

China's New Silk Road: Will it contribute to export of the black fossil-fuelled economy?

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Abstract: This article assesses the expansive internationalization of China's energy role and inquires to what extent it is contributing to the export of greenhouse gases or a renewable energy future in Asia and beyond.

Suddenly the geopolitics of world energy are turned upside down. Donald Trump's overt campaigns against green energy in the US, and his promotion of fossil fuels, are being viewed by informed observers as a case of 'Donald Trump's China First, Russia Second, America Third Foreign Policy'. As Michael Klare puts it in his latest posting on this topic, '.... in pursuing progress on clean energy, President Obama was driven not only by a concern for the future depredations of climate change, but also by a desire to ensure American pre-eminence in what he perceived as a global race to master the green technologies of the future'.¹ Now the music has changed.

There is no doubt that China has emerged as a formidable player in the global renewable energy race. In its domestic sphere it is greening its electric generation system at a rate that exceeds 10% in a decade. In 2016 the country reached a level of dependence on fossil fuels for electric power generation of 64%, down from 77% a decade earlier. China has emerged as the world's largest energy economy, largest generator of electric power and largest emitter of greenhouse gases, and its greenhouse gas emissions continue to grow in absolute terms. At the same time, it is also becoming the world's renewables superpower with plans to reduce emissions based on a strategy of translating its leadership in renewables into manufacturing capacity and

export success for products and technologies at the leading edge.²



But in the international domain, the real issue is this: are China's energy exports getting greener, or are they getting blacker, with increasing reliance on fossil fuel based systems? Or are the green trends outranking the black in the external as well as domestic domain? Is it really a case of China 'outsourcing its pollution' or 'cutting pollution at home, while growing coal abroad'?³ Since these are claims made by reputable scholars they need to be treated on their merits. But if the weight of evidence points to China's greening its external energy system in the same way that it has been greening its domestic system, then this too needs to be made clear and acknowledged. Much hangs on the way these questions are posed and answered.

If the issue is posed solely in the domestic arena, the answer is very clear. China is greening at a rate and scale that bears comparison with the best in the world.⁴ It has to be acknowledged that while China's energy consumption levels and carbon emissions are still expanding, but at a much lower rate in recent years, from a level of 8% per annum and over for most of the 2000s, to around 1% per annum during the past two years. This was achieved thanks to a number of factors including a slow-down of the economy, economic structural change involving more service and high-value-added manufacturing activities, improved energy efficiency, and reduced use of coal. In particular, the use of coal, which is seen as the most significant contributor to climate change, has dropped since 2013. While there exist uncertainties, many experts estimate that the country's carbon emissions will peak sooner than previously expected.⁵ But the most dramatic change is in the use of renewable sources of energy. In the electric power sector, the headline results are that in the year 2016, China's total electric power capacity increased to just over 1.64 trillion watts (1.64 TW), with water, wind and solar sources accounting for about 34% -- up from 32.5% in 2015. In the decade since 2007, China's reliance on WWS sources (water, wind and solar) in terms of capacity has risen from 20% to 34% in 2016 - a 14% increase in a decade, and from 16% to 25% in terms of actual electric generation. At this rate, one third of China's electric power generation would be based on WWS sources by the middle of the 2020s.⁶



Statue of Chairman Mao at the Wuhan Iron and Steel Works, Wuhan

But when China's global expansion is taken into account, the issue is not nearly so clear. The global expansion of China's energy system is part of its globalization more generally. Just a few years ago, China's international orientation was limited to enunciation of its 'China dream' backed by rising levels of outward orientation on the part of Chinese companies, resulting in rising exports, rising levels of outward FDI, and rising levels of foreign exchange holdings. China was known internationally more for the domestic value of its development strategy, which over the previous three decades of 'opening' had produced the world's highest growth rates, than for any meaningful engagement with the world's problems or trouble spots.

