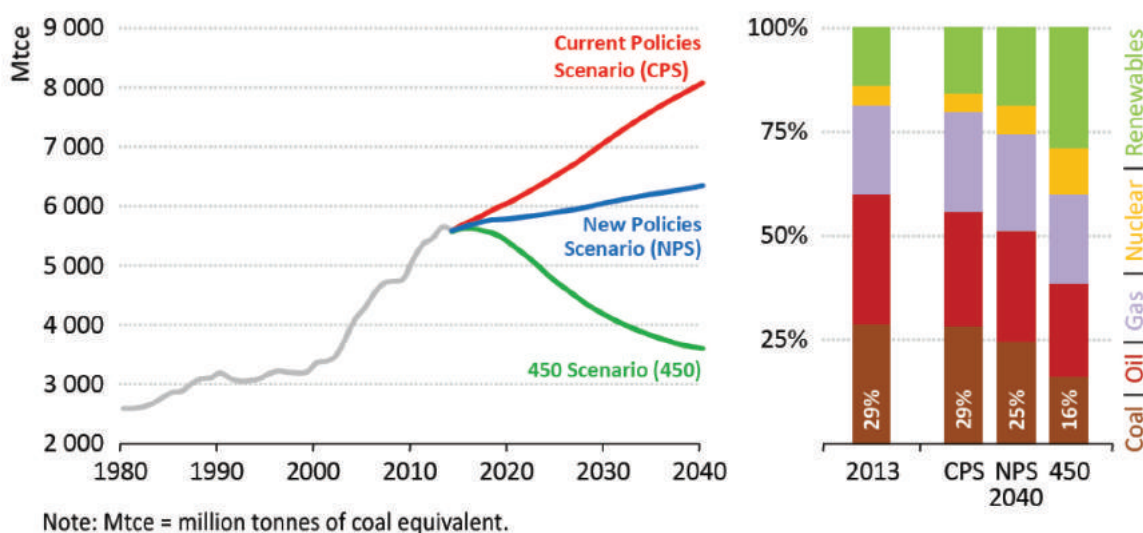
Global Coal Markets: Shifts in Production and Demand Patterns²⁸

Global Coal Developments vis-à-vis Climate Protection Policies

Instability in the Middle East and Ukraine has directed attention to coal as the most abundant and widely available fossil energy resource at the global level. While global coal reserves have been halved during the last decade,²⁹ with an RP ratio of 110 years, it will be available for longer than oil with 52.5 years and conventional natural gas with 54.1 years. Likewise, after oil, coal is the second most important energy resource in the world for global energy consumption. It is cost-competitive and not limited to any regions and countries – currently, 75 countries possess proven coal reserves of lignite, and in more than 50 countries, coal can be mined. Hard coal, together with lignite, accounts for not less than about 55 per cent of all fossil energy resources. Furthermore, coal is also used for making steel, cement, and fertilisers, and it is used as a feedstock for the chemical industry.

Between 2000 and 2012, coal-fired electricity generation increased by 52 per cent. For more than 20 years, global growth in absolute volumes in coal-fired generation has been greater than that of all non-fossil fuel sources combined – including during the last few years.³⁰ In 2013, coal again added more primary energy than any other fuel and was still the fastest-growing fossil fuel, with trade growing another 4.9 per cent, albeit lower than the 7.4 per cent from 2012. Coal consumption slowed down in 2014, however, largely because of slowing increase in global primary energy consumption, or PEC, by just 0.9 per cent in 2014 instead of a rapid change in the global energy mix and the expansion of renewables. All in all, global coal consumption grew by just 0.4 per cent in 2014 and thus dropped below the 10-year average annual increase of 2.9 per cent. At the same time, the IEA expects a 2.1 per cent rise in global coal demand by 2019 relative to 2013.³¹ In the meantime, international coal prices have fallen to 12-year lows as a result of soaring global production, coal

Figure 4: World Coal Demand and Share of Coal in World Primary Energy Demand by Scenario (IEA 2015)



Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

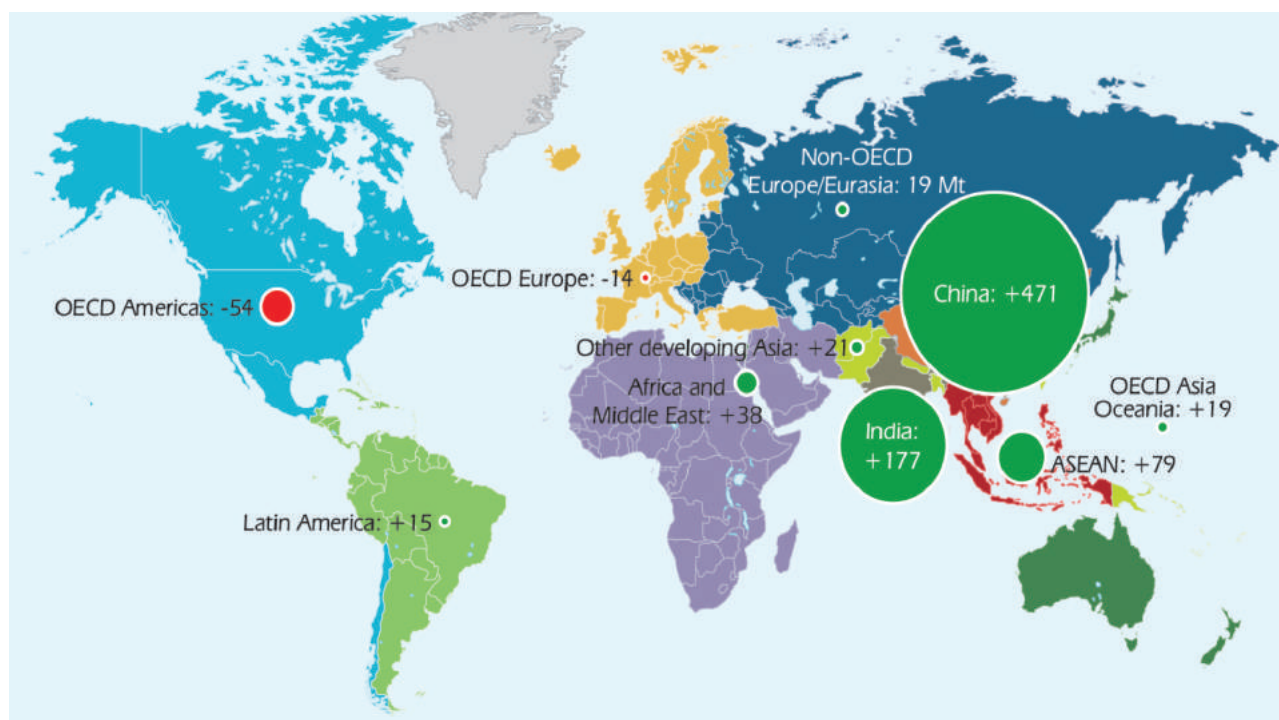
28 This chapter is partly based on a previous analysis – see F. Umbach, 'The Future Role of Coal: International Market Realities vs. Climate Protection?', but has been revised, updated and expanded.

29 In 2001, the R/P ratio of global coal reserves was still 216 years according to BP, 'BP Statistical Review of World Energy 2002', June 2002, p. 30. At the same time, coal resources are 20 times larger than coal reserves and could be exploited with slightly higher prices or future technological innovations.

30 See the annual statistical analyses by BP, 'Statistical Review of World Energy 2014', and the older annual versions.

31 The increase is equivalent to 6,462 Mtce, up from 5,690 Mtce in 2013. In this context, China's coal demand growth at 196 Mt. was again larger than in the rest of the world. At 188 Mt, China's energy consumption rise also decreased to just 2.6 per cent, but was still higher than in most other countries. See IEA, 'Coal- Medium-Term Market Report 2014. Market Analysis and Forecasts to 2019' (Paris: IEA/OECD, 2014).

Figure 5: Forecast of incremental global coal demand 2013-2019



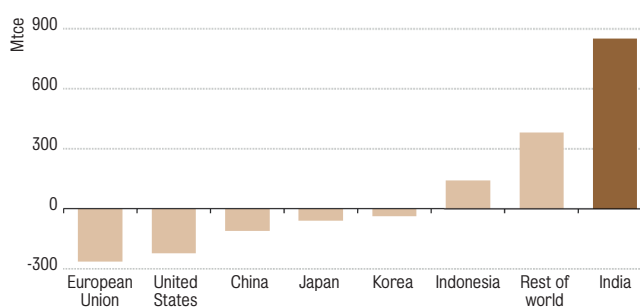
Source: © OECD/IEA (2014) IEA, 'Coal- Medium-Term Market Report 2014. Market Analysis and Forecasts to 2019'.

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oversupply, and a slowdown in global purchases – including from China and India.³²

The largest territorial states in the world – the United States, Russia and China – also hold the largest proven coal reserves. By region, however, Europe and Eurasia possess the largest proven coal reserves with the highest R/P ratio of 268 years, followed by the United States at 262 years.³³ Although the non-OECD Asia region is the main demand centre of global coal consumption, it only holds 30 per cent of global coal reserves. The total Asia-Pacific region has an R/P ratio of just 51 years and, therefore, needs to increase its coal imports in the years and decades ahead.³⁴ Eight countries dominate global coal production – see following figure –, accounting for 90 per cent of the total. By 2040, China, India, Indonesia and Australia alone are expected to account for more than 70 per cent of global coal output. India and Indonesia may overtake the falling U.S. production around 2030 and become the second- and third-largest coal producer, respectively, after China.³⁵

Figure 6: Change in Coal Demand by Selected Countries and Regions in the New Policies Scenario, 2013-2040



Source: © OECD/IEA (2015), 'World Energy Outlook 2015',

Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Furthermore, two factors need to be considered when analysing future global energy and coal demand. First, the world population will increase from the current seven billion to over nine billion after 2040. Second, almost one-third of world population – including an estimated 620 million in sub-Saharan Africa and 400 million in India – still lacks access to electricity.³⁶ Despite an expected rapid expansion of solar

32 See 'Coal Prices Fall to 12-Year Low as China, India Join Demand Slowdown', Reuters – Inside Power, Gas & Carbon, 19 August 2015.

33 See BP, 'BP Statistical Review of World Energy 2015', p. 30.

34 See *ibid.*

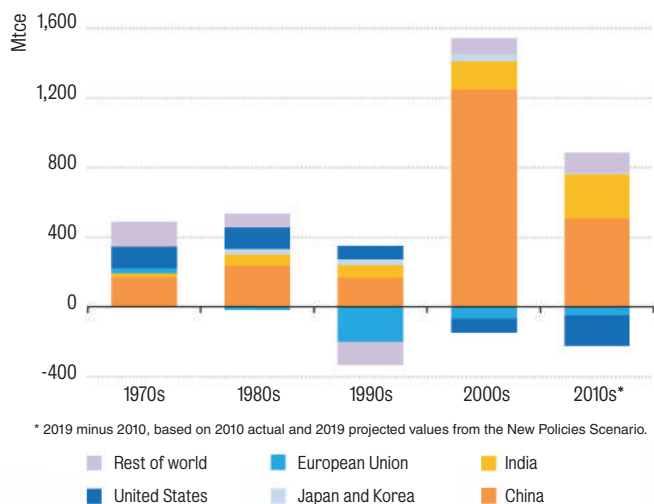
35 One factor for India's rapidly rising coal demand is also that it will become the most populous country in the world surpassing China. According to new analyses, it will happen already around 2022 –

much earlier than previously anticipated (2028) – see Rick Gladstone, 'India Will be the Most Populous Country Sooner than Thought, U.N. Says', *The New York Times*, 29 July 2015.

36 See IEA, 'WEO 2014', Paris 2014, pp. 23 ff.

and wind power in developing countries, the so-called 'green revolution' alone will not solve the huge demand and supply problems, as reliable energy storage technologies are currently unavailable and the costs of a renewables-only electricity system is prohibitive for most developing countries.

Figure 7: Change in Coal Demand by Key Region and Decade in the New Policy Scenario



* 2019 minus 2010, based on 2010 actual and 2019 projected values from the New Policies Scenario.

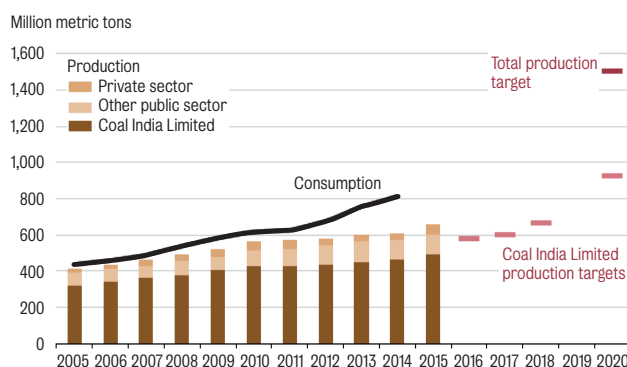
Source: © OECD/IEA (2014), *World Energy Outlook 2014*, Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Additionally, India will play a large role in the future development of global coal markets. This situation is expected to have far-reaching consequences for climate change mitigation efforts, as Indian CO₂ emissions are eight times lower than China's and thus have more room to grow. For instance, if India were to impose per capita emissions similar to those in China – which are higher relative to those in the EU –, temperatures would be expected to rise beyond 3.6°C. It is therefore hardly surprising that India refuses to take a similar deadline for capping emissions like China,³⁷ and Delhi has made it clear that it will not make commitments that may threaten its energy supply security or economic growth.

Similarly, the share of fossil fuels in the total primary energy mix will only slowly decrease from 82 per cent in 2012.³⁸ In

addition, nuclear energy will remain a key energy source – particularly in China –, with global output increasing by almost 60 per cent, although its overall share of global electricity generation will grow by just one per cent.³⁹ For their part, renewable energy sources (RES) will expand their share in the primary energy mix from 13 per cent in 2012 to 19 per cent, while they will reach one-third in global power generation. Furthermore, RES will account for almost 50 per cent of the increase in total electricity generation.⁴⁰ Finally, electricity generation will remain the fastest growing final form of energy demand. Global installed electricity generation capacity will grow from about 5,950 GW in 2013 to more than 10,700 GW in 2040 due to capacity increases, as well as replacement of retired plants.⁴¹

Figure 8: India's Coal Production will Double (2005-2020)



Source: EIA, 'India's Coal Industry in Flux as Government Sets Ambitious Coal Production', Washington D.C. 2015.

Moreover, the IEA projects a series of developments, but chief among them is its expectation that world energy demand will continue its steep rise through 2040. For one, primary energy demand should increase by 37 per cent; growth, however, is set to decrease from above two per cent during the last decade to just one per cent annually after 2025. Likewise, almost all growth will come from non-OECD-countries, with Asia accounting for 60 per cent of that growth and China alone making up more than one-third of the global increase in primary energy demand.

37 See also 'New Delhi Says 'No' to Emission Cap Deadline', *The Hindu*, 6 December 2014; Robert Wilson, 'The 'Historic' US-China Climate Change Deal Confirms that We Are Failing in the Fight against Climate Change', *Energy Post*, 20 November 2014 (<http://www.energypost.eu/historic-us-china-climate-change-deal-confirms-failing-fight-climate-change/>), Matt Hope, 'What Are We to Make of the U.S. and China's 'Historic' Climate Deal?', *ibid.*, 17 November 2014 (<http://www.energypost.eu/detailed-look-us-chinas-historic-climate-deal/>), Andrew Bolt, 'China, US Deal on Global Warming a Load of Hot Air', *The Australian*, 17 November 2014, Pilita Clark/Richard McGregor, 'China and US Deal to Curb Emissions Draws Mixed Response', *FT*, 12 November 2014; John Kemp, 'U.S. Climate Statement Is No Breakthrough', *FT*, 12 November 2014 and Pilita Clark, 'Q&A: the U.S.-China Plan on Climate Change', *ibid.*

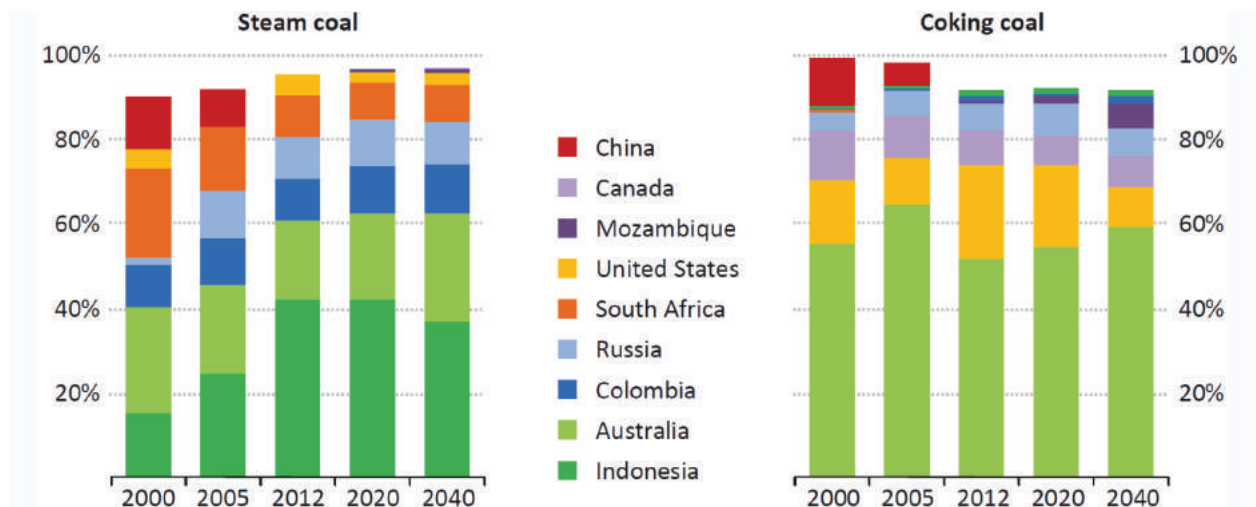
38 Fossil fuels will drop to between 60 and 80 per cent, depending on the policy scenario used – see *ibid.*, p. 55.

39 China alone will account for 45 per cent of global nuclear generation growth, followed by India, Korea and Russia – a joint 30 per cent. While nuclear generation is forecasted to decline by 10 per cent in Europe, it will rebound in Japan – albeit on lower levels prior to the Fukushima disaster – as well as in the U.S. – over 16 per cent – see *ibid.*, p. 27.

40 Wind power, followed by solar PV, will become the second largest of all power technologies after gas-fired capacity. RES-based electricity generation is projected even to triple from 2012 to 2040. Its output will increase more than coal and gas combined, accounting for 48 per cent of all incremental electricity generation. In the EU, the RES share in total electricity generation is expected to double to up to 46 per cent. See IEA, 'WEO 2014', p. 25 f. and 239 ff.

41 Almost 40 per cent of existing power generation capacity and 200 GW of RES capacity need to be replaced. In the EU, almost 60 per cent of the retired power generation capacity needs to be replaced – see *ibid.*, here p. 201 ff.

Figure 9: Share of World Coal Trade by Type and Key Countries in the New Policy Scenario



Source: © OECD/IEA (2014), 'World Energy Outlook 2014', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Figure 10: Global Primary Energy Demand 2013-2040 (in Mtoe.; IEA New Policy Scenario)

	2013	2020	2025	2030	2035	2040	2013–2040 (in % per year)
Coal	3,929	4,033	4,112	4,219	4,322	4,414	0.4
Oil	4,219	4,461	4,540	4,612	4,675	4,735	0.4
Gas	2,901	3,178	3,422	3,691	3,977	4,239	1.4
Nuclear Power	646	831	923	1,042	1,127	1,201	2.3
Hydro	326	383	426	467	502	531	1.8
Bioenergy	1,376	1,541	1,639	1,727	1,805	1,878	1.2
Other Renewables	161	316	442	591	758	937	6.7
Total	13,559	14,743	15,503	16,349	17,166	18,293	1.0

* average annual growth rate in per cent.

The numbers in brackets for 2020-2035 are those of the ambitious 450-Scenario linked with Kyoto's climate policies and its 2° C-target.

Source: Dr. F.Umbach based on © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Importantly, fossil fuels would still account for three-quarters of growth in primary energy demand and lead to a further rise of energy-related CO₂ emissions by another 20 per cent, as well as an average temperature increase of up to 3.6°C.⁴²

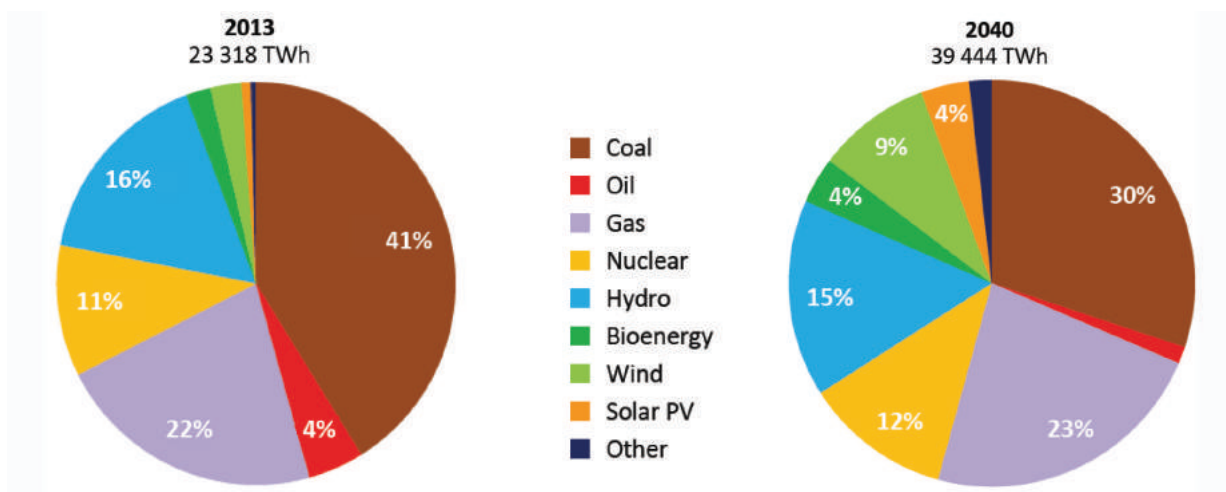
Importantly, the IEA predicts that through 2040 global coal consumption will further grow by another 15 per cent, although annual growth would reach 0.5 per cent instead of 2.5 per cent during the last decade. Almost two-thirds of this growth would take place within the next decade. At the same time, coal's share of global energy demand will decline from 29 per cent in 2012 to around 24 per cent, but

coal would still remain the world's second most important energy source just ahead of natural gas.⁴³ The EU, for its part, is expected to use 50 per cent less coal as part of its climate protection agenda.

43 Nevertheless, the IEA's different scenarios and other studies differ significantly in their conclusions due to several uncertainties and conditions. Similar research, for instance, forecasts that coal will remain the dominant fuel for power generation with more than a third of the inputs as part of a stronger growth of fossil fuels – see BP, 'Energy Outlook 2035', January 2015 (http://www.bp.com/content/dam/bp/pdf/Energy-economics/Energy-Outlook/Energy_Outlook_2035_booklet.pdf).

42 See IEA, 'WEO 2014', pp. 53 ff.

Figure 11: World Electricity Generation by Type in the New Policy Scenario



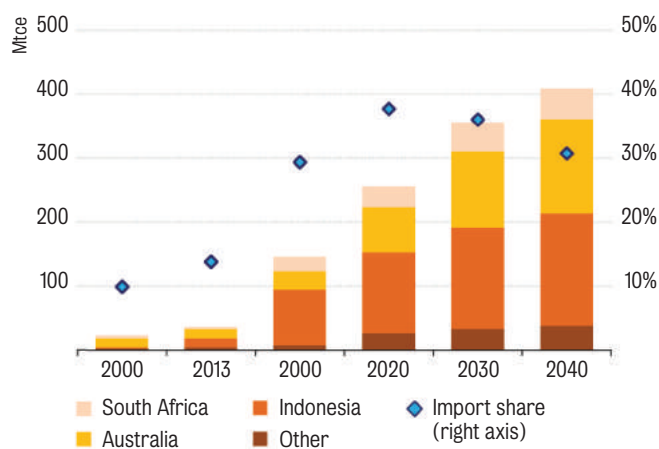
Note: Other includes geothermal, concentrating solar power and marine.

Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

These and other global efforts notwithstanding, the construction of coal power plants continues unabated. In Asia alone, coal will be the main energy resource for an extensive network of new power plants: currently, 851 new coal plants have been operating since 2010, and more than 500 are being built in 2015. Globally, 624 are under construction and over 1,000 plants have been planned.⁴⁴ Even acknowledging that not all these plans will come to fruition, this vast building programme starkly stands in the way of international climate protection policies. Against this background, the implementation of clean coal technologies could reduce these plants' emissions and significantly enhance their energy efficiency.⁴⁵

All in all, almost all international energy organizations and experts expect coal to continue to play a major role in world energy supply – at least through 2040. But a world without coal appears unrealistic even through 2050 and beyond. Most public energy debates ignore the fact that new coal production and coal transformation options for liquefying or gasifying coal are underway.⁴⁶ By the same token, on-going global energy developments and financing difficulties still make cheaper coal projects more attractive than RES, gas, and nuclear options. Consequently and all else being equal, a peak in global coal demand and trade appears unfeasible before 2030 to 2040. Hence, global coal trade is expected to

Figure 12: Coal Imports by Origin in India in the New Policies Scenario



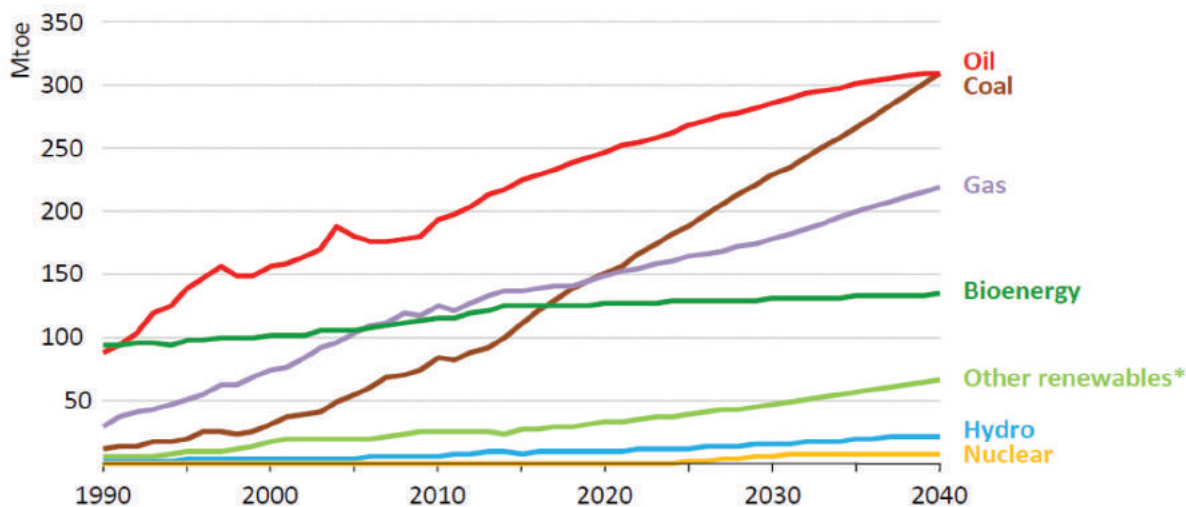
Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

44 See Florence Tan/Henning Gloystein, 'Natural Gas Losing its Shine as Asia Holds Faith in Coal Power', Asia Energy Stories of the Day/Reuters, 3 November 2015. According to another source, in 2012 some 1,200 coal plants had been planned across 59 countries, with three quarters in China and India alone – 363 and 455, respectively. The total capacity of these new plants was expected to increase the world's coal power capacity up to 1,400 GW – the equivalent of another China as the world's biggest emitter. See also Ailun Yang/Yiyun Cui, 'Global Coal Risk Assessment', Damian Carrington, 'More than 1,000 New Coal Plants Planned Worldwide, Figures Show', *The Guardian*, 20 November 2012.

45 The average global energy efficiency ratio in power generation is below 35 per cent. By the same token, the most efficient German and Japanese power plants, using ultra-supercritical technologies, have an efficiency grade up to 45 per cent. They emit some 25 per cent less CO₂ per MWh than a plant operating at average global efficiency – in other words, they can produce one-third more power with the same amount of coal. If all coal power plants used the ultra-supercritical efficiency technologies – 43 to 47 per cent –, coal-fired CO₂-emissions would be 17 per cent lower by 2040 in the IEA's New Policy Scenario. Likewise, CO₂ emissions would drop by almost 0.8 gigatonnes per year on average, or cumulatively by 17 Gt by 2040 – see IEA, 'WEO 2014', p. 180.

