ENERGY FOUNDATION
能源基金会

COAL TRANSITION QUARTERLY

NEWSLETTER OF ENERGY FOUNDATION CHINA'S COAL TRANSITION TASK FORCE

ISSUE 3

April 2022

Authored by LI Jie and Kevin Tu; with contributions by CUI Sheng and GAO Yuan

CONTENTS

*All the data and information in this quarterly are publicly available, with their sources provided in corresponding reference. Energy Foundation China does not guarantee the accuracy of either the data or information included in this newsletter and assumes no responsibility whatsoever for any consequence of use by any third party.

Foreword by Dr. LI Jie

Vice President, Programs
Acting Director of Coal Transition Task Force

A retrospect of 2021

After China's landmark dual-carbon pledge in September 2020, the Chinese energy economy witnessed a very exciting, yet tumultuous 2021. On one hand, China made two additional major climate pledges on coal: 1) in April, China pledged to strictly control coal consumption during the 14th Five Year Plan (FYP, 2021–2025) period and will phase down coal beginning from the 15th FYP (2026-2030) period; and 2) in September, the country pledged to stop supporting new overseas coal projects. On the other hand, the country experienced an unusual and widespread power crunch starting in September. Although there were various reasons behind the so-called "power crisis," certain interest groups blamed dual energy control and dual carbon goals as the main drivers.

Unsurprisingly, pursuing energy supply and power system security and stability was elevated as a new strategic priority for China. Consequently, the Chinese energy system witnessed another wave of growth in coal demand and supply. Meanwhile, the government introduced a suite of policies (guidelines and notices), both at the national level and at the sectoral level, addressing the planning of dual carbon goals and promoting the transition to a low-carbon economy and new type of power system. The top-down signal has been extremely clear that sustainable development and carbon neutrality remain China's strategic priorities especially in the medium- and long-term. However, in the near future, balancing energy transition-related gaps while ensuring energy security will be challenging.

Internationally, coal production rebounded strongly on a national basis, with global coal production estimated to have grown at a disturbing 5.4% year-on-year (YOY) in 2021. China remained the world's largest coal producing economy, with national output exceeding 4 billion tons for the first time, which is equivalent to a 4.7% YOY growth. Except for South Africa, almost all the top 10 coal producing countries experienced a production uptick last year, with five countries (India, Indonesia, US, Russia, and Poland) witnessing a rather strong expansion with a growth rate of roughly 7-9%. Finally, Germany, a champion of clean energy transition and the world's largest lignite producer in, had an astonishing 18% growth rate last year.

Alongside the rise in coal production, geopolitical tensions in Europe have sent shock waves across the world's energy market. With increasing energy security anxiety in Beijing, Brussels and beyond, maintaining the momentum of a just coal transition calls for concerted efforts by like-minded international stakeholders from government, industry, philanthropies, CSOs, academia, media and beyond.

Note from Dr. HE Ping

Program Director, Industry

China's industry sector is the country's largest energy consumer and carbon emitter, accounting for 65% of China's energy consumption and more than 70% of its carbon emissions. Meanwhile, key energy-intensive industries including iron and steel, building materials, coal-to-chemical, and cement collectively consume over 40% of China's total coal consumption.

EFC's Industry Program aims to accelerate the deep decarbonization of China's industry sector, in support of meeting the country's early emissions peaking and carbon neutrality goals. Our program initiatives focus on formulating ambitious and actionable industry strategies, policies, and standards system, facilitating concrete deep decarbonization actions in energy-intensive sectors, strengthening market-based mechanisms driving low carbon production and demand, and promoting capacity building, cross-cutting integrations, and amplification.

In particular, our Industry Program utilizes four pathways for phasing out coal consumption across China's industry sector.

Demand Reduction: Key measures include controlling unreasonable consumption that leads to excessive production, optimizing the structure of export products, building a global supply chain, improving material strength, and applying alternative materials.

Process Optimization: Key measures include promoting intelligent manufacturing and Internet of Things (IOTs), adopting advanced and efficient technologies, eliminating backward production capacity, strengthening circular economy, and establishing compound/integrated factories.

Energy Efficiency Improvement: Key measures include applying energy-saving and carbon-reducing technologies, implementing energy system integration and management, and improving energy efficiency of equipment such as boilers, furnaces, and others.

Alternative Energy: Key measures include exploring coal reduction and its replacement, multi-energy complementarity and interaction between supply and demand, improving electrification levels, and utilizing green hydrogen on a large scale.

Coal Data Updates

In 2021, the Chinese economy grew by 8.1% year-over-year (YOY), significantly higher than the 2.2% YOY growth in 2020. However, the average two-year GDP growth rate from 2019 to 2021 was approximately 5.2%, which is still lower than the 2019 level of 6.0% YOY. The growth rate in 2021 is generally higher than that in 2020 for all indicators listed in Figure 1, except for hydro power generation, which witnessed a continuous decline of YOY growth rate due to the drought weather condition.

China's impressive economic expansion is nevertheless rather power-intensive, with national power consumption up ticking by 10.3% YOY in 2021, mainly driven by the strong export. By comparison, the average two-year growth rate of national power demand from 2019 to 2021 stands at 6.7%, which is noticeably higher than the 4.7% YOY growth back in 2019. Meanwhile, demand for fossil fuel rebounded strongly, with coal, oil and gas all witnessing much higher YOY demand growth than 2020, leading to a 5.2% YOY growth of national energy consumption in 2021. Again, the average two-year growth rate of national energy consumption at 3.7% is also higher than the pre-pandemic level at 3.3% YOY in 2019.

By comparison, in H1 2021, the Chinese economy grew by 12.7% YOY, with national power and energy consumption up ticking by 16.2% and 10.7% YOY, respectively. As quarterly growth of Chinese economy slows down over time last year, China's annual energy consumption growth is substantially lower than otherwise would be the case.

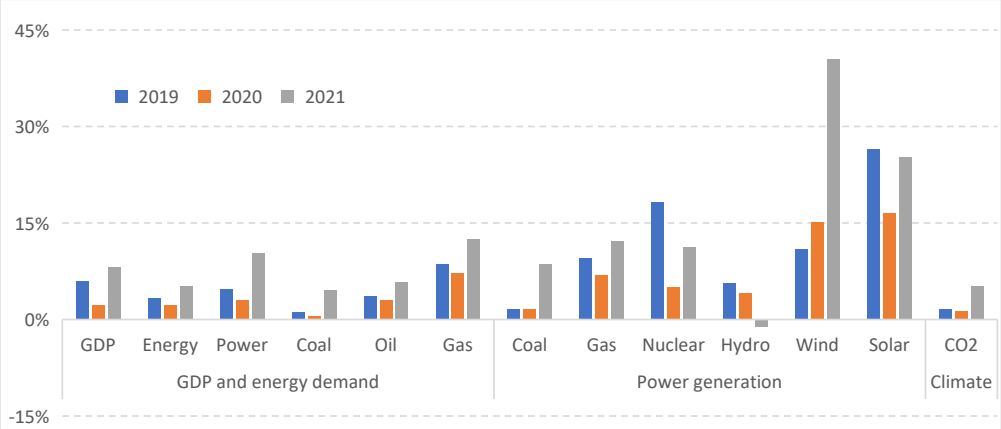

Figure 1. YOY Changes of China's Key Economic and Energy Indicators, 2019 – 2021

Source: Agora Energiewende.

China's national carbon emissions are estimated to grow by about 5% YOY in 2021. As global carbon emissions increased by about 6% YOY last year, China's share of global carbon emissions declined slightly for the first time since 2016. China's slower than world average increase in carbon emissions last year could be partially explained by the extraordinary expansion of the country's renewable development, with solar PV and wind power generation witnessing a 25.2% and 40.5% YOY spike, respectively.

