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Agora Energiewende

Promoting regional coal just transitions in China, Europe and beyond

EUROPE-CHINA DIALOGUES ON A JUST COAL TRANSITION IN 2021

Zhou Yang
Kevin Jianjun Tu
Nga Ngo Thuy

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Dear reader,

Largely driven by the unexpectedly strong domestic demand for power and surging industrial activities, China's coal consumption increased substantially by 4.6 percent in 2021, marking the highest record of annual growth since 2012.

The pandemic and its aftermath, together with the current geopolitical conflicts in Europe, have added more uncertainties to the energy transition agendas of China and the world. In particular, this may mean that coal-producing regions are seen as a source of energy security, which would potentially lead to delays in their transformation process. Therefore, more concerted endeavors are called on to move the just transition agenda forward for coal regions and coal-sector employees.

In 2021, Agora Energiewende and Energy Foundation China (EFC) co-organized three dialogues on a just transition for China's coal-reliant regions. The series of dialogues discussed the challenges faced by coal-based corporations and by the communities affected by the coal transition in major coal-producing and coal-consuming regions, and proposed possible solutions that could help mitigate transition impacts in both China and Europe, along with wider policy relevant implications for other parts of the world.

This paper summarizes the key findings from the dialogues and identifies the differences and similarities of the challenges faced by the coal regions in China and Europe. The conclusions from this paper will support further in-depth research and bilateral conversations on promoting coal just transitions in China, Europe and beyond.

We hope you enjoy reading this report.

Jesse Scott
Director International Programme,
Agora Energiewende

Key findings

1. **Involving key stakeholders in coal phase-out discussions is essential for the success of just transition.** The transition out of coal involves a wide range of industries from upstream producers to downstream supply chains, together with their workers and investors. A policy package should cover all relevant key sectors and stakeholders of the coal value chain from the national to the regional level, aiming to distribute benefits and burdens as equally and positively as possible.

2. **Appropriate balance between top-down and bottom-up approaches is a prerequisite for diversifying the economies of coal regions.** Regional governments are best positioned to understand local resources, capacities, and preferences. Therefore, more decentralized decision making coupled with far-sighted guidance from the central/federal government is key to stimulating new economic diversification and momentum in coal regions.

3. **Financial and policy tools are key to facilitating profound transformation.** Compared with administrative orders or direct subsidies, market-oriented instruments have often proved to be more effective in delivering a just transition.

Table of content

Introduction

China consumes more than half of global coal and accounts for around 30% of the world's carbon dioxide emissions. Coal-fired power capacity in China alone represents more than half of the global total and has undergone sustained growth since the outbreak of the COVID-19 pandemic. Transitioning the emissions-intensive Chinese economy away from coal is crucial not only for fulfilling the country's 2060 carbon neutrality pledge but also for moving the global climate agenda forward.

The geographical imbalance of energy consumption and supply in China makes the energy transition a challenge in coal-producing provinces, especially those vulnerable to pandemic-induced slowdowns. To ensure that the benefits and burdens are distributed as equally as possible, it is desirable that coal regions undergo a just transition focusing on directly affected communities, companies, and workers.

The member states of the European Union (EU) and the United Kingdom (UK) have pledged to phase out coal power generation, and their coal-dependent regions have faced similar challenges to those of coal-reliant provinces in China. International best practices from the EU and the UK on a just coal transition would thus be beneficial for China as well. Agora Energiewende, a well-regarded Berlin-based energy think tank that has closely engaged with Germany's just-transition design and with other transition experts in Europe, is well positioned to bridge the coal just transition-related gap between Europe and China.

In 2021, Agora Energiewende and Energy Foundation China (EFC) co-organized three dialogues on a just transition for China's coal-reliant regions. The series of dialogues discussed the challenges faced by coal-based corporations and communities affected by the coal transition in coal-producing and coal-consuming regions and proposed possible solutions that could help eliminate negative impacts in China and Europe. Experts from both sides were invited to explore a just transition pathway from coal. This paper aims to examine the messages developed from those workshops and to frame the key issues about the transition in coal regions in Europe and China, identifying the challenges they face, and providing just-transition policy recommendations based on the dialogues.

1 The coal transition so far in selected countries

1.1 China

Between 2015 and 2020, China had reduced its share of coal consumption in its national energy consumption mix from 63.8% to 56.8%, exceeding the 13th Five Year Plan (FYP) target of 58%. However, the upward trajectory of the absolute amount of coal consumed has not changed: indeed, coal consumption is estimated to increase sharply by 4.6% in 2021, driven by a strong surge in domestic power and industrial demand in the first year of the post-COVID era.