46 See also Henry Foy, 'Several Factors Conspire to Increase Fossil Fuel Use', FT, 22 October 2014.

Figure 13: Primary Energy Demand by Fuel in Southeast Asia (1990-2040)



*Includes solar PV, wind, and geothermal.

Source: © OECD/IEA (2015), 'Southeast Asia Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

grow by 40 per cent through 2040, mainly because of rising coal imports from China and India.⁴⁷

In particular, developments in Asia and the United States will strongly influence global demand for coal. Before 2020, India could have already overtaken the United States as the world's second-largest coal consumer as its annual coal consumption is expected to grow from 177 Mtce to over 250 Mtce.⁴⁸ Between 2012 and 2040, Delhi's import levels may more than triple and make up to 30 per cent of global trade.⁴⁹ Similarly, Southeast Asia energy demand is expected to grow by 80 per cent, while regional coal demand is expected to increase at the fastest rate among all energy sources, reaching 440 Mtce in 2040 – a level equivalent to India's present demand for the resource. All in all, Southeast Asia will remain a net coal-exporting region.⁵⁰ Moreover, developments in the U.S. shale gas and

shale oil markets will have a wide-ranging impact on global coal markets, as these developments could boost incentives for exporting U.S. coal, thereby lowering international coal prices even.

Another factor contributing to this sustained coal demand is coal's role as the only option that can sustainably meet the growing global energy demand at such a scale. As international studies have highlighted, from 1990 to 2010 some 832 million people gained access to electricity due to coal-fired generation in developing countries.⁵¹ Currently, around 1.2 billion people have no electricity supply, while another two billion people have little or inadequate access to power. A main goal of the 2010 Copenhagen accord is to provide energy to these impoverished populations as a key condition for education, economic growth and socio-political stability. Despite the falling prices of solar and wind power, RES-generated power is simply still too expensive, particularly considering the entire infrastructure investment and transformation costs for a new decarbonized energy system.

47 It will increase the share of global coal trade versus of the world coal demand from 18 per cent in 2012 to 23 per cent by 2040. Trade of global coking coal production will increase from 30 per cent in 2012 to 40 per cent by 2040, while steam coal production will rise from 17 per cent to 21 per cent, respectively – see IEA, 'WEO 2014', p. 173.

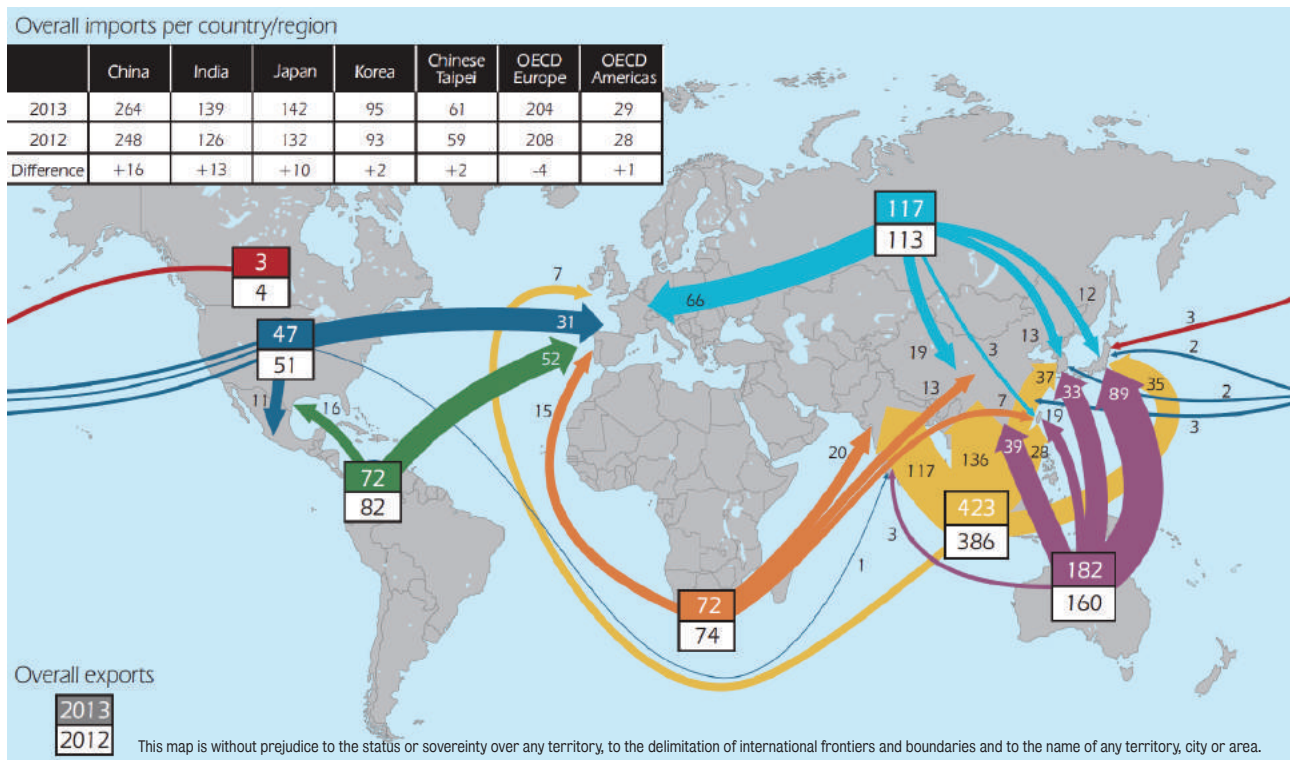
48 See also IEA, 'Coal – Medium-Term Market Report 2014'.

49 India's coal import dependence will rise sharply from 25 per cent in 2012 to 40 per cent by 2040 – see *ibid*, p. 184.

50 Southeast Asia's economy may triple its size, with its population reaching 760 million. The regional share of coal of the Southeast Asian power market will rise from 32 per cent to 50 per cent by 2040, whereas natural gas may decline from 44 to 26 per cent. Regional coal production may further rise from 450 Mtce to almost 680 Mtce by 2040 – see IEA, 'Southeast Asia. Energy Outlook 2015. World Energy Outlook Special Report' (Paris: OECD/IEA, 2015) and Florence Tan/Henning Gloystein, 'Natural Gas Losing its Shine as Asia Holds Faith in Coal Power', Reuters, 3 November 2015.

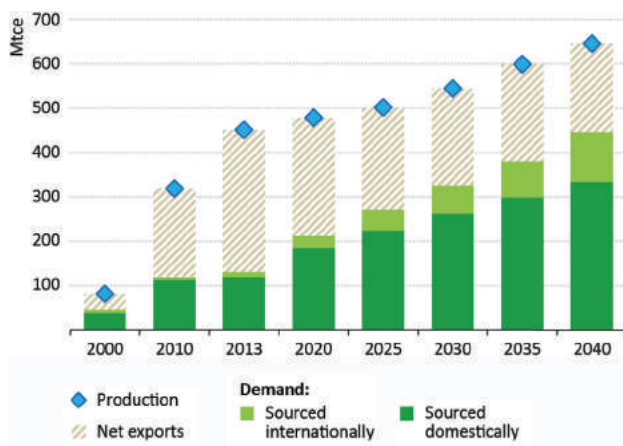
51 See Robert Price, 'Not Beyond Coal. How the Global Thirst for Low-Cost Electricity Continues Driving Coal Demand', Center for Energy Policy and the Environment (CEPE) at the Manhattan Institute Report, No. 14, October 2014, p. 2 and 9 f. – see also IEA, 'Global Value of Coal'.

Figure 14: Major Trade Flows in the Thermal Coal Market 2013



Source: © OECD/IEA (2014), 'Coal – Medium-Term Market Report 2014', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Figure 15: Southeast Asia Coal Balance in the New Policy Scenario



Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Furthermore, even if intermittent RES were to expand rapidly in developing countries, fossil fuel power plants would still be necessary for ensuring 24-hours electricity supply – the so-called base-load stability.⁵² Therefore, expanding, on the one hand, RES electricity generation

and, on the other, promoting sustainable coal supply and clean coal technologies may hold the potential of helping the world cope with its rising energy demand, while also providing a future perspective for countries' economic development. This reality, however, clashes with Western energy policies and supporting programmes, which presently make investment in new coal power plants and the coal mining sector exceedingly complicated, if not outright impossible in Europe and the United States.⁵³

U.S. Coal-to-Gas Transition and Emerging Role as a Global Export Leader

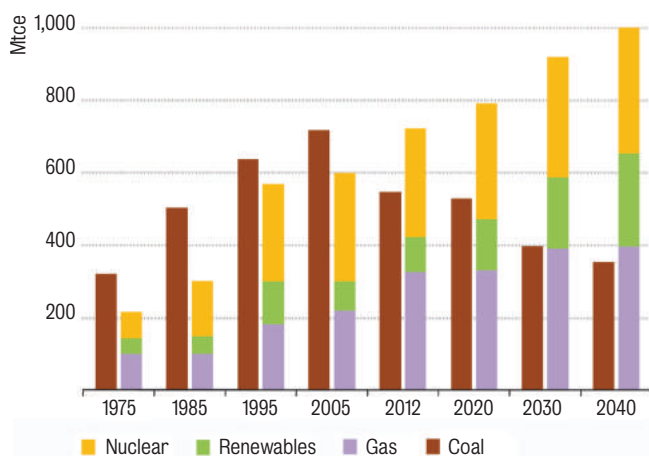
Several economic and policy factors are contributing to a situation in which the United States continues decreasing its reliance on coal for domestic power generation, with far-reaching consequences for global coal markets. For one, almost half the fleet of the existing coal-fired plants in the United States was built in the 1950s and 1960s and has subpar efficiency levels. Since 1964, hardly any new coal-fired power plants have been built. During the last years, a combination of relatively cheap shale gas and environmental regulations has accelerated a coal phase-out. According to U.S. government estimates, up to one-fifth of the present coal capacity could retire. But coal will still meet about 30 per cent of U.S. power demand under the new regulations by 2030 – down from 39 per cent in 2013.

52 See also Patrice Hill, 'As U.S. Scales Back, 'King Coal' Reigns as Global Powerhouse', *The Washington Times*, 4 March 2013.

53 See also Keith Johnson, 'Dirty Pretty Rock'.

The newly introduced environmental legislation and emission targets may further fasten the retirement of U.S. coal plants in years to come, although these developments also largely depend on the country's future political configuration. Overall, the IEA expects U.S. coal demand to fall by a third by 2040. Its coal share is set to decline to just nine per cent of the national energy mix, while the share of RES should grow to more than 25 per cent and may even double in electricity generation to 46 per cent.⁵⁴

Figure 16: U.S. Power Generation Fuel Mix in the New Policy Scenario



Source: © OECD/IEA (2014), 'World Energy Outlook 2014', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Likewise, the 'Clean Power Plan' of August 2015 – opposed by the U.S. coal and power industries – foresees additional energy standards in order to reduce CO₂ emissions by 32 per cent by 2030 vis-à-vis 2005 levels, and it also accelerates the economics of the U.S. coal-to-gas transition.⁵⁵ All in all, the Plan identifies four blocks of measures: (1) improved efficiency in coal-fired plants; (2) emphasis on combined-cycle gas-fired power; (3) more nuclear and renewable energies, and (4) improved end-use energy efficiency. Many older coal power plants are not expected to undergo modernization or replacement; instead, they would be closed or replaced by new, more efficient gas-fired power plants. Furthermore, many high-cost mines in the Appalachian region will be shut down, leading to lower production and exports after 2020.⁵⁶ Already before the new regulation, 163 coal fired generating units with a net summer capacity of almost 23,000 MW were scheduled to close between 2014 and 2017. The EIA expects about 60 GW of coal generation to shut down between 2012 and 2018.⁵⁷ At the same time, U.S. power generators are

currently closing more coal plants than anticipated two years ago – a considerable rate that, nonetheless, barely matches the pace of construction in India or China.⁵⁸ All in all, these closures have fuelled concerns that stable regional electricity supply might be at risk during peak demand periods.⁵⁹

Although some analysts regard it as the most ambitious climate change effort in the United States, the Plan may be much less radical than it appears at first glance. To its credit, besides the 32 per cent reduction in CO₂ emissions, renewable energy is anticipated to rise up to 28 per cent of electricity generation by 2030 – instead of the previously planned 22 per cent –, while coal would shrink to 27 per cent – previously 31 per cent. Nevertheless, according to some new estimates, by the end of 2015 the power sector's emissions will have already decreased by 18 per cent from 2005 levels – already enough to meet the Plan's emission cuts targets for 2022. Such dramatic reductions are the result of a variety of factors,⁶⁰ but especially of the implemented and announced retirement of some 206 coal plants during the last five years – the equivalent of one-third of the U.S. coal fleet's total capacity. In fact, in 2015 alone as much coal capacity retired in the United States as in the two decades before the Obama Administration. In this context, coal is currently supplying around 36 per cent of U.S. power – down from 50 per cent in 2005.⁶¹ Given the progress achieved, observers expect the decarbonisation rate to slow down between now and 2030.

Critics have also questioned whether the larger climate goals of the Obama Administration can realistically be met as long as the share of coal consumption remains as high as 27 per cent by 2030 – a decided improvement over the current 40 per cent of U.S. electricity generation mix, but still a relatively large share.⁶² Likewise, although the Plan confirms the intended coal-to-gas switch, the coal option may resurface whenever new gas-fired power plants may have to install clean coal technologies in light of cost-saving and efficiency considerations. Furthermore, the Plan gives

54 See IEA, 'WEO 2014', p. 65 f. and Keith Johnson, 'Dirty Pretty Rock', Foreign Policy, 29 January 2015.

55 In the summer of 2015, natural gas overtook coal as the primary source of U.S. electric power generation for the first time.

56 See *ibid.*, 196 f.

57 See also Ed Crooks, 'Cheap Natural Gas and Emission Rules Darken Future of U.S. Coal', FT, 9 December 2014.

58 By 2020, India may build about 2.5 times as much as capacity as the United States is about to lose. In addition, between 2010 and 2013, China added half the coal generation of the entire United States – see Stephen Moore, 'World Falls in Love with Coal That Obama Is Waging War On', Investor's Business Daily, 6 August 2015.

59 Independent researchers within the U.S. government are concerned that gas-fired generators may not replace coal plants fast enough. Some 42 GW – 13 per cent of the U.S. coal capacity – has been or will be retired by 2035; 15 GW has already been shut, and an additional 13 GW might be closed alone in 2015 – see Margaret Ryan, 'US Coal Shutdown too Fast, too Soon – Experts', Interfax-NGD, 22 September 2014, p. 7.

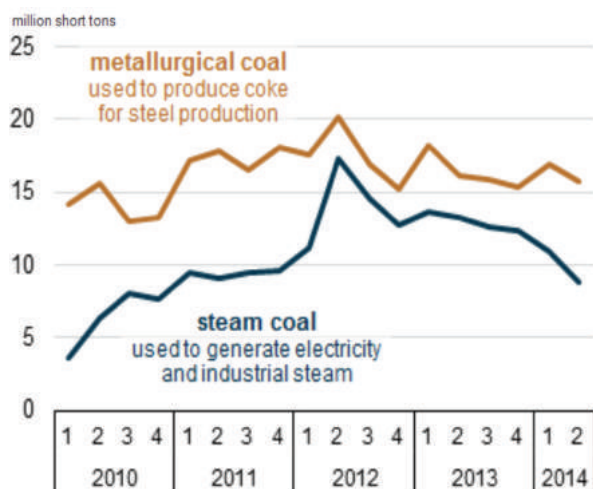
60 Not only is natural gas now a cheap alternative for power generation, but Americans are also using less oil – see Michael Grunwald, 'Keystone? Whatever. It's Coal that Matters', Politico, 10 November 2015.

61 See *ibid.*

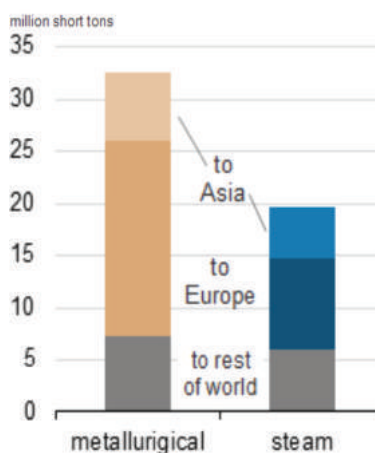
62 See also Michael Grunwald, 'Why Obama's Epic Climate Plan Isn't Such a Big Deal', Politico, 4 August 2015.

Figure 17: U.S. Coal Exports 2010-2014

Quarterly U.S. Coal Exports by type (2010-14)



U.S. Coal Exports (first-half 2014)



Source: EIA, 'U.S. Coal Exports Fall on Lower European Demand, Increased Global Supply', Washington D.C., 3 October 2014.

federal states ample room in terms of time and methods for implementing a specific reduction target.⁶³

All in all, this recent decline in domestic coal consumption has already made Washington a leading coal exporter and a strong factor in the reshaping of global and European coal markets. Between 2005 and 2012, U.S. coal exports increased almost threefold, although they dropped again recently.⁶⁴ Nevertheless, in the next years, U.S. coal exports are expected to remain relatively high, while coal prices will only slightly increase given current stock levels.⁶⁵ There is also the possibility of disruptions to these trends in light of environmental opposition to coal exports.⁶⁶ Regardless, U.S. coal export prowess and increasing demand in China and India have led to a de facto power shift to the Asia Pacific region and to a resulting outside factor influencing coal

prices in Europe.⁶⁷ Furthermore, European coal markets will be affected by strategic technological developments in China, which – together with Australia, the world's largest exporter of hard coal – has become itself a leading promoter of clean coal technologies – e.g. carbon capture and storage (CCS), coal-to-liquids (CTL), coal-bed methane (CBM) and underground coal gasification (UCG).

63 See 'U.S. Clean Power Plan – Future of Nuclear and Coal Uncertain', World Energy Focus, 15 September 2015.

64 Coal exports went from 45.3 mt to a record 114.1 mt in 2012, before decreasing slightly in 2013 to 106.7 Mt. In the last two years, coal exports already declined to 52.3 million short tonnes during the first half of 2014 – a 16 per cent drop relative to the same period in 2013 – see EIA, 'U.S. Coal Exports Fall on Lower European Demand, Increased Global Supply', Washington D.C., 3 October 2014.

65 For instance, of six proposed coal export facilities on the West Coast in 2013, three projects were already cancelled. See David Price/Catherine Robinson/Shankari Srinivasan, 'The Coal Connection. Impact of the US Market on Europe', p. 1.

66 See also Keith Johnson, 'U.S. Coal Finds Warm Embrace Overseas'; Patrice Hill, 'As U.S. Scales Back, 'King Coal' Reigns as Global Powerhouse', *The Washington Times*, 4 March 2013; and Richard Martin, 'In the West, Big Coal Makes a Stand', *Forbes*, 20 May 2013.

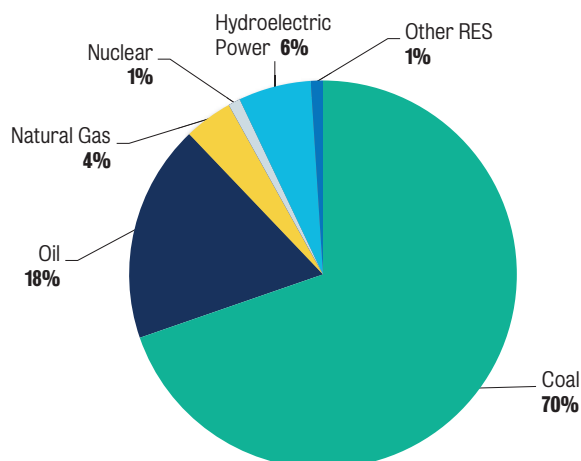
67 See also Federal Institute for Geosciences and Natural Resources (BGR), 'Annual Report 2010 – Reserves, Resources, Availability', Hannover 2011, p. 30.

China's Energy Mix, Coal Policies and Rising Coal Investments and Imports

China's Energy Policies at a Crossroads

As the world's most populous country and a fast-growing economy, China is already the world's largest energy producer, consumer and – oil – importer. Currently, fossil fuels meet about 80 per cent of China's power generation needs and represent more than 70 per cent of installed capacity in its power sector.⁶⁸ Nevertheless, the Chinese government hopes to reduce this reliance by expanding the role of RES, nuclear power and particularly natural gas. Importantly, China is already the world's largest producer of electricity from renewables and has plans to boost the RES share from 9.9 per cent in 2009 to at least 15 per cent of the national energy mix in 2020.⁶⁹ In 2011, it accounted for 28 per cent of global growth – more than the combined growth of the EU, the United States, and Japan.⁷⁰

Figure 18: China's Primary Energy Mix in 2013



Source: Dr F. Umbach based on BP, 'Statistical Review of World Energy 2013', 63th edition, June 2014.

At the same time, China faces similar problems with the expansion of renewables, as not all generated RES electricity can be transported to its private and industrial consumers due to the lack of existing modern grid systems and to insufficient speed to build new electricity networks. Similarly, the Chinese government has announced plans to increase its gas supplies – domestic production and imports – from 174 bcm in 2013 up to 420 bcm by 2020. Moreover, China will expand its nuclear power generation and represent around half of the global increase by 2035. It will become the largest producer of 'climate-friendly' nuclear power after 2030, and Beijing is event set to add more nuclear power capacity than the total installed U.S. capacity at the moment.⁷¹

Nevertheless, Beijing has to cope not just with the transition to a more environmentally friendly energy framework, but also simultaneously with a further significant growth of its primary energy demand.⁷² Against this background, boosted RES, nuclear, and gas consumption will fail to replace coal in the next decades, and it will instead merely decrease its anticipated growth by 2030. China's electricity demand has grown faster than in any other country in the world during the last decade, although this growth is set to slow down – from almost 12 per cent to 4.8 per cent between 2012 and 2020, and just 2 per cent annually in 2021-2040.⁷³ Nonetheless, Beijing still needs to duplicate the entire U.S. electricity system between now and 2030.⁷⁴

China's 12th Five Year Plan for Natural Gas (2011-2015) – Production Targets for 2015

Demand	230 bcm
Total conventional and unconventional gas production	176 bcm
Conventional Gas production	138.5 bcm;
Shale Gas	6.5 bcm
CBM	15 bcm (originally 30 bcm)
CTG	15-18 bcm
LNG import terminal capacity	25.3 bcm

68 See EIA, 'China. Analysis Briefs', p. 33.

69 The RES share in China's generation mix will grow from one fifth in 2011 to one-third in 2035.

70 Beijing is projected to triple its RES energy generation from 841 TWh to 2800 TWh in 2035, and it will account for almost 50 per cent of the net increase of renewables in global electricity generation. While three quarters of global solar manufacturing is taking place in China, these solar panels are mostly exported – Beijing has still to create a market for domestic installations for its production. Its wind power capacity will cover around 30 per cent of the capacity concentrated in three major regions together with the EU and the U.S., totalling some 70 per cent of the global one – EIA, 'China. Analysis Briefs', pp. 31 ff. and F. Umbach, 'China's Growing Hunger for Energy Resources', GIS, 5 September 2014.

71 It currently has 21 nuclear reactors in operation and another 28 are under construction. By 2020, it will have raised its nuclear power capacity from the present 10 GW to at least 70-80 GW. The Chinese State Council Research Office (SRCO) has recommended expanding it up to 100 GW by 2020, 200 GW by 2030 and 400 GW by 2050 – see *ibid.*

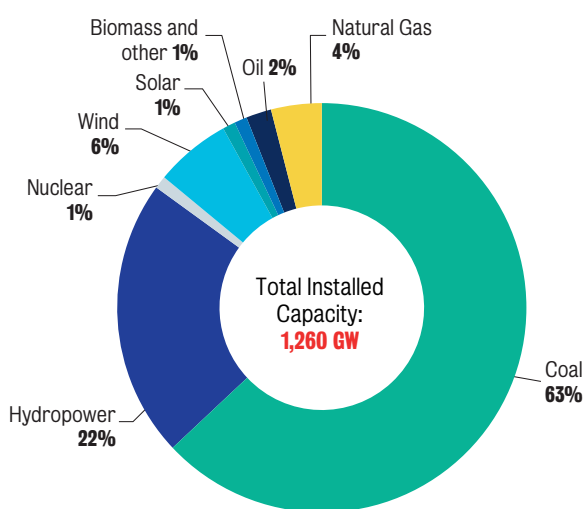
72 While China's share of global energy demand was just 12 per cent in 2002, it almost doubled to 22 per cent in 2012 and is forecasted to rise further to 24 per cent in 2025.

73 See IEA, 'WEO 2014', here p. 234.

74 China needs to build up an additional electricity generation capacity from coal and nuclear power that would be equivalent to the total U.S. capacity in 2012 – see Keith Johnson, 'Dirty Pretty Rock'.

In this context, experts assert that the 'golden era of coal' in China might already be over.⁷⁵ The annual growth rate of coal-fired power will fall from more than 11 per cent in the decade prior to 2012 to just 0.6 per cent between 2030 and 2040. At the same time, China will remain by far the largest coal producer throughout 2040, yet India could replace it in regard to its total coal consumption.⁷⁶ By 2040, China is projected to consume about 80 per cent more than the United States, while demand for oil, gas, hydro, wind, and solar electricity generation is estimated to grow faster than in any other country. China alone will account for around 40 per cent of the rise in world energy demand from 2011 to 2025 and for some 31 per cent between 2011 and 2035. Furthermore, Beijing's electricity demand may even double between 2012 and 2040.⁷⁷ All in all, over the next twenty years China will require total energy investments of \$4 trillion in order to keep its economy running and to avoid electricity blackouts and power shortages.

Figure 19: China's Installed Electricity Capacity at the End of 2013



Source: F.Umbach based on EIA, 'China. Analysis Briefs', 14 May 2015.

China's conventional and unconventional gas strategy stands out as particularly ambitious, and it already faces a number of difficulties.⁷⁸ Expanding its share of gas consumption makes sense for China from both a strategic economic and environmental perspective. On the one hand, gas poses fewer problems than the expansion of nuclear power and can help the country meet its goals of reducing the share of coal in

75 See IEA, 'Coal. Medium-Term Market Report 2015. Market Analysis and Forecasts to 2020' (Paris: IEA/OECD, December 2015) and 'Coal's Golden Era Over, Says IEA', EurActiv, 18 December 2015.

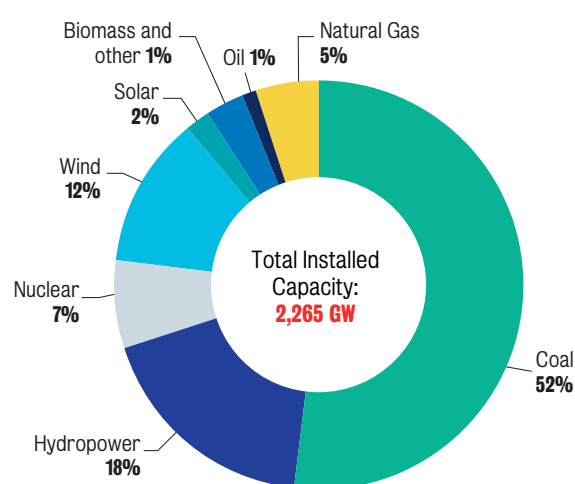
76 All in all, the IEA has even projected that China may need to import 8 per cent of its huge domestic demand for coal – see IEA *ibid.*, pp. 182 and 192.

77 See IEA, 'WEO 2014', p. 206, and 'China: A Potential Opportunity to Consolidate the Coal Industry', 19 July 2013.

78 See also Li Xin, 'Next Five Years Crucial for Chinese Climate Pact', Interfaxenergy.com-NGD, 14 November 2014, p. 4.

annual energy demand from the current 58 per cent to 53 per cent in 2035. On the other hand, gas can support Chinese authorities' efforts to tackle air pollution issues, and it also represents the most realistic energy option for achieving China's 2020 GHGE reduction goals.⁷⁹ China already surpassed Japan as the third-largest natural gas consumer in 2009, yet the share of gas fell short of expectations and barely reached 5.9 per cent in the national energy mix in 2013. Beijing's future gas demand is expected to grow at an average 6 per cent per year and become the largest in the world. Its consumption levels in 2013 are projected to quadruple by 2035 – from 169.2 to 530 bcm –, yet even this higher demand will be equivalent to just 50 per cent of that in the United States by 2035, which already is and will remain the world's single largest gas consuming country. China's gas power generation capacity will grow to 60 GW by the end of 2015; gas use in the power sector alone has been forecasted to grow six fold to around 160 bcm.⁸⁰

Figure 20: China's Installed Electricity Capacity Planned in 2040



Source: Dr. F.Umbach based on EIA, 'China. Analysis Briefs', 4 February 2014.