Summary of China's 2021 coal data

In 2021, China's coal production reached a record level at 4,130 Mt, and for the first time surpassed the four-billion-ton milestone. The total coal consumption was estimated at about 4,230 Mt, which almost tied with the peak level of 2013 (i.e., 4,240 Mt). Looking back at the track record of the past decade, though national coal consumption peaked in 2013 and declined for three consecutive years thereafter, China's national coal production and consumption generally stayed more or less on a plateau.

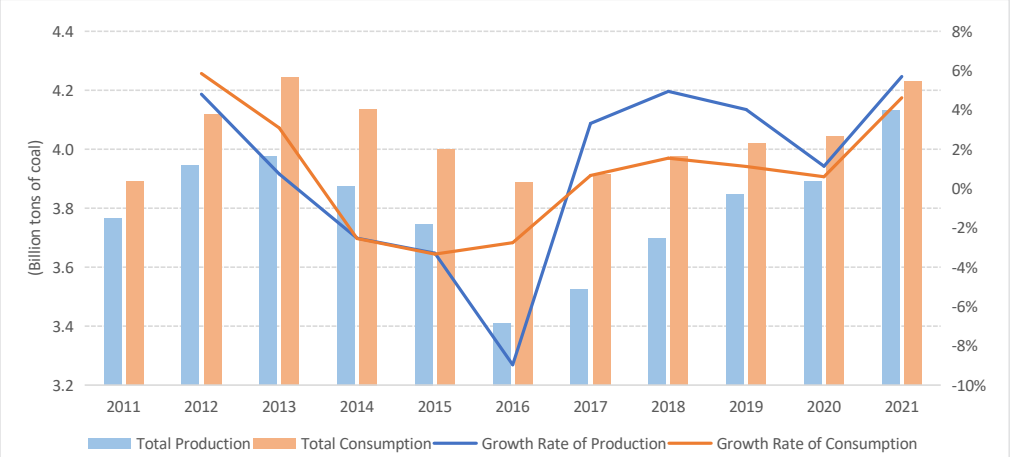

Figure 2 China's Coal Production and Consumption in the Past Decade

Source: National Bureau of Statistics.

Meanwhile, the share of coal in national energy mix continues to decrease. Since 2011, coal's share in China's total energy consumption has continued to decline over time. In 2021, despite the relatively high growth rate of coal consumption, coal's share in total energy consumption decreased to 56%, which is 0.8 percentage points lower than 2020.

	Quantity	Unit
Total Coal Production	4,130	Mt
Total Coal Consumption	4,230	Mt
Total Import	320	Mt
Total Export	2.6	Mt
Share of Coal in Total Energy Consumption	56	%
Change of Share of Coal in Total Energy Consumption, compared to 2020	-0.8	Percentage Points
Installed Coal Power Capacity	1,110	GW
Coal power Capacity Addition, compared to 2020	31	GW
Coal Power Generation	5,030	TWh
Growth of Coal Power Generation, compared to 2020	400	TWh
Share of Coal Power in Capacity Mix	46.7	%
Share of Coal Power in Generation Mix	60	%
Standard Coal Consumption Rate for Power Supply (Power plants at 6000 kW and above)	303	gce/kWh

Table 1. Summary of China's Coal-related Data in 2021

Coal production

Domestic China

In 2021, Chinese national coal production reached 4,071 Mt, equivalent of a 4.7% YOY growth. National coal production is highly concentrated in top producing regions. More specifically, the top four coal mining provinces (top 4), namely Shanxi, Inner Mongolia, Shaanxi and Xinjiang, account for four fifths of national coal production. By comparison, the similar ratio of the top 10 coal mining provinces stands at 94%.

Shanxi is currently China's largest coal producing province by output. Its annual coal production was 1,193 Mt in 2021, accounting for 29% of China's total output. By comparison, Inner Mongolia, Shaanxi and Xinjiang represents 26%, 17% and 8%, respectively. Unsurprisingly, these four top producers play a key role in China's clean energy transition agenda.

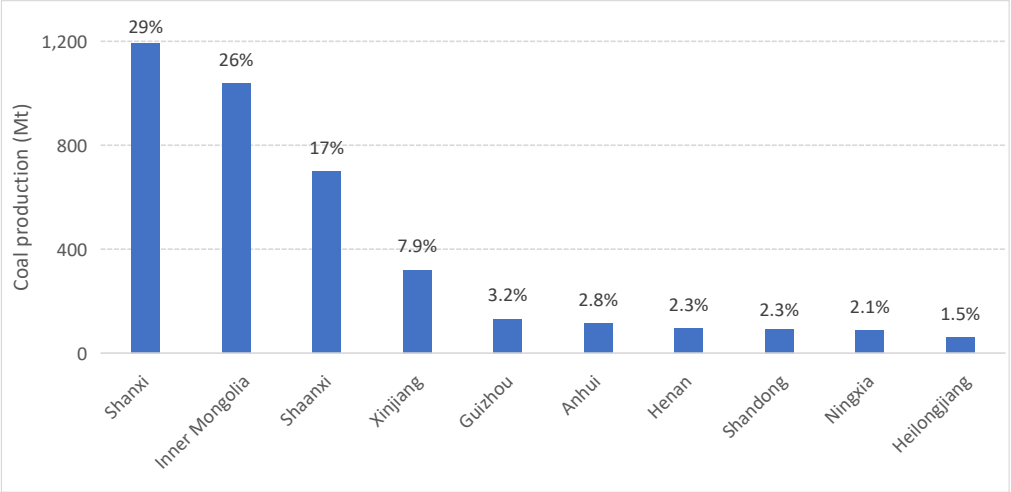

Figure 3. China's Top 10 Coal Producing Provinces in 2021

Source: National Bureau of Statistics and Provincial Bureaus of Statistics

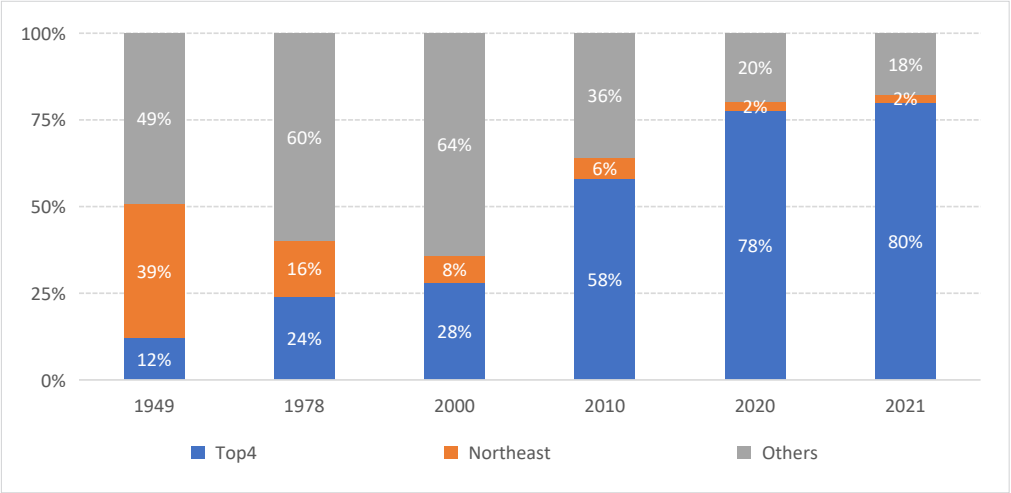

Figure 4. National Coal Production Mix by Region Over Time

Source: National Bureau of Statistics and Provincial Bureaus of Statistics.