Then came President Xi Jinping's initiatives to create a Maritime Silk Road for the 21st century, and a complementary overland route connecting China's western provinces with central Asia, Russia, India and Europe. In two dramatic speeches delivered in 2013, Xi outlined a vision of China's outward aspirations that has come to be known as the Belt and Road Initiative (BRI) or the 'One Belt, One Road' (OBOR) program.⁷ It is central to Xi's administration and the centrepiece of China's emerging 'grand strategy' for the 21st century.

The OBOR initiative involves major

infrastructure investments in high-speed rail, highways, ports, dams, pipelines, IT connectivity and electric power grids linking China with a host of countries across Central Asia, South and Southeast Asia, Russia and Europe. It envisages the creation of a unified Eurasia, linking China to Europe via multiple channels and promoting development of all the countries in-between. Also caught up are littoral countries in Africa as part of the maritime New Silk Road. It represents a huge westward push, involving trade, investment and finance on a previously unheard of scale. This is a 'grand strategy' to enhance China's profile, to promote a Chinese model of development as well as to provide Chinese firms with new export and investment opportunities. It also generalizes and institutionalizes China's exports of its energy system and energy products - so the two issues are now inextricably entwined.

At a time when the US under newly elected President Donald Trump shows signs of scaling back its involvement in a number of areas in international development, China is becoming a more active player on the global stage. It is offering the world's developing countries a model for their own development as well as substantial assistance in building their own infrastructure to enhance their industrialization prospects. In the vacuum created by Trump's taking the US out of the TransPacific Partnership (TPP), which excluded China, Xi has moved quickly to offer Chinese leadership through the Regional Comprehensive Economic Partnership (RCEP), which links China with the ASEAN countries plus 5 (Australia, China, India, South Korea, New Zealand) in a comprehensive trade deal,⁸ and through an expanded Free Trade Area of the Asia Pacific (FTA-AP) currently being formulated by the APEC countries. But the One Belt One Road Initiative is more comprehensive than any of these individual trade agreements and is likely to have an even greater global impact. It really is a case of constructing a new 21st century Silk

Road.

We can identify four major steps that have accelerated and internationalized Chinese development while reducing poverty and expanding China's global position since the rapprochement between China and the US in 1972. First was the opening to the world taken under Deng Xiaoping in 1979, and the high-speed growth it ushered in for the next three decades and more. Second was the integration of China with the world trading community, achieved via accession to the WTO finalized in 2001, which saw an enormous boost in FDI into China and the beginnings of outward FDI by Chinese firms. Third was China's resilience in the face of the great financial crash of 2008 triggered by Wall Street excesses, through inspired infrastructure spending at home, ushering in a period in which China has become an engine of the world economy. Now we come to the fourth such step, in which China extends its domestic growth model to the world, in the form of a vast infrastructure building program involving a westward push, and offering an attractive alternative to a Western-dominated development model that has attracted support not only from Asian countries but from among the major developed countries with the notable exception of the US and Japan.

When the focus is on the vast energy system needed to drive these transformations, we can identify an early Chinese domestic energy model based on fossil fuels, that we could call China energy Mark I, and a new domestic model that is greening faster than blackening, that we could call China energy Mark II. Which model is being exported - Mark I or Mark II - or both?

The Asia-Pacific Journal has already published an account of this Chinese grand strategy, by the former US Ambassador Marc Grossman ([Two visions, one collaboration?](#) January 15 2017). Mr Grossman inevitably evaluates the

OBOR initiative from an American perspective, arguing that it creates new opportunities for Chinese-American cooperation. The advent of Trump in the US would seem to put paid to such aspirations, at least for the moment.⁹ China is of course moving ahead decisively with initiatives being taken across all the Eurasian economic belts and maritime roads. But there is a widespread (if rarely articulated) fear that China will be using its foreign energy investments as a means of outsourcing its coal-fired domestic activities and generating fresh markets for its coal-burning power firms. In other words, while greening its energy and manufacturing systems at home, it will be exporting its black coal-burning systems abroad.