Significantly, China hopes to boost domestic gas production in order to meet growing demand and limit import dependence. The country aims to triple its own gas production from 121 bcm in 2013 to 320 bcm in 2035. Its current gas production comes largely from conventional gas reserves – 117 of 121 bcm –, though conventional gas fields have struggled to keep up with demand. Against this background, China has been a net natural gas importing country since 2007, with imports ballooning to 30 per cent of national gas demand in 2013 and now set to increase further to 50 per cent by 2020.⁸¹ In the end, however,

79 Beijing hopes to reduce CO₂ emissions by at least 40 per cent between 2005 and 2020 – see also F. Umbach, 'China's Growing Hunger for Energy Resources'.

80 See *ibid.*

81 China's future gas import dependence may further rise up to 154 bcm by 2020 and may exceed around 210 bcm by 2035.

reality may exceed these estimates, as projected gas production will considerably depend on further progress in China's unconventional gas production – shale gas, coal-bed methane or CBM, and tight gas –, as well as widespread reforms and timely investments in its wholesale gas sector. In a sign of the several roadblocks to this gas strategy, already in 2014 China had to adjust and scale down its planned production growth of unconventional gas reserves.

Additionally, the potential for shale gas exploration and production in China is substantial. The country possesses 31.6 tcm of technically recoverable shale gas resources – almost as much as the United States (32.9 tcm) or even the world's largest holders of gas reserves. Nevertheless, China's geology is much more complicated and its shale gas resources are in significantly deeper formations than in the United States, which in turn raises production costs. Furthermore, China's water shortages are also a complicating factor in some regions, although current technology is constantly reaching new levels of efficiency in water use and drilling time.⁸² The official production target for 2015 is just 6.5 bcm, but it is set to reach 120 bcm by 2035.⁸³ Concerns about these production targets remain, however, as several complications forced China to revise its forecast for 2020 downward from as much as 100 bcm to over 30 bcm.⁸⁴ Similarly, China may also miss its production target for 2015.⁸⁵

China's technically recoverable unconventional gas reserves

Shale gas resources	31.9 tcm
CBM	11 tcm
Tight Gas	12 tcm

While China's environmental policy and the September 2013 Action Plan are essential for a greater role of natural gas in its primary energy consumption, China's conventional and unconventional gas developing projects have faced increasing difficulties during the last years. They have delayed numerous natural gas projects and set lower as well as less ambitious targets, hence making the overall shift from coal to gas more difficult and costly. Moreover, the declining oil and gas prices have made any investments in often expensive gas projects even more uncertain. By the same token, the current coal oversupply and low prices

make any investments in new, more efficient coal power plants with less emissions more difficult.⁸⁶

In the end, it is important to bear in mind that despite China's efforts to expand gas projects and the resource's share in the national energy mix, the Chinese government does not want to become overly dependent on imports of an additional energy source. Instead, Beijing is merely interested in having a balanced and diversified national energy mix with a lower coal share and a higher contribution from non-fossil fuel resources in order to reduce the country's CO₂ emissions. No longer relying on its own indigenous coal reserves would only serve to heighten Beijing's perceived geopolitical rivalries and anxiety about national dependence on imports of maritime oil, gas, and coal via unstable Sea-Lines of Communication (SLOCs) and Choke points.

China's Dependence on Coal and its Global Dimensions

China – together with India – will be the single most influential country in global coal markets. Beijing's tremendous growth in power generation during the last decade was based upon the expansion of coal-fired power generation, accounting for 75 to 80 per cent of China's overall increase in its power generation.⁸⁷ In 2013, Chinese thermal and lignite coal demand accounted for almost 69 per cent of non-OECD demand.⁸⁸

Already in 2005, China's government established a coal production limit of 2.6 billion tonnes for 2010, but its actual coal output reached 3.24 billion tonnes.⁸⁹ In 2012, it consumed more than twice as much coal as in 2000 and more than half of the globally produced coal.⁹⁰ In 2014, China produced 3,748 Mt and was again the world's largest coal producer, yet, remarkably and for first time, its coal production declined by 0.7 to 2.5 per cent – the largest volumetric fall in the world – and its consumption by 2.9 per cent relative to 2013.⁹¹ This decline partially stems from a slowdown that year in the rise of China's primary energy consumption or PEC to just 2.6 per cent, which was nevertheless still higher than in most other countries of the world.⁹² In this context, global coal consumption grew by just 0.4 per cent in 2014 and was significantly below the 10-year average annual increase of 2.9 per cent. This lower

86 See *idem*, 'Next Five Years Crucial for Chinese Climate Pact'.

87 Power generation capacity increased from 1,388 TWh in 2000 to 5,023 TWh in 2012 – see also IEA, 'Coal – Medium-Term Market Report 2014', p. 63.

88 See *ibid.*, p. 70.

89 See Kevin Jiangjun Tu, 'Chinese Goal: Key to a Global Climate Solution', East Asia Forum, 7 January 2013.

90 See EIA, 'China', Analysis Briefs, p. 29.

91 See IEA, 'Coal Information. IEA Statistics 2015' (Paris: OECD/IEA, 2015) and BP, 'BP Statistical Review of World Energy 2014'.

92 India's PEC rose by 7.1 per cent; in the OECD countries, the PEC in the U.S. was 1.2 per cent, while it decreased in the EU by 3.9 per cent and in Japan by three per cent.

82 See Li Xin, 'Sinopec to March on With Shale Development', Interfaxenergy.com-NGD, 5 January 2015.

83 China's shale gas development is also spearheading liberalisation and competition in part of its oil and gas sectors – see also F. Umbach, 'The Strategic Implications of Russia's Record Breaking Gas Contract', GIS, 11 September 2014, 4 pp. and *idem*, 'China's Growing Hunger for Energy Resources', GIS, 5 September 2014, 4 pp.

84 Reasons for this revision included geological, technical, infrastructural, technological and topographical hurdles, insufficient investment, lack of a comparative competitive system in China's upstream sector and drilling and managing experiences in hydro-fracking operations – see *ibid.*

85 See also Li Xin, 'PetroChina on Course for Shale Fail in 2015', Interfaxenergy.com-NGD, 9 September 2015.

Figure 21: The World's Largest Coal and Steam Coal Producer 2012-2014

Major Coal Producers				Major Steam Coal Producers			
	2012	2013	2014		2012	2013	2014
PR of China	3,532.5	3,843.6	3,747.5	PR of China	3,016.8	3,282.0	3,179.6
United States	932.3	903.7	916.2	United States	779.4	755.7	769.2
India	602.9	610.0	668.4	India	512.9	516.1	569.9
Australia	430.8	458.9	491.2	Indonesia	441.4	484.1	468.1
Indonesia	444.5	487.7	470.8	South Africa	257.0	252.9	250.6
Russian Federation	329.4	326.0	334.1	Australia	212.5	236.9	245.7
South Africa	258.6	256.3	253.2	Russian Federation	179.3	178.5	189.5
Germany	197.0	191.0	186.5	Kazakhstan	99.9	99.9	93.5
Poland	144.1	142.9	137.1	Colombia	84.5	81.3	83.5
Kazakhstan	120.5	119.6	115.5	Poland	68.1	64.9	61.0
Colombia	89.0	85.5	88.6	Vietnam	42.1	41.0	35.8
Canada	66.5	68.9	69.0	DPR of Korea	30.3	36.3	35.2
Turkey	71.5	60.4	64.1	Ukraine	46.8	49.1	31.9
Greece	63.0	53.9	48.0	Canada	25.9	25.9	29.9
Czech Republic	55.9	49.1	46.9	Mongolia	11.7	12.7	13.7
Ukraine	67.7	68.8	44.7	Mexico	13.0	13.5	11.9
Other	358.0	349.2	340.8	Other	79.2	72.6	78.4
World	7,763.9	8,075.5	8,022.5	World	5,900.6	6,203.1	6,147.2

Source: Dr. F. Umbach based on © OECD/IEA (2015), 'Coal Information. IEA Statistics 2015', Paris: IEA-Publishing.

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Chinese demand for coal, in turn, contributed to a fall in coal prices in 2014.⁹³ Given the weaknesses most recently exposed by the stock market meltdown and the structural changes taking place in the Chinese economy, this lower or stagnating demand is expected to continue and may thus further contribute to a sustained drop in global coal prices in the years to come,⁹⁴ with prices not expected to recover until 2020. In turn, cheaper coal prices deriving from lower Chinese demand may only fuel worldwide coal-fired electricity generation, as coal will remain price-competitive vis-à-vis – the now more economical – natural gas and renewables.⁹⁵

Despite the slowdown in Chinese demand, by 2020 the rise in China's appetite for the resource may still exceed that of the rest of the world combined. The capacity of Chinese coal-fired power plant is therefore projected to increase by a further 420-600 GW by 2040⁹⁶ – the total combined coal-fired generation capacity of the United States, the EU and Japan. China currently still plans to build 50 additional modern coal plants, which may produce an estimated 1.1 billion tonnes of CO₂ per year. The plan will reduce CO₂ emissions in China's largest cities, but ultimately only shift pollution to other regions. By 2030, however, China's coal use has been planned officially to begin declining.

In the meantime, the Chinese government also seeks to further enhance the energy efficiency of its coal fleet in order to reduce emissions. Current efficiency levels reach 37 per cent and are thus higher than the world's average of 33 per cent.⁹⁷ In the end, reliance on coal for China's primary energy and generation mix may drop to around 55 per cent by 2040, yet the country's present annual consumption of two billion tonnes of coal cannot be replaced entirely by gas or renewables while these resources continue facing financial, technological and safety challenges. Consequently, coal will remain the

93 International coal prices are at a 12-year low also as a result of oversupply and a slowdown in global demand from India and elsewhere. See also Neil Hume, 'Thermal Coal Falls Victim to China's Energy Policy', *The Financial Times*, 20 August 2014, and 'Coal Prices Fall to 12-Year Low as China, India Join Demand Slowdown', *Reuters-Inside Power, Gas & Carbon*, 19 August 2015.

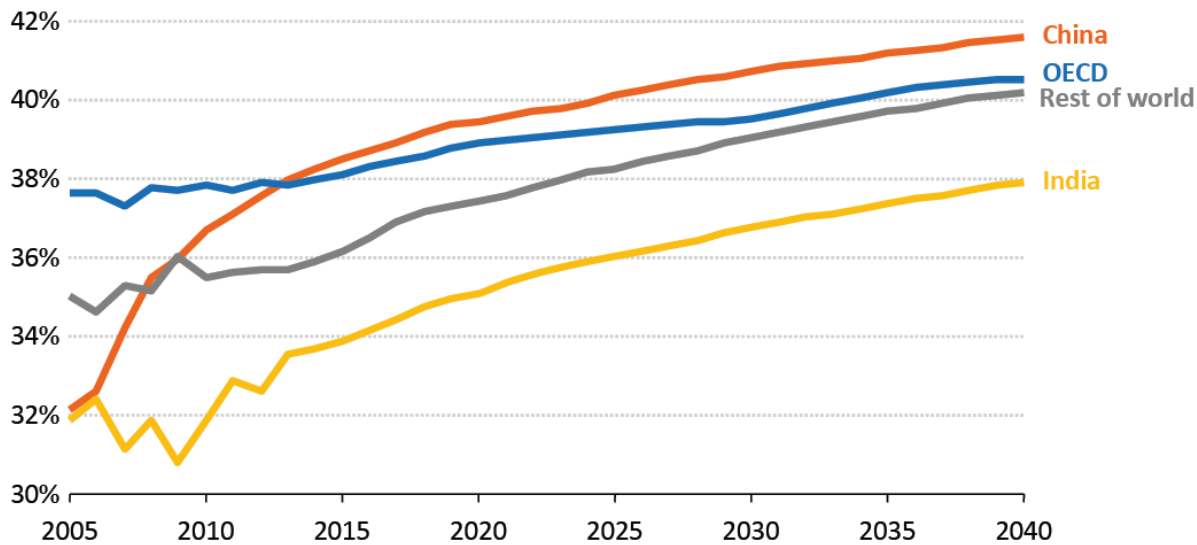
94 The government is making efforts to transition away from the economic growth model from past decades – one fuelled by exports, investments, and savings. Beijing's economy has also been marred by slowing GDP growth rates and the devaluation of the renminbi – see Robert Zoellick, 'China Will Stumble If Xi Stalls on Reform', *FT*, 7 September 2015.

95 Maarten Akkerman, 'The Flipside of China's Shift Away from Coal', 16 June 2015 (<http://www.iied.org/flipside-chinas-shift-away-coal>).

96 See IEA, 'WEO 2014', p. 180 and EIA, 'China', Analysis Briefs.

97 See IEA, 'Energy, Climate Change and Environment', p. 20.

Figure 22: Average Efficiency of Coal-Fired Power Plants by Region in the New Policy Scenario



Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Figure 23: The World's Largest Coking and Lignite Coal Producers (2012-2014)

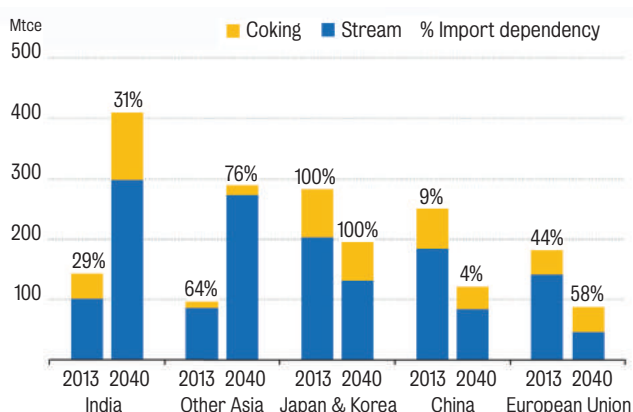
Major Coking Coal Producers (Mt)				Major Lignite Producers (Mt)			
	2012	2013	2014		2012	2013	2014
PR of China	515.7	561.6	567.9	Germany	185.4	182.7	178.2
Australia	146.9	159.5	184.8	United States	71.6	70.1	72.1
Russian Federation	72.8	73.8	75.0	Russian Federation	77.3	73.7	69.6
United States	81.3	77.9	75.0	Poland	64.3	65.8	63.9
India	43.5	49.6	51.4	Turkey	68.1	57.5	61.5
Canada	31.1	34.1	30.6	Australia	71.4	62.8	60.7
Kazakhstan	13.0	13.0	15.3	Greece	63.0	53.9	48.0
Ukraine	20.9	19.7	12.8	India	46.5	44.3	47.2
Poland	11.7	12.1	12.3	Czech Republic	43.5	40.4	38.2
Mongolia	8.8	6.9	10.3	Bulgaria	33.4	28.6	31.2
Colombia	4.5	4.2	5.1	Serbia	38.2	40.3	29.9
Germany	6.3	4.8	4.8	Romania	33.9	24.7	23.6
Czech Republic	5.1	4.6	4.6	Thailand	18.1	17.5	18.0
Mozambique	2.8	3.3	3.8	Hungary	9.3	9.6	9.6
Indonesia	3.1	3.6	2.7	Canada	9.5	9.0	8.5
South Africa	1.6	3.4	2.6	Kosovo	8.0	8.2	8.2
Other	7.1	5.8	6.0	Other	45.7	45.5	42.2
World	976.1	1,037.6	1,064.8	World	887.2	834.7	810.5

Source: Dr. F.Umbach based on © OECD/IEA (2015), 'Coal Information. IEA Statistics 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

country's most reliable resources to guarantee base-load-stability and energy supply security.⁹⁸

Equally consequential for developments in the Chinese and global coal markets, China has vast coal reserves that may nevertheless be unable to meet growing domestic energy demand and needs. As of 2013, China possessed an estimated 114,500 Mtoe of recoverable coal reserves – the equivalent to 12.8 per cent of global coal reserves and the third largest behind the United States and Russia. Nonetheless, the Chinese production-reserve ratio is just 30 years compared with 262 years in the United States and 441 years in Russia.⁹⁹ In this context, the Chinese government may be forced to rely on increasing coal imports in order to satisfy national coal demand. This reality has two strategic policy consequences for Beijing: first, it needs to encourage and support its coal industry for overseas investments in coal mining and coal import projects; and, second, it has to make its coal industry more efficient both at home and abroad, which in turn implies a restructuring and liberalization agenda.

Figure 24: Major Net Importers of Coal by Type in the New Policy Scenario



Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Those efforts are all the more needed as China's coal demand and indigenous production may also grow because of its programmes for coal conversion to synthetic natural gas and liquid fuels.¹⁰⁰ Coal-bed methane (CBM) and coal-to-gas production are two areas in which the Chinese government plans to substantially boost investment.¹⁰¹ In particular, China intends to build the world's largest synthetic natural gas (SNG) and CTG industries,¹⁰² and it already has a wide

98 See also Li Xin, 'China's Clean Coal Hopes May Affect Gas Outlook', *Interfaxenergy.com-NGD*, 23 October 2014, p. 4.

99 See BP, 'BP Statistical Review of World Energy 2014', p. 30.

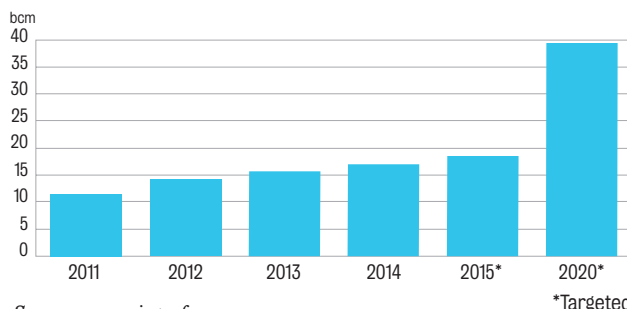
100 See IEA, 'Coal – Medium-Term Market Report 2014'.

101 CBM is already commercially produced at some 10 bcm per year. The government had planned to triple production up to 30 bcm by 2015, but this target may only be reached by 2020 or even later.

102 See Colin Shek, 'Coal-to-Gas Gaining Momentum in China', *Interfaxenergy.com-NGD*, 12 May 2014, p. 7.

range of projects.¹⁰³ Currently, the Chinese government is set to exclude additional CTG projects for the next five years and instead focus on the construction of approved CTG plants, hence keeping Chinese CTG production capacity at a minimum of 15 bcm around 2020.¹⁰⁴ At the same time, Chinese authorities harbour some concerns regarding these technologies' intensive use of energy and water,¹⁰⁵ even if SNG, for instance, can also substantially reduce CO₂ emissions and pollution.¹⁰⁶

Figure 25: China's CBM Production 2011-2020



Source: www.interfaxenergy.com.

*Targeted

Restructuring of Chinese Coal Sector and Industry

China's unprecedented exploitation and use of coal during the last 30 years has created enormous environmental and social challenges, which in turn have repeatedly forced the country to restructure its coal sector and industry over the last 15 years.¹⁰⁷ On the environmental side, the ever-growing coal mining waste has had a deleterious impact on Chinese land. In addition, coal mining and use has led to severe water shortages in major coal mining regions and to deteriorating air quality in many urban centers and adjacent regions – now a sensitive political issue for the government.

103 China's first CTG plant has just begun its production operation at the beginning of 2015 and will be expanded to an annual production target of 16 bcm by the end of the year. There are 48 CTG projects under construction or in the planning stage with a combined annual capacity of 225 bcm – see Zhang Yiping/Colin Shek, 'China Urged to Approach Coal-to-Gas with Caution', *ibid*, 21 July 2014, pp. 1-2.

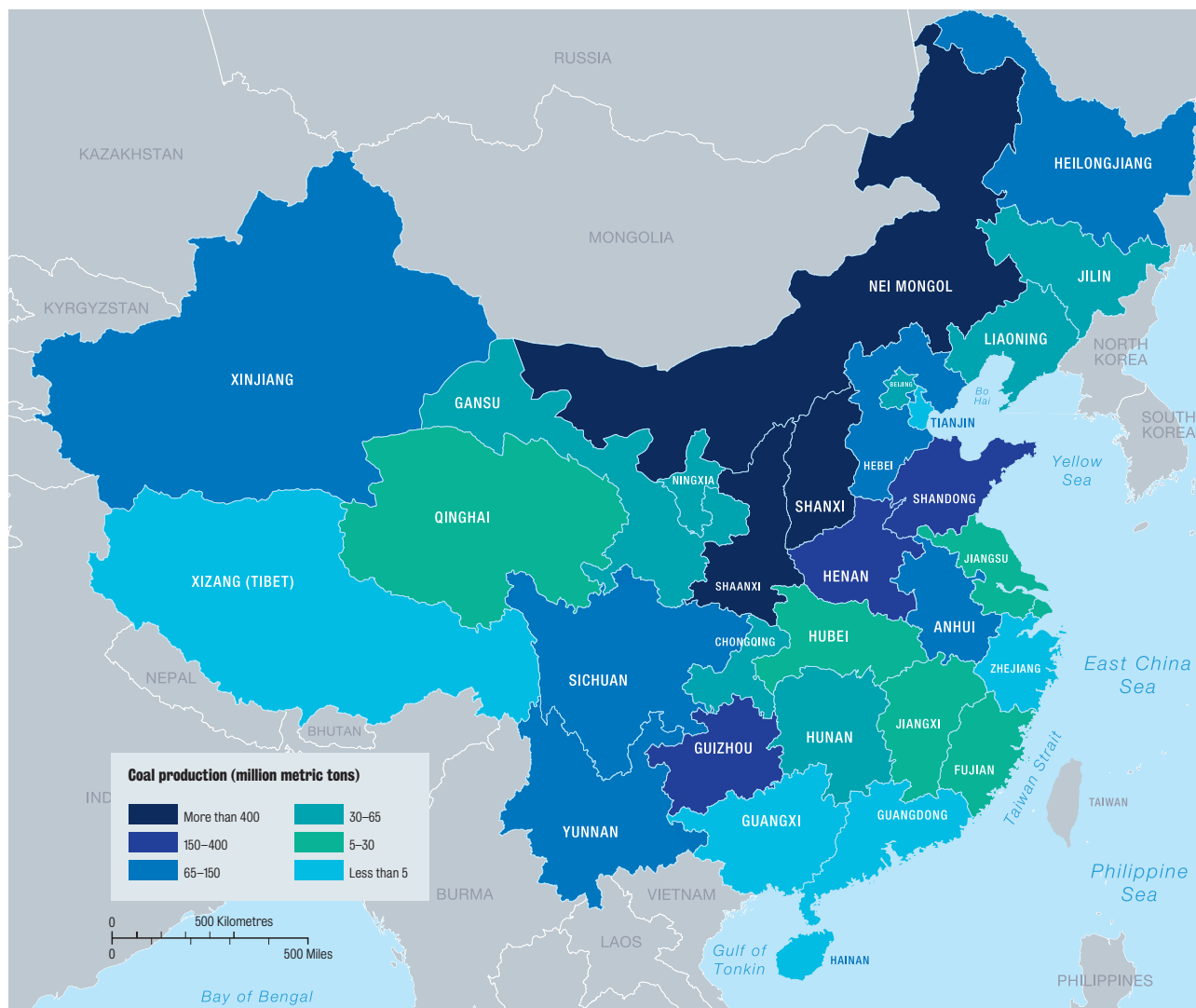
104 In turn, this level should support Chinese efforts to cap coal consumption to 4.2 billion tons by 2020, as well as to decrease the share of coal from 66 per cent in 2013 to 62 per cent of the primary energy mix by 2020. See 'China Plans Major Slowdown of New Coal-to-Gas Projects in Bid to Cut Emissions', *Ukraine Energy News*, 18 December 2014; Edward Wong, 'In Step to Lower Carbon Emissions, China Will Place a Limit on Coal Use in 2020', *The New York Times*, 20 November 2014.

105 Quoted following Li Xin, 'China's Coal-to-Gas Output to Disappoint Next Year', *Interfaxenergy.com-NGD*, 22 September 2014, p. 6 and Lucy Hornby, 'Coal Conversion Plants Sap China's Emissions Targets', *FT*, 30 November 2014.

106 See Lucy Hornby *ibid.* and 'China Plans Major Slowdown of New Coal-to-Gas Projects in Bid to cut Emissions', *Ukraine Energy*, 18 December 2014.

107 See also Tim Wright, 'The Political Economy of the Chinese Coal Industry: Black Gold and Blood-Stained Coal' (Cambridge: Cambridge University Press, 2012) and Elspeth Thomson, 'The Chinese Coal Industry: An Economic History' (London-New York: Routledge/Curzon, 2003).

Figure 26: China's Coal Production Regions in 2012



Source: Stratfor.com (Courtesy of Stratfor.)

Likewise, China has experienced severe bottlenecks in its transport infrastructure, and especially in rail. Meanwhile, there has been growing international pressure to mitigate GHGE in China, especially after Beijing overtook Washington as the world's top polluter. Yet more worryingly, coal mining has taken a human toll – more than 250,000 miners have died in numerous coal mine accidents since 1949.¹⁰⁸

Against this background, and given the present global coal oversupply and the drop in prices¹⁰⁹ that has affected the profits of some 70 per cent of China's coal producers, momentum for reform is stronger than ever. In particular, consolidation has emerged as a priority. Chinese coal production is relative decentralized and inefficient, with

Chinese SOEs still accounting for 65 per cent of total coal production in 2012 and controlling more than 60 per cent of the national power generation sector.¹¹⁰ China has to cope with more than 10,000 small local and often-inefficient coal mines with poor safety practices, out-dated equipment, and insufficient investment. In 2009, those small-scale inefficient mines still accounted for almost 30 per cent of China's total national coal production;¹¹¹ equally worrisome, they are plagued by poor safety records.¹¹² Closing especially

108 See Jianjun Tu, 'Industrial Organization of Chinese Coal Industry', Program on Energy and Sustainable Development, Stanford University, Working Paper, No. 103, Stanford, July 2011, pp. 1.

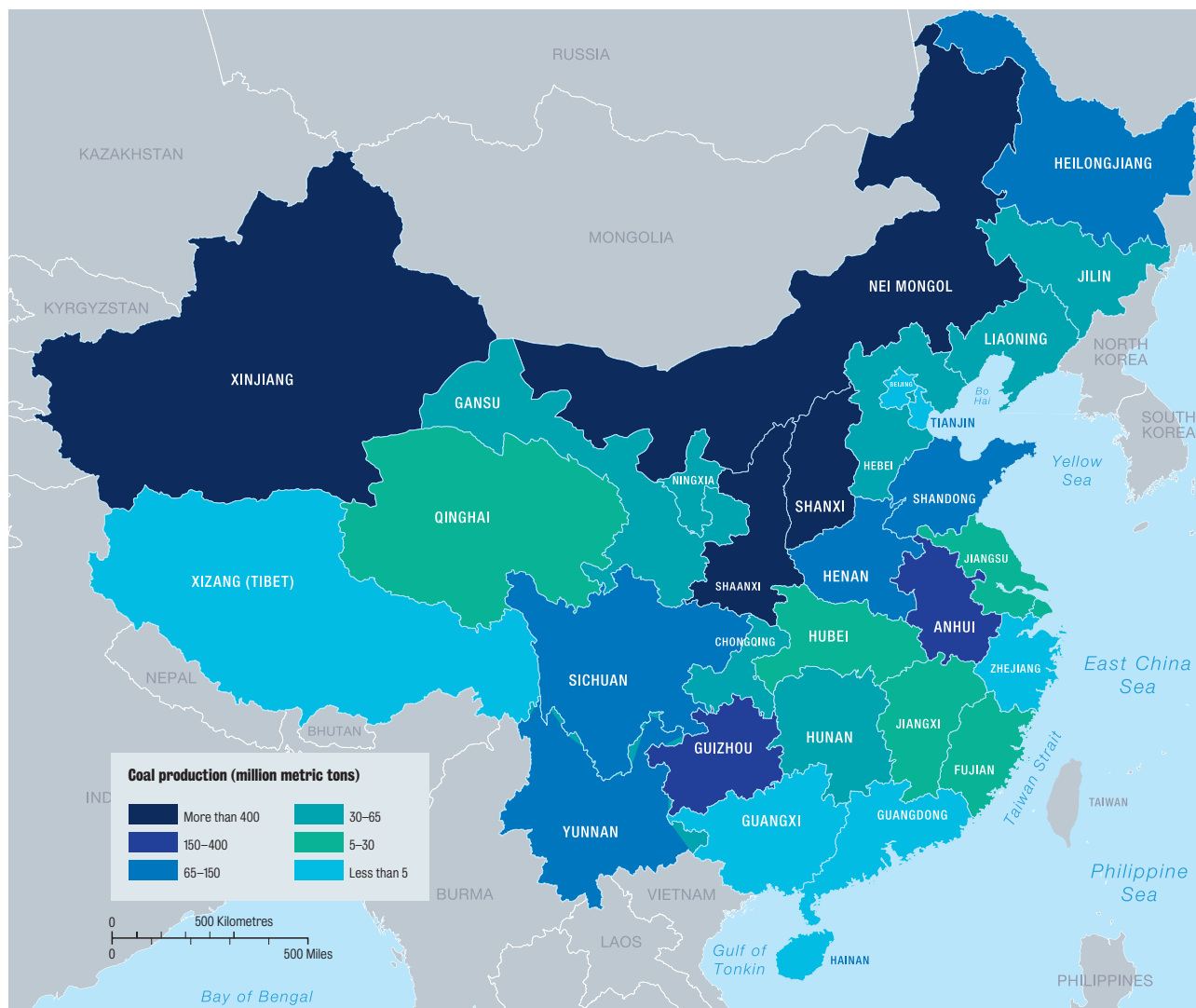
109 The drop has reached some 40 per cent from a 2008 peak.