When the People's Republic of China was founded in 1949, the current top four producers accounted for only 12% of national coal production, which stood at 32.43 Mt. In comparison, Northeast China, which consists of Liaoning, Jilin and Heilongjiang, represents nearly 40% of national coal production back in 1949. Seventy-two years later, coal resources in Northeast China are close to depletion, with aggregate output in this region accounting for a mere 2.4% of the national total. In comparison, output level in both Shanxi and Inner Mongolia once exceeded the 1,000 Mt/annum mark. With national coal production in China increasingly concentrated in the top four provinces, the strategic phase-down of coal production and while achieving a just coal transition without severe regional impacts deserves more attention from key Chinese and international stakeholders.

Global landscape

Against the backdrop of the ongoing COVID-19 pandemic, coupled with a widespread energy shock in the second half of last year, national coal production rebounded strongly across the world, with global coal production estimated to grew at a disturbing 5.4% YOY in 2021.

Based on preliminary data obtained from various sources, China remains the world's largest coal producing economy. While China's national coal output grew slightly lower than the world average at 4.7% YOY in 2021, the country nevertheless still accounts for about half of global coal production, with the next two top producers, namely India and Indonesia, staying at a distant 10% and 8% of the world total, respectively.

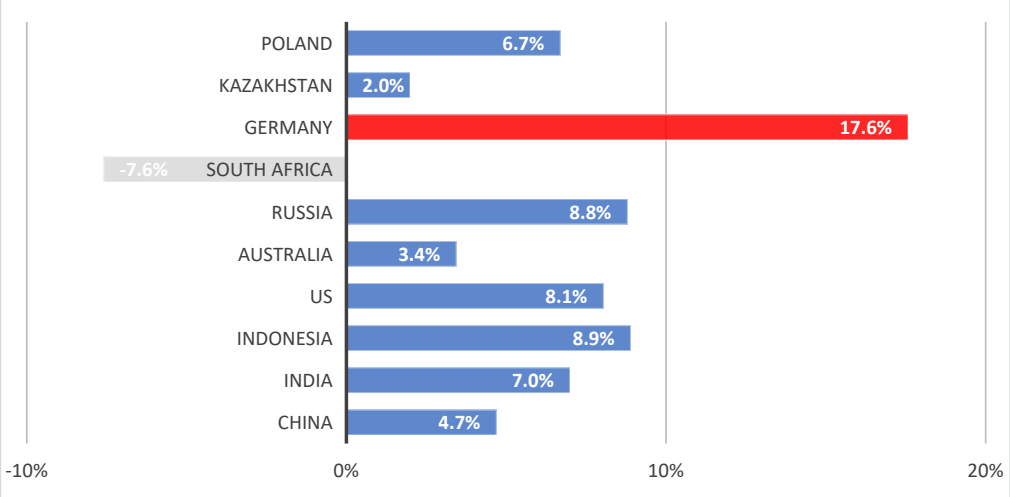

Figure 5. YOY Changes of National Coal Production of Top 10 Coal Producing Countries in 2021

Source: Agora Energiewende.
Note: South Africa is based on national output of the first 11 months.

Among the top 10 coal producers in 2021, South Africa is the only country that witnessed a contraction instead of upticking of national coal output, largely caused by heavy rain in the first and last quarter of 2021, railway bottlenecks and operational disturbance related to COVID-19 pandemic other than the South African government's climate policy.

Meanwhile, it is worthwhile to point out that Germany's astonishing 18% YOY spike of national lignite output has made the country the world's 8th largest coal producing economy. By comparison, similar ranking was only the 9th in 2020, which is in sharp contradiction with the German federal government's increasingly ambitious climate policy.

China's coal consumption in the international context

China is the most dominant coal consumer in the world, accounting for more than half of global total demand, with the next two top consuming economies, namely India and US, standing at 12% and 6.1% of global total, respectively. Against the backdrop of the COVID-19 pandemic, worldwide coal demand declined by 4.2% YOY in 2020. Nevertheless, due to a strong rebound of global coal production in 2021, global consumption is estimated to grew by about 5% YOY, with the share of China still representing more than half of the world total.

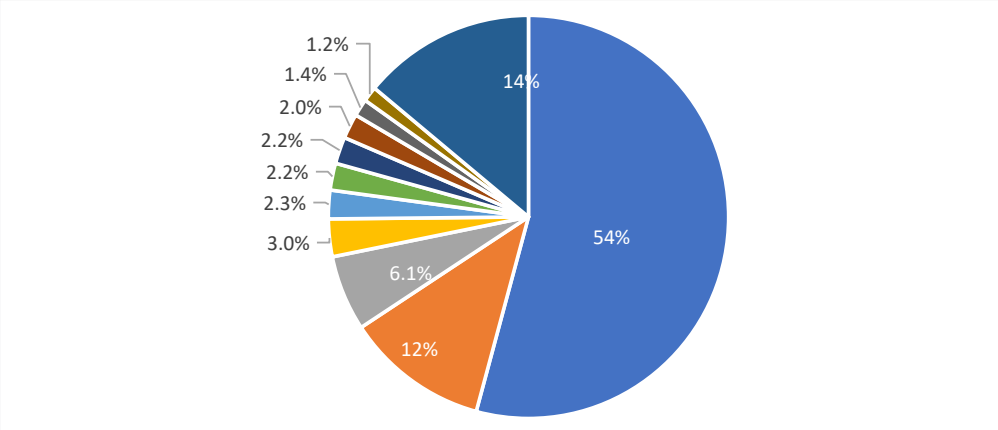

Figure 6. Share of Global Coal Demand by Top 10 Consuming Countries in 2020

Source: BP Statistical Review of World Energy 2021.

In 2021, China's coal consumption increased by almost 190 Mt. Out of this amount, about one third was consumed by the coal-intensive heavy industries, with the remaining two thirds contributed by rising power generation. The incremental demand was primarily boosted by the post-pandemic economic recovery and export growth, while clean energy development alone could not keep pace with the growth of overall energy demand.

Coal-fired power plants

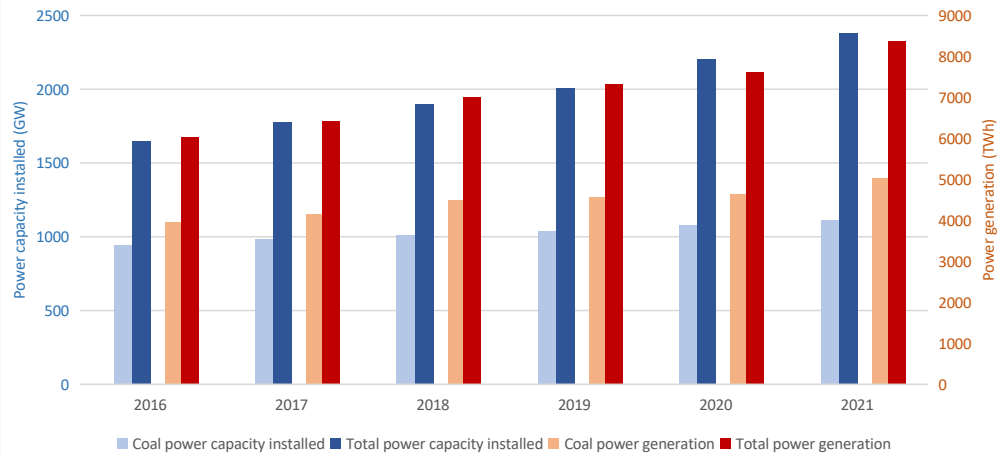

Figure 7. Coal Use in China's Power Sector 2016-2021

Source: China Electricity Council.