In this article we propose to tackle this issue head-on, namely the extent to which China's One Belt One Road (OBOR) initiative may be viewed as promoting fossil fuel systems internationally while green energy systems are promoted at home - while touching on the broader implications of the Belt and Road initiative and its potential impact in shaping the development of a unified Eurasia.

One way of comprehending the vision of OBOR is to think of it as creating a new set of inter-related countries, linked with China through trade, investment infrastructure that spans the

historic Silk Road routes. Altogether one can count 66 countries as being involved, from Spain to Indonesia. These countries including China could be viewed as accounting for 60% of the world's population (around 4.4 billion people), around 30% of the global economy (around \$2 trillion) and an estimated total infrastructure need of around \$5 trillion.¹⁰ In the year 2016, according to the global consultancy PwC, these 66 countries as a group accounted for investment in new infrastructure of \$494 billion - very nearly half a trillion dollars in investment, in infrastructure such as ports, airports, high-speed rail, roads, pipelines, IT networks and electric power stations and power grids as well as in free trade zones and new cities.¹¹ The only comparable grouping would be the now moribund Trans-Pacific Partnership, which excluded China, and drew 12 countries together under the leadership of the United States, but which lacked any comparable incentives to participation such as infrastructure development.

How the One Belt One Road Initiative works

Let us take a particular project that encapsulates the spirit of China's Belt & Road Initiative, and see how it impinges on the issue of black vs green development. The landlocked central Asian state of Azerbaijan, by the Caspian Sea, has long aspired to become an exporter of its gas and oil deposits, targeting markets in Turkey and Europe. For many years there was the prospect of an EU-financed and managed pipeline project, known as Nabucco, that would transport gas across Azerbaijan and Georgia to Turkey and then into southern Europe, bypassing Russia and making Europeans less dependent on Russian gas supplies. Conceived in 2002 the Nabucco project made initial headway (backed by both the US and EU) but languished as credit guarantees failed to materialize and construction dates slipped.¹² Then in late 2011

a completely new project was announced, developed jointly by the Azeri and Turkish authorities, involving the Southern Corridor consortium and a new pipeline to be called the Trans-Anatolian Pipeline (TANAP). It was designed to take Azeri gas direct into Turkey and connect with the proposed trans-Adriatic pipeline that would take the gas on to Italy. (see map in Fig. 1)

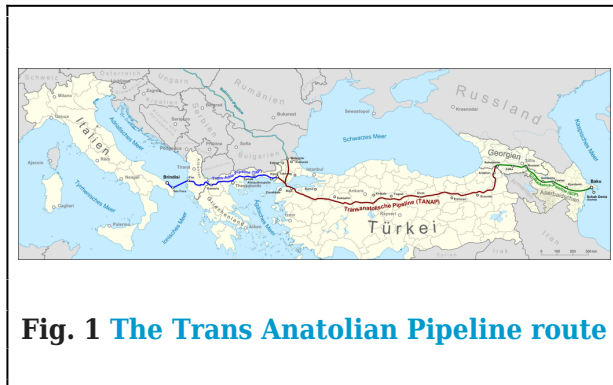


Fig. 1 The Trans Anatolian Pipeline route

This new project attracted strong financial support, from both the World Bank and the European Investment Bank (which had also been a potential backer of the Nabucco project). Thus project funding is well advanced. Behind the scenes China has been a key player. One of the most important projects backed by the new Asia Infrastructure Investment Bank (AIIB) in 2016 is precisely this TANAP project, with the AIIB agreeing to channel \$600 million to support it – the largest investment made by the AIIB in its first year of operation. Unlike the Nabucco project, the TANAP does not seem to involve any substantial funding from the US. It has led directly to the World Bank, an organization which is also facing increasing financial pressure due to the proposed funding cuts under the Trump administration, finalizing loan agreements with both Azerbaijan and Turkey in February 2017 for \$400 million each -- extended by \$2.4 billion in further loan support. The support from AIIB is a tangible

expression of the spirit of the Belt and Road Initiative, which is to promote interconnections (roads, rail, pipelines) across the countries of Eurasia, whether they link directly with China or not.