110 See also Benjamin Denjean et al., 'G20 Subsidies to Oil, Gas and Coal Production: China', Priceofoil/ODI, Country Study, November 2015, p. 5.

111 See also 'China: A Potential Opportunity to Consolidate the Coal Industry'.

112 Although 7,500 smaller mines have an annual capacity of less than 90,000 tonnes and produce about 20 per cent of China's total coal output, they make up more than 70 per cent of mine safety accidents – see Alstom, 'China Takes Steps to Revive its Coal Industry', Fuel Intelligence Special Report, November 2014.

Figure 27: China's Coal Production Regions in 2020



Source: *Stratfor.com* (Courtesy of *Stratfor*).

old, small, unsafe, and unprofitable mines while also implementing a coal tax reform would significantly improve the overall efficiency of coal-use in the country.¹¹³

Accordingly, Beijing has pushed through major structural reforms in the form of mergers and acquisitions in order to create 10 large coal companies, accounting for about 60 per cent of the country's total coal production, and reducing the overall number of mines to 4,000 by 2015.¹¹⁴ This target, however, has proved unrealistic, as the government has encountered widespread opposition to the closure of township and village mines,¹¹⁵ as it had in the past – 1999–2001 and after 2005. Yet consolidation is, admittedly, a

long-term process, as a rapid increase in the top 10 coal producers' output would still struggle to fill the gap left by a fast-tracked closure of small mines.¹¹⁶

Additionally, there is impetus for rationalizing and stabilizing national coal output. For one, new estimations of China's rising coal production capacity – originally planned in 2013 to decrease from 5.1 billion tonnes to 3.6 billion tonnes – caused alarm bells to ring in Beijing government circles.¹¹⁷ Consequently, the government capped coal consumption at 4.2 billion tonnes and set a coal share of no more than 62 per cent of the primary energy mix for 2020, which also implies reaching higher efficiency standards.¹¹⁸

113 See Alstom Power – GPS Marketing, 'China Takes Steps to Revive its Coal Industry', Fuel Intelligence Special Report, November 2014.

114 See EIA, 'China. Analysis Briefs', p. 30.

115 See Alstom, 'China Takes Steps to Revive its Coal Industry', Fuel Intelligence Special Report, November 2014.

116 In 2012, the top 10 state-owned companies contributed some 36 per cent of total Chinese coal output – see 'China: A Potential Opportunity to Consolidate the Coal Industry'.

117 See *ibid*.

118 See for the background of the need for rapidly increasing the introduction of CCTs also IEA, 'Cleaner Coal in China'.

In parallel, Chinese authorities stated their intentions to have the country become up to 85 per cent energy self-sufficient by 2020 and to increase the share of gas in the primary energy mix to more than 10 per cent.¹¹⁹

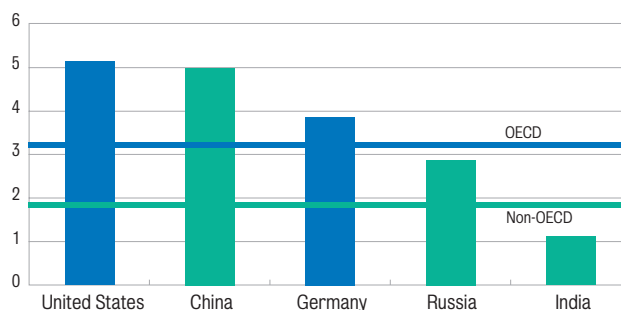
Equally important, in January 2013 the government fully liberalized the coal sector in order to promote competition and improve market functioning. The sharp decline in coal prices reduced the gap between increasing upstream costs and fixed below-market end-user prices that had beset power producers between 2000 and 2012. This growing gap exacerbated chronic inefficiencies and operational losses of power suppliers, who also had no incentive to invest in newer infrastructure and more efficient power plants. Moving away from these price controls, even if gradually, promises to increase the flexibility of the power sector to respond to changing market conditions, to allocate resources more effectively, and to invest in cleaner energy sources.¹²⁰

Other reforms are also changing the landscape of Chinese coal production and use. For instance, Beijing created 31 coal trading hubs with the support of regional authorities.¹²¹ Coal production itself is moving westwards – to the cheaper, but more politically unstable Xinjiang province – following depletion in old mining areas.¹²² In addition, in January 2015 the Chinese government imposed a value-based tax on coal production, which could have far-reaching implications for coal companies in all of China. The tax gives local governments new options to raise capital, but may also offer new possibilities for corruption; Beijing, however, also makes efforts in fighting widespread corruption and other issues by promoting its further integration processes, which are also aimed at enhancing the overall efficiency of its coal sector. At the same time, this tax has failed to modify the core conditions for coal mining companies and local governments that continue impairing the efficiency of coal production in the country – namely, special privileges for SOEs, a decentralized decision-making process shared by the central government and local authorities, and so forth.¹²³

China's New Climate and Environmental Protections Policies in the context of the Paris Climate Summit

Already in 2006, China became the world's largest polluter, surpassing the United States and causing serious domestic environmental problems such as air and soil pollution. According to various independent estimates, China's air pollution leads annually to up to 1.2 million premature deaths from coal-related respiratory diseases and air pollution, and it costs about 3.5 per cent of national GDP. Coal alone is believed to contribute to at least 60 per cent of airborne pollutant emissions.¹²⁴ To be sure, Chinese estimates are much lower, accounting for around 2,000 deaths and annual economic losses of US\$32 billion.¹²⁵

Figure 28: Coal-related CO₂ Emissions per Capita of Selected Countries and Regions (2012)



Source: © OECD/IEA (2014), *Coal – Medium-Term Market Report 2014*, Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

Nevertheless, China's recent clean energy reforms have been consequential.¹²⁶ With huge state and foreign subsidies, China has overtaken the rest of the world as the biggest investor in wind power and other clean RES. Nevertheless, it is still doubtful whether Beijing can meet its own energy efficiency and GHGE reduction targets by 2020. More strikingly, despite new energy efficiency and climate mitigation policies, Beijing might still emit up to 50 per cent more GHGE by 2030.

While the country is making strides in its efforts to reduce CO₂ emissions, China will still remain the largest emitter through 2035 and produce more than twice the amount of GHGE set to originate in U.S. by that year. In 2012, for

119 See Edward Wong, 'In Step to Lower Carbon Emissions, China Will place a Limit on Coal Use in 2020', *The New York Times*, 20 November 2014; Zhang Yiping, 'China's Latest Energy Blueprint Raises Eyebrows', *Interfaxenergy.com-NGD*, 27 November 2014, p. 8 and Yuge Ma, 'China's Energy Strategy in the 'New Normal' Economy', *GIS*, 9 February 2015.

120 See 'Cheap Coal: Enabling Power Price Reform in China', *Strafor.com*, 17 February 2015 and 'China: A Potential Opportunity to Consolidate the Coal Industry', *ibid*, 19 July 2013.

121 Their functioning, however, is hampered by various problems and the still existing dominance of SOEs – see IEA, 'Coal – Medium-Term Market Report 2014', p. 46.

122 At the same time, transport costs will be higher.

123 See also 'China Imposes a New Coal Production Tax', *Strafor.com*, 13 January 2015.

124 See Edward Wong, 'Air Pollution Linked to 1.2 Million Premature Deaths in China', *The New York Times*, 1 April 2013; Jeffrey Hays, 'Air Pollution in China'. Facts and Details, January 2014, <http://factsanddetails.com/china/cat10/sub66/item392.html>, and Leon Kaye, 'China's 2020 Coal Cap = 50,000 Lives Saved Annually', <http://cleantechnica.com/2015/04/10/chinas-2020-coal-cap-50000-lives-saved-annually/>.

125 See Francois Godement (Ed.), 'China: Taking Stock Before the Paris Climate Conference', European Council on Foreign Relations (ECFR), September 2015, p. 6.

126 See also Bernice Lee/Nick Mabey/Felix Preston/Antony Froggatt/Sian Bradley, 'Enhancing Engagement between China and the EU on Resource Governance and Low-Carbon Development', E3G and Chatham House, June 2015.

instance, China emitted some 60 per cent more CO₂ than the United States.¹²⁷ By 2014, for the first time, Beijing was producing more CO₂ emissions per person than the EU – 7.2 tonnes vs. 6.8 tonnes, respectively. Its total emissions that year even outstripped those of the EU and United States combined.¹²⁸ Just a year earlier, China had recorded 28.5 per cent less per capita emissions relative to 2005 levels.¹²⁹

Against this background, China has endured a serious air pollution crisis. Beijing's leadership became increasingly unnerved in the last two years by increasing public debates such as the recent chemicals warehouse explosions in the port city of Tianjin in August 2015,¹³⁰ as well as independent Chinese documentary *Under the Dome* critical of the current levels of air pollution.¹³¹ The worsening pollution, in turn, has shaken Chinese leaders into action. In the spring of 2014, China declared a 'war on pollution'¹³² with plans to improve air quality and reduce CO₂ emissions per capita by 40 to 45 per cent by 2020 from 2005 levels – in 2014, cuts were equivalent to 33.8 per cent vis-à-vis 2005. In 2014, for the first time, a record of additional renewable capacity surpassed the additional capacities of coal with its lowest increased level since 2004.¹³³ But even the implementation of the new near-zero pollutant emissions standards will prove insufficient to sustain air quality at internationally recognized safe levels. Consequently, the government will need a parallel strategy to improve energy efficiency by means of upgrading and modernizing coal

The World's Largest CO₂ Emitter in 2014

China	28%
U.S.	14%
EU-28	10%
Rest of the world	48%

127 Individual electricity consumption, however, still remains modest. In 2012, a Chinese citizen consumed on average just 3,300 kw/h of electricity per year – still much less than Germany, South Korea, and the United States at 7,000, 10,000, and 13,000 kw/h, respectively – see Keith Johnson, 'Dirty Pretty Rock'.

128 See also Pilita Clark, 'China's Emissions Outstrip EU plus U.S.', FT, 22 September 2014.

129 See Li Xin, 'Next Five Years Crucial for Chinese Climate Pact', Interfaxenergy.com-NGD, 14 November 2014, p. 4.

130 See also Lucy Hornby, 'Chinese Environment: Ground Operation', FT, 1 September 2015.

131 Another example of increasing public concern had been an extreme haze covering 1.3 million square kilometres in northern and eastern China affected around 800 million people. Beijing had to cope with the highest daily average concentration of fine particulate matter – around 600 micrograms per cubic meter, or more than 20 times the amount deemed safe – see Yuan Jiahai, 'Capping Coal Consumption Is the Correct Choice for China', East-Asia Forum, 7 April 2015.

132 The Chinese government already declared a new 'Plan for Air Pollution Control' in September 2013 to reduce national urban emissions – see also Lucy Hornby, 'Chinese Environment: Ground Operation', FT, 1 September 2015.

133 See IEA, 'WEO 2014', p. 203.

power plants, while also switching to low-carbon energy resources of renewables and nuclear power.¹³⁴

At the international level, the U.S.-China Joint Announcement of November 2014 has been widely praised as a key breakthrough in the fight against climate change.¹³⁵ Nevertheless, the stated objectives are relatively modest. For one, the announcement is merely a political declaration of intent. Moreover, China announced that its GHGE will peak around 2030 and therefore has ample room for growth given its recent emissions development – 40 per cent growth during the last five years – and the country's higher energy needs. Likewise, China's target to boost total energy consumption coming from zero-emission energy sources up to around 20 per cent by 2030 is not new, but rather largely in line with its present policies, targets and adopted energy plans. Similarly and as previously pointed out, U.S. pledges from the announcement do not represent a significant deviation from existing policy objectives and already face internal political opposition in the U.S. Congress.¹³⁶ Nevertheless, the declaration is significant in that, for the first time, the world's two largest emitters – responsible for around 44 per cent of global CO₂ emissions – added important political momentum ahead of the Paris summit in December. Importantly, the move also highlights China's preference for cooperation with Washington over Brussels despite a proliferation of bilateral EU-China climate and environmental initiatives, which hints at some loss of environmental influence by the EU.¹³⁷

Going further, China unveiled new pledges on climate change for the medium term in June 2015, ahead of the Paris climate change summit at the end of the year. Thus, Beijing will cut CO₂ emissions per unit of GDP by 60 to 65 per cent by 2030 from 2005 levels. To this end, China intends to expand its share of non-fossil fuels in its PEC to around 20 per cent by 2030 from 11.2 per cent in 2014.¹³⁸

134 See Yuan Jiahai, 'Capping Coal Consumption Is the Correct Choice for China', East Asia Forum, 7 April 2015.

135 The White House, 'U.S.-China Joint Announcement on Climate Change', Office of the Press Secretary, Washington D.C., 11 November 2014; William Mauldin, 'U.S., China Reach Deal on Limiting Emissions', Wall Street Journal, 13 November 2014, p. 15; Johnny Erling, 'China will sauberer werden', Die Welt, 26 November 2014; Coral Davenport, 'Climate Deal Wins Praise, as Landmark with Caveats', *The New York Times*, 13 November 2014, pp. 1 and 4; Mark Landler, 'Differences Arise Despite U.S.-China Deal', *ibid.*, p. 4; Edward Wong, 'China's Plan on Emissions Raises Hopes, and Queries', *ibid.*, and Annemarie Botzki, 'China-US-Climate Pledges Will Set the Scene for Paris', Interfaxenergy.com-NGD/European Policy Weekly (EPW), 20 November 2014, p. E3.

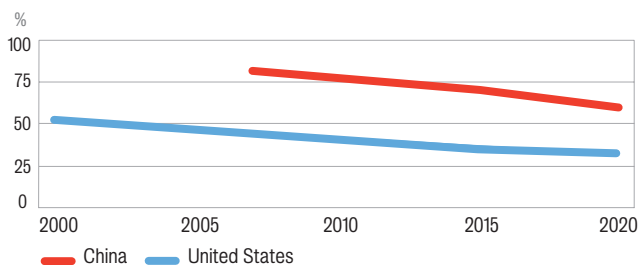
136 U.S. pledges to cut GHGE by 26 to 28 per cent from 2005 levels by 2025 are in line with the goals of the Climate Change Action Plan of 2013; the conservative majority in the U.S. Congress has vowed to oppose implementation.

137 See also Bernice Lee/Nick Mabey/Felix Preston/Antony Froggatt/Siân Bradley, 'Enhancing Engagement between China and the EU on Resource Governance and Low-Carbon Development' and 'EU 'Slipping Down' China's Clean The Agenda', EurActiv, 29 June 2015.

138 See 'China Unveils New, Ambitious Climate Goals', Xinhuanet, 1 July 2015.

Alongside these pledges, China also aims to build up to 350 GW of hydro, 200 GW of wind power, 100 GW of solar power, and 58 GW of nuclear power by 2020.¹³⁹ Reaching these targets will imply huge investments in new green infrastructure such as smart power grids, high-speed rail networks, and urban recharging systems for electric vehicles.¹⁴⁰ Furthermore, China has also announced to change and further reform its statistics calculations in order to gain more international credibility, market confidence, and transparency in its statistics reporting.¹⁴¹ Most recently, China's equity market in Shanghai launched the first carbon index of its kind in the country in October 2015, aiming to track and identify the carbon efficiency and greenest companies on the Shanghai Stock Exchange and China Securities Index.¹⁴²

Figure 29: Declining Coal Use for Electricity Generation in China and the U.S.



Source: www.interfaxenergy.com

The above-mentioned moves follow ongoing scepticism regarding official government statistics and actions on coal consumption. While some research argues that Chinese carbon emissions might have been overestimated and thus be significantly lower,¹⁴³ newly disclosed and revised official data has exposed previously undetected gaps in data collection that had underestimated coal consumption since 2000. Thus, China has been burning up to 17 per cent more GHGE per year – almost a billion more tonnes, or more than Germany's annual emissions – than previously reported. Likewise, Beijing's total coal consumption was

139 In 2014, these figures amounted to 300 GW, 96.4 GW, and 28 GW, respectively.

140 See John Mathews, 'The Chinese Model: Backing Up Climate Policy with Green Growth', *Energypost.eu*, 6 July 2015.

141 These reforms are also important for calculating its GHGE more accurately, as well as for offering more transparency in this climate and environmental policies. See also 'China Moves toward Greater Transparency', *Stratfor.com*, 9 September 2015.

142 See 'China's Stock Market to Launch Carbon Efficiency Index Next Month', *Reuters-Inside Power, Gas & Carbon*, 9 September 2015.

143 The study is based on empirical data and a national survey of about 5,000 coal mines covering 85 per cent of China's total coal production. According to the study, Chinese coal quality was generally poorer than that used in the West. Poor-quality coal emits more air pollutants per unit of energy but up to 50 per cent less CO₂ per tonne – see Zhu Liu et. al., 'Reduced Carbon Emission Estimates from Fossil Fuel Combustion and Cement Production in China', *Nature*, Vol. 524 (20 August 2015), pp. 335-338 and Lucy Hornsby, 'Study Claims China Emissions Much Lower than Expected', *FT*, 19 August 2015.

revised up to 4.2 billion metric tonnes in 2013.¹⁴⁴ By the same token, coal capacity is on the rise. For instance, the first six months of 2015 have witnessed a construction boom in coal plants – up 55 per cent vis-à-vis the same period in 2014 – with approvals in this period – some 200 GW – exceeding the total from the previous three years.¹⁴⁵ Thus, amid questions regarding the necessity and economic value of an additional fleet of coal plants, in 2015 authorities have thus far approved some 155 new projects – the equivalent of 15 per cent of overall Chinese coal-fired power capacity in 2014, or almost 40 per cent of the capacity of operational American coal plants.¹⁴⁶

Figure 30: Coal-Fired Utilisation Rate in China



Source: www.interfaxenergy.com

In spite of the Paris agreement, there are doubts that China may still make further commitments, particularly because of ongoing difficulties to push through and implement the current climate and environmental targets in China's federal provinces and local administrations. Indeed, even with strong political will, in the past China has often lacked the strong and effective implementation instruments to translate the agreed objectives and announced targets of its energy, climate and environmental policies into lower national emissions.¹⁴⁷ Indeed, as long-time observers have pointed out, the government lacks "the local and regulatory mechanisms in place to ensure long-term implementation," and, contrary to "the very nature of the country's political system," putting in place such mechanisms "will require a shift from a top-down to a bottom-up approach."¹⁴⁸

Nonetheless, the need for a transition strategy to a new stage of economic development and China's recent vast anti-corruption campaign may ultimately facilitate efforts

144 In comparison and highlighting the scale of the revision, China added about 600 mt to its previously reported 2012 coal consumption level – equivalent to more than 70 per cent of the total annual coal use and overall energy consumption in the United States. Between 2011 and 2013, the new revised data even indicated an increase of 900 mt – see Chris Buckley, 'China Burns Much More Coal than Reported, Complicating Climate Talks', *The New York Times*, 3 November 2015.

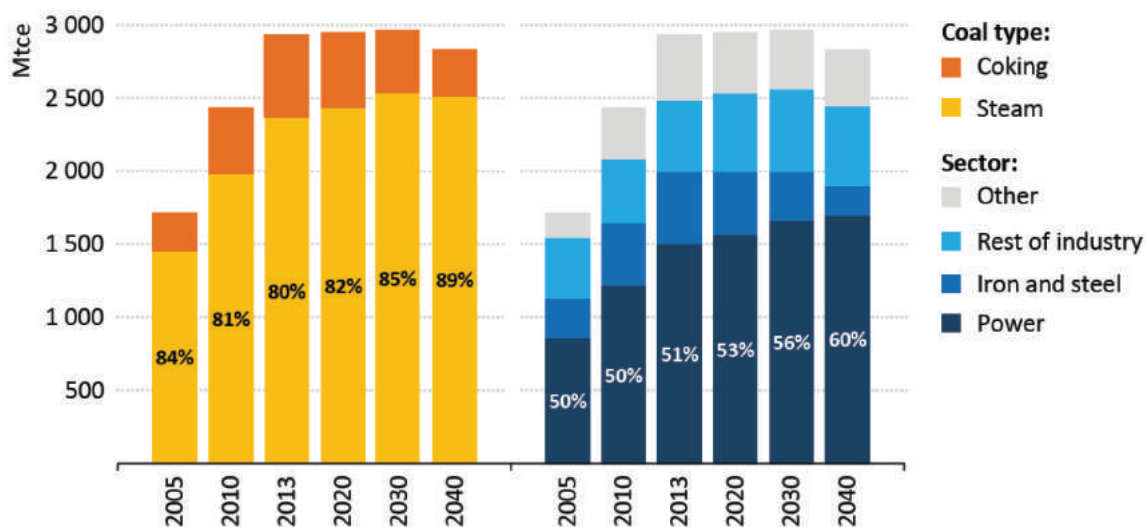
145 See 'China Should Stop Adding New Coal-Fired Power Plants – State Researcher', *Inside Power, Gas & Carbon/Reuters*, 6 November 2015.

146 See Edward Wong, 'A Glut of Coal-Fired Plants Raises Doubts about China's Energy Priorities', *The New York Times*, 11 November 2015.

147 See Erica S. Downs, 'China's 'New' Energy Administration', *China Business Review, Commentary*, November-December 2008, pp. 42-45 and Francois Godement (Ed.), 'China: Taking Stock Before the Paris Climate Conference'.

148 Francois Godement, 'Introduction', in: idem (Ed.), 'China: Taking Stock before the Paris Climate Conference', p. 2.

Figure 31: Coal Demand in China by Coal Type and Key Sector in the New Policy Scenario



Notes: Steam coal includes lignite. Iron and steel includes own use and transformation in blast furnaces and coke ovens. Rest of industry also includes petrochemical feedstocks, coal-to-liquids and coal-to-gas plants.

Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

to reinforce the central government's power vis-à-vis its provinces.¹⁴⁹ At the same time, such moves could also strengthen the huge Chinese bureaucratic machinery and weakening reforms and initiatives elsewhere.¹⁵⁰

Scenarios for a Peak in Coal Consumption by 2020

Before the release of China's newly revised coal data and given the country's flurry of climate policy activity, observers had started to wonder whether Beijing's officially declared peak of GHGE and coal consumption by 2030 could take place even by 2020. These discussions were further fuelled by China's falling GDP growth and the relocation of Chinese manufacturing companies abroad, as well as by low oil and gas prices.¹⁵¹ Moreover, new research from the Chinese government has even found that, with the right measures in place, China could reach the peak of its fossil fuel consumption and CO₂ emissions already by 2020/2025 or they have already peaked.¹⁵² Admittedly,

149 See also Aurélie Faure-Schuyler/John Seaman, 'China's Coming of Age on Climate Change. Just in Time for Paris?', Note de l'Ifrri-Center for Energy and Center for Asian Studies, Paris, May 2015.

150 See *ibid.*

151 See National Resource Defence Council (NRDC), 'Coal Cap Policy Can Help China Achieve an Earlier Peak in Carbon Emissions', New York, 10 June 2015 and *idem*, 'Coal Consumption in China's Building Sector Can Peak by 2020', 27 May 2015; 'Peak Coal by 2020 Could Save China Thousands of Lives – Study', Reuters-Inside Power, Gas & Carbon, 16 July 2015, and Frank Jotzo, 'China Could Outperform its Carbon Pledge', East-Asia Forum, 16 July 2015.

152 According to the study, China could rely on renewables – including hydropower – for more than 60 per cent of its total energy demand through 2050. Electricity could be supplied even by 85 per cent from renewables and just seven per cent from coal. Yet, the study demands a national deregulation of electricity markets and highlights a variety

of additional measures – see China National Renewable Energy Centre (with a variety of other Chinese organizations with support from the U.S. Department of Energy), 'China 2050 High Renewable Energy Penetration Scenario and Roadmap Study', Beijing, 20 April 2015 (<http://de.scribd.com/doc/262478415/China-2050-High-Renewable-Energy-Penetration-Scenario-and-Roadmap-Study>) and Bobby Magill, 'China Can Cut Out Most Coal Generation by 2050', *Energypost.eu*, 20 April 2015.

Nevertheless, this speculation may still fail to reflect the economics of coal. As previously explained, coal prices have dropped to record levels within the last decade. While more than 80 per cent of China's coal mining firms have to incur significant losses as a result of low prices, slowing demand, and chronic overcapacity, coal still retains a cost advantage of 40 to 50 per cent relative to gas. Likewise, lower GDP will admittedly reduce growth in energy demand and related GHGE, yet lower international coal prices also make coal imports considerably cheaper – even when taking the devaluation of the renminbi into account. On the other hand, the substantial reduction in China's foreign exchange reserves¹⁵⁴ and potential for more limited overall investments in other countries may also contribute to a temporary drop in national coal import needs. In this light,

of additional measures – see China National Renewable Energy Centre (with a variety of other Chinese organizations with support from the U.S. Department of Energy), 'China 2050 High Renewable Energy Penetration Scenario and Roadmap Study', Beijing, 20 April 2015 (<http://de.scribd.com/doc/262478415/China-2050-High-Renewable-Energy-Penetration-Scenario-and-Roadmap-Study>) and Bobby Magill, 'China Can Cut Out Most Coal Generation by 2050', *Energypost.eu*, 20 April 2015.

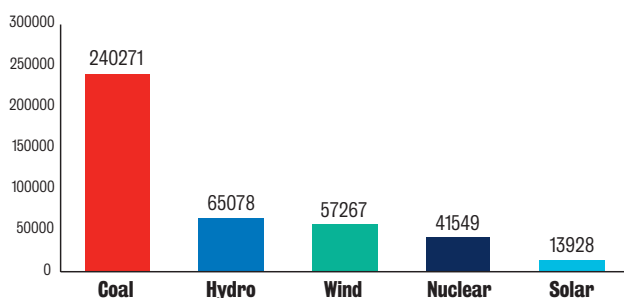
153 See Chris Buckley, 'China Burns Much More Coal Than reported, Complicating Climate Talks'.

154 Reserves dropped by US\$436 billion after peaking at nearly US\$4 trillion in June 2014. See also 'China's Economic Evolution Shrinks Its Foreign Currency Reserves', *Strafor.com*, 22 September 2015.

a peak of coal consumption in its coastal regions may have already occurred – but not necessarily in its entire country.

Other factors cast also doubt on the assumptions of a peak in CO₂ emissions by 2020. For instance, a peak in coal consumption does not necessarily correlate directly with a peak in emissions as long as China's oil and gas demand keeps rising.¹⁵⁵ Likewise, despite the impressive expansion of renewables, hydro, and natural gas during the last years, growth in China's new coal production capacity in 2014 had been massive. In fact, it exceeded new added capacity for solar, wind, and hydro energy by 17, four, and more than three times, respectively (see figure below).¹⁵⁶ Moreover, most of China's coal power plants were built after 2000; they are thus relatively young and may operate commercially for 40 to 60 years. In addition, more than 50 new plants are still being built.¹⁵⁷ Against this background, almost all projected scenarios for China have concluded that, through 2040, the majority of Chinese energy and electricity generation mix will still come from fossil fuels – and even at higher volumetric levels. In the end, only a nationwide deregulation of electricity markets would decisively reduce reliance on coal while also boosting renewables by a wide margin.

Figure 32: China's Electricity Generation Additions 2014



Source: Dr. F. Umbach based on 'No China Coal Peak in Sight; Carbon Capture Will be Necessary to Tame Emissions in this Century', Clean Air Task Force (CATF, Boston) from China National Energy Administration website for GW, accessed 17 February 2014. Assumed capacity factors: fossil (58% per IEA WEO 2013); hydro (34% per IEA WEO 2013); wind (33%); solar (15%).