Coal power's share in installed power capacity dropped to below 50% for the first time in 2020, and declined further to 46.7% in 2021. By the end of 2021, China's total installed power capacity reached 2,380 GW, with an YOY addition of 180GW, and about one sixth is coal power. Because of the continued capacity addition, installed coal power capacity in China reached a new record of about 1,110 GW. In terms of power generation, coal power's share in generation mix continued to decrease and dropped to 60%.

During the 13th Five Year Plan (FYP) period, China's national power capacity increased from 1,526 GW in 2015 to 2,202 GW in 2020, the equivalent of an annual average growth rate at 7.6%. In retrospect, though coal-fired power capacity in China increased from 900 GW in 2015 to 1,079 GW in 2020, its annual average growth rate at 3.7% is significantly lower than that of national power capacity at 7.6%. As a result, coal-fired power plants' share in the national power capacity mix declined below 50% for the first time by the end of the 13th FYP period. In 2021, the share of coal-fired power in national power capacity mix further dipped to 46.7%.

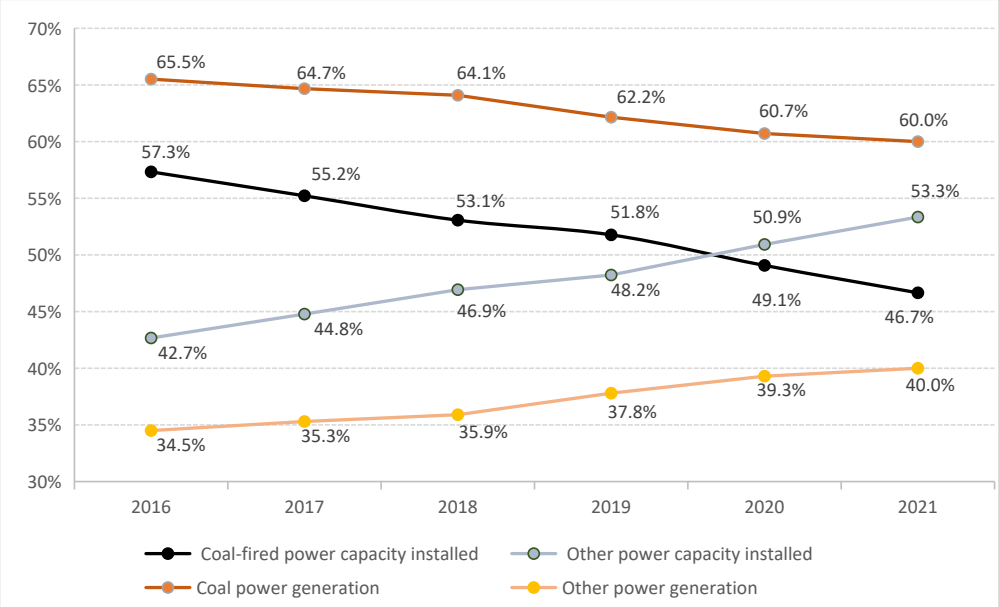

Figure 8. Power Installed Capacity and Power Generation: Coal vs Others

Source: BJX Power Info Net and China Electricity Council.

China's incremental coal-fired capacity (~30GW) accounts for ~60% of global incremental coal power capacity in 2021, the net increase is lower than the average increase during 13th FYP. Following a sizable addition of 57 GW of new operational coal-fired power capacity globally in 2020, a slight worldwide contraction of new capacity addition meant there was only 50 GW added in 2021.

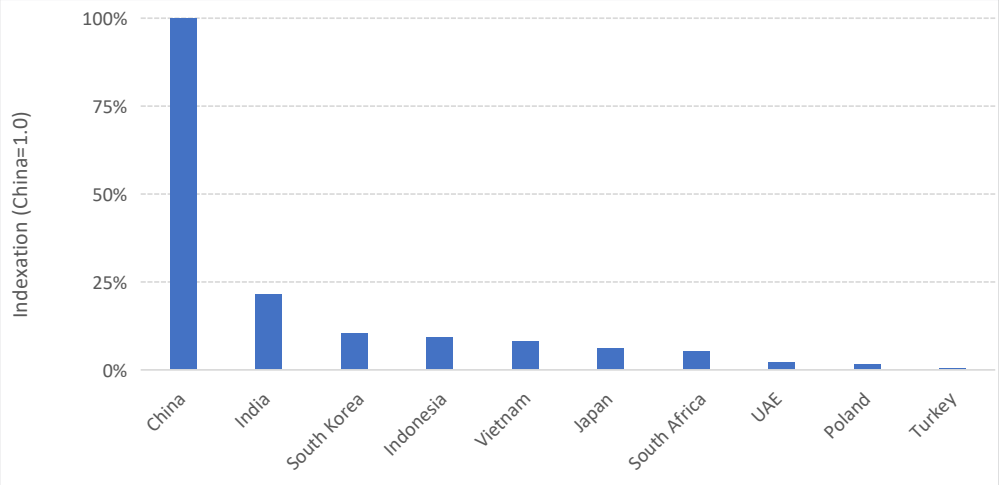

Figure 9. Comparison of New Operational Coal-fired Power Capacity Addition by Country in 2021

Source: Global Energy Monitor.

Surges in coal imports in second half of 2021

China's monthly coal imports declined continously YOY during the first five months in 2021, but started to rebound from June 2021. In fact, coal imports surged strongly by 76%, 99% and 201% YOY from September to November 2021 as power plants scrambled for securing fuel supply to ease a power crunch that pushed domestic coal prices to record highs. Cumulative coal imports in 2021 reached 324 Mt, the equivalent of 6.6% YOY growth.

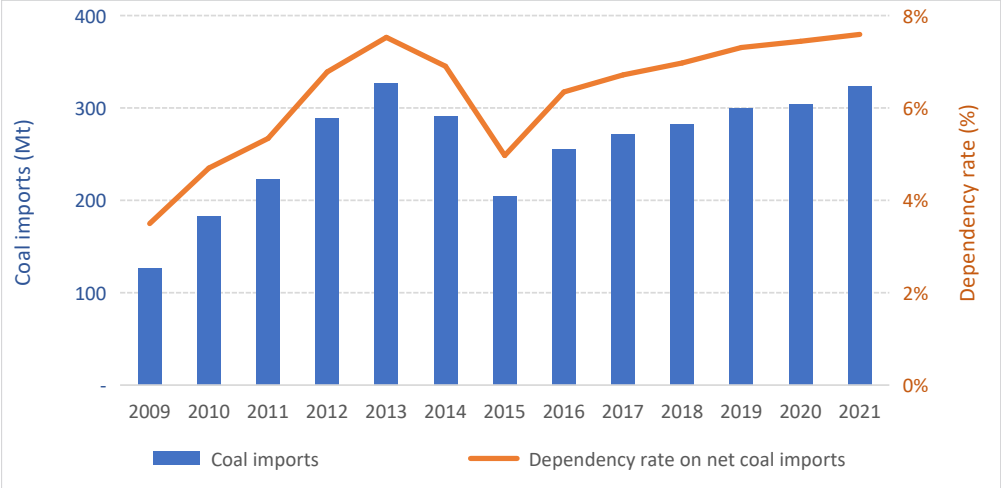

Figure 10. China annual coal imports vs. dependency rate on net coal imports over time

Source: China Customs, National Bureau of Statistics and estimation.

China first became a net coal importer in 2009, then quickly surpassed Japan as the world's largest coal importer in 2011. Since then, annual coal imports soon peaked in 2013 at 327 Mt with depencency rate of net coal imports standing at 7.5%. Following two consecutive years of declining in 2014 and 2015, national coal imports started to ramp up over time, reaching the second highest record last year, with dependency rate on net coal imports hitting historical record at 7.6% in 2021.