In September 2020, during his UN General Assembly video address, Chinese President Xi Jinping committed China to peaking its national carbon emissions before 2030 and achieving carbon neutrality before 2060. At the Leaders' Summit on Climate in April 2021, President Xi stated that China will strictly control coal-fired power generation projects, and strictly limit the increase in coal consumption during the 14th FYP and phase it down over the 15th FYP. The statement indicates that China is aware of its growing coal consumption and its inconsistency with the country's climate neutrality pledge.

Background

For decades, coal has been the primary energy source powering China's rapidly growing economy. The period between 2000 and the early 2010s saw the planning and implementation of ambitious coal projects, which led to a massive expansion of production, transport and consumption — and subsequently, to oversupply and stranded assets along the coal value chain. The crisis of overcapacity began in 2014, when coal demand declined for the first time since 1998 and coal prices fell into a downward spiral, causing a significant decrease in coal production for three years in a row (2014–2016). Consequently, cutting excess capacity became one of the most prioritized energy and industry strategies in China's 13th FYP (2016–2020).

After China reached a record level of coal consumption in 2013, coal demand declined slightly for three years running before ticking up again in 2017. Currently, China's coal consumption is only 0.35% below its 2013 level, largely due to the significant surge in 2021. If the upward trend continues in 2022, China will soon exceed its 2013 peak level of national coal consumption.

The decision-making progress

China's energy development is guided by top-level policy blueprints released every half-decade known as five-year plans. China's top-down approach has been effective for policy design and target-setting, especially in the energy and heavy-industry sectors, where state-owned enterprises own a significant share of the market.

China first spoke of the importance of renewable energy for national development in the early 2000s. Not surprisingly, transitioning away from coal did not become a national policy priority until later.

In its 13th FYP, China set its first binding target for the share of coal consumption at 58% in the energy mix. Over the past five years, the share of coal consumption has declined by 7%, the largest such reduction since 1980. The two leading factors driving the progress have been rapid renewable development and mounting public pressure to control heavy urban air pollution.

In September 2020, Chinese President Xi announced that China would peak national carbon emissions before 2030 and achieve carbon neutrality before 2060. The pledge was later repeated in the 14th FYP (2021–2025), a sign that climate change is now pushing the country's energy-transition agenda.

1.2 Germany

Germany's commitment to climate neutrality by 2050 is now established by the Climate Change Act 2019. Following a historic ruling on 29 April 2021 by Germany's supreme constitutional court that the government's climate protection measures are insufficient to protect future generations, the German Federal Government presented an amended Climate Change Act 2021 which was subsequently passed by the federal parliament on 25 June 2021. The amendment mandates the country to be climate neutral by 2045 instead of 2050. In addition, Germany has a 2030 climate target to reduce greenhouse gas (GHG) emissions by at least 65% relative to 1990.

Since coal-fired power generation is responsible for around one-third of Germany's greenhouse gas emissions, climate targets cannot be achieved without an early phase-out of coal-fired power generation. In 2020, a coal phase-out law and a structural change law were adopted by the parliament, preparing a coal phase-out in the energy sector by 2038. To comply with the EU's intermediate target of GHG emissions by 55% relative to 1990 levels by 2030, however, a phase-out by 2030 would be necessary.

The new coalition government (2021–2024) speaks of phasing out coal 'ideally by 2030'.

Russia's war on Ukraine has posed new climate agenda and energy security challenges to Germany and other countries, especially in Europe. While European countries seek to phase out coal, they will need growing amounts of natural gas to meet the EU's intermediate climate target. The geopolitical tensions have raised energy security anxiety across Europe to an unprecedented level. The coal phase-out might be temporarily delayed for the sake of diversifying energy supply away from Russia, but in the medium term, EU member countries especially Germany are expected to double down on their decarbonization efforts. On 8 March of 2022, the EU Commission announced a plan of joint European action that would make Europe independent from Russian fossil fuels – starting with natural gas – well before 2030. In April 2022, the Council of Europe decided to ban all coal imports from Russia, starting from August 2022, as part of the bloc's fifth round of sanctions against Russia.

Background

Hard-coal consumption in Germany has gradually declined since 1960. It was first replaced by oil and gas imports, and later by an increase in renewable energy and more gas utilization. Domestic hard-coal production has not been able to compete with imported coal since 1964, but coal subsidies kept levels of production close to consumption until 1990. Once Germany started to reduce subsidies, the country's prolonged goodbye to coal started to accelerate, and culminated in 2018 when hard coal production finally ended. The history of lignite production, however, follows different trajectories in the eastern and western parts of Germany. While the development of western lignite production has been relatively flat over the past decades, in eastern Germany, it nearly doubled between the 1950s and 1990.