In 2015, Beijing approved some 155 new coal power projects – the equivalent of 15 per cent of total Chinese coal-fired power capacity in 2014, or almost 40 per cent of the capacity of all operational coal power plants in the U.S.¹⁵⁸

155 See also Edward Wong/Chris Buckley, 'Fading Coal Industry in China May Offer Chance to Aid Climate', *The New York Times* 21 September 2015.

156 See 'No China Coal Peak in Sight; Carbon Capture Will be Necessary to Tame Emissions in this Country', Clean Air Task Force, 18 February 2015.

157 See Armond Cohen/Kexin Liu, 'Peak Coal in China – or Long, High Plateau?', *Energypost.eu*, 7 November 2013.

158 See Edward Wong, 'Glut of Coal-Fired Plants Casts Doubts on China's Energy Priorities', *NYT*, 11 November 2015.

Growth of China's Overseas Coal Investments

China is the largest global provider of coal financing abroad,¹⁵⁹ but arriving at precise estimates of these flows is problematic given the overall opacity of Chinese statistics.¹⁶⁰ According to new estimates, energy projects and total stakes amount to no less than two-fifths of the US\$630bn in Chinese overseas investments.¹⁶¹ In 2013 alone, the Chinese share in global coal financing was worth no less than 40 per cent (provided by major countries of the U.S., Germany, Japan and China). All in all, Beijing has exported more manufactured boilers, steam turbines, and other coal power technologies than any other country in the world.¹⁶² Despite the size of the Chinese coal investment portfolio, the country has largely avoided the attention of campaigns – mostly targeted at Western governments and institutions – aimed at ending all forms of international public financing for new coal plants.

China's expanding overseas coal power investment enjoys considerable national policy support. In 2003, China boosted its foreign investment strategy and encouraged and actively supported the country's leading firms to carry out various forms of mutually beneficial economic cooperation. This strategy has become an intrinsic part of Chinese economic development, playing an important role in China's efforts to establish a mutually beneficial and win-win, safe, efficient and open economic system. Beijing's finance strategies pursue not only commercial interests, but are also part of an integrated geo-economic and geopolitical strategy. In this context, Chinese overseas market expansion not only serves domestic energy policies and economic growth, but also buttresses the country's geopolitical leverage and bargaining power at the regional and global levels.¹⁶³ It is not a coincidence that China's growing economic power coincides with an increasingly assertive foreign policy, or that Chinese SOEs and banks sometimes engage in unprofitable investments and business

159 See also Jane Nakano/Michelle Melton, 'Overseas Public Financing for Coal. Bringing China into the Debate', CSIS-Commentary, Washington D.C., 24 April 2015; Michael Forsythe, 'China's Emissions Pledges are Undercut by Boom in Coal Projects Abroad', *NYT*, 11 December 2015 and Aamir Saeed, 'China Billions Drive Pakistan Coal Power Expansion', *climatechangenews.com*, 2 June 2015. See also the updated list of China's international coal projects: Source Watch, 'International Chinese Coal Projects', 18 December 2015 (http://www.sourcewatch.org/index.php/International_Chinese_coal_projects).

160 Beijing, like other developing countries, is not required to provide information on loans, guarantees, and insurances by their export credit agencies (ECA's) or their aid agencies, in contrast to OECD member states.

161 See Clifford Krauss/Keith Bradsher, 'China's Global Ambitions, Cash and Strings Attached', *NYT*, 24 July 2015.

162 See Takahiro Ueno/Miki Yanagi/Jane Narkano, 'Quantifying Chinese Public Financing for Foreign Coal Power plants', University of Tokyo, GraSPP Working Paper Series, GraSPP-DP-E-14-003, Tokyo, November 2014.

163 See Morgan Herve-Mignucci/Xueying Wang, 'Slowing the Growth of Coal Power Outside China', pp. 8 and 10 and Clifford Krauss/Keith Bradsher, 'China's Global Ambitions, Cash and Strings Attached'.

activities as part of wider short- and long-term national strategic objectives.

Further research sheds light on the scale of Chinese investments. According to a new investigation, Chinese SOEs have already constructed, started building, or formally announced plans to build at least 92 new coal-fired power plants in 27 countries. This combined capacity of 107 GW would add the equivalent of an extra 10 per cent of Chinese coal-fired domestic electricity output, and be superior to the planned closing of all coal plants in the United States through 2020. Public information available for 26 of the 92 plants reveals that at least US\$25 billion has come from Chinese commercial and policy banks.¹⁶⁴ Likewise, a 2014 study estimated that Chinese public financing for new foreign coal power plants between 2007 and 2013 was worth at least US\$13.1 billion on the basis of official loan agreements, and US\$20.6 billion when including agreements defined as MOUs.¹⁶⁵

Moreover, Chinese power plants and generation companies have expanded their own direct investments in foreign coal plants and mining projects. In particular, power generators – e.g. the Huadian Group and China Southern Power Grid – and project contractors – e.g. Power Construction Corporation of China – have shown a greater appetite for in equity investments.¹⁶⁶ All in all, over the last 10 years China is estimated to have financed coal projects abroad in the range of US\$21–38 billion, with a further US\$35 to 72 billion – or 11 to 21 per cent of total overseas coal finance – earmarked as planned investment prior to the September 2015 joint U.S.-China statement on China's commitment to curb public financing for highly polluting projects.¹⁶⁷ In general, Beijing provides only part of the necessary capital for coal projects, but projects yet to be closed indicate a higher proportion of Chinese money.¹⁶⁸

In general, Chinese financing terms are relatively attractive compared to those of Western development banks and other international competitors. This partially explains the expansion and broad geographic reach of Chinese investment, which has moved beyond the traditional focus on countries in South and Southeast Asia¹⁶⁹ such as Indonesia, Pakistan, Bangladesh, Vietnam, the Philippines, and Sri Lanka.¹⁷⁰ Chinese state-owned banks are assumed to lend up to 85 per cent of a given contract's value, offering loan interest rates as low as two or three per cent over a period as long as 20 years. Chinese state-owned banks have also increasingly used syndicated loans, which allow a consortium of banks to take up a larger share of the total lending amount, but reducing their individual risks in case of economic losses on the project.¹⁷¹ Most prominent among Chinese public finance institutions, however, are the China Development Bank (CDB), the Export-Import Bank of China (China Exim Bank), and China Export and Credit Insurance Corporation (Sinosure).¹⁷² In particular, the CDB stands out as the most important bank,¹⁷³ having provided foreign currency loans of US\$251 billion in 2013. In the same year, China's Exim Bank financed the export of mechanical and electronic equipment, high-tech products, and had overseas projects contracts and investments worth US\$256 billion.¹⁷⁴

Nonetheless, following the Paris climate summit, China is facing increasing Western pressure to end support for coal projects abroad in order to achieve the agreed climate mitigation target of 1.5–2°C. Such moves are all the more important given that Chinese-backed projects in developing countries often rely on less efficient technologies;¹⁷⁵ similarly, a Western financing vacuum may only incentivize Beijing to more than double its financing portfolio.¹⁷⁶ While the September 2015 U.S.-China joint statement calls for public finance restrictions on “projects with high pollution and

164 See Michael Forsythe, 'China's Emissions Pledges are Undercut by Boom in Coal Projects Abroad', *NYT*, 11 December 2015.

165 See Takahiro Ueno/Miki Yanagi/Jane Narkano, 'Quantifying Chinese Public Financing for Foreign Coal Power plants', pp. 1 and 14. See also Y.Louvel/R.Brightwell/G.Aitken, 'Banking on Coal. Banking Finance on Coal Mining and Coal Power, and Why It Must Stop', Netherlands, BankTrack 2014. To Chinese overseas investments in total also see American Enterprise Institute, 'China Global Investment Tracker', 2015 (<http://www.aei.org/china-global-investment-tracker/>), Ernst and Young, 'Riding the Silk Road: China Sees Outbound Investment Boom. Outlook for China's Outward Foreign Direct Investment', March 2015.

166 See Morgan Herve-Mignucci/Xueying Wang, 'Slowing the Growth of Coal Power Outside China: The Role of Chinese Finance', *Climate Policy Initiative (CPI)*, November 2015, p.5 f.

167 Other governments, international investors and lenders contribute an additional US\$272 to 307 billion for coal power plants, whereas local investment has been estimated at US\$218 billion. See Morgan Herve-Mignucci/Xueying Wang, 'Slowing the Growth of Coal Power Outside China: The Role of Chinese Finance'.

168 According to an analysis of past investments, China provided around 30 to 60 per cent of the sample's total estimated project cost of US\$65 billion for some 55 GW of coal power generation. For yet-to-be-closed projects, China's investment contribution increases anywhere from 40 to 80 per cent for 70 GW of coal power worth some US\$92 billion. See *Ibid* 2 ff.

169 See *ibid.*, p. 3 f. See also Fabiola Ortiz, 'Will China 'Export' GHG Emissions through Overseas Investment?', *China Dialogue*, 22 July 2015.

170 See also Appendix 1 for China's key coal power overseas investment expansion.

171 See Morgan Herve-Mignucci/Xueying Wang, 'Slowing the Growth of Coal Power Outside China: The Role of Chinese Finance', p. 7.

172 See also Benjamin Denjean et al., 'G20 Subsidies to Oil, Gas and Coal Production: China', p. 5.

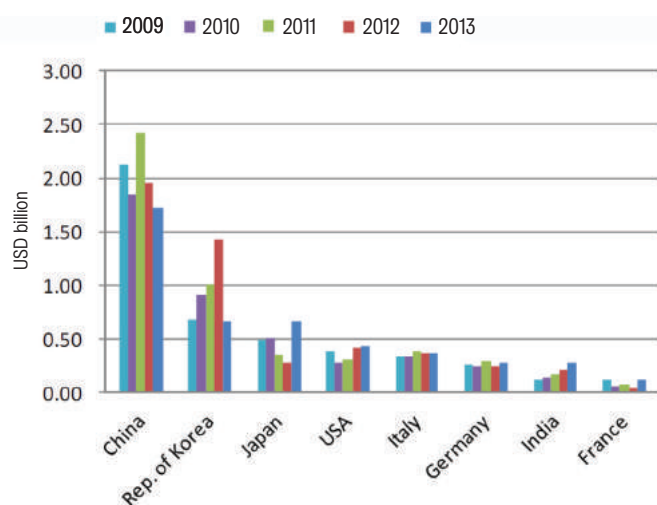
173 It has been described as a “link between the strategic ambitions of the Chinese government and the commercial interests of Chinese firms because the financing it provides to support cross-border deals connects state policy to commercial activity” – see Erica Downs, 'Inside China, Inc.: China Development Bank's Cross-Border Energy Deals', John L. Thornton China Center Monograph Series, Number 3, Washington D.C.: The Brookings Institution, 2011.

174 See Morgan Herve-Mignucci/Xueying Wang, 'Slowing the Growth of Coal Power Outside China: The Role of Chinese Finance', p.5 f.

175 See also again Jane Nakano/Michelle Melton, 'Overseas Public Financing for Coal. Bringing China into the Debate'.

176 See Takahiro Ueno/Miki Yanagi/Jane Narkano, 'Quantifying Chinese Public Financing for Foreign Coal Power plants', p. 20.

Figure 33: Export of Steam or other Vapor Generating Boilers (other than central heating hot water boilers) between 2009 and 2013



Source: Takahiro Ueno/Miki Yanagi/Jane Narkano, 'Quantifying Chinese Public Financing for Foreign Coal Power plants', University of Tokyo, GraSPP Working Paper Series, GraSPP-DP-E-14-003, Tokyo, November 2014, p. 3.

carbon emissions both domestically and internationally,¹⁷⁷ Chinese implementation is far from clear and may ultimately depend on the country's overall economic situation.¹⁷⁸ Thus, mounting economic problems and an exceedingly expensive transformation of the energy sector may push Chinese leadership to continue relying on cheap coal and coal investments abroad.¹⁷⁹ Equally weighing on Chinese considerations will be the dwindling profits of national coal SOEs and banks. Similarly, the attractiveness of overseas investments may increase in light of Chinese efforts to curb domestic coal consumption, which in turn may drive the Chinese coal supply chain to target its overcapacities abroad¹⁸⁰ and result in carbon leakage.¹⁸¹

177 See 'China – One of the Largest Providers of Public Financing for Infrastructure Worldwide – Agreed to Work towards strictly Controlling Public Investment Flowing into Projects with High Pollution and Carbon Emissions both Domestically and Internationally', Washington D.C., 25 September 2015 (<http://www.whitehouse.gov/the-press-office/2015/09/25/fact-sheet-united-states-and-china-issue-joint-presidential-statement>).

178 The CPI study has estimated that China could decrease its overseas coal investments by a potential US\$18bn if China follows an ambitious strategy to cut its overseas coal investments – see Morgan Herve-Mignucci/Xueying Wang, 'Slowing the Growth of Coal Power Outside China: The Role of Chinese Finance', p. 17.

179 See also F.Umbach, 'Coal to Remain King in China', GIS, 4 January 2016.

180 See also Morgan Herve-Mignucci/Xueying Wang, 'Slowing the Growth of Coal Power Outside China: The Role of Chinese Finance', p. 8.

181 Beijing may see its coal imports and emissions drop, but admittedly by merely pushing pollution abroad and even increasing global emissions.

Context of China's Rising Import Demand

As previously mentioned, in 2009 China became a net importer of coal for the first time, after having peaked in its export capacity in 2003.¹⁸² Despite having the third largest coal reserves in the world – after the United States and Russia –, China became the world's largest net importer of coal in 2011, surpassing Japan.¹⁸³ Currently, Indonesia and Australia are China's largest suppliers of steam and coking coal, respectively, accounting for no less than 67 per cent of all Chinese coal imports in 2013.¹⁸⁴ Coal imports have continued on their upward path ever since 2009, except for a drop in 2014.¹⁸⁵ The rise of imports has been primarily driven by its steady energy and coal demand growth, as well as by the government's overt efforts to boost national energy supply security.¹⁸⁶ Nevertheless, other factors also stand out:

- **High costs and bottlenecks in domestic coal transport:**

Bottlenecks in national railway capacity make domestic production more costly and imported coal more economically attractive, particularly in Southeast China. These costs have constantly increased given that as China's coal production has increasingly moved to the country's western regions. Moreover, China still lacks north-south rail lines, which can transport coal from its mines to its consumption centres in the South. As a result of this geographic mismatch in supply and demand, China's domestic coal needs first to be transported to its north-eastern seaports around the and then shipped to its major importing coal ports along the country's south eastern coastline.¹⁸⁷

- **Expansion of infrastructure capacity:** During the last decade, more infrastructure capacity – rather than

182 In 2003, Chinese coal exports peaked at 94 Mt, while imports reached only 11 Mt. By 2009, China was importing 126 Mt. – see Kevin Jianjun Tu/Sabine Johnson-Reiser, 'Understanding China's Rising Coal Imports', Carnegie-Policy Outlook, Washington D.C., 16 February 2012.

183 See also Kevin Jianjun Tu, 'Coal to Newcastle? Understanding China's Coal Importing Behaviour' and Sylvie Cornot-Gandolphe, 'China's Coal Market: Can Beijing Tame 'King Coal?'' Oxford Institute for Energy Studies (OIES) Paper: CL 1, Oxford, December 2014, p. 2.

184 Indonesian steam coal is mainly used for producing steam and in power generation; in 2010, it accounted for 95 per cent of Indonesian coal exports to China. Australian coking coal, primarily used for industrial processes – iron and steel production –, represented 63 per cent of total Australian coal exports to China in 2011 – see Kevin Jianjun Tu and Sabine Johnson-Reiser, 'Understanding China's Rising Coal Imports', Carnegie-Policy Outlook, Washington D.C., 16 February 2012.

185 Officially, imports grew more than 30 per cent in 2012 vis-à-vis 2011, while in 2013 China imported a record 326.8 mt – accounting for more than 8 per cent of the country's coal supply. In 2014, imports dropped to 291.6 Mt. Western figures are often slightly different – according to the IEA, for instance, China increased its gas imports in 2013 by another 13.2 per cent to 341 Mt. – see IEA, 'Coal – Medium-Term Market Report 2014', p. 42.

186 See also Jianjun Tu, 'Industrial Organization of Chinese Coal Industry', p. 1.

187 See *ibid.*, pp. 8 ff. and Kevin Jianjun Tu/Sabine Johnson-Reiser, 'Understanding China's Rising Coal Imports'.

improved efficiency and utilization rates of railways and seaports – has driven rapid coal consumption. Coal consumption was simply expanding faster than coal production and railway transport capacity. Coal transported by rail decreased from 69 per cent in 1980 to less than 50 per cent before 2011, whereas coal shipped by major coastal ports increased in the same period from insignificant to 36 per cent. By expanding this infrastructure, China was able to stabilize coal supply and consumption, particularly during peak demand season.¹⁸⁸

- **Implementation of water conservation and climate policies:** China's restructuring and closure of around 10,000 smaller mines occurred largely in response to the inefficient use of water resources in mines located in water-scarce regions. The urge to save water for agricultural and human consumption, and the need to comply with international climate obligations and national air pollution regulations have led China to cut some of its own coal production and to rely instead on imports.¹⁸⁹
- **Safety issues in local mines:** Smaller Chinese mines – run by town and village firms – have a dismal safety record, having often ignored safety regulations and lacking modern technologies and technical equipment. These problems had been exacerbated by the increasing size of China's grey markets in its coal value chain, which had reached "dangerous levels that are too significant to be ignored."¹⁹⁰ In this context, importing more coal was another way to address the country's huge mining safety challenges.¹⁹¹

Lack of specific coal resources: China may have rich coal resources, but not all types. For instance, Chinese steam coal makes up just 25 per cent of total reserves. Likewise, although China had been a coking coal exporter in the past, rapid industrialization and the growth of iron and steel production capacity during the last decade has quickly depleted the country's coal coking stock.¹⁹²

Over the next ten years, the Chinese are expected to absorb more than 50 per cent of global coal consumption. China will also be largely responsible – together with other parts of Asia – for no less than 80 per cent of the increase in coal trade – particularly for steam coal. In 2013, China's imports accounted for around 30 per cent of all global coal trade, importing 264m tonnes ahead of Japan – 142m tonnes – and India – 139m tonnes.¹⁹³ In the first five months of 2015,

Figure 34: Major Coal Importers (Mt)

	2012	2013	2014
PR of China	288.8	327.2	291.6
India	164.2	188.8	239.4
Japan	183.9	195.6	187.7
Korea	124.3	126.5	130.9
Chinese Taipei	64.6	66.0	67.1
Germany	49.0	54.3	57.0
Netherlands	24.4	46.7	54.7
United Kingdom	44.8	49.4	40.6
Turkey	29.2	26.6	29.8
Russian Federation	30.3	29.4	25.3
Malaysia	22.6	22.1	23.6
Thailand	18.6	18.7	20.9
Brazil	16.5	18.0	20.4
Italy	24.5	20.1	19.9
Spain	22.4	13.7	16.4
Philippines	11.7	14.2	15.2
Other	178.2	174.4	183.1
OECD Americas	35.9	34.4	35.3
OECD Asia-Oceania	322.3	335.5	329.7
OECD Europe	258.1	276.7	280.5
OECD Total	616.3	646.5	645.6
Africa + Middle East	14.0	11.6	16.5
Other Asia-Oceania	592.2	659.2	686.7
Other Europe + Eurasia	54.8	52.7	48.3
Other Americas	20.7	21.7	26.6
Non-OECD Total	681.7	745.2	778.0
World	1,297.9	1,391.7	1,423.6

Source: Dr. F.Umbach based on © OECD/IEA (2015), 'Coal Information. IEA Statistics 2015', Paris: IEA-Publishing.

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however, China's coal imports fell by 38 per cent – down to 83.2 tonnes – relative to the same period in 2014¹⁹⁴ – likely the result of slowing economic performance and energy demand.

Going forward, China's net imports could already peak by 2020, although the country's electricity generation may increase up to 55 per cent that same year.¹⁹⁵ In 2014, and as part of its campaign to fight pollution, Beijing introduced a coal-quality testing regime in order to ban coal imports with ash content higher than 16 per cent or sulphur content

188 See Kevin Jianjun Tu/Sabine Johnson-Reiser, 'Understanding China's Rising Coal Imports', p. 5.

189 This strategy, however, has also led to carbon leakage in other regions – see also *ibid.*, p. 8.

190 See Jianjun Tu, 'Industrial Organization of Chinese Coal Industry', pp. 19 and 57 ff.

191 See Kevin Jianjun Tu/Sabine Johnson-Reiser, 'Understanding China's Rising Coal Imports', p. 9.

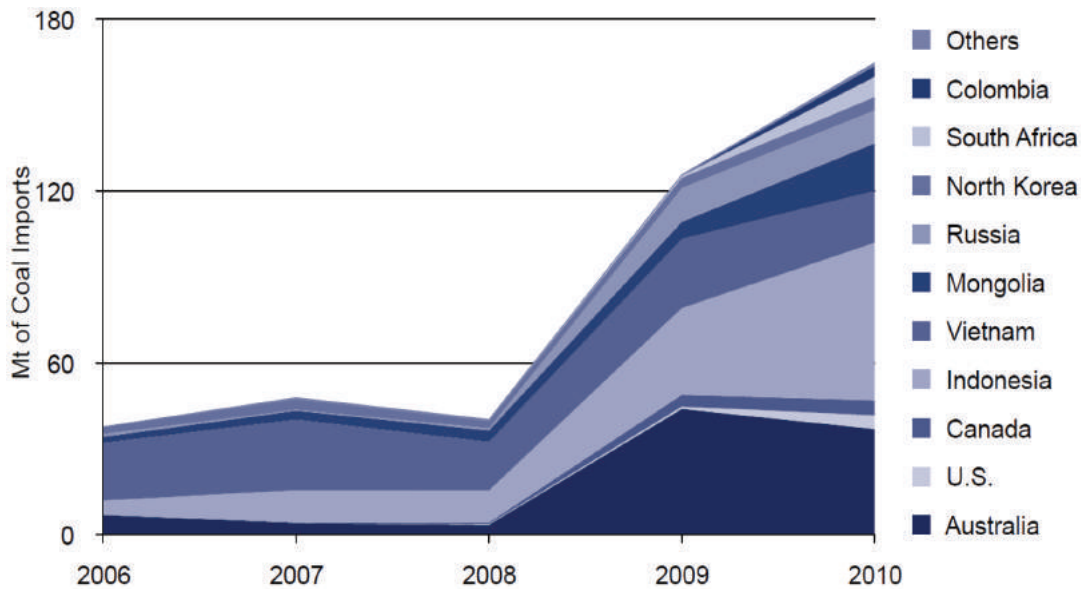
192 See *ibid.*, p. 11 f.

193 See IEA, 'WEO 2014', pp. 171 ff. and 'Coal Use in Chinese Power Below 62% by 2020', Interfaxenergy.com-NGD, 22 September 2014, .

194 See Jamie Smyth, 'Australian Miners Cry Foul over China Coal-Testing Regime'.

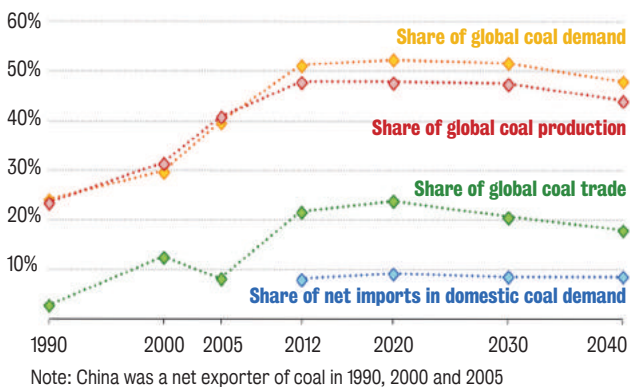
195 See IEA, 'WEO 2014', p. 139 ff.

Figure 35: China's Coal Imports by Country 2006-2010



Source: Kevin Jianjun Tu/Sabine Johnson-Reiser, 'Understanding China's Rising Coal Imports', *Carnegie-Policy Outlook*, Washington D.C., 16 February 2012.

Figure 36: Share of China in Global Coal Markets and China's Coal Import Dependence in the New Policy Scenario



Source: © OECD/IEA (2015), 'World Energy Outlook 2015', Paris: IEA-Publishing. Licence: www.iea.org/t&c/termsandconditions

of more than one per cent in populous eastern cities. Additionally, in October 2014 the Chinese government re-imposed duties on various imported coal types in order to safeguard domestic coal producers, with an emphasis on higher quality.¹⁹⁶ The levies have heavily affected imports of Australian coal¹⁹⁷ and have consequently attracted

complaints from Canberra.¹⁹⁸ Similar duties had been removed in 2007, when China's coal demand was soaring and imports were steadily increasing.

196 See Lucy Hornby, 'China to Impose Coal Import Duties', FT, 9 October 2014; idem, 'China Ban on Low-Grade Coal Set to Hit Global Miners', FT, 16 September 2014.

197 See Alstom Power-GPS Marketing, 'China Takes Steps to Revive its Coal Industry'.

198 Australia regards the levies as costly, and it has called them an "inadequate allowance for commercial remedies" and a wider shift towards protectionist policies in China "masquerading as environmental measures" – see Jamie Smyth, 'Australian Miners Cry Foul over China Coal-Testing Regime', FT, 5 July 2015.

The International Outlook for Chinese Energy Firms

Growth of China's Coal Industry Abroad

As explained above, the Chinese government has actively promoted coal power investment abroad. In turn, this policy is the inevitable choice for power companies to develop the market space, optimize the industrial structure, and obtain high-quality resources as well as a significant way to improve international competitiveness and build a first-class comprehensive power group.¹⁹⁹ Against this background, Chinese companies typically will invest abroad as long as any given project meets four criteria: 1) there are reliable resource supplies, 2) the project relies on Chinese equipment and technology, 3) the project promises to deliver a reasonable return on investment, and 4) the selected country offers a stable investment and political environment.²⁰⁰

In this context, three types of Chinese firms have become major actors in China's overseas coal power business:

1. Major SOEs that control Chinese electricity generation, transmission, distribution, and the sale of power. The five major power generation groups include China Huaneng Group, China Datang Corporation, China Huadian Corporation, China Guodian Corporation, and the State Power Investment Corporation. For their part, the two grid companies are the State Grid Corporation of China and China Southern Power Grid Company Limited, and they are responsible for transmitting, selling and distributing the power. They are all engaged in overseas coal power investments, with their activities subject to on-going monitoring by the State Council, China's cabinet.²⁰¹
2. Four relatively smaller corporations with the same wide range of business activities. They are SDIC Huajing Power Holdings Company Limited, Guohua Power Company of China, China Shenhua Energy Company Limited and CR Power.
3. Equipment manufacturers in infrastructure construction that are not traditionally players in the power business. Out of these actors, three stand out: the Power Construction Corporation of China, the China Machinery Engineering Corporation and Dongfang Electric.²⁰²

199 See In-En.com, 'Can the Top Five Power Generation Group in China 'Go Out'?' (五大发电集团能否成功“走出去”), 26 December 2014, <http://power.in-en.com/html/power-2228820.shtml>.

200 Private conversation with a senior advisor of a Chinese SOE.

201 The specific oversight body is the State-owned Assets Supervision and Administration Commission.

202 In general, the main business of these companies includes investment, equipment production, infrastructure construction, project operation,

In particular, the following three companies are not only some of the most important in the Chinese coal mining industry, but also pioneers in foreign markets:

- **China Shenhua Energy Company:** One of the world's leading integrated coal based energy companies and the largest coal supplier in the world, Shenhua has had a presence in Australia since 2008, where it has a good track record in environmental and social responsibilities.²⁰³
- **Datong Coal Mine Group – Foreign Trade & Economic Cooperation Co., Ltd. (FTECC):** Datong established the FTECC in 1998. As a state-owned corporation specializing in imports and exports, as well as international project construction and bidding, FTECC is authorized by the Ministry of Commerce to perform economic and technological cooperation on behalf of Datong. The Corporation has nine departments, a branch in Europe and a project in Turkey. FTECC has earned its reputation through its importing and exporting businesses with companies in the United States, South Africa and European states. More importantly, with the support from Chinese government, FTECC has contracted several international projects in recent years.²⁰⁴
- **China Coal Overseas Development Co., Ltd. (CODCO):** Established in 1982 under China National Coal Mining Equipment Co., Ltd (CME), CODCO's mission is to take charge of exporting products made by subsidiaries of CME and other Chinese manufacturers. With its wide range in technological capacity with reasonable price, CODCO has become the only exporter of complete fully mechanized longwall equipment in China with experience of more than 20 years and a good global reputation. CODCO is also widely engaged in international market of construction, equipment and technology service.²⁰⁵ CODCO's equipment export has reached markets like Russia, India and Turkey.

technical support and so on. In addition, they also participate in overseas coal exploitation and coal-electricity integration.