Key Developments in China

The wrestle between conventional and new energy

Over the past two years, momentum for climate action and coal transition in China has continued to grow. In September 2020, President Xi pledged "30/60" goals to pursue ambitious climate action. In April 2021, President Xi committed that China will "strictly limit" coal power projects and coal consumption during the 14th FYP period, and "phase it down" gradually in the 15th FYP (2026–2030). His speech sent a clear and important political signal domestically that China's golden age of coal will come to an end. Meanwhile, it was quickly followed in September by President Xi's announcement that China will no longer build new coal-fired power plants overseas. The announcement, which has attracted widespread attention in China and abroad, has significantly boosted global momentum for moving away from coal.

Despite of the above progress, some setbacks also occurred last year. In September 2021, spiking coal prices led to power shortage and power rationing throughout the country, which triggered broad debates over coal's fundamental role in China's energy system and appropriate balance between green development and energy security. The so-called "power crisis" gave ammunition to those seeking to slow the transition away from coal. Meanwhile, coal consumption reached a new record level in China, and almost surpassed the historical peak in 2013.

China's coal transition agenda is now at a crossroad. On the one hand, the challenge related to additional coal rebounding is not easy to reverse in the near future. Due to national "power shortage" and global "energy shock", attacks on coal transition are rampant. Meanwhile, in the short term, risk management on energy security and people's livelihoods has to be emphasized. On the other hand, there exist opportunities to better facilitate coal transition from political, social-economic, technological, and financial aspects. In medium- to long-term, prospects of coal phase-out are still promising. China moves fast to put in place a "1+N" policy framework in support of its dual carbon goals, and boost renewable power together with new energy storage and green power trading, as well as restriction of permitting new coal power projects for the sole purpose of power generation.

Summary of recent policy developments

During the first quarter of 2022, Chinese governments issued a series of opinions or plans to guide the general energy work and targets for this year or the 14th FYP period, such as Opinions on Improving Institutional Mechanisms and Policy Measures for Green and Low-Carbon Transformation, Implementation Guidelines for Energy Conservation, Carbon Reduction, and Transformation and Upgrading in Key Areas of High Energy-Consuming Industries 2022, the 14th FYP of Modern Energy System Planning, and Guiding Opinions on Energy Work in 2022. Some key goals show that the proportion of non-fossil energy in total energy consumption will increase to approximately 17.3% by the end of 2022, with the proportion of non-fossil energy in national power generation mix expected to reach around 39% by 2025. In addition, China aims to establish an energy supply-demand framework, in which non-fossil energy not only basically meets growth in energy demand but is also the substitute for fossil energy stock at scale, thereby enhancing energy security and resilience.

In the coal mining industry, national policies focus on stabilizing prices and ensuring supply security. On the one hand, the National Development and Reform Commission (NDRC) has set a reasonable price range of 570-770 yuan per ton (including tax) for medium- and long-term trading of benchmark 5,500 kilocalorie thermal coal at Qinhuangdao Port. Furthermore, the State Council organized a working seminar on clean coal utilization. Meanwhile, the Chinese government still has a strong desire to control coal, which is evidenced by the announcement by the National Energy Administration (NEA) that no more support in principle on building new coal power projects for the sole purpose of power generation. The detailed policies are synthesized below.

March 2022: Guiding Opinions on Energy Work in 2022 was issued by NEA

On March 29, 2022, NEA issued The Guiding Opinions on Energy Work in 2022 (The Opinions). The Opinions propose three main development goals that are aimed at enhancing supply assurance capabilities, promoting structural transition, and improving quality and efficiency. It is clearly stated that the proportion of coal consumption should steadily decline, while the proportion of non-fossil energy in total energy consumption should be expected to increase to about 17.3%, alternative electricity should be expected to increase to about 180 TWh, and the share of wind and photovoltaic (PV) in national power consumption should be expected to reach around 12.2%. The Opinions also stress the significance of renewable energy development, proposing to vigorously develop wind power and PV, and orderly promote key projects of hydropower and nuclear power.(NEA)

March 2022: The 14th FYP on Modern Energy System was jointly issued by NDRC and NEA

On March 22, 2022, NDRC and NEA jointly issued the long-awaited 14th FYP on Modern Energy System, laying out a general direction—as well as specific tasks and goals—for the energy system during 2021-2025. The overarching objective of the plan is to "accelerate" the development of a "modern energy system"—which, according to a government spokesperson, stands for a "clean, low-carbon, secure and highly efficient" energy system. The document lists five main goals. To summarize, it stipulates that the country should strive towards "more safe and solid" energy security, achieve "remarkably effective" energy transition, "significantly" raise energy efficiency, "obviously" enhance innovation capabilities and "continuously" improve general energy service levels. The main targets for 2025 are consistent with previous plans or opinions, and there are specific new targets. For example, the total installed capacity of power generation should be expected to reach approximately 3 TW, the proportion of non-fossil energy power generation should be expected to increase to about 39%, the proportion of flexible power supply should be expected at about 24%, and power demand side response capacity should be expected to reach 3%-5% of the maximum power load. (NDRC, Carbon Brief)

March 2022: The State Council organized a working seminar on clean coal utilization

On March 22, 2022, the State Council organized a working seminar on clean coal utilization. The seminar was hosted by Han Zheng, Vice Premier of the State Council. The seminar stressed the importance of achieving carbon peaking and neutrality goals while ensuring the energy security. It also highlighted the necessity of a scientific and orderly green transition of energy development, in which the utilization of coal needs to be based on China's current social and economic conditions. (State Council of China)

According to EFC's point of view, the above development highlights the complexity of China's green transition. In the short term, coal still serves as primary fuel for baseload generation to ensure power system stability and reliability. However, coal is emission-intensive, and pollution-prone with large impacts on air, water and soil even with utilization of the most advanced technologies. Therefore, in the longer term, coal phase-down is still inevitable. Meanwhile, China should consider accelerating clean power sector transformation agenda during the 14th FYP period to ease burden related to emissions reduction thereafter.

February 2022: NDRC issued notice on coal market price

On February 24, 2022, NDRC issued the Notice on further Improving the Formation Mechanism of Coal Market Price (the Notice). NDRC is to rationalize Qinhuangdao delivered ex-ship (DES) coal (5,500 Kcal) price in the range of 570-770 yuan per ton (including VAT) for medium- and long-term contracts. Wellhead mid- and long-term contractual coal prices at major mining regions are also rationalized at no more than RMB570/t the highest, to make sure the reasonable profits shared between coal mining sector and power generation sector. In addition, coal mining sector shall only have 10%-20% of exposure under spot trading at the maximum, in order to avoid price volatility. (NDRC)

February 2022: NEA: no more support in principle on building new coal power projects for the sole purpose of power generation

On February 24, 2022, NEA issued the answers to the Proposal on the high-quality development of the coal power industry under the goal of carbon neutrality from the Chinese People's Political Consultative Conference representative. It clearly indicates that China will further strictly control coal power projects during the 14th FYP period, and in principle will no longer build new coal power projects for the sole purpose of power generation. Coal power projects are positioned as either peak-shaver to balance renewable output, or as guaranteed generation when facing power supply shortage. (NEA)

February 2022: NDRC and related authorities issued implementation guidelines on industrial energy conservation and carbon reduction