Of course a dark view of this project could be taken, in that it is extending the sway of fossil fuels in the Central Asian region. But it must be recognized not only that the project unlocks fossil fuel supplies that were constrained by under-development of Azerbaijan and other central Asian countries, but also that these supplies are of gas, the cleanest of the fossil fuels. The development of this pipeline under joint Azeri and Turkish control creates new opportunities for further infrastructure projects along its path. Of course Chinese firms offering pipeline engineering and gas pumping technology will be bidding on these projects – and why not?

The globalization of China's energy system

China is now a dominant player in global energy markets. In the space of little more than a decade, China's energy system (the companies and their activities, plus infrastructure, investments, exports) has rapidly extended its global reach. According to a recent estimate by researchers from Boston University, exports of Chinese energy products and equipment expanded from the year 2000 to 2013 to reach a cumulative total \$476 billion for the 14 years. By contrast, the accumulated exports of U.S. manufactured energy products and equipment over the same period reached \$260 billion (plus \$600 billion in oil exports).¹³ In some sectors such as renewables, China is by far the dominant global player: over the same period 2000-2013 China's exports of solar PV equipment grew to \$174 billion, or 44% of the world total; exports of wind turbines grew to \$9 billion, or 6% of the world total. By contrast exports of fossil fuels encompassing oil and oil products, natural gas and coal plus coal equipment in the years 2000-2013 were valued

at \$262 billion (dominated by petroleum and petroleum products valued at \$211 billion).¹⁴ Thus over the period to 2013 China's 'black' fossil fuel exports (oil and oil products, natural gas and coal plus coal equipment) accounted for 55% of China's overall exports of energy products and equipment as calculated by the researchers from Boston University, while renewable energy-related exports (hydro, PV and wind equipment) accounted for 37%. In addition, 6% of exports were in power plants (at \$28 billion)¹⁵ and a small amount of exports in nuclear equipment and fuel (less than \$1 billion, or 0.08%).

So, while China is globalizing the fossil fuel aspects of its domestic energy expansion, so too are the greening aspects expanding globally. The real question concerns whether the scale of China's fossil fuel energy globalization greater than that of its green power globalization - and which process is expanding faster? There is little hard data available to answer this question. The recent paper by Bo Kong and Kevin Gallagher from Boston University (2016) provides useful data - but its emphasis is on the role played by Chinese development banks such as the China Export Import Bank (Chexim Bank) and the China Development Bank (CDB) rather than on securing a time-based picture of comparative trends between green and black energy expansion.

Observers like *ChinaDialogue's* Beth Walker make the point that China's energy exports are largely based on fossil fuels - but this offers little insight beyond recognizing that China's domestic energy system is still heavily based on fossil fuels. Generating capacity is currently based 58% on coal while actual electric energy generated is based 68% on coal. But these totals are changing rapidly (as noted above) and declining at a rate of 10% per decade or faster. Looking to the future, the issue is: are the proportions of China's external energy trade greening as fast or even faster?¹⁶

Financing initiatives and their impact on the green/black balance

China has created a large financial infrastructure to support the OBOR projects. Three such structures are the Silk Road Fund (SRF); the China-initiated Asia Infrastructure Investment Bank (AIIB); and the BRICS-initiated New Development Bank (NDB). This amounts to an initial OBOR-focused funding capacity amongst the three institutions capitalized at \$240 billion - \$100 billion each from the NDB and AIIB and \$40 billion from the SRF -- with the potential to drive OBOR investments towards or away from black energy and resource projects. So far the indications are that there is a distinct preference for green projects over those extending the reach of the black economy.