203 For instance, over the past five years, Shenhua Watermark has invested US\$5 million into the local community. Such measures have helped Shenhua taking deeper roots in Australia market. See Watermark, Introduction, <http://www.shenhua-watermark.com/html/AboutUs/Introduction/>

204 Examples of its projects are its housing one in Eritrea, coal exploration project in Niger, coal mine project in Zimbabwe, coking plant project in Bhutan etc., and independently contracting reservoir dam project in Iran, Amasra coal mine construction in Turkey – see *Datong Coal Mine Group, Foreign Trade*, <http://english.dtcoalmine.com/30999.html>

205 See *China Coal Overseas Development Co., Ltd.*, company Introduction, http://codcofly.en.ec21.com/company_info.html

Other Chinese firms have also had considerable success abroad. For example, Shandong Energy Group Co. Ltd. is in the Canadian, Australian, Thai and Burmese markets, and in March 2012, Linyi Mining Group, one of its subsidiaries made a take-over bid for Australian coal company Rocklands Richfield. Likewise, the Jingmei Group founded the Beijing-based Haohua Energy Resource Co., whose Hong Kong-based subsidiary – Haohua Energy International – signed a partnership agreement in 2013 with Coal of Africa to share its expertise in commercial, technical, financial and operational issues, and to help with the development of Coal of Africa's substantial project pipeline.²⁰⁶ Moreover, the Kailuan Group has invested in the Gething Project in Canada to produce sulphur metallurgical coal and low ash for steel projects.²⁰⁷ Finally, China Coal Technology & Engineering Group Corp (CCTEA) has technical communications with over 30 countries and 100 organizations in the world. Its businesses cover, among others, underground mine, open-pit mine, preparation plant, washing plant, power generation plants, and infrastructure.²⁰⁸

To be sure, despite their relative success, Chinese SOEs – irrespective of industry – still face a path full of difficulties in their overseas operations. Indeed, Chinese SOEs have increased their overseas foothold and still dominate many strategic industries – including energy, telecommunications, transportation, and infrastructure – with monopoly benefits; in 2013, they represented 63.4 per cent of Beijing's overall non-financial overseas direct investment. Along with private companies, Chinese SOEs have increasingly diversified their overseas investment during the last years in response to declining profits at home and in order to acquire capital abroad, modernize supply chains, gain advanced technology, and improve management skills. Nevertheless, their lack of understanding of foreign social and legal environments has also often led to poor performances and substantial losses in profitability.²⁰⁹ In the sections below, the paper will try to sketch the main challenges, opportunities, and risks for these companies going forward.

Challenges: Operational Transparency, Corporate Social Responsibility (CSR), and Technical Equipment Issues

- **Operational Transparency:** According to a report on corporate transparency in emerging economies, the situation in China is grim, and the coal power industry is no exception.²¹⁰ Chinese scholars share such concerns and point out that the overall level of corporate transparency in China is low.²¹¹ A recent report, for example, found that a whopping 44.5 per cent of companies have poor transparency, while not a single firm earned a top rating.²¹² Some new research finds that Chinese companies have explored transparency of information concerning overseas investment, but there is still huge room for improvement. Although most companies believe that disclosure of information is important for reducing the main risks in overseas investment, only about a third of companies understand the need for implementing transparency-related international standards or initiatives. Taking the Chinese extractive industry as example, over 60 per cent of Chinese firms express that they have established communication mechanisms with stakeholders in the host country; however, the mechanisms are limited, and most communication only involves government departments, suppliers and internal staff.²¹³

Weaknesses in transparency and communication at home translate into problems when doing business overseas. Moreover, Chinese companies usually fail to pay enough attention to information disclosure on corporate social responsibility (CSR) matters. Similarly, companies usually fail to set up an effective accounting system for key information such as carbon emissions. Furthermore, Chinese investors tend to underestimate the importance of communicating with civil society, trade unions, and NGOs.²¹⁴ Moreover, there is not an information-sharing platform for mining investment abroad; consequently, companies will often not know where to disclose

206 See Stock Market Wire, "Coal of Africa Forms Link with Haohua Energy International," 26 March 2013, <http://www.iii.co.uk/stockmarketwire/82920/coal-africa-forms-link-haohua-energy-international>

207 The project is still in the exploration, design and permitting stage. See China Coal News, "Chinese Coal Companies Gradually Going Global Better" (中国煤炭企业“走出去”逐步成熟), 23 April 2014, available at: <http://www.ccoalnews.com/upzt/2014zt/investment/index.htm>

208 At present, CCTEG is doing projects in Turkey, Vietnam, Indonesia, Russia, Uzbekistan, and Nigeria, etc. See CCTEG, "Mining Engineering Services," <http://www.ccteg.cn/cctegen/CoreBusiness/MiningEngineeringServices/index.html>

209 See Zhibo Qiu, 'The Impact of SOE Reform on Chinese Overseas Investment', China Brief, Vol. 15, Issue 2, 23 January 2015.

210 Transparency International, 'Emerging Market Multinational Companies – Ready for Prime Time?', 16 October 2013, http://www.transparency.org/whatwedo/publication/transparency_in_corporate_reporting_assessing_emerging_market_multinational.

211 See China.net, 'Report on Transparency of Chinese Enterprises: Generally at a Low Level' (《中国企业公众透明度报告》:企业整体水平较低) 22 December 2014, <http://finance.china.com.cn/industry/hotnews/20141222/2864875.shtml>

212 The report evaluated the general public transparency in 2014 of the top 200 companies in China in terms of headquarters location, industry, ownership and listed status – see China.net, 'Report on Transparency of Chinese Enterprises: Generally at a Low Level' (《中国企业公众透明度报告》:企业整体水平较低) 22 December 2014, available at: <http://finance.china.com.cn/industry/hotnews/20141222/2864875.shtml>

213 Duan Chirong, 'Report: Risk Management through Transparency' (以透明降风), Tsinghua University, 11 September 2015.

214 Private conversation with a researcher from Academy of Macroeconomic Research, NDRC, 22 May 2015.

information, and stakeholders will not know where to obtain it.²¹⁵

- **CSR:** Equally problematic, research on China's 200 largest publicly listed companies in 2013 revealed that these firms register, in general, low levels of CSR.²¹⁶ This lack of awareness is only exacerbated abroad, where Chinese energy firm's CSR issues are commonly related to lack of compliance with local regulations; localization and labour practices; environmental protection; operational transparency of stakeholders; community participation; financial and in-kind contributions to the community; and cross-cultural integration.

At the same time, other analyses point out that the power industry ranks first out of 14 industries in this regard by establishing a social responsibility management system and by disclosing related information.²¹⁷ Additionally, there are examples of energy firms taking concrete steps to improve their operations and their impact on communities and the environment.²¹⁸ Nevertheless, fluctuating coal prices and declines in company profits may have an impact on companies' CSR activities. All in all, striking a balance between profit and CSR has become an increasing delicate task for power generation company chiefs.²¹⁹ Another complicating factor is the fact that Chinese companies still retain a domestic mind set when doing business abroad, which in turn leads to poor contacts with the local community, a poor work environment,²²⁰ ineffective hiring practices, and little regard for environmental protection matters. SOEs often tend to mirror domestic practice, and they may therefore just follow orders from top management with little willingness to communicate with local people if it is not necessary.

215 Ibid.

216 See Si Jiannan, 'Poor Transparency: Chinese Enterprises Need to Improve Competitiveness' (公众透明度“不及格”中国企业可持续竞争力亟待提升), 27 January 2015, <http://www.cinn.cn/xw/chanj/332179.shtml>

217 See GMW.cn, '2014 Blue Book of Corporate Social Responsibility: the Power Industry Performs Best' (2014企业社会责任蓝皮书:电力行业责任指数排名第一), 13 November 2014, http://politics.gmw.cn/2014-11/13/content_13828868.htm.

218 China Datang Corporation, for instance, has been awarded the title of "the most responsible corporation since reform and opening up" in the Fourth China Corporate Social Responsibility International Forum. Likewise, China Guodian Corporation has mastered and utilized a large number of energy saving environmental protection technologies, including the high-tech in the field of power and environmental protection, such as desulfurization, de-nitration, de-dusting and waste-water utilization – see Chen Peng, 'Coping strategy for power companies to fulfil social responsibility with the contradiction between coal supply and power generation' (煤电矛盾状况下发电企业履行社会责任的对策), China Business Update, 2009(8).

219 See Ibid.

220 Poor working conditions in Chinese SOEs include as forced overtime, lack of social security rights, and severe health risks.

- **Technical Equipment Issues:** Product quality ranks as the top reason in China for unplanned power outages.²²¹ In general, despite the ever improving quality of China's coal and electricity equipment, failures in Chinese manufacturing technical equipment and mismanaged integration of advanced Western technologies are frequent occurrences at home and abroad. Strictly speaking, China's large-scale overseas projects have been running for only about ten years. Because of relative inexperience and initially unrealistic expectations regarding investment, China's coal-fired power industry lacks both an integrated global strategy and an emphasis on standards when they go abroad.

Against this background, Chinese companies take relatively huge risks with technical equipment quality when they operate in global markets. The most common risk is that the Chinese-made equipment may fail to meet local standards, as Chinese companies usually fail to fully understand international regulations. Sometimes, construction drawings in Chinese are difficult for foreigners to understand, or Chinese workers and engineers do not speak any foreign languages. Similarly, design standards and regulations in China may not be consistent with their target destinations, particularly as Western countries often have higher standards for environmental and working conditions. Besides, when it comes to the export of equipment in the coal-fired power industry, there are other frequently encountered problems including talent qualification, procedure assessment, and raw material authentication. Nevertheless, Chinese companies have usually paid more attention to cost rather than quality, even if this approach may threaten the company's long-term survival and reputation. Notably, studies show that Chinese investors do not consider problems of equipment quality and difference in management culture as obstacles to investing overseas. In other words, quality of equipment is often not a major concern for Chinese firms.²²²

Opportunities in Reform and Geopolitical Repositioning

China's coal power investment abroad has received unparalleled state and administrative support through the 'One Belt, One Road' (OBOR) Initiative,²²³ an ambitious geopolitical strategy that places China at the centre of a neighbourhood that stretches over 65 countries in Asia and Europe. The initiative will include five areas of connectivity – policy, infrastructure and facilities, trade, currency, and people –, and can be understood as a new round in Chinese

221 See Yu Haijiang, 'Three Major Units of Coal Power Need Better Quality' (火电三大主设备质量仍待提高), 27 June 2012, http://www.cpn.com.cn/zdgc/201206/t20120625_419840.html

222 See China Council for the Promotion of International Trade, 'Survey (2008-2010): Situation and Viewpoints of Chinese Enterprises' Overseas Investment (in Chinese: 中国企业对外投资现状及意向调查报告(2008—2010)).

223 For more details, see section 5 below.

opening in response to the challenges of overproduction and overcapacity, rising labour costs, backward development in the western part of the country, and transformation into a net capital exporter.²²⁴ In this regard, OBOR offers both SOE modernization and obvious economic opportunities.

- **SOE Reform:** The implementation of the initiative has led to Beijing's first steps in 2015 towards tackling on-going issues with its SOEs. The reform aims to allow the central government to tighten its control over assets and overall strategy for macroeconomic development and direction, while at the same time loosening control over corporate governance at the micro-level. The reform is also the result of the increasing role of private investment and private stakeholders in SOEs. Chinese SOEs are expected to increase their overseas investment as a result of OBOR, but also to increase their risk control and profitability analyses so as to improve overall management skills. With this policy in place, China's energy sector, including its coal industry, will remain at the top of Beijing's investment and acquisitions agenda.²²⁵

Importantly, the reforms aim to increase mixed ownership structures. Chinese reformers hope that private stakeholders will be a counterbalance to the government's control over SOE decisions, and that they will help to improve the transparency of corporate governance in order to maximize returns, mitigate the risks of huge financial losses, and to boost overall competitiveness.²²⁶ As Chinese expert Zhibo Qiu concluded, ultimately, leadership will still "set the grand strategy for investment priorities," yet individual SOEs will have more freedom within a specific set of bounds. As a consequence, observers expect a more cautious SOE approach on high-profile overseas investments; SOEs to be less willing to bet on speculative investments such as purchases of property abroad, and more likely to focus on the strategic sectors of China's domestic economic growth; and the government to provide more support to create a better investment environment for SOEs, mainly through bilateral and multilateral negotiations on investment treaties.²²⁷

- **Enhanced Investment Opportunities in the OBOR Neighbourhood:** There are several new investment opportunities for the coal power industry as a result of the OBOR initiative:

- *Demand for electricity from countries in the OBOR initiative:* Long-term lack of electricity supply is a common problem faced by countries along OBOR,

particularly South Asian countries such as Pakistan, Bangladesh, and Sri Lanka. The Pakistani government in particular is eager to build power stations with its rich natural resources to ease the problem, which represents an investment opportunity for Chinese coal and electricity companies.²²⁸

- *Richness in resources in the OBOR neighbourhood:* Rich in energy resources, these countries are also geographically and geopolitically very important for China. China's energy cooperation with South Asia, Central Asia, Russia, Southeast Asia and Asia-Pacific is the crucial starting point to promote China's vision of energy cooperation through OBOR.²²⁹
- *Energy infrastructure construction and market integration:* China's and regional future energy cooperation in the context of OBOR will rely on infrastructure cooperation, including transnational oil pipeline and power corridor construction in the region. Based on these infrastructures, China could establish regional markets, then an energy free-trade area, and finally create international geostrategic partnerships. In other words, construction of coal-fired power plants can fulfil OBOR goals.²³⁰
- *The advantages of coal-fired power:* Coal power projects have a shorter construction cycle and lower technological difficulty than the other type of power projects. More importantly, the coal reserve structure in OBOR countries is similar to that in China, where

228 Pakistan is beset by power shortages especially in the summer. In 2011, the domestic electricity gap reached 30 per cent. In extreme cases, there is no electricity for almost 12 hours a day during the summer time. In addition, Pakistan's neighbouring countries, such as Bangladesh and Sri Lanka, also face the problem of power shortage – see Chang Hua, 'One Strip One Road and Chinese Coal Power' ("一带一路" 中国煤电走起) 30 April 2015, available at: http://www.nengyuan.com/news/d_2015043015252400001.html.

229 Pakistan, for example, is one of the Asian countries with the most lignite resources. Almost 97 per cent of its coal reserves are lignite, and only the remaining 3 per cent are sub-bituminous or bituminous coal. Proven coal reserves in Pakistan rank seventh in the world and are sufficient to generate electricity in the country for more than 30 years – see Chang Hua, 'One Strip One Road and Chinese Coal Power' ("一带一路" 中国煤电走起) 30 April 2015, http://www.nengyuan.com/news/d_2015043015252400001.html.

230 For example, the China Power Investment Corporation has undertaken the operation and maintenance of seven million KW of coal power stations along OBOR. Moreover, China has started building the Yongxing coal powered electric plant in Greater Mekong in Vietnam; it is China's largest investment project in Vietnam so far, and it has also been the first Build-Operate-Transfer (BOT) project for electric power held by a Chinese firm in that country. Likewise, China Huadian Corporation has developed a coal-fired plant in the Trà Vinh-province of Vietnam. The project is geostrategically significant given that China, Malaysia, and Vietnam are establishing a free-trade area. For its part, Datang Corporation is also promoting programmes for coal-electricity integration in Kazakhstan, Indonesia, Mongolia and other countries – see China Power News Network (2015), 'China Southern Power Grid starts construction of Phú Lâm coal-power plant in Vietnam' (南方电网越南永兴燃煤电厂项目将进入建设阶段), 9 June 2015, http://www.cpn.com.cn/zdzt/201506/t20150609_805827.html

224 Private conversation with a former senior officer from the Chinese Ministry of Foreign Affairs.

225 In the words of expert Zhibo Qiu, "The past paternalistic support from then central government also provided fewer incentives for SOEs to upgrade management style, improve the quality of their products and services, or build their innovative capacity" – Zhibo Qiu *ibid.*, p. 1.

226 See *ibid.*

227 See *ibid.*, p.3.

more than half of the coal used is bituminous coal. These resources are therefore compatible for use with Chinese power generation equipment, as in the case of Pakistan. As long as there are coal resources, China's excess coal boilers can be directly used in OBOR countries.²³¹

On-Going Socio-Political and Operational Risks

Although there is huge potential for China's overseas coal-fired power market, important challenges remain. A comprehensive overview of the main issues faced by Chinese companies is yet to be assembled and is certainly worthy of further research. Nevertheless, interviews and informal exchanges with Chinese business leaders offer a glimpse into the following six ongoing concerns and difficulties:

1. **Political risks:** Standing out as the greatest concern for Chinese investors, political events in host countries and changes in relations between a host country and a third-party can have potentially negative consequences for investment abroad.²³² Importantly, such risks are not limited to developing nations. In fact, while the developing world may suffer from political and social instability – among others, regime change, religious and ethnic conflict, and even civil war –, the more stable industrialized countries often impose technology restrictions on foreign investment and have more stringent environmental protection standards.²³³ China's current overseas coal market is mainly concentrated in South and Southeast Asia, where political unrest and testy diplomatic relations with Beijing are still common – e.g. in Thailand, Burma, and the Philippines.²³⁴
2. **Policy and legal risks:** Chinese energy investors highlight policy changes or difficulties in putting policies into effect as a further, important risk.²³⁵ On the legal side, Chinese business people report that authorities in destination countries often disregard or even breach laws, hence delaying project implementation, or increasing

implementation cost and/or legal liability. Likewise, there are reports of seemingly unnecessary legal changes and judicial corruption,²³⁶ as well as disputes emerging from contract and environmental issues.²³⁷ Importantly, these risks are not exclusive to Chinese energy investment projects in developing or emerging markets.²³⁸

3. **Economic and financial risks:** With large investments like coal power projects, Chinese companies tend to face long payback periods and, often, uncertainty of repayment. Some Chinese firms have also focused mostly on expanding their business without sufficiently taking into consideration the viability of the project or the credit worthiness of their clients. In addition, there are risks associated with inflation and with volatile foreign exchange and interest rates – all common issues in the regions in which Chinese SOEs have heavily invested. For example, the 2008 devaluation of the Australian dollar led to considerable losses in Chinese investment.²³⁹
4. **Environmental, infrastructure, and social risks:** The Chinese electricity sector has explicitly identified social factors – among others, social services, cultural traditions, and religious practices – as having a significant impact on project implementation.²⁴⁰ Likewise, local preference for cash payments often represents a problem in areas with security issues. Poor transport and road infrastructure can also slow down implementation, as can natural disasters. Most recently, Chinese investment has faced unprecedented opposition in light of local environmental pollution concerns,²⁴¹ and has also been affected by the

231 See Chang Hua, 'One Strip One Road and Chinese Coal Power' ('一带一路' 中国煤电走起) 30 April 2015, http://www.nengyuan.com/news/d_2015043015252400001.html.

232 Author's private conversation with a senior advisor of a Chinese state owned coal company.

233 See China Electricity Council, 'Risk Identification and Control of Overseas Electricity Investment' (境外电力投资项目风险识别及防控), 24 May 2011, <http://www.cec.org.cn/zhuanti/2011nianzhuantihuigu/dianliqiyezouchuqujinjunhaiwaishichang/yaowen/2011-05-24/54570.html>

234 For example, State Grid Corporation of China spent more than a year trying to get a project in the Philippines national grid given political opposition in the Philippines to transferring operations of the grid to a Chinese firm – see Liu Xiuli, 'State Grid Corporation of China assets in Philippines exceed 10 billion, political risks are not yet manageable' (国家电网在非资产超百亿 政治风险不可控) 20 May, 2012, <http://finance.sina.com.cn/chanjing/gsnews/20120520/232012105283.shtml>

235 Private conversation with a senior advisor of a Chinese coal SOE.

236 See *ibid.*

237 See Tianshan.net, 'Six Risks that Chinese Overseas Enterprises Are faced with' (海外中资企业面临六大风险), 1 June 2015, available at: http://epaper.ts.cn/ftp/site1/xjdsb/html/2015-06/01/content_38583.htm.

238 For instance, in June 2011 China National Petroleum Corporation (CNPC) announced a memorandum of understanding with Canada's Encana. Nevertheless, the joint venture faced two delays in Canada under allegations that more time was needed to investigate whether the deal was in line with Canadian investment law. Eventually, the discussions collapsed a year later – see China Business News, 'Negotiations between CNPC and a Canadian Company on Shale Gas Cooperation Break Down' (石油与加拿大公司页岩气合作谈判宣告破裂), <http://money.163.com/11/0623/10/77705VT900253B0H.html>.

239 The Economic Observer 'CNPC Assets in Australia devalue, with a loss of 89.4 billion renminbi, or around US\$ 13.1 billion in that month's exchange rate', (中石油陷入澳元门·澳洲资产缩水894), 27 October, 2008, <http://www.eeo.com.cn/2008/1027/117831.shtml>

240 See China Electricity Council, 'Risk Identification and Control of Overseas Electricity Investment' (境外电力投资项目风险识别及防控), 24 May 2011, <http://www.cec.org.cn/zhuanti/2011nianzhuantihuigu/dianliqiyezouchuqujinjunhaiwaishichang/yaowen/2011-05-24/54570.html>.

241 The Las Bambas copper project in Peru – the largest Chinese mineral project thus far – has triggered a series of deadly protests, forcing the Peruvian government to declare a state of emergency- see BBC News, 'Peru Declares State of Emergency in Mining Region', 30 September 2015, <http://www.bbc.com/news/world-latin-america-34400831>.

fraught security situation in some countries,²⁴² with some African nations standing out as of particular concern.²⁴³

5. **Operational risks:** With the expansion of China's coal industry abroad, Chinese companies now have local facilities that carry out value-added activities – e.g. research and marketing – in different countries. In this context, differences in operational culture become apparent and can be a source of contention. Often times, Chinese companies lack the 'soft skills' of doing business, and they will thus prioritize cost-related information and disregard other equally important factors. Consequently, they often fail to take into consideration issues such as labour conditions, residential living, and environmental legislation in their investment decisions. In addition, energy companies often ignore or underestimate the differences in institutional environment that are intrinsic to the developing countries in which they usually invest.²⁴⁴ Other factors include the lack of proper information regarding the industry; the mismatch between the skills found in the local labor force and those needed; miscommunication among companies; relations with the local government; and inadequate organization and management skills. Additionally, the differences in management culture between Chinese companies and local units can often be a source of conflict.²⁴⁵
6. **Specific risks to the coal power industry:** Finally, the operation of coal and electricity – which depends on vast amounts of water and coal resources – could also bring unique risks related to supply, quality, price, transportation, energy transition, and environmental protection in the destination country.²⁴⁶ Furthermore, there are contradictions between Chinese coal and electricity companies. The Chinese electricity sector used to wield the most influence within China's energy industry. Yet, the rapid growth in other high energy-consuming industries in recent years has also enhanced the status of the coal industry. In turn, the coal industry's elevated status has led to weaker political coordination between coal and electricity companies and hence hindered any possible cooperation in overseas investment.²⁴⁷

242 In 2012, Sudanese rebels kidnapped – and subsequently released – 29 Chinese construction workers. Ulf Laessing/Sui-Lee Wee, 'Kidnapped Chinese Workers Freed in Sudan Oil State', Reuters, 7 February 2012, <http://www.reuters.com/article/2012/02/07/us-china-sudan-workers-idUSTRE8160UU20120207>.

243 Private conversation with a manager of a Chinese state-owned coal company.

244 Private conversation with a manager of a Chinese state-owned coal company.

245 See Zhai Wei, 'Risk Management of Chinese Company 'Going Out'' (我国企业“走出去”的风险管理), Anhui University, 2005.

246 See Wu Shangyuan, 'Case Study: Risk Management of BOT Power Plant Programs Overseas' (基于案例的海外BOT电站项目风险管理研究), Tsinghua University, 2012.

247 See Cai Jiangang, 'Competition Intensified between Coal and Power: Focus more on New Energy Market Development Overseas' (煤电

Examples on the Ground: Indonesia and Sri Lanka

The expansion of China's overseas coal power industry has covered a wide range of countries, as listed in Appendix 1. This report considers two specific examples on Chinese coal power investment – one in Indonesia and one in Sri Lanka – to analyse opportunities and risks ahead.

Indonesia

In April 2005, the Indonesian government began to accelerate the construction of power generation projects in order to address power supply issues. In July 2006, the government officially launched a plan to build 40 coal power plants of about 10 million kilowatts. With their competitive advantages, Chinese firms play a key role in implementing this plan and accounted for over 90 per cent of the first batch of power plant projects. Ever since, Indonesia's existing power generation capacity has reached close to 30 million kilowatts. Nevertheless, the Indonesian government and industry have expressed a number of complaints regarding Chinese companies. In particular, there is widespread frustration with delays that have set back projects for one to two years on average, and by at least six months in the fastest two projects. Some of the completion dates cannot even be determined. Another common complaint is the quality of equipment provided by Chinese companies. Once in operation, projects have shown different degrees of quality problems – some projects cannot operate in full capacity, and some even have to be returned for repair due to severe accidents after just a few days of operation. Thus far, none of these projects has achieved a long operation cycle, let alone operations in full capacity. In the wake of these problems, Indonesian government and private sector representatives – as well as Beijing's manufacturing competitors – have openly criticized Chinese power equipment. Chinese companies may even find themselves cut out of the electricity market in Indonesia altogether, which has prompted Chinese authorities to exhort their country's companies to address these credibility and quality concerns.²⁴⁸

Sri Lanka

The Chinese-built Pute Lahm coal power plant is by far the largest economic cooperation project between China and Sri Lanka and the largest coal-fired power station in that country. With Chinese loans of US\$445 million, the first phase of the project started in 2007 and ended in 2011. The second phase, worth some US\$890 million, started

博弈激化: 看海外新能源市场发展), China Electrical Equipment Industry, 2009(7).

248 See Xinhua News Note of Shenhua (Indonesia), 'Coal fire project' (记神华国华印尼南苏煤电建设项目), 6 Dec 2010, http://news.xinhuanet.com/overseas/2010-12/06/c_13637077.htm. Anonymous, 'Understanding the strategy of Chinese electricity companies in Indonesia through Shenhua Indonesia coal fire project' (从神华印尼南苏煤电项目的开发看中国电力企业在印尼发展思路), Electricity Enterprise, 2013.

in 2009 was planned for completion in 2014. In early August 2012, however, due to a sudden and unexpected technical fault in its units – salt deposits on power lines resulting from sea breeze –, the plant was unable to generate electricity as normal, forcing Sri Lanka to adopt power-rationing measures. According to local regulations, new units should be subject to maintenance after being in operation for one year. These regulations notwithstanding, Sri Lanka continues to overload the plant's system despite China's repeated requests to avoid this practice, which also contributed significantly to the failure.

In the wake of the accident, Chinese authorities and technical staff have worked with Sri Lanka in a timely manner in order to address the issue and carry out repair work. Nevertheless, the station has repeatedly stopped transmission due to continued technical problems. Meanwhile, because of persistent drought, Sri Lanka's hydropower generating capacity has declined sharply. The end result was the daily rationing of power supply for up to two and half an hours throughout June and July 2012. Similarly, the incident has led to a PR crisis for the quality Chinese energy know-how in general and of the plant in particular, with Indonesian authorities accusing Chinese firms of using substandard equipment and failing to give due design consideration to the risks associated with the plant's coastal environment.²⁴⁹

In general, a number of reasons were behind the unsatisfactory results of the coal power projects in Indonesia and Sri Lanka. In the case of Indonesia, Chinese executives originally held concerns regarding the expected building timeframes; delays that were long in the making were then further complicated by differences between Chinese and Indonesian standards. Moreover, miscommunication between Chinese and Indonesian officials as a result of differences in management styles and culture exacerbated the problem. Lastly, the Chinese would complain of untimely payments from the Indonesians. Importantly, in both cases managers often lacked the ability and experience to join and coordinate the various parts of the projects, including design, equipment, construction, and debugging. Appreciation of the renminbi, in addition, altered budgets plan and demanded adjustments. Moreover, firms with little experience in large power generation projects in China – e.g. technology and trade companies, or mechanical and electrical equipment manufacturing firms – were in charge of the early stages of construction. As for Sri Lanka, less experienced local technicians may have contributed to the plant's faulty operations.