On February 11, 2022, NDRC, the Ministry of Industry and Information Technology (MIIT), the Ministry of Ecology and Environment (MEE), and NEA co-issued the Implementation Guidelines for Energy Conservation, Carbon Reduction, and Transformation and Upgrading in Key Areas of High Energy-Consuming Industries 2022 (The Guidelines). The Guidelines point out that it is needed to accelerate the elimination of backward technology and production units which do not meet the requirements of green and low-carbon development. In the Guidelines, the share of overall capacity above the energy efficiency benchmark level in 17 key industries by 2025 is regulated, including iron and steel, cement, and coal chemical. With respect to iron and steel, it is required that the share of overall capacity should reach 30% in both ironmaking and steelmaking processes. With respect to cement manufacturing, it is required that the share of overall clinker capacity should reach 30%. With respect to coal chemicals, it is required that the share of overall capacity should reach 30%, 50%, 30% in coal-to-methanol, coal-to-olefin, and coal-to- ethylene glycol industries respectively. (NDRC)

January 2022: NDRC and NEA issued guiding opinions on low-carbon transformation of energy development

On January 30, 2022, NDRC and NEA issued the Opinions on Improving Institutional Mechanisms and Policy Measures for Green and Low-Carbon Transformation (the Opinions). The Opinions set a goal by 2030 of establishing a complete institutional mechanism and policy system for low-carbon energy development, and the development of an energy supply-demand framework in which non-fossil energy not only basically meets the increase in energy demand, but also substitutes fossil energy stock at scale, as well as comprehensively enhancing energy security resilience. At the same time, it is important to establish such a comprehensive system during the 14th FYP period, which should include multiple dimensions including policy, standard, market, and supervision. (NDRC)

December 2021: The 2022 Annual Energy Working Conference was convened in Beijing

On December 24, 2021, the 2022 Annual Energy Working Conference was convened by NEA to summarize energy development in 2021 and plan major work streams for 2022. According to the keynote speech delivered by NEA administrator Zhang Jianhua, one of the priorities is to strive for ensuring energy security, continue to position coal as the “ballast stone” of the energy system, effectively play the basic regulatory role of coal power, further upgrade electricity safety and supply capacity, further expand efforts on upstream oil and gas exploration, continuously improve energy supply, transport, storage and sale system, ensure residential heating supply in north China in winter, and strengthen the prediction and early warning mechanism of energy safety operations. (NEA)

November 2021: NEA and MOST jointly released the 14th FYP on Energy Science and Technology Innovations

On November 29, 2021, NEA and the Ministry of Science and Technology (MOST) jointly issued the 14th FYP on Energy Science and Technology Innovations. The plan focuses on the realization of energy technology self-reliance and self-improvement, and relies on improving the energy technology innovation system, focusing on strengthening the weakest links of energy technology equipment, and enlarging cutting-edge energy technology through new application and business model innovation of emerging and disruptive technology, supporting and enhancing the continuous and stable supply of energy and risk management and control capabilities, and lead the construction of a clean, low-carbon, safe and efficient energy system. (State Council of China, Teller Report)

November 2021: The People's Bank of China (PBC) launched a special relending facility on clean use of coal

On November 18, 2021, following the State Council's requirement, PBC, China's central bank, launched special relending facility at the size of RMB 200bn (~$31bn) to target on finance for clean and high performance process along the coal production and consumption value chain, including green and smart exploitation, clean and efficient processing, coal-fired power retrofits, clean heating for both industrial and residential sectors, and the use of coalbed gas. The facility provides commercial banks and final borrowers with low cost of capital and flexible terms on project finance and/or working capital finance. (State Council of China)

Key Developments: International Perspective

April 2022 China's MEE and California extended climate change collaboration

On April 19, 2022, China's MEE and California renewed a Memorandum of Understanding (MOU) that advances ongoing initiatives to protect the environment, reduce carbon emissions and air pollution, and promote clean energy development. The MOU, renewing a prior version signed in 2018 and effective for four years, outlines continued exchanges and collaboration between the two sides on the implementation of emissions trading systems, expanding markets for clean transportation, and reducing air pollution and short-lived climate pollutants. Meanwhile, it includes new focuses on strategies for achieving carbon neutrality, applying nature-based solutions to combating climate change, and promoting climate-resilient infrastructure investment and green finance. As part of the agreement, China and California will share experiences on policies and practices and organize exchange activities such as annual meetings and trainings. (China Daily)

This is very encouraging. It sent very strong a positive signal indicating that the window of US-China climate collaboration remains open and through which constructive dialogues on climate can be channeled, despite the challenging geopolitical environment.

April 2022 The latest IPCC climate report calls for drastic reduction of coal-fired power generation in the coming decade

In early April 2022, the Intergovernmental Panel on Climate Change (IPCC), the scientific group assembled by the United Nations to monitor and assess all global science related to climate change, released a major climate report entitled Climate Change 2022: Mitigation of Climate Change. The latest IPCC report shows greenhouse gas emissions continue to rise, and current plans to address climate change are not ambitious enough to limit warming to 1.5°C above pre-industrial levels—a threshold scientists believe is necessary to avoid even more catastrophic impacts. To achieve the 1.5°C goal of the Paris Agreement, the IPCC concludes that global coal power needs to decline by 76% by 2030. In addition, limiting warming to 2°C or below alone would "require cancellation of new coal power projects and accelerated retirement of existing coal plants". (Nature, IPCC)

Amid a worldwide backlash against clean energy transition especially coal phase-out agenda, the latest IPCC climate report is a timely reminder to decision makers worldwide that short-term challenge caused by rising energy security anxiety should not suppress concerted efforts required to achieve longer-term climate targets.

March 2022 EU-China energy dialogue focuses on green policies after coronaviru

On March 31, 2022, NEA administrator Zhang Jianhua and EU energy commissioner Kadri Simson convened the tenth China-Europe Dialogue on Energy. The two parties had an in-depth exchange on energy security, global energy transition, power market, energy reform, international energy cooperation and other issues of mutual interest. In addition, progress reports on China-Europe Energy Technology and Innovation Cooperation Platform, and China-Europe Energy Cooperation Platform were presented during the dialogue, both sides also reach agreement on focus and direction of next step cooperation. (NEA, New Europe)

Amid the geopolitical conflict in Europe, and prolonged ongoing COVID-19 pandemic, the convening of this timely dialogue indicates that prospects of EU-China collaboration on clean energy transition are still rather promising in terms of moving each other's green development agenda forward.

February 2022 – ongoing | Escalation of Russia-Ukraine conflicts and its profound impacts on global energy market including international coal trade

Following a major Russian military build-up around Ukraine's borders in 2021 and early 2022, Russia officially recognized the two self-proclaimed separatist states in the Donbas region of Ukraine, and openly sent troops into the territories on February 21, 2022. Three days later, Russia launched a multidirectional special military operation to change the regime and demilitarize Ukraine. Given Russia's status as the world's largest oil and gas exporter and the third largest coal exporter, and the decisive sanctions imposed by the West on Russia thereafter, Russia not only became the most sanctioned country in the world but also sent a shocking wave of energy security anxiety across the globe especially in Europe. On March 8, the United States banned imports of Russian Oil, LNG and coal. On April 6, the UK announced to end all imports of Russian coal and oil by end of 2022. In the EU's fifth restrictive packages against Russia on April 8, The Council of Europe decided to impose an import ban on all forms of Russian coal, amounting to around €8 billion loss of revenue per year for Russia. Meanwhile, Japan also announced that it would ban all coal imports from Russia. (White House, UK Government, European Commission, Reuters)

Escalation of Russia-Ukraine conflicts has resulted in rising energy security anxiety across the globe. How the world including China may appropriately balance its concerns of national energy security to safeguard economic growth and livelihoods and the longer-term strategic climate goals will be a short to mid-term struggle for many countries.