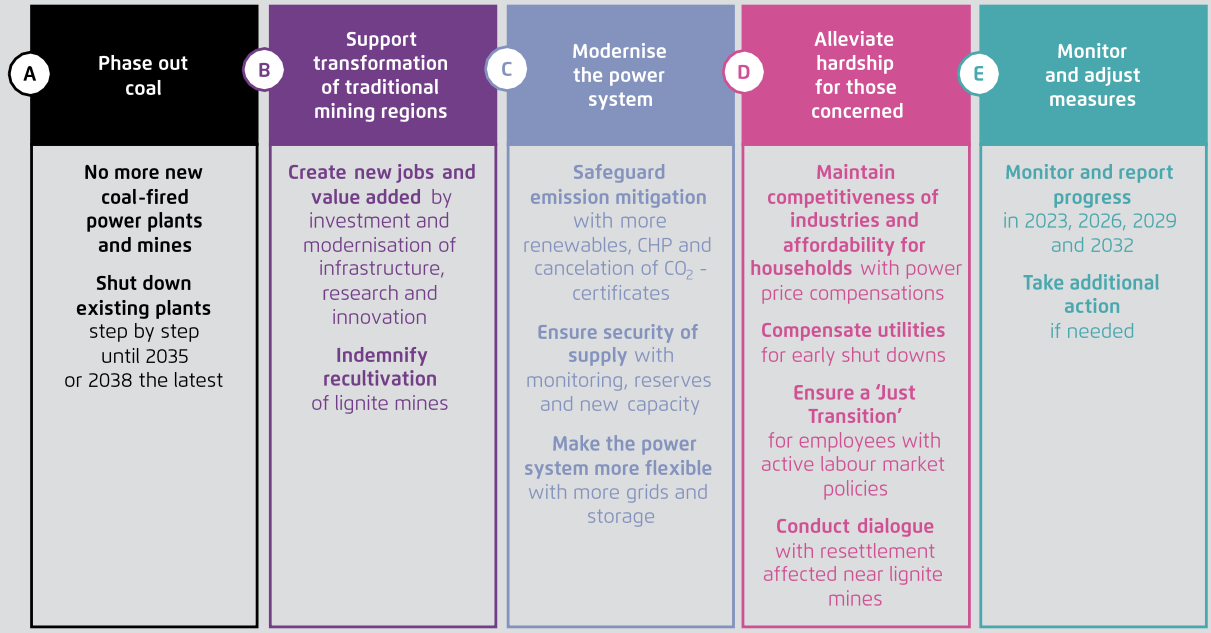
In 2020, coal accounted for 15.6% of Germany's total primary energy consumption, following oil and natural gas. The share of renewables was around 16.5%. Unfortunately, amid a worldwide energy shock, lignite production in Germany increased drastically by 17.6% year-over-year (YOY) in 2021, setting a temporary blow to the country's energy transition agenda.

The decision-making process

In 2015, the German government proposed the implementation of the 'Coal Commission'. The Climate Action Plan 2050, from 2016, set the process for creating the commission in motion, and the 2017–2021 coalition treaty confirmed it, leading to the formation of the Coal Commission in June 2018.

In January 2019, the Coal Commission presented a final report and recommended the implementation of measures across five areas:

Figure 1: Overview of the Coal Commission's recommendations



Agora Energiewende (2019)

The Coal Commission has called on a just transition for coal regions and coal-sector employees. The compromise guarantees that no worker will be left without options to transition to new work, and that coal-mining regions will have sufficient time and resources to adapt.

Before Russia's war on Ukraine, Germany resolved to phase out both nuclear energy (by 2022) and coal (ideally by 2030) and was fully committed to developing renewable energy. But the conflict has currently jeopardized the country's nuclear and coal phase-out plans due to Germany's dependence on Russian fossil fuels, natural gas in particular. Germany might temporarily abandon its objective of eliminating nuclear and coal to ensure domestic energy supply security in the short term. Changes in Germany's energy strategies are expected following the EU's energy independence plan. Additional scale-up of US LNG gas supplies will also be a key factor.