To take the NDB first, it was formally established in 2014 as a joint initiative of the BRICS countries - Brazil, Russia, India, China and South Africa. The BRICS countries floated the idea of a joint development bank at their meeting in New Delhi in 2012, and signed the bank into existence at their summit in Fortaleza, Brazil, in July 2014, with the agreement coming into force a year later in July 2015. The NDB's authorized capital is set at \$100 billion, with an initial capital of \$50 billion equally contributed by each of the five BRICS countries. Consistent with the remarks of the NDB's first president, the Indian banker K.V. Kamath, that the NDB should be a green bank promoting green infrastructure projects, the NDB issued loans to approved projects across all BRICS countries in its first year of operations, with no fewer than six of the seven projects being targeted at renewable energy and one at a road project in India, with funds to be invested totalling \$1.5 billion. The NDB is reported to be planning on approving loans totalling \$2.5 billion in 2017. At the end of 2016 the NDB finalized its first loan agreement, involving a loan to the Shanghai Lingang Distributed Solar Power project of RMB 525

million (US\$76 million). The NDB has already raised a yuan-denominated green bond on the China interbank bond market, to help finance its projects.¹⁷

The Silk Road Fund likewise has a promising early trajectory. The SRF was established by the Chinese government and state-owned agencies (including China Investment Corp, Export-Import Bank of China and China Development Bank) at the end of December 2014, with initial capital of \$40 billion, and with the specific goal of supporting OBOR initiatives across the entire Eurasian region. The first investment of the Fund was in a standard-gauge rail link between Nairobi and Mombasa in Africa, while other early projects involved hydropower projects in Pakistan as part of the China-Pakistan Economic Corridor and a liquefied gas project in Russia, in the Yamal Peninsula. At the end of 2016 the Fund announced its first equity investment, in the Russian gas processing and petrochemicals company SIBUR, with a principal focus on developing a new petrochemicals processing complex at Tobolsk. Since the petrochemicals industry promises an important continuing use for fossil ‘fuels’ – as chemical feedstock rather than as fuel to be burnt. It can be argued that these investments by the Silk Road Fund are assisting the global green shift – providing a sound strategic direction for oil and gas to play as petrochemical feedstocks rather than as fuels competing with renewable sources.

Finally, the Asian Infrastructure Investment Bank was proposed by China as an international infrastructure development bank, formally proposed by President Xi Jinping during a visit to Indonesia in October 2013. At the end of October 2014 no fewer than 21 countries largely from Central, South and Southeast Asia signed a memorandum of understanding to bring the bank into existence, with many European countries expressing interest to join in 2015. China agreed to open up membership of the bank, and increased its

proposed initial capital to \$100 billion, so that the bank was founded in May 2015 with articles of agreement being signed by 50 founder-member countries (notably excluding the US and Japan). These articles entered into force on 25 December 2015, and the bank opened for business in January 2016.

Under its president, Jin Liqun (a former vice minister of finance in China) the bank has steered a cautious and promising path in its first year of operations, seeking to work as closely as possible with the existing multilateral development banks, the Asian Development Bank (ADB) and the World Bank. Nine projects attracted financing in 2016, totalling \$1.2 billion, with projects estimated for 2017 as totalling \$2.5 billion. Early projects span countries across the Belt and Road Initiative, including construction of a new rail system in Oman (the first in the country); \$165 million for a power grid upgrade and extension in Bangladesh; a road improvement project in Uzbekistan; a \$100 million road project in Pakistan; a \$300 million hydropower project in Pakistan and \$20 million for a greenfield 225 MW power plant in Myanmar (involving highly efficient Combined Cycle Gas Turbine technology). The major project of the first year is a \$600 million loan to finance construction of the Trans-Anatolian gas pipeline (co-financed with the World Bank), which will connect Azerbaijan gas supplies with Europe through southern European countries and the TransAdriatic pipeline currently under construction (as described above). This may be interpreted as a piece of key infrastructure for Azerbaijan and all the intermediary countries along the route (including Turkey, Greece, Albania) and a means of enhancing energy security by increasing diversity of supplies.