January 2022 | Indonesia bans coal exports to head off blackouts amid a difficult transition towards renewables

In early January 2022, Indonesia, the world's largest coal exporter, announced that it was banning coal exports for the month of January, after supplies at domestic power plants fell to critically low levels, raising the risk of widespread blackouts. This is the fifth time in the last 15 years that Indonesia has had to institute a coal export ban due to domestic shortfalls. The announcement immediately caused a global spike in coal prices and left China, the world's largest coal importer, in a temporary lurch. Though the Indonesian government quickly resumed coal exports in response to requests by several importing countries, the move speaks to the political and economic importance of coal especially in some Asian economies, and the difficulty Indonesia will have in organizing a transition to renewable energy. (The Diplomat, Maritime Intelligence)

As the largest coal exporter in the world, Indonesia's unexpected bans of coal exports apparently undermines the country's image as a reliable coal supplier. This episode also indicates to major coal consumers that heavy reliance on coal compromises a country's energy security and phasing down/out coal will eventually bring, both environmentally and economically, sustainable energy supply.

December 2021 | The new Czech government aims to end coal use by 2033

The new Czech government aims to phase out coal in energy production by 2033 while increasing the country's reliance on nuclear and renewable sources, its policy program published on the last day of 2021 said. Coal-fired power plants currently generate almost 50% of total Czech electricity output. The previous government hadn't approved any target for stopping coal use, but its advisory body recommended 2038, a target year that environmental groups said wasn't ambitious enough. (The Associated Press)

Though Czech is long considered as a laggard of coal transition in Europe, the country eventually eyes to end coal use by 2033, which sends a clear signal that coal phase-out is not only an indispensable component of clean energy transition but also the prerequisite of achieving net-zero goal.

December 2022 | U.S. President Joe Biden's climate agenda suffered a massive setback after a democrat senator pulled his support from Democrats' spending bill

After senator Joe Manchin announced his opposition to President Joe Biden's Build Back Better Legislation at Fox News on December 19, 2021, Democrats' spending bill soon collapsed. As an overwhelming majority of Biden's proposed climate change investments were in the $1.75 trillion bill, Manchin's opposition s translated into the demise of a $555 billion package of tax credits, grants and other policies aimed at lowering greenhouse gas emissions that would rank as the largest clean-energy investment in U.S. history. This makes it nearly impossible for the U.S. to meet its emissions-cutting pledges under the Paris Agreement. (NBC News, White House)

Given Biden administration's slow progress to move domestic climate agenda forward, it becomes even more imperative for the United States to improve its fragile international climate cooperation with other major economies.

Progresses of EFC's Coal Transition Task Force

Progress on the Master Plan

With regard to the Master plan, the conclusion of the final report is expected in July 2022, with an article summarizing key findings, as well as a launch event. All the aforementioned three outputs are expected to be promoted through strategic communication, aiming to nurture constructive policy discussions among key stakeholders and also inspire broader public engagement. In parallel, policy briefs on the necessity, solutions and feasibility of coal phase-down, as well as specific recommendations will be submitted to relevant policymakers as appropriate.

In terms of the Sectoral Action Plans, the scattered coal use sectoral Action Plan is expected to be launched in May 2022. Meanwhile, the power sectoral Action Plan is under preparation and will focus on the coal power phase-down as well as the new electric power system ramp-up by 2030.

Deep dive in Zhejiang

To maintain the momentum built by the first-phase project of coal transition master plan in Zhejiang, EFC initiated the second phase to further implement the coal reduction strategy and related policy recommendations in a selected pilot of Jiaxing City in Zhejiang Province in January 2022. Meanwhile, EFC also initiated a new study focusing on the cooperation between Zhejiang and western provinces in developing renewable energy in support of China's overarching dual carbon goals.

To date, the existing efforts include background information collection and on-the-ground field research in Jiaxing, as well as preliminary analysis on transition cost. Next steps include, building a technology and policy database for coal phase-down, selecting a development park to pilot innovative coal reduction mechanism, compiling a handbook for experience sharing, and providing policy guidance to key stakeholders. In parallel, surveys on renewable energy, regional power grid development and power infrastructure installation in western provinces have been carried out to feed into the development of a plan for the selection of appropriate provinces to cooperate with Zhejiang Province for inter-provincial electricity trade, as well as to make recommendations for large-scale renewable energy power trade with west China.

Deep dive in Inner Mongolia

EFC has supported Inner Mongolia to develop a local master plan, with a focus on the socio-economic aspect of the clean energy transition. The project includes three topics: analysis of overall production and demand plan of China's coal value chain during the 14th FYP period, research on just coal transition in Inner Mongolia during the 14th FYP, and the development of models of green investment and financing in support of coal sector transformation.

In addition, EFC has already established office-wide in-depth cooperation on key issues related to coal transition with Inner Mongolia, including but not necessarily limited to mechanism and case study on flexibility retrofit of coal power plants, comparative study on coal consumption control in Inner Mongolia, as well as training and capacity building of local grassroot organizations to strengthen their knowledge and capacity, while catalyzing on-the-ground activities and providing local solutions and policy recommendations.

Low carbon transition pathway of coal power in China

Building on the existing efforts of cost analysis and risk assessment of coal-fired power plants in China, EFC continues to support the low carbon transition pathway of coal power in China, with another deep dive case study in Inner Mongolia.

The preliminary research results lay down a key supporting foundation for the ongoing project, such as coal power and renewable energy unit costs, carbon emission parameters, etc. In the coming months, the project is scheduled to formulate a feasible phase-out pathway for coal power at both national and regional level that features a feasibility analysis of replacing coal power with renewable energy. Meanwhile, the results are expected to provide theoretical framework in support of relevant government departments to formulate scientific and sound policies on coal power transition, and help policymaking avoid new investment on coal as well as enabling renewables.

Green hydrogen in coal chemical industry

In December 2021, EFC initiated the project of Technology and Economic Evaluation and Feasibility Analysis of Future Investment on Green Hydrogen in Coal Chemical Industry.

Preliminary findings of the ongoing study include but not necessarily limited to: 1) In Baofeng's two pilots of green hydrogen in coal chemical, the projects are considered to possess certain economic competitiveness; in Ningxia pilot, coal-to-olefin is estimated to reach cost parity with oil-to-olefin when the oil price is $46/barrel; and in Inner Mongolia pilot, cost parity is achievable when the oil price is as low as $36/barrel. 2) Compared with the application in fuel cell, the application of green hydrogen in coal chemical industry seems to be more promising as the high cost of hydrogen storage and transportation is a bottleneck that will take significant time and resources to overcome. 3) Considering the CAPEX, grid electricity price and carbon pricing, the proportion of grid electricity used for hydrogen production is expected to decline over time.

Research on Pathway of Carbon Neutrality in the Chinese Cement Industry

In March 2022, EFC initiated the Research on Pathway of Carbon Neutrality, CCUS and Co-processing pilot in the Chinese Cement Industry.

The next steps will include, but not be necessarily limited

to the following tasks: 1) research on carbon neutral pathway and key technology of the cement industry; 2) CCUS technology evaluation and policy recommendations for further development; 3) evaluation of the role of cement kilns in promoting the integration of production and city to achieve energy saving and carbon reduction, with case analysis and pilot demonstration programs.

Pathway and policy for clean heating in northern China

Funded by EFC, this study aims to propose the development pathway, goal and policy recommendation of low-carbon clean heating suitable for China's national circumstances in the short and the long term.

In March 2022, the project was successfully finalized, and solid policy recommendations were submitted accordingly. For the 14th FYP period, recommendations include building an overarching clean heating plan in northern China, researching on collection, conversion, storage and long-distance transportation of waste heat, and carrying out demonstration projects in one to two typical cities. Consequently, In 2035, the heating area covered by waste heat and alternative heating technologies is expected to reach 18.3 billion square meters and 2.2 billion square meters respectively, and carbon emissions related to heating are projected to decline by 70% compared with the current level. In 2050, the all of north China will be capable of achieving carbon neutrality with zero carbon fuel substitution.