249 A member of the opposition party in Sri Lanka claims has even called for the removal of the plant's image from the country's 100 rupee note – see, Global Times, 'Sri Lanka complains about the breakdowns of the coal-fired power station that China constructed' (斯里兰卡抱怨中国建煤电站问题频发) 15 August 2012, <http://world.huanqiu.com/exclusive/2012-08/3025893.html>

Strategic Perspectives for China's Overseas Coal and Energy Investments

China's Grand Design Concept of 'One Belt, One Road' (OBOR)²⁵⁰

As the world's largest economy, global manufacturer and exporter, and energy consumer and coal importer,²⁵¹ Beijing has developed a new foreign policy concept with strong geo-economic dimensions that makes China's neighbourhood the "top strategic priority for the first time."²⁵² In fact, it is expected that China will become the world's largest overseas investor by 2020 with global offshore assets tripling presently from US\$6.4 trillion to almost US\$20 trillion.²⁵³ In this context, in September 2013 Chinese President Xi Jinping launched the OBOR initiative.²⁵⁴ OBOR is based on a pro-active engagement strategy with the country's neighbours. It foresees turning bilateral relations into more of a regional engagement strategy that is underpinned and bolstered by multiple strategic initiatives.²⁵⁵ The OBOR initiative is essentially a Chinese vision of the future regional integration of Eurasia that, crucially, aims to achieve China's economic, foreign, and security policy interests through a series of smaller initiatives and projects.²⁵⁶ It envisions six corridors across Eurasia – see next figure –, which have often combined overland and maritime infrastructures.²⁵⁷

Involving 65 states and around 4.4 billion people, OBOR is meant to spur regional cooperation by using China's huge potential for investment and trade, and to link the Chinese economy not only to those of Southeast and South Asia, but also to Africa and Europe.²⁵⁸ After all, China's rise to a global economic power would not have been possible without massive investments into its domestic transport and energy infrastructures.²⁵⁹ In particular, China's OBOR strategy seeks to use and benefit from economic complementarities. Thus, it promotes common interests in the areas of regional production, transportation, ports, highways, fibre optic cables, airports, energy infrastructures and value chains. It also aims to significantly expand the overland trans-continental container trade, as 90 per cent of global trade still relies on maritime transport.²⁶⁰ Additionally, China is rapidly expanding its domestic railway infrastructure – by another 3,000 km in 2014 alone – and investing in railroad construction abroad as part of OBOR's Maritime Silk Road.²⁶¹ To aid with the construction of these new railways, China can also import coal from Central Asia and Pakistan. Interestingly, all larger domestic transport infrastructures in China are defined and designed with military implications – such as transporting troops and goods for the Chinese armed forces. While it is unclear that any OBOR-backed railway project abroad may have any such implications,²⁶² the Chinese armed forces are actively debating how OBOR could be used to promote China's military power.²⁶³

The Chinese government also regards OBOR as an instrument to tackle its currently worsening economic problems. Recently, it officially linked OBOR to its domestic economic development strategy and views its

250 This is a revised and updated chapter of the previous one included in: Umbach, F./ Raszewski, S. (2016). Strategic Perspectives for Bilateral Energy Cooperation between the EU and Kazakhstan - Geo-economic and Geopolitical Dimensions in Competition with Russia and China's Central Asia Policies. Konrad-Adenauer-Foundation/EUCERS, Berlin-Astana, EUCERS-Strategy Paper No.8, February 2016, pp. 34-37.

251 It presently also accounts for between one-quarter and one-third of manufacturing imports in Japan, the EU and the United States – see Sri Mulyani Indrawati, 'Who Sets the Rules of the Game in Asia?', East Asia Forum, 28 June 2015.

252 See Chen Dongxia, 'China Aims to Set the Regional Cooperation Agenda', East-Asia Forum, 27 July 2015.

253 See Jamil Anderlini, 'China to Become World's Biggest Overseas Investor by 2020', FT, 25 June 2015.

254 The announcement was part of a speech before a summit of the Shanghai Cooperation Council (SCO) in Kyrgyzstan in September 2013. In October 2013, the Chinese Communist Party Central Committee announced new priorities under its New Neighbourhood Diplomacy guidelines – see Jacob Zenn, 'Future Scenarios on the New Silk Road: Security, Strategy and the SCO', China Brief, Vol. 15, Issue: 6, 19 March 2015.

255 The previous Silk Road Economic Belt and the 21st Century Maritime Silk Road (MSR) were merged into the new grand design Silk Road concept.

256 See Pepe Escobar, 'The Eurasian Big Bang: How China and Russia Are Carving Out Their Own World Order', Energypost.eu, 25 August 2015.

257 See 'The Grand Design of China's New Trade Routes', Stratfor.com, 24 June 2015.

258 See also 'China's Maritime Limitations', Stratfor.com, 25 June 2015.

259 Between 1992 and 2011, China spent 8.5 per cent of its GDP on infrastructure modernization and expansion – much more than the average of two to four per cent in other developing countries in that timeframe. From 1992 to 2007, Beijing alone spent US\$120 billion on building 35,000 km of highways – see Pradumna B. Rana, 'Building Silk Roads for the 21st Century', East Asia Forum, 16 August 2014.

260 For example, China has already contracted US\$30 billion investments in Kazakhstan and US\$15 billion in Uzbekistan, while providing Turkmenistan and Tajikistan with US\$8 billion and one billion in loans, respectively.

261 See idem, 'Rolling Out the New Silk Road: Railroads Undergird Beijing's Strategy'.

262 China experts actually see the plans as a possibility for changing China's South China Sea policies and thereby boost the cooperation levels needed for OBOR's implementation – see Feng Zhang, 'Beijing's Master Plan for the South China Sea', Foreign Policy, 23 June 2015.

263 See Nathan Beauchamp-Mustafaga, 'Dispatch from Beijing: PLA Writings on the New Silk Road', China Brief, Vol. 15, Issue: 4, 20 February 2015.

Figure 37: China's OBOR Initiative



Source: Stratfor.com (Courtesy of Stratfor).

Figure 38: China's Maritime Silk Route and Choke Points



Source: Stratfor.com (Courtesy of Stratfor).

activities as a new driver for future economic growth. At the same time, OBOR also represents a vehicle to strengthen the central government's direct control over China's economy as part of a more conservative economic policy.²⁶⁴ The present investment strategy focuses on six of the country's regions in the shipping, construction, energy, commerce, tourism, and comparative advantage manufacturing sectors. Authorities also consider these investments as safeguards for social stability and lasting political order in China and its neighbouring regions. China's provinces will have to play a major role in the OBOR strategy, but will try to follow their own specific interests and further increase their influence on China's international economic and foreign policies.²⁶⁵

In parallel, China has promoted its idea for a Free Trade Area of the Asia-Pacific (FTAAP). To an extent, FTAAP rivals the U.S.-led Trans-Pacific Partnership (TPP) and the Regional Comprehensive Economic Partnership (RCEP) – the two leading trade negotiations in the Asia-Pacific region –, but it also commits its partners to more open, liberalized and high quality trade and investment and encourages more integrated regional economic cooperation. Chinese experts view FTAAP as a long-term process that can only be fully realized through enhanced cooperation with other key economies particularly the United States, Japan, and India.²⁶⁶ Bilateral relations with these three countries, however, are ambivalent, involving both forms of economic cooperation as well as competing strategic interests.

Western response to OBOR has been mixed. While some observers see a geopolitical tectonic shift in Eurasia,²⁶⁷ initial Western responses tended to regard OBOR merely as a response to the Obama Administration's October 2011 New Silk Road initiative. Nevertheless, although both initiatives share broad similarities, the U.S. strategy was more limited in scope and was unable to commit sufficient economic, financial and diplomatic resources.²⁶⁸

Meanwhile, to Beijing's disappointment, the EU had initially largely failed to acknowledge or paid proper attention to the geo-economic and geopolitical importance of the OBOR initiative.²⁶⁹ Only now is the EU recognizing the value of enhanced cooperation with China in this regard. At the same time, a large number of European countries, including 14 EU Member States, have joined the China-led Asian Infrastructure Investment Bank (AIIB). China has also increased its cooperation with Central and Eastern European countries and institutionalized it in a so-called '16+1 Framework' in order to boost European support for the OBOR initiative. In particular, Chinese leadership has highlighted the centrality of these countries for a 'China-Europe land-sea express line' and existing transport and logistic routes that would "become an integral, convenient, and efficient connectivity network linking Asia and Europe."²⁷⁰ Beijing has already started providing financial support to key transport projects in the region.²⁷¹

Governments in the OBOR orbit have generally been warmer about the initiative. For instance, Vietnam and India have welcomed OBOR,²⁷² while also expressing security-related concerns with regard to these railroad construction plans.²⁷³ Meanwhile, countries like Russia, Turkey,²⁷⁴ and Thailand²⁷⁵ have openly embraced the

264 See also Willy Lam, 'One Belt, One Road' Enhances Xi Jinping's Control over the Economy', *China Brief*, Vol. 15, Issue: 10, 15 May 2015.

265 Both provinces, Xinjiang and Fujian, will seek to benefit from their ancient roles of the historic Silk road and their natural geographic vicinity to Central Asia and the Caspian Region. Xinjiang in particular hopes to transform itself into a regional transport hub, a centre of trade and logistics, culture and technology, as well as financial and healthcare services – see Nathan Beauchamp-Mustafaga, 'NPC Meeting Touts New Silk Road as New Driver for Economic Growth', *China Brief*, Vol. 15, Issue 6, 19 March 2015 and idem, 'Chinese Provinces Aim to Find Their Place Along New Silk Road', *ibid.*, Vol. 15, Issue 10, 15 May 2015.

266 See Chen Dongxia, 'China Aims to Set the Regional Cooperation Agenda'.

267 See Pepe Escobar, 'The New China-Europe Connection: How China's New Silk Road Strategy Will Change the Face of the World', *Energypost.eu*, 23 December 2014.

268 Although the U.S. initiative had also foreseen assistance and support to develop North-South infrastructure links between Eurasian countries, it sought largely to re-embed Afghanistan into the regional economic networks of Central Asia and has focused to remove bureaucratic barriers and other factors hindering the free flow of goods and people. The region, however, regarded this move as a decline in U.S. attention and commitment to the region – see also Michael Clarke, 'China Takes its Eurasian Moment', *East Asia Forum*, 17 July 2015.

269 The EU's failing response was perceived, among other terms, as "lukewarm," "disappointing," and "tepid to non-existent" – see Dragan Pavlicevic, 'China, the EU and One Belt, One Road Strategy', Vol. 15, Issue 15, 31 July 2015.

270 Quoted following Dragan Pavlicevic, 'China's New Silk Road Takes Shape in Central and Eastern Europe', *China Brief*, Vol. 15, Issue: 1, 9 January 2015.

271 These projects include the Belgrade-Budapest High-Speed Railway agreed in 2014, as well as a trans-Balkan high-speed railway connecting the China-controlled Greek port of Piraeus and European markets. Beijing has considerably increased all kinds of investment in Balkan states like Serbia – see *ibid.*

272 India views the establishment of the Bangladesh-China-India-Myanmar (BCIM) Economic Corridor, one of the six OBOR corridors, as a "game changer for South Asian trade" – see Pravakar Sahoo/Bhirup Bhunia, 'BCIM Corridor Game Changer for South Asian Trade'.

273 India in particular distrusts this strategy as a backdoor effort to consolidate a strategically designed creation of Chinese commercial and military, as well as strategic relationships in the Indian Ocean, which is perceived in India as its own privileged sphere of influence – see Geethanjali Nataraj, 'India Should Get on Board China's Maritime Silk Road', *East Asia Forum*, 27 June 2015.

274 China and Russia would like a Moscow-Beijing pan-Eurasian high-speed rail. Meanwhile, Chinese companies are also building Turkey's new rail line between Istanbul and Ankara. Turkish experts see a great degree of alignment between Turkish and Chinese railway priorities – see Nathan Beauchamp-Mustafaga, 'Rolling Out the New Silk Road: Railroads Undergird Beijing's Strategy', *China Brief*, Vol. 15, Issue 8, 16 April 2015.

275 In May 2015, China and Thailand signed an MOU to consider the resurrected Thai Canal as part of OBOR, which would allow reducing the daily 15-16 mb of oil transports and LNG-shipping through the chokepoint of the Malacca Strait. The canal will connect key ports, special economic zones and highways between Thailand and Myanmar – see Andre Wheeler, 'The New China Silk Road (One Belt, One Road) – Changing the Face of Oil and GAS in SE Asia', *Oilpro.com*, 28 July 2015.

opportunity to work with the Chinese on OBOR-related rail projects. All in all, these investments and intergovernmental cooperation arrangements may signal a new order in Eurasia with a more limited EU or American geo-economic and geopolitical presence.²⁷⁶

Investment Instruments

The Chinese government is pursuing an ambitious agenda for boosting the country's overseas direct investment (ODI). Beijing has an impressive ODI record as its official ODI had risen twentyfold in just eight years – from US\$2.85 billion in 2003 to US\$68.8 billion in 2010 – by preferring to upgrade the Chinese economy through strategic asset-seeking ODI.²⁷⁷ Back in 2012, it had announced that the aim was for Chinese investors to make ODI worth US\$390 billion over the next five years.²⁷⁸

One option for implementing this program is the Silk Road Infrastructure Fund with a capitalization of US\$40 billion. Yet one of the most important instruments for China's investments in various energy and other infrastructure projects is the AIIB. Created in 2013 and counting 57 founding members, the AIIB aims to expand road, rail, maritime transport links between China, Central Asia, the Middle East and Europe, and to support energy projects within the OBOR region. The bank was launched at the end of 2015 with a capital of US\$100 billion – 75 per cent of which came from Asian countries.²⁷⁹

Despite China's crucial role in setting up the bank, it only has minority status, which can help to counter criticism that the bank is merely an instrument of Chinese foreign policy and geopolitical ambitions. Admittedly, the AIIB is competing with other Western-backed development banks,²⁸⁰ and its creation was met with scepticism in Washington, Tokyo, and Canberra – the other three most important actors in the Asia Pacific region. Beijing has

already taken steps to assuage these concerns.²⁸¹ At the same time, reception to the AIIB has been mostly positive, as Asian and global infrastructure challenges are simply too large and complex for any single financial institution,²⁸² especially at a time when Western governments are still coping with the effects of the 2008 global financial crisis.²⁸³

In addition to the AIIB, China will tap on other sources of financing. One such geopolitically important source will be the New Development Bank (NDB), created by Beijing and the other so-called BRICS nations – Brazil, Russia, India, and South Africa. Though its initial capitalization amounts to just US\$50 billion, its funding is set to double to US\$100 billion in the coming years.²⁸⁴ Going forward, the NDB might even be capable of collecting as much as US\$400 billion in capital in the medium to longer term.²⁸⁵ Both the AIIB and NDB have their headquarters in China and are expected to cooperate and complement each other's initiatives and projects. Furthermore, China has already invested more than US\$50 billion in Central Asian infrastructure and has established another US\$40 billion Silk Road Fund to finance future infrastructures and transportation networks as part of its OBOR initiative. In addition, Russia's foreign investment instrument, the Direct Investment Fund, is also set to cooperate with the Chinese and BRICS initiatives.

Beyond rail, road, and maritime transport projects, the AIIB and the NDB will finance energy infrastructure projects such as pipelines as well as fossil fuel projects, including coal mining and coal-power projects. These investments are also important for regional security reasons. While the

276 These include the Russia-led Eurasian Economic Union (EEU, involving Russia, Armenia, Belarus, Kazakhstan and Kyrgyzstan) and the Shanghai Cooperation Organization – see Pepe Escobar, 'The Eurasian Big Bang: How China and Russia Are Carving Out Their Own World Order' and Peter Drysdale, 'The Economic Rules of Geopolitics', East Asia Forum, 3 November 2014.

277 See also Bijun Wang, 'Upgrading China's Economy through Outward Investment', East Asia Forum, 30 August 2012.

278 In 2012, the global stock of Chinese ODI was around US\$170 billion – see Luke Hurst, 'Asia, Africa and the Contestability of the Global Iron Ore Market', East Asia Forum, 22 April 2012. To the different interpretation and differentiation between official ODI and other overseas investments see Deborah Bräutigam, 'Using Official Chinese Development Aid to Support Investment', *ibid.*, 9 July 2012.

279 See Andrew Elek, 'The Potential Role of the Asian Infrastructure Investment Bank', East Asia Forum, 11 February 2015 and 'UAE Signs Up As AIIB Founding Member', Gulf Research Center and Khaleej Times, 30 June 2015.

280 Chiefly, the AIIB is competing with the World Bank and the Asian Development Bank (ADB), led by the United States and Japan, respectively.

281 China has promised a "meaningful increase" of its financial contributions to the World Bank and other regional development banks, while also pledging that the AIIB will abide by the highest international environmental and governance standards – see Shawn Donnan, 'White House Declares Truce with China over AIIB'. China has also announced the creation of a new fund for sustainable development in low-income countries; its capitalization will start at US\$ two billion and increase up to US\$12 billion by 2030 – see 'United States: Chinese President Announces New Development Fund', *Strafor.com*, 26 September 2015.

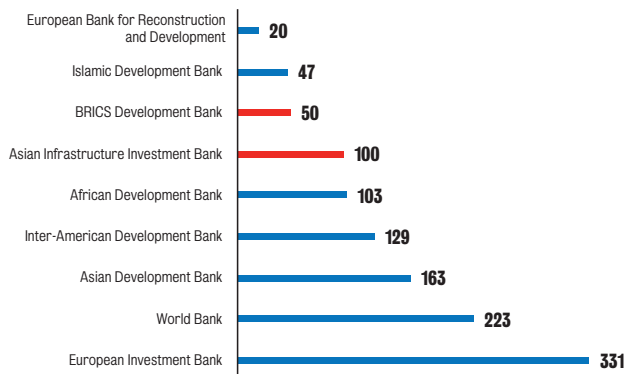
282 See Gabriel Waldau, 'AIIB Launch Signals China's New Ambition', FT, 29 June 2015 and Suman Bery, 'Why the AIIB Could Work for India', East Asia Forum, 17 June 2015.

283 The ADB itself has estimated that developing Asian economies alone will need to invest US\$8 trillion from 2010 until 2020 in order to cope with infrastructure needs. Existing banks, however, are unable to increase their financial support for new infrastructure projects given current political constraints on their financial capacity – see Andrew Elek, 'Welcoming China's Asian Infrastructure Investment Bank Initiative', East Asia Forum, 21 September 2014; Peter Drysdale, 'Put Up or Shut Up on China's Infrastructure Bank', *ibid.*, 22 September 2014 and Tomoo Kikuchi/Takehiro Masutomo, 'Japan Should Influence the Asian Infrastructure Investment Bank from Within', *ibid.*, 18 March 2015.

284 China would contribute US\$41 billion, Russia, India, Brazil a further US\$18 billion each, and South Africa would add the final US\$ 5 billion – see 'China, Russia: Interests Converge in Regional Blocks', *Strafor.com*, 10 July 2015.

285 See Pepe Escobar, 'The Eurasian Big Bang: How China and Russia Are Carving Out Their Own World Order'.

Figure 39: International Development Banks and Their Capital Base



Source: Dr. F. Umbach based on Stratfor.com (Courtesy of Stratfor).

new system of mega-transport infrastructure projects also help and support China's future energy imports of oil, gas and coal, boosting such imports is not the primary objective of the OBOR initiative. Instead, OBOR is intended to spur the export of excess capacity in industries hurt by China's recent economic slowdown. It is also aimed at enhancing China's state-owned energy companies for international mergers and acquisitions after the ongoing anti-corruption campaign. In so doing, OBOR will be a tool for linking Chinese companies' investments 'to a broader Chinese national strategy aimed at forging tighter economic links between China and the rest of Eurasia.'²⁸⁶

Going forward, Beijing is set to rely on its direct overseas investment strategy in order to bolster and solidify its geopolitical standing. For one, Beijing will continue to oppose U.S. dominance in global financial institutions and geopolitical presence in Asia.²⁸⁷ China has also found an opportunity in the European financial crisis for boosting its investments to more than US\$60 billion in European company shares, including in critical infrastructures such as ports and telecommunication. Since 2014, Chinese investments have focused increasingly on Central and Eastern European countries, which have received almost US\$ seven billion mainly in energy and infrastructure.²⁸⁸ Most recently, at an EU-China workshop involving five Chinese banks, both sides have sought cooperation and Chinese contributions to the Juncker Investment Plan, which aims to mobilize public and private investments in the European economy of at least 315 billion Euros between 2015 and 2017. In particular, China has a keen interest in

²⁸⁶ See Erica Downs, 'Mission Mostly Accomplished: China's Energy Trade and Investment along the Silk Road Economic Belt', *China Brief*, Vol. 15, Issue 6, 19 March 2015.

²⁸⁷ See also George Magnus, 'China Must Prove Silk Road Plan Is Serious', *FT*, 4 May 2015.

²⁸⁸ See 'China's Push Towards Europe through Piraeus Boots Infrastructure and Tensions', *GIS*, 22 September 2015 and Tom Mitchell, 'Chinese Investors Wary of Filling Greece's Golden Begging Bowl', *FT*, 25 June 2015.

a EU-China investment treaty as a way to bolster current levels of bilateral investment.²⁸⁹

The scope of these activities notwithstanding, the new economic difficulties in China may constrain the government's future investment plans and capabilities. Furthermore, while the BRICS bloc does share some common interests, there are also diverging priorities. By the same token, neither Russia nor Brazil is in the economic position to contribute more heavily to the NDB.²⁹⁰

Energy Dimensions and Investments

Beijing aims to pursue a close, strategic energy partnership with the countries of Central Asia and the Caspian Region (CACR). In the context of these investments, China's Xinjiang region stands as particularly important.²⁹¹ China had already created closer energy and gas links with CACR in the second half of the 1990s. For instance, Turkmenistan is currently China's biggest supplier of gas imports.²⁹² In 2007, the countries signed a bilateral agreement for supplying an annual 30 bcm via a new gas pipeline from Turkmen gas fields to China. Launched in 2009, volumes have only reached 25.9 bcm in 2014 and were planned to rise to 40 bcm in 2015, although the gas pipeline has an annual capacity of 65 bcm. The addition of two extra lines is expected to increase overall transport capacity up to 65 bcm by 2020.²⁹³ To fill this gap, Uzbekistan is expected to deliver 10 bcm per year in addition to Turkmenistan's 30 bcm. Turkmenistan's new giant gas field South Elotan might supply the remaining 25 bcm. Beijing has financed

²⁸⁹ The scale of bilateral investment was merely US\$20 billion or less in 2014 – see 'China Brings Big Banks Along to Talk EU Tech Investment,' *EurActiv.com*, 5 June 2015; James Kyng, 'Li Keqiang Pushes for China-Europe Investment Treaty', *FT*, 29 June 2015 and Maaike Okano-Heijmans/Daniel Lanting, 'Europe Finds the China Connection', *East Asia Forum*, 23 July 2015.

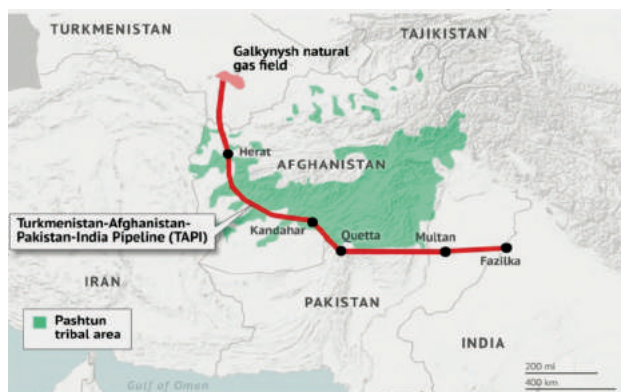
²⁹⁰ See Kathrin Hille/Joe Leahy, 'Brics Nations' Differences on Display as Club Stages Summit', *FT*, 8 July 2015.

²⁹¹ The region's importance is increasing as China's future coal production continues moving westwards. In addition, by granting private domestic companies to bid for six new oil and gas blocks, Xinjiang has become a model for other projects in China. Xinjiang is home to the huge Tarim Basin, which produced more than 25 bcm of natural gas in 2014. Xinjiang in total produced 28.67 bcm of natural and 27.05 mt of crude oil in 2014. It's not a coincidence that the former head of the Xinjiang regional government was appointed as director of China's National Energy Administration in January 2015 – see Zhang Yiping, 'China Opens Xinjiang Block Tender to Private Firms', *Interfaxenergy.com-NGD*, 8 July 2015.

²⁹² According to BP's newest Statistical Review of World Energy of June 2015, Turkmenistan has the world's fourth-largest total proven gas reserves with 17.5 trillion cubic meters (tcm) – a 9.3 per cent share of global gas reserves. With its population of just 5.5 million, the ratio of gas reserves versus production is more than 100 years (much more than the U.S. with 13.4 years and even Russia with 56.4 years). With its Galkynysh gas field, it has the world's second-largest, already feeding its gas exports to China. Turkmenistan plans to increase its total gas production of 69.3 bcm in 2014 to 230 bcm and its gas exports to 180 bcm by 2030.

²⁹³ See F. Umbach, 'First Steps in Turkmenistan Deal to Supply Gas to Europe', *GIS*, 9 July 2015.

Figure 40: The Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline Route



Source: Stratfor.com (Courtesy of Stratfor).

this huge project with a direct loan and controls the field's development with Chinese subcontractors.²⁹⁴

With Russia's announced cessation of natural gas purchases from Turkmenistan, the country now counts China as its sole export market and is making efforts to diversify its gas export destinations. In this context, Turkmenistan has approached Japan and South Korea for developing new projects for LNG, gas-to-liquids, and the manufacture of fertilizers from natural gas. Nevertheless, Turkmenistan's best-known gas export diversification project at the moment is the long-planned Trans-Afghanistan Pipeline – also known as the Turkmenistan-Afghanistan-Pakistan-India Pipeline, or TAPI – that aims to feed energy-hungry India and Pakistan. The almost 1,800 km long gas pipeline with an annual capacity of 33 bcm originally dates back to the 1990s and faces an important challenge in its transfer route through politically unstable Afghanistan and Pakistan – 735 and 800 km, respectively. In addition, the original scheduled for construction in December 2015 proved unrealistic. At the same time, there is strong political will on all sides to implement the gas project, with a meeting in March 2015 reaching a breakthrough with regard to the financing of the US\$10 billion. Significantly, for the first time Turkmenistan has offered an international oil company a large enough profit share as a consortium leader for pipeline construction, while Ashgabat will retain legal ownership of the land.

TAPI may not just diversify Turkmenistan's gas exports, but could also permanently alter the geopolitical landscape of an increasingly Russia-independent Central Asia as a resource deposit for Eurasia and South and East Asia. TAPI may also fuel efforts for new transnational and interregional road and rail transportation connectivity between Central and South Asia, creating new economic

and political alliances.²⁹⁵ All in all, the implementation of TAPI and of OBOR gas mega-projects will not only boost natural gas businesses and other forms of economic cooperation, but it will also create new interdependencies in Eurasia and new safety nets for regional and Chinese security.²⁹⁶ In particular, by guaranteeing energy supply security in Central Asia, TAPI can contribute to one of the cornerstones of India's strategic interest in establishing much closer relations with countries in the region. In so doing, TAPI will also offer new cooperation opportunities between India and China within the OBOR framework – namely ways to make full use of each other's geographical advantages in order to guarantee each other's energy security.²⁹⁷

As for Pakistan, China has already announced a US\$46 billion infrastructure plan in the country as part of the OBOR initiative. The largest part of China's Pakistan investments – around US\$ 37 billion – will be used for various energy projects. These energy investments will focus on electricity, and mostly on building new coal-fired plants. Pakistan has coal resources of more than 185.5bn tonnes – sufficient to generate 100,000 MW of electricity for 30 years.²⁹⁸ In overcoming Pakistan's electricity crisis, its government plans to add 10,400 MW of electricity at a cost of US\$15.5 billion by 2018.²⁹⁹ In particular, Beijing is supporting Pakistan's 'Thar Coal Mining and Energy Project'³⁰⁰, with financing expected to come from Chinese banks or the AIIB.³⁰¹ The project holds great importance for Pakistan energy experts given its potential to address the energy shortages that are stifling the country's economic growth. The project will allow exploiting estimated coal reserves of more than 175 billion tonnes spreading over

295 See F. Umbach, 'First Steps in Turkmenistan Deal to Supply Gas to Europe'.

296 See Ariel Cohen, 'China's 'One Belt, One Road' Mega-Project Will Boost Eurasian Natural Gas Opportunities', *Natural Gas Asia*, 29 June 2015.