Projects currently under consideration by the AIIB include a power grid upgrade in India (the Andhra Pradesh Power for All project); another grid improving project in southern India; a hydropower and dam improvement project in

Indonesia; a road corridor project in Kazakhstan; a natural gas infrastructure and efficiency improvement project in Bangladesh; and a 40 MW solar PV farm project in Kazakhstan (the Gulshat Solar PV power plant project).¹⁸ This latter project is designed to increase renewable energy capacity in the southern areas of Kazakhstan where grid connectivity is low.

A number of these lending practices are guided by green policies as set out by participating financial institutions, including the ‘Environmental and Social Framework’ introduced in NDB and AIIB. For example, some of the core principles specified in NDB’s Environmental and Social Framework include promotion of climate change mitigation and adaptation measures, and conservation of natural resources including energy.¹⁹ Likewise, the AIIB emphasizes the measures for climate change, including support of the aims of the Paris Agreement, and the support for green economic growth as part of the Bank’s Vision in its Environmental and Social Framework. The Bank further states in the Framework that it “[...] plans to prioritize investments promoting greenhouse gas emission neutral and climate resilient infrastructure”. As a multilateral Bank that involves a diversity of countries and states in its governance, the Bank has established a comprehensive set of measures to safeguard those principles, as indicated in the Framework.²⁰

The Silk Road Fund has yet to publish its environmental policies. However, in the area of energy investment, the Fund has so far invested both fossil fuel-based energy projects, such as the Yamal LNG project in Russia, but also clean energy projects such as the hydropower projects in Pakistan.

Thus whatever misgivings there might have been that these projects would be utilized by China as a means of exporting its excess thermal power capacity and coal-burning

technology, they do not seem at this stage to be borne out. So far the Chinese-initiated OBOR-financing mechanisms are maintaining the green tinge to their investments as well as safeguarding the due diligence aspects of the loans and curbing alarm expressed by established multilateral development banks by fostering joint ventures with these banks wherever possible.

Changing perspectives of other industrializing countries

A strong aspect of the critical remarks directed at China in terms of the globalization of its energy system is that other industrializing countries like India are viewed as being increasingly tied to Chinese fossil fuel exports as it ramps up its coal-burning power system. The case along these lines is made by Hannam – but he also hedges his bets and notes that India could equally well expand its renewable energy system even faster. So which is the likely development?²¹ In fact the evidence from 2016 is that India is rapidly transitioning from a country that was building a fossil fuelled power system (a movement similar to China Mark I) to one that is now swinging towards a system that is based more on renewables (a movement similar to China Mark II). And as it does so the markets for China’s fossil fuelled systems would diminish while the markets for advanced renewable energy systems would expand.

While India is still expanding its coal use, it is worth noting that it is actively building green capacity, through National Solar and Wind Power programs. Meanwhile it is shutting down some of its coal-fired plants. In 2016 the Indian Energy Ministry announced plans to cancel four proposed coal-fired power plants, having a combined capacity of 16 GW, while the draft National Electricity Plan released at the end of the year concluded that beyond already partially completed plants, India needs no further coal-fired power plants.²² This move

was described by the Indian Minister for Energy, Piyush Goyal, as a means to reduce coal imports into India - to enhance energy security and to keep down the cost of electricity.²³ By the end of the year, India's new draft National Electricity Plan for the next two five-year periods concludes that beyond already partially completed plants, India needs no further coal-fired power plants. Shortly after the release of the plan, India's Energy Minister made the comment that "We have to look at a world beyond fossil fuels".²⁴ At the same time that India's dependence on coal appears to be diminishing, its reliance on solar and wind is rising (if slowly). In the first week of February 2017 the state of Madhya Pradesh staged a public auction for bids to build solar arrays in the Rewa Solar Park, with the winning bid coming in at Rupees 3.59-3.64/kWh (US\$53/MWh) - a bid that was 25% lower than bids lodged a year earlier.²⁵ Then at the beginning of 2017 The Energy and Resources Institute (Teri), India's leading climate campaign organization, issued a report suggesting that as long as renewables and batteries continue falling in cost, they will undercut coal-fired systems within a decade.²⁶ These developments in the greening of India's electric power sector are not only of enormous benefit to India, such plans also cast China's prospects for exporting coal-fired plants to India in a fresh light.