Finally, EFC plans to organize a roundtable to further discuss this study and relevant policy recommendations with key stakeholders, aiming to enlarge policy impacts of this study.

Diversified investment and financing channels for clean heating

EFC has supported the Chinese Academy of Environmental Planning (CAEP) to conduct research on incentive policies and practical application of scattered coal phase-out. The existing efforts include investigation of status quo, detailed analysis such as clean heating affordability at individual, corporate and city levels, and policy research on fiscal/tax instruments and green finance. For the next steps, CAEP will conduct additional case studies, as well as submit a policy recommendation and publish an academic paper on clean heating promotion in China.

Focusing on the integrated "4-E" nexus of Economy-Energy-Environment-Equity, with office-wide collaborative efforts, EFC has made significant progress in moving the agenda of the Coal Transition Task Force forward. In 2022, building upon existing efforts, the work plan of the Task Force will include, but not necessarily be limited to the following main components:

- Launch the national master plan, with an article summarizing key findings, as well as the launch event.
- Continue to support sub-national action plans and coordinate with EFC's subnational strategy.
- Finalize the industry sectoral Action Plans, as well as the carbon neutrality pathways in areas of clean heating and the cement industry.
- In the power sector, take advantage of the window of opportunities related to the concept of the New Type of Power System and further supporting relevant research and exchanges.
- In the industry sector, support one to two on-the-ground pilots of zero-coal/zero-carbon industrial parks locally.
- Drive coal-related industries structure optimization in Greater Beijing region (Beijing, Tianjin, Hebei, Shandong, Henan) and Fenwei-plain region (Shanxi and Shaanxi) according to a health and air quality-oriented strategy.
- Deep dive in Shanxi and Inner Mongolia for research and pilot related to just transition.
- Support research on green finance and transition finance, including transition finance taxonomy, transition risk analysis, and more.
- Carry out training and capacity building to local grassroot organizations, not only via workshops and salons, but also by research projects collaboration to strengthen local know-how and capacity.
- Curate constructive dialogues on the solutions of coal transition during the 14th FYP period and inspire broad public engagement.
- Complete the development of the coal big data platform.
- Organize a series of China-EU/China-US/China-South dialogues on coal transition.
- Release Coal Transition Quarterly and Coal Information Updates.
- Establish series of Coal Transition Roundtables.

Highlights of Knowledge from the Field

UMD & UC Berkeley

A Decade of Action: A Strategic Approach to Coal Phase-down for China (UC Berkeley)

In March 2022, the Center for Global Sustainability at the University of Maryland, together with the California-China Climate Institute at UC Berkeley, launched a report entitled A Decade of Action: A Strategic Approach to Coal Phase-down for China. The report indicates China can feasibly phase-down coal power by retiring a small set of poorly performing, old, small, redundant, or otherwise undesirable plants (low-hanging fruit plants). According to the analysis, a total of 203 GW coal power capacity (19.4% of existing capacity) can be targeted for retirements, and with the additional cancellation of new projects at early development stages, national coal power capacity in China would decrease even further to 981 GW by 2030. This power transformation can both support China's carbon neutrality target and the global 1.5˚C goal. The report also makes policy recommendations at both national and regional levels. First, to identify an early retirement schedule and strategy, conducting a plant-level in-depth analysis is important. In addition, central and local governments should fund investments on renewable energy, grid, storage and transmission, and replace any lost tax revenues. Third, it is necessary for governments and communities to provide dedicated fiscal and capacity-building support such as job training for impacted groups.

EFC

What Are the Impacts of the Russo-Ukrainian Crisis on Global Low Carbon Energy Transition? (Caixin)

The drastic escalation of the ongoing Russo-Ukrainian Crisis starting from February 2022 has deepened energy security anxiety across the globe. As a result, many countries started to reexamine potential risks related to their over-reliance on fossil fuel, the international community especially the EU countries is determined to double down efforts to achieve energy independence. While the above situation is a window of opportunity, but also possesses significant challenges. In this special analysis published Caixin, one of China's most influential business publications, EF China analyzes the geopolitical crisis' impacts on global energy landscape, presents the emergency responses of major economies, evaluates opportunities and risks associated with low carbon energy transition in general and renewable development in particular, and aims to illustrative policy implications for improving China's low carbon development and ensuring national energy security.

Ember

Coal Power Grew Strongly YOY in 2021 (Ember)

The third annual Global Electricity Review published by Ember, a climate think tank, estimates global electricity demand surged by 5.4% YOY, the fastest growth rate since 2010, outpacing the growth in clean energy capacity. It is worthwhile to note that coal power generation increased by 9% YOY in 2021, an all-time high and two per cent higher than the previous record set in 2018. The preliminary data reveals that coal power generation rose in almost all top 10 coal power economies except for South Africa, including China (+9% YOY), India (+11% YOY), US (11%), Japan (+3.4%) and Germany (an astonishing +24% YOY).

IEA

Coal 2021: Analysis and Forecast to 2024 (IEA)

Coal 2021 is the IEA's flagship forecast of coal demand, supply and trade, based on detailed analysis of the most recent data in 2019 and 2020 at country and sectoral level, broken down by coal grade. Coal 2021 places a special focus on China, whose dominance of coal markets—it is the largest consumer, producer and importer—has no parallel with any other country or any other fuel. India, the second-largest producer, consumer and importer, also receives special attention. According to the report, rapid economic recovery is driving global coal power generation to a record in 2021 and overall coal demand to a potential all-time high as soon as 2022, underlining urgent need for policy action.

CAEP & NRDC

Pathway for Capping Coal Consumption in Major Coal Consuming Sectors to Achieve China's Carbon Peaking and Neutrality Goals (NRDC China)

In December 2021, Chinese Academy of Environmental Planning (CAEP) and Natural Resources Defense Council (NRDC) China published a report entitled the Pathway for Capping Coal Consumption in Major Coal Consuming Sectors to Achieve China's Carbon Peaking and Neutrality Goals. Four major coal consuming sectors in China are selected: power, steel, cement, and coal chemical sectors. The report concludes that if measures aimed at energy structure adjustment, industrial structure optimization, energy saving technology upgrades, and resource recycling are implemented, the four sectors will peak coal consumption at 2.49 billion tce around 2025, then enter a plateau period for five to six years. Meanwhile, corresponding CO2 emissions are projected to peak at 8.01 billion tons in 2025. The report also projects the peaking time of the four aforementioned sectors. On the national level, comprehensive measures including innovative and sector-specific policies, as well as national carbon trading scheme, green taxonomies and standards, and financing and taxation mechanisms are required for coal phase-down in key sectors, according to the analysis.

BEC, ADB and PKU

Policy Suggestions on Energy Development in the 14th FYP Period (PKU)

As the second year of 14th FYP period, 2022 is key for the development of policies in specific sectors and the implementation of relevant plans and policy guidance. The energy sector, needs to take the opportunity to realize high-quality development and transformation. As a collective effort, with the critical support and active participation of the National Energy Expert Committee for the 14th FYP and relevant ministries, the Beijing Energy Club (BEC), the Energy Department of Asian Development Bank (ADB), and the Institute of Energy at Peking University (PKU), during June to December 2020, jointly organized 15 online seminars on energy development in the 14th FYP period. More than 100 experts from domestic and international research institutions, governments, and experienced practitioners in the energy sector, participated in the seminar series and in-depth discussions on cutting-edge topics and pressing issues, and provided suggestions for the formulation of national energy plans. The insights—establishment of modern energy system, hydrogen development, energy and environment co-management, energy development in rural areas, digitalization, energy saving, role of international finance and cooperation, etc.—have been summarized in the report, and have broad impacts in the field.