297 See also Micha'el Tantum, 'Energy is the Key to Modi's Central Asian Reset', *South Asia Monitor*, 9 July 2015 and Dai Yonghong, 'China-India Energy Cooperation: A Perspective of Geo-politics and Geo-economics', *China-India Brief*, No. 50, 1-13 May 2015.

298 See also Aamir Saeed, 'China Billions Drive Pakistan Coal Power Expansion', 2 June 2015, <http://www.climatechangenews.com/2015/06/02/china-billions-drive-pakistan-coal-power-expansion/>.

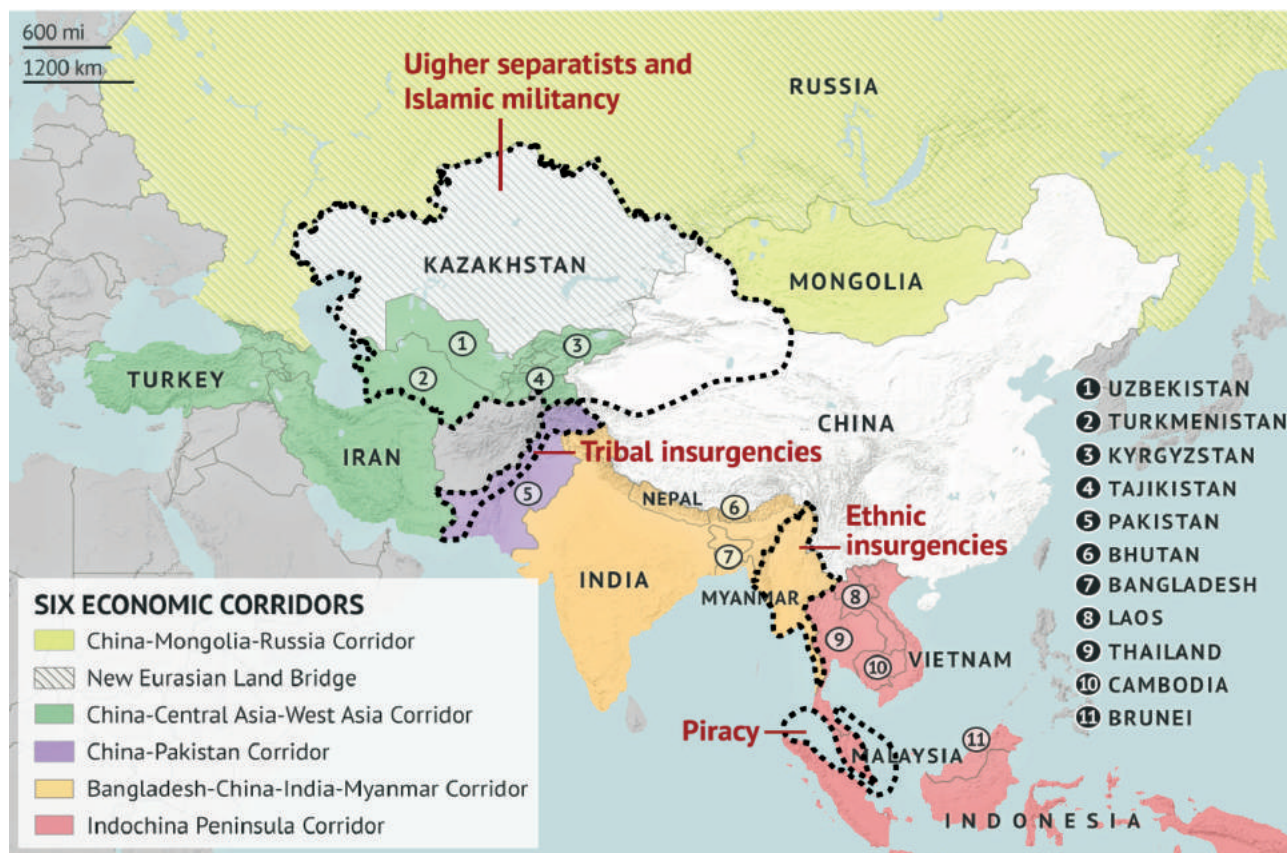
299 For comparison's sake, Pakistan's per capita electricity consumption of 451 kWh is just one-sixth of the world average of 2730 kWh – see Jeremy Page, 'China's President to Cement Huge Coal Power Projects', *Wall Street Journal*, 19 April 2015; Naveed Butt and Ali Hussain, 'China to Invest \$37 Billion in Energy Projects', *Business Recorder*, 18 April 2015.

300 For some background on the project see Rafaqat Hussain, 'Thar Coal: From Dark to the Light', *Pakobserver*, 26 July 2014.

301 In contrast, the project may lack any World Bank financing – see *ibid.*, Manoj Kumar/Tony Munroe, 'For India, China-Backed Lender May be Answer to Coal Investment', *Reuters*, 5 November 2014; Peter Foster, 'Why Coal Looms Large in India's Future', *The Financial Post*, 16 April 2015 and 'China's Cooperation Expedite Thar Coal Project', *Samaa TV*, 19 April 2015.

294 Chinese companies are part of a limited number of international firms operating in Turkmenistan, gaining an important spot ahead of the EU and breaking Russia's Turkmen natural gas export monopoly in the region.

Figure 41: China's Security Challenges in its Regional Neighbourhood



Source: Stratfor.com (Courtesy of Stratfor).

9,000 km² in the Thar Desert.³⁰² The government has also launched an underground coal gasification project in 2010, but it is still in development.

Against this background, it should come as no surprise that the push by Western governments and institutions push against the financing of coal-fired power plants in developing countries has met opposition from Asian countries.³⁰³ Precisely frustration with lending guidelines for energy projects spurred the development of and support for the AIIB.³⁰⁴ Developing countries in Asia had even discussed the need to invest in energy infrastructure with AIIB support, to the detriment of Western-dominated multilateral development banks. In this context, the United States and Europe risk not only to lose business

302 In the first phase, the Thar coal mining and power project will be developed with a capacity of 3.8 mt per year and 660 MW. Later the mine will be expanded with a capacity of 6.5 mt annually to support a 1300 MW power plant. In the second phase, the mining project will be expanded further to 13.5 mt and 19.5 mt with a power generation of 2400 MW and 3600 MW – see *ibid*.

303 See Swati Mathur, 'U.S. to World Bank: Don't Fund Coal-Fired Plants', *The Times of India*, 24 January 2015.

304 To the AIIB see Mark Fleming-Williams, 'China's New Investment Bank: A Premature Prophecy', *Stratfor.com*, 22 April 2015 and Stefan Lippert, 'Hopes for Cautious Reconciliation between East Asia's Key Economies', *GIS*, 24 April 2015.

and investment opportunities in the most economically dynamic region in the world, but also to undermine their own wider geo-economic influence, which could have wide-ranging geopolitical implications.³⁰⁵ More worryingly, Western economies would also be unable to contribute to a significant drop in CO₂ emissions in many developing countries. This situation will continue at least as long as there is financing elsewhere for fossil fuel-generated energy that is both less expensive and more reliable and effective than the current generation of renewables.

A Major Challenge for OBOR: Creating a Stable Security Environment

The OBOR initiative and future Chinese investments are highly dependent on a stable and politically safe neighbourhood. China's border areas and neighbouring regions, however, have relatively low degrees of political stability,³⁰⁶ and as a result Beijing may have to increase security in its own border regions and in neighbouring

305 See also Scott Morris, 'How Washington Will Annoy Friends and Influence Nobody on Asian Infrastructure', *East Asia Forum*, 4 November 2014.

306 See also Jacob Zenn, 'Future Scenarios on the New Silk Road: Security, Strategy and the SCO'.

countries.³⁰⁷ Fortunately, increased investments in infrastructure and in the promotion of transnational trade offer better alternatives for ensuring regional security. In this regard, the OBOR initiative can strengthen regional security policies that seek to address issues as diverse as the management of maritime territorial and resource conflicts – i.e. South and East China Seas –, traditional conflicts – i.e. Chinese-Indian border –, as well as non-traditional security challenges – e.g. Islamic terrorism.

Nonetheless, even increased investments and trade may fail to change the overall security situation in the region, as the investments themselves depend on safe and politically stable conditions. Beijing's primary security concerns are linked to Afghanistan and its peace process. Consequently, China has become more proactively engaged in the reconciliation negotiations between the Taliban and the Afghan government. On the one hand, Beijing has a stake in the process because Afghanistan serves as a haven to Uighur militants that fuel tensions in China's Xinjiang region, which is home to an important Muslim Uighur population. On the other hand, even though Beijing had secured crucial arrangements with the Taliban, Chinese investments in the country – e.g. the Mes Aynak copper mine – have never gone into operation given the uncertain security situation.³⁰⁸

In parallel, OBOR can also rely on a range of regional and bilateral mechanisms to address security challenges. For example, China and its neighbours continue using already existing regional security mechanisms and confidence-building measures for non-traditional security challenge such as collective natural disaster relief, joint rescue and patrol, and

anti-terrorism exercises. Furthermore, they have cooperated on rebuilding security measures in Afghanistan and on reducing tensions in the Korean peninsula. Likewise, despite their competing strategic interests in Central Asia, China and Russia are already cooperating in regional security as members of the Shanghai Cooperation Organization³⁰⁹ and the Conference of Interaction and Confidence Building Measures in Asia. Regional security cooperation under OBOR can also build upon numerous bilateral and multilateral meetings such as between China and the Association of South East Asian Nations, or ASEAN.

Despite the many avenues for security cooperation under OBOR, frictions and competing interests will persist in bilateral Russian-Chinese relations for the foreseeable future. For example, OBOR runs counter to Moscow's perceived geopolitical sphere of influence and its largely protectionist strategy for its Eurasian Economic Union. Nonetheless, Russia can ill afford to stay on the side-lines of the OBOR initiative, as it has become more dependent on China in order to bolster its own claims to great power status.³¹⁰ By the same token, China's relations with Pakistan will still be beset by the latter's poor security situation. In fact, insecurity in Pakistan has affected the planned Iran-Pakistan pipeline, a geopolitically important OBOR project that China is building with a loan worth US\$ two billion and equivalent to 85 per cent of the construction cost.³¹¹ With a planned capacity of around 31 bcm, the pipeline passes through territory prone to kidnapping and terrorist attacks.³¹² In an effort to assuage concerns, Pakistan has reportedly promised China to create a new division of 10,000 troops to protect Chinese engineers and workers.³¹³

307 See also 'Tibet: An Ancient Threat to Modern China', Stratfor.com, 16 July 2015 and 'Uighur Militancy Threatens China 'New Silk Road'', IISS-Strategic Comments, Vol. 20, Comment 39, November 2014.

308 While the Taliban benefited from Chinese arms, money, and modest political support, the recent death of Mullah Mohammed Omar may signal an end to the era in which Chinese investments were mostly shielded from militant extremism – see Andrew Small, 'China's Man in the Taliban', Foreign Policy, 3 August 2015.

309 The SCO had until recently six members: China, Russia and the four Central Asian countries Uzbekistan, Kyrgyzstan, Tajikistan, and Kazakhstan. In July, India and Pakistan became also members and Belarus has acquired an observer status – see also Kathrin Hille, 'India and Pakistan Join Shanghai Cooperation Organisation', FT, 10 July 2015.

310 See also Kathrin Hille, 'Great Game Echoes in Summit Halls for Putin's Pursuit of China Ties', FT, 6 July 2015 and Luke Coffey, 'Russia Remains Leading Power in the Caspian Region at Heart of Eurasia', GIS, 18 May 2015.

311 The pipeline is also part of the US\$46 billion infrastructure package to establish the China-Pakistan Economic Corridor (CPEC) that extends from the Gwadar port on Pakistan's Indian Ocean coast to China's westernmost city Kashgar (Kashi) in Xinjiang – see Michael Tanchum, 'Modi and the Sino-Indian Game for Iranian Gas', The Diplomat, 17 July 2015.

312 See Andrew Walker, 'China Investment Springboards Pakistan Section of IPI', Interfaxenergy.com-NGD, 19 August 2015.

313 See also Ahmed Rashid, 'It Will Take Silky Diplomacy to Build China's New Road', FT, 25 June 2015.

Conclusions and Strategic Perspectives

China's economic and foreign policies, and in particular its OBOR initiative, may dramatically change the geopolitical order and strategic environment in Eurasia, and South and Southeast Asia. All things being equal, China has the potential to become the world's largest investor in energy, transport and other infrastructures in the years and decades to come. China is already the world's largest energy consumer in general and coal consumer in particular, using nearly as much coal as rest of the world combined. It is also the largest coal producer, providing more energy to the world's economy than the whole of Middle Eastern oil production. In 2009, it became a net coal importer, and since 2011 it is the world's largest coal importer.

Unlike its overseas oil and gas investments, Beijing's investments in foreign coal mining and coal power projects have mostly gone unnoticed on the international stage. To the West, these investments seem to lack any comparable geo-economic and geopolitical implications. Nevertheless, this argument can be challenged first because such investments may prove counterproductive to the global efforts against climate change and undermine the Western economic and foreign policy influence in Eurasia. Second, they play a large role in Beijing's ambitious OBOR initiative. Third and finally, these investments may fill the gap left U.S. and European governments' refusal to support any coal projects in developing countries with Western loans and credits from national and international development banks.

Against this background, this study has analysed the dimensions and reasons behind China's dramatically rising coal imports and the growth of investments in overseas coal mining and coal-power projects since 2009. In light of China's OBOR initiative, the analysis has also identified the factors – opportunities, risks and challenges – influencing future coal imports and coal-related overseas investments.

Global and, in particular, Asian demand for coal offers numerous new investment possibilities and prospects for the Chinese coal mining and power industries. Nevertheless, the current international coal oversupply and the decreasing investment opportunities for European coal power companies also suggest increasing competition in the more prosperous coal markets in Asia, Africa and Latin America. While such competition creates new risks and vulnerabilities for Chinese companies, it, simultaneously, offers them numerous new strategic opportunities. By the same token, it provides new strategic perspectives for Chinese-European cooperation, joint ventures, and strategic alliances on established and new emerging coal markets and projects. If an enhanced bilateral cooperation can be established and strengthened, Chinese companies might benefit from technology transfers – e.g. energy efficiency and environmental technologies –, know-how sharing, and the experiences of European companies with compliance

with environmental legislation and social responsibility standards. In other words, growing cooperation between Chinese and European coal power plants may offer more win-win benefits for both sides. It would also increase energy efficiency and boost GHGE reduction efforts globally and in China's strategically important OBOR region.

During the last years, however, China appears to model its climate and energy policies after those in the United States rather than those in the EU. The joint U.S.-China declaration of November 2014 has also highlighted China's willingness to seek international climate cooperation with Washington despite a proliferation of bilateral EU-China climate and environmental initiatives. Overall, the EU seems to have lost strategic opportunities and has become less influential in shaping China's climate, environmental and energy policies during the last years.

Nevertheless, Beijing's ambitious energy and climate policies face numerous challenges for translating agreed upon plans, regulations and political initiatives into reality. In the future, the central government needs to have a stronger and more coherent political will to implement climate and environmental targets in China's provinces and local administrations. In the past, the central government, despite strong political will, has failed in these attempts because of a lack of effective implementation instruments and flaws in governmental oversight and existing financial sanctions.

Should implementation succeed, the result could be a significant reduction in Chinese coal consumption and imports. Nevertheless, China's de-carbonization strategy also remains largely dependent on the planned expansion of its other fossil and non-fossil fuels. As analysed, the ambitious expansion of conventional and unconventional gas in its primary energy mix and power generation, for instance, is already facing numerous problems and uncertainties regarding its targets for 2020 and beyond. Furthermore, China's new SOE reform in combination with OBOR may also increase China's future coal imports because of economic, environmental, and energy supply security reasons. This is even truer for China's future investments in overseas coal mining and coal power projects, which the Chinese government highly encourages in light of the current growing structural economic problems and the need to transform the Chinese economy and firms.

As previously examined, Western discussions on a forthcoming peak in Chinese coal consumption, emissions, and coal imports before or shortly after 2020 often overlook several economic factors and energy realities. Moreover, a peak in coal consumption and/or imports does not necessarily and automatically correlate directly with a peak in emissions as long as China's oil and gas demand is rising and compensating a declining coal consumption.

And contrary to widespread interpretation of China's impressive expansion of renewables, hydropower, and natural gas during the last years, China's added coal production capacity in 2014 still exceeded new solar energy by 17 times, new wind energy by more than four times, and new hydropower by more than three times.

Going forward, OBOR can serve China's economic, foreign, and security interests in its regional neighbourhood. It can also bolster the country's regional and global economic power, as well as its ambitious diplomatic strategy and initiatives. Whether China's top-down approach of economic development will work in Beijing's fight against widespread corruption and in its attempts to control and influence the state-owned economy remains to be seen. In the end, it might also hinder private initiatives of non-state companies, as OBOR disproportionately favour large state-owned companies in ways that do "not seem to bode well for the long-term prospects of economic reform and restructuring."³¹⁴

Most China energy experts expect that its coal imports will decline over time as a result of weakened coal consumption demand and its decarbonisation efforts. Having said that, coal imports will continue – and so will Chinese investment in coal projects abroad. The government has already encouraged the import of high-quality coal, which achieves both GHGE reduction as well as coal supply security. Thanks to OBOR, large-scale coal projects are planned with the participation and involvement of Chinese companies in a growing number of coal-producing countries. The

westwards movement of China's coal industry will apply both to domestic production – i.e. Xinjiang – and foreign imports – i.e. South and Central Asia. The strategic OBOR initiative will provide the needed logistical infrastructure – railways, highways, ports and other maritime infrastructure – for coal and other energy imports to diversify and for Chinese coal companies to increase their business interests and activities along OBOR's six corridors.

At the same time, OBOR faces numerous challenges, risks and vulnerabilities both in economic and in political and social stability terms. Chinese investments can support the economic development and regional security of its neighbourhood, but they are, at the same time, dependent on a stable environment in order to succeed and to preserve economic and political stability at home.

Western countries have largely overlooked the geo-economic and geopolitical opportunities and implications of OBOR, as well as the prospects for common enhanced political and economic cooperation and joint business strategies. They now have to decide whether they would like to participate in OBOR in order to open up opportunities for business activities and energy and environmental policy cooperation. In the end, Western government and industry should realize that staying on the side-lines may not only be economically counterproductive, but it also has the potential of undermining their own strategic influence in China and the OBOR neighbourhood. More worryingly, however, their lack of engagement may even negatively impact global climate and energy policies.

314 Willy Lam, 'One Belt, One Road' Enhances Xi Jinping's Control over the Economy', p. 3.

Annex

Region	Country	Location	Coal Power Plant	Chinese Partner	Foreign Partner	Start Year	Capacity (MW)	Investment
South Asia	Bangladesh	Chittagong	Maheshkhali power station (Huadian)	China Huadian Corporation	Bangladesh Power Development Board	2011(M)	1320	N/A
South Asia	Bangladesh	Kalapara upazila of Patuakhali	Kalapara power station	China National Machinery Import & Export (Group) Corporation	North-West Power Generation Company	2014(M)	1320	2 billion
South Asia	Bangladesh	Chittagong	Chittagong power station (S Alam)	SEPCOIII Electric Power Construction Corporation	S Alam Group of Bangladesh	2013	1320	1.8 billion
East Europe	Bosnia and Herzegovina	Gacko	Gacko Thermal Power Plant	Dongfang Electric Corporation	N/A	2015	350	N/A
East Europe	Bosnia and Herzegovina	Near Banja Luka	Stanari Thermal Power Plant	Dongfang Electric Corporation	EFT Group	2010	300	350 million
East Europe	Bosnia and Herzegovina	Near Tuzla	Tuzla Thermal Power Plant	China Gezhouba Group Co	N/A	2014	715	N/A
Africa	Botswana	Near Palapye	Morupule B Power Station	China National Electric Equipment Corporation	Botswana Power Corporation	2006	600	Over 11 billion
Latin America	Brazil	Rio Grande do Sul	President Medici (Candiota) power station	China Development Bank	Cia Geração Térmica Energia Elétrica	N/A	796	430 million
Southeast Asia	Burma	Sagaing	Kalewa power station	China Guodian Corporation	Tun Thwin Mining Co., Ltd	2011	600	N/A
Southeast Asia	Burma	Shan State	Tigyit power plant	China National Heavy Machinery Corporation	Eden Group of Myanmar	2002	120	N/A
Southeast Asia	Cambodia	Preah Sihanouk	Sihanoukville CID power station	Erdos Electrical Power & Metallurgical Co.	Cambodia International Development Group	2010	700	362 million
Africa	Ghana	N/A	Ghana Coal power station	Shenzhen Energy Group	Volta River Authority	2014	1200	N/A
South Asia	India	Uttar Pradesh	Lanco	China Development Bank	Lanco Group	N/A	1320	N/A
South Asia	India	Gujarat	Mota Layja power station	Industrial and Commercial Bank of China; Huaneng Group	N/A	N/A	4000	N/A
South Asia	India	N/A	Sasan Ultra Mega Power Project	Jotun China	Reliance Power	N/A	3960	N/A
South Asia	India	Tamil Nadu	Cuddalore SRM power station	China Datang Technologies & Engineering	N/A	2010	1980	1.4 billion
South Asia	India	Maharashtra	Tiroda UMPP	China Development Bank Corporation; Industrial and Commercial Bank of China	Standard Chartered Bank	N/A	3300	480 million
Southeast Asia	Indonesia	Kalimantan	Adaro East Kalimantan power station	Shenhua Group	Adaro Indonesia	2014	600	N/A
Southeast Asia	Indonesia	Sumatra	Bangka Tengah (SS-8) power station	China Huadian Corporation; Export-Import Bank of China	PT Bukit Asam Tbk (PTBA)	2011	1200	1.2 billion

Region	Country	Location	Coal Power Plant	Chinese Partner	Foreign Partner	Start Year	Capacity (MW)	Investment
Southeast Asia	Indonesia	North Bali	Celukan Bawang power station	China Huadian Engineering Corporation Ltd; China Huadian Development	N/A	2010	425	1.5 billion
Southeast Asia	Indonesia	Java	Celukan Bawang power station	N/A	N/A	N/A	5000	N/A
Southeast Asia	Indonesia	Aceh	Nagan Raya power station	Export-Import Bank of China	N/A	N/A	220	124 million
Southeast Asia	Indonesia	Java	Pacitan power station	Export-Import Bank of China	N/A	N/A	630	293 million
Southeast Asia	Indonesia	N/A	Parit Baru power station	China Gezouba (Group) Corporation	Praba Group	N/A	210	N/A
Southeast Asia	Indonesia	Java	Pelabuhan Ratu power station	Export-Import Bank of China	N/A	N/A	945	481 million
South Asia	Iran	Tabas	Tabas power station	Chinese financial backing	2012	650	1 billion	
Africa	Kenya	Lamu County	Lamu Power Project	China Huadian Corporation Power Operation Company; Sichuan Electric Power Design and Consulting Company; Sichuan No 3 Power Construction Company	Centum Investment; Gulf Energy	N/A	1000	500 million
Central Asia	Kyrgyzstan	Bishkek	Bishkek CHP power station	Export-Import Bank of China	N/A	2014	150	N/A
Africa	Malawi	N/A	Malawi Power Station	China Gezhoubu Group	N/A	2013	1000	500
Southeast Asia	Malaysia	N/A	N/A	China Huadian Company	N/A	2009	200	
Asia	Mongolia	Shivee Ovoo	Shivee Ovoo power station	State Grid Corporation	N/A	2010	270	N/A
Africa	Nigeria	Enugu	Ezinmo power station	HTG-Pacific Energy	N/A	2013	1000	3.7 billion
South Asia	Pakistan	N/A	Gadani Power Park	Gezhoubu Group Company	Pakistan's Private Power and Infrastructure Board	2014	2660	N/A
South Asia	Pakistan	N/A	APTMA Pothohar power station	China Machinery Engineering Company	All Pakistan Textile Mills Association	2014	330	N/A
South Asia	Pakistan	Port Qasim, Karachi	Port Qasim SSRL power station	Dong Fang Electric Corporation	N/A	N/A	220	N/A
South Asia	Pakistan	Karachi	Karachi power station	Sinohydro Resources	Al Malaki Group	2015	1320	N/A
South Asia	Pakistan	N/A	Faisalabad FIEDMC power station	Shandong Ruyi Technology Group; ICBC	N/A	N/A	N/A	N/A
Southeast Asia	Philippines	N/A	Mariveles Power Plant	China Development Bank	N/A	N/A	600	493 million
East Europe	Romania	N/A	Halanga Power Station	China Power Energy	N/A	N/A	290	N/A
East Europe	Romania	Halanga Commune	Rovinari Power Station	China Huadian Engineering Co. Ltd	SC Complexul Energetic Rovinari	N/A	1420	N/A

Region	Country	Location	Coal Power Plant	Chinese Partner	Foreign Partner	Start Year	Capacity (MW)	Investment
	Russia	Gorj County	Erkovetskaya power station	State Grid Corporation of China	Inter RAO	N/A	8000	N/A
East Europe	Serbia	N/A	TPP Kostolac Power Plant	Export-Import Bank of China	N/A	N/A	N/A	1.25 billion
East Europe	Serbia	Obrenovac	TPP Nikola Tesla Power Plant	China Environmental Energy Holdings; Shenzhen Energy	N/A	N/A	744	N/A
South Asia	Sri Lanka	Northwestern Province	Lakvijaya Power Plant	Export-Import Bank of China	N/A	N/A	900	1341 million
Africa	Tanzania	N/A	Mchuchuma Coal Mine and Mchuchuma power station	N/A	Tanzania China International Mineral Resource	N/A	600	3 billion
Africa	Tanzania	N/A	Rukwa Coal To Power Project	SEPCO	N/A	N/A	250-300	3 million
Mediterranean	Turkey	N/A	N/A	Harbin Electric International; China Power Investment Corporation	Hattat Holding; Avic International	2012	2640	2.4 billion
Mediterranean	Turkey	İskenderun	İskenderun power station	Shenhua Group	Yıldırım Group	2012	2000	2 billion
North America	United States	Odessa	Sinopec and the Texas Clean Energy Project	Sinopec Group; Export-Import Bank of China	Summit Power Group	2012	N/A	More than 1 billion
Central Asia	Uzbekistan	Dzhuma-Angren	Novo-Angren power station	Harbin Electric International Company	Uzbekenergo	2012	484	N/A
Southeast Asia	Vietnam	N/A	Duyen Hai Power Generation Complex	Dongfeng Group	Teknik Janakuasa	2011	4035	N/A
Southeast Asia	Vietnam	Hải Phòng	Hai Phong Thermal Power Station	Dongfang Electric Corporation	Marubeni Corporation	2005	1200	N/A
Southeast Asia	Vietnam	N/A	Mao Khe power station	Bank of China	BNP Paribas of France	440	N/A	
Southeast Asia	Vietnam	N/A	Plant in southern Vietnam's Binh Thuan province	China Southern Power Grid Corp	N/A	2010	600	1.75 billion
Southeast Asia	Vietnam	Quảng Ninh	Uong Bi power station	China Southern Grid	N/A	2008	740	N/A
Southeast Asia	Vietnam	Binh Thuan	Vinh Tan power station	China Huadian Corporation	N/A	2007	1200	N/A
Southeast Asia	Vietnam	Hà Tĩnh	Vung Ang power station	CLP Group	Mitsubishi Corporation	N/A	3600	N/A
Africa	Zambia	Maamba	Maamba power station	SEPCO Electric Power Construction Corp; The Bank of China and the Industrial and Commercial Bank of China	Maamba Collieries Limited	N/A	300-600	300 million
Africa	Zimbabwe	N/A	Gwayi Mine power station	China Africa Sunlight Energy; the China Exim Bank	N/A	N/A	600	N/A
Africa	Zimbabwe	Gwayi	Gwayi power station (Shanghai)	Shanghai Electric Group; Shenergy Co Limited; Nan Jiang Group.	N/A	N/A	1200	N/A

Region	Country	Location	Coal Power Plant	Chinese Partner	Foreign Partner	Start Year	Capacity (MW)	Investment
Africa	Zimbabwe	N/A	Hwange power station	China Export Import Bank; Sino Hydro Corporation	Zimbabwe Power Company	N/A	920	1.2 billion
Africa	Zimbabwe	nearby Lusulu coal field	Lusulu power station	China State Construction Engineering Corporation	N/A	2016	600	N/A
Africa	Zimbabwe	N/A	Zimbabwe power station	Guangdong Bureau of Coal Geology	N/A	N/A	1200	3.5 billion

Source: Ka-ho Yu, Renming-University (December 2015)



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