A similar story can be told for other countries that are industrializing and seeking to break free of their fossil fuel dependence. Around the Persian Gulf, for example, oil and gas rule -- but countries like the United Arab Emirates (UAE) are increasingly looking to a future based on renewables. The UAE has made headlines with its championing of a new green city, Masdar, as an exploratory bid to build a post-oil future. At the beginning of 2016 Energy Minister, Suhail Al Mazrouei, lifted the country's target for power generation from low-carbon sources including solar and wind from 25% to 30% by 2030. Central to this target is the proposed 3

GW solar park named after Sheikh Mohammad bin Rashid Al Maktoum. In September 2016 a consortium won the right to generate solar power in the UAE by offering a world record low price of 2.4 cents per kilowatt-hour. The winning consortium, involving the Chinese solar PV firm JinkoSolar and the Japanese developer Marubeni, proposed the 350 MW Abu Dhabi solar farm as a pillar of the region's renewables potential.²⁷ At the beginning of 2017 the country's renewables target had been raised to 50% power coming from clean sources by 2050, amidst calls for a Gulf-wide renewable energy strategy. While it also includes the building of nuclear power plants, it is a target that is likely to promote a rapid expansion of utility-scale solar power. Meanwhile Abu Dhabi's UAE neighbor Dubai is persevering with its 'clean coal' generating facility, the Hassyan coal-fired power plant, where it is Chinese finance and Chinese engineering that is the winner. The generating plant will be built by China's Harbin Electric using its advanced 'clean coal' technology, with financing supplied by Chinese and Saudi banks.²⁸ So this is the 'less green' aspect of China's energy globalization.

Here then we have one country, the UAE, currently committed to fossil fuels. With Chinese and Japanese assistance Abu Dhabi is making a break to a renewable energy future (assisted by China's JinkoSolar) but at the same time Chinese institutions are assisting with a 'clean coal' future for Dubai (assisted by Harbin Engineering and Chinese finance). One country, two energy strategies, both facilitated by China. The world is a complicated place.

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Notes

¹ See Michael Klare, Feb 14, 2017, ‘Donald Trump’s China First, Russia Second, America Third Foreign Policy’ at [Tomdispatch.com](#) (and subsequent repostings)

² We have been publishing analyses of China’s green vs black energy strategies for several years. For recent articles by us, see postings [here](#) and [here](#).

³ See Kara Sherwin [here](#); Beth Walker [here](#); Phillip Hannam [here](#).

⁴ According to the data from *BP Statistical Review of World Energy* released in 2016, the share of energy from non-fossil fuel sources, including renewables and nuclear energy, in the

total primary energy consumption in China increased from 7% in 2008 to 12% in 2015, a 5% increase over the eight years. The share in Germany, the US and India increased by 8%, 3% and less than 1% over the same period. The most significant green transition has taken place in the electric power generation sector, where the share of power generation based on non-fossil fuel sources increased from 17.6% in 2007 to 28.4% in 2016, according to the data from the China Electricity Council.

⁵ For example, Fergus Green and Nicholas Stern in their recent paper concluded that China's GHG emissions "are much more likely to peak by 2025". See their report [here](#).

⁶ We are not including nuclear power in these totals - in contrast to China's statistics which usually include non-fossil generation as encompassing WWS and nuclear.

⁷ For some recent discussions on OBOR, see for example, Francis Fukuyama, 'Exporting the Chinese model', 12 Jan 2016, *Project Syndicate*, and Gal Luft, 'It takes a road: China's One Belt One Road Initiative', November 2016, Institute for the Analysis of Global Security (IAGS), and the report by PwC [here](#). Wade Shepard has been providing vivid on the ground reportage in a series of articles published in *Forbes*, such as 'A look at 7 new cities rising along the New Silk Road', 20 Sep 2016

⁸ The Regional Comprehensive Economic Partnership (RCEP) is a proposed [trade agreement](#) between the ten member states of the [Association of Southeast Asian Nations](#) (ASEAN) (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam) and the six countries with which ASEAN has existing free trade agreements (Australia, China, India, Japan, South Korea and New Zealand). For analysis, see [here](#)

⁹ We acknowledge the uncertainty and fluidity of the circumstances post-Trump, with China-US-Taiwan relations being perhaps less fraught than they appeared to be early in Trump's ascendancy. But foreign affairs commentators like Fareed Zakaria are pointing to the gains China is making in international soft power as the US is seen to be retreating. See [here](#).

¹⁰ Those are based on estimates in a report by PwC in Feb 2016, available [here](#).

¹¹ See article reporting the result in *China Daily*, [here](#).

¹² The role of Russia has remained a point of contention, with the US declaring eventually it would not oppose Russian participation; see the analysis [here](#).

¹³ These data are sourced from Bo Kong and Kevin Gallagher, 2016, 'The Globalization of Chinese Energy Companies: The role of state finance', Boston University's Global Economic Governance Initiative, The 'energy exports' as defined in their study involve exports of energy products and equipment in six specific categories only, including petroleum and petroleum products, natural gas, coal and coal equipment, hydro equipment, PV equipment, nuclear fuel and equipment, wind equipment and power plants. Since other energy-related products and equipment are left out in their study, the result may not present a full picture of energy exports from China.

¹⁴ China is a major petroleum importer and exports much less crude oil to the world. For example, according to the UN Comtrade database, see [here](#), China's imports of crude oils amounted to US\$220 billion in 2013, compared with US\$ 1.4 billion of its exports in crude petroleum oils. Therefore, we expect the majority of exports in this category in the study of Kong & Gallagher (2016) involved manufactured petroleum products such as petrochemical products and fertilisers etc.

¹⁵ According to Kong & Gallagher (2016), the category of ‘power plants’ includes both ‘black’ energy exports such as coal-fired power generation equipment, and ‘green’ energy exports such as hydroelectric dams. Further analysis would be required to differentiate these different categories of energy-related products.

¹⁶ These questions inevitably raise issues to do with China’s development strategy, and the implications of its energy choices being made. As a consequence of its industrialization, China is creating the world’s largest energy system, initially one based largely on fossil fuels and now increasingly one that involves the building of a green energy system, targeted at the domestic market but also at external export markets. One can no longer assume the unmitigated good of rapid development of energy resources in a world of deep climate threat, nowhere deeper than in China. Our argument is that China is making its contribution on the climate front while targeting its own energy and resource security – both domestically and now internationally as well. For a discussion of the issues, see the new book by one of us, [Global Green Shift](#).

¹⁷ See the report [here](#).

¹⁸ A list of proposed and yet approved projects can be found in the AIIB’s website [here](#).

¹⁹ For NDB’s policies see [here](#).

²⁰ For AIIB’s Environmental and Social Framework document, see [here](#); for the Bank’ draft energy policies, see [here](#).

²¹ See Phillip Hannam [here](#).

²² See ‘[No new coal fired power plants for India](#)’ by Tim Buckley, 20 December 2016, *RenewEconomy*, at:

²³ See ‘[India cancels four major new coal plants in move to end imports](#)’ by Tim Buckley, *RenewEconomy*, 10 June 2016

²⁴ See ‘[No new coal fired power plants for India](#)’ by Tim Buckley, 20 December 2016, *RenewEconomy*

²⁵ See ‘[Indian solar tariffs on cusp of smashing record lows](#)’, by Tom Kenning, 8 Feb 2017, *PVTech*

²⁶ See the report in the *Financial Times*, ‘[India optimistic of being coal-free by 2050](#)’, by Kiran Stacey, Feb 13 2017

²⁷ See ‘[A Jaw-Dropping World Record Solar Price Was Just Bid in Abu Dhabi](#)’, by Katie Fehrenbacher, *Fortune*, 19 Sep 2016