1.3 The United Kingdom

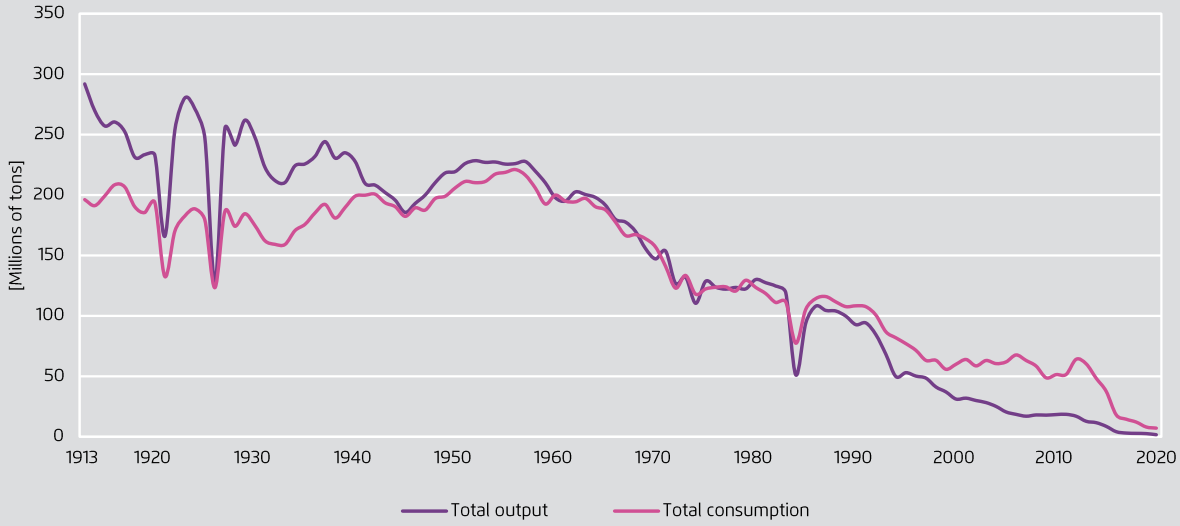
In 2020, primary energy consumption in the UK totaled around 6,895 PJ. Its primary energy sources are natural gas with a share of 37.9% and gasoline with a share of 34.7%. The share of renewable energy is around 18.3%, and nuclear energy accounts for 6.5%. Coal currently makes up only about 2.8% of energy consumption. In 2019, the government decided to target net-zero greenhouse gas emissions by 2050, and announced a coal phase-out by 2024 along with emission reduction targets.

Background

The role of coal has changed since 1984, when coal miners went on a one-year strike for better working conditions. In 1990 the UK liberalized the power market and introduced a variety of competitive

mechanisms. This encouraged different energy sources to enter the power generation market. During this time, a shift took place from domestic coal to domestic gas and imported coal after the cost of mining coal at home became more expensive than buying it abroad. Following the strikes, hard-coal production and employment continued to decline, while overall coal consumption fell more gradually. Though national coal production in 2021 fell to a record low of 1.1 Mt, down 37% compared with 2020, total coal demand across the UK in 2021 rose to 7.3 Mt, 2.9% higher than in 2020. The increase was driven by a 14% rise in coal-fired electricity generation from a record low in 2020 following Covid-19 restrictions and high renewable electricity generation that year. The rise was considered a temporary deviation from the downward trend.

Figure 2: Coal production and consumption in the UK



Department for Business, Energy & Industrial Strategy 2021

The decision-making process

An accelerated coal phase-out process, steered by the government, started much later. A major shift in the perception of climate change came in 2005 thanks to the 'Big Ask' campaign of the NGO Friends of the Earth. Starting in 2006, the government created several interdepartmental institutions including the Office for Climate Change, staffed by representatives from governmental departments with remits on GHG emissions (energy, business, transport, treasury, etc.), and the independent Committee on Climate Change which sets binding carbon budgets—which has become a model for independent climate councils now established in more than twenty countries worldwide. By bringing different interests together, these initiatives managed to build a consensus around integrated approaches that moved beyond traditional economic analysis to develop a climate security economic perspective to guide decision-making.

The UK set incentives for renewables and created a carbon price floor and emissions performance standards. The declining role of coal combined with widely available alternatives such as local natural gas, nuclear energy, and renewable energy have helped to maintain public support for climate change policies.

1.4 Poland

Poland is the only EU country that has not officially announced a commitment to the EU's climate neutrality target. Nevertheless, it is obliged to reach climate neutrality objectives as per the European Climate Law adopted in June 2021. Coal dominates the Polish power sector, where it is the largest source of GHG emissions and a major employer. Poland currently relies on coal for more than 70% of its electricity needs. In February 2021, Poland published Energy Policy by 2040 (PEP 2040), which announced the aim to reduce the share of coal-fired power generation in the range of 37.5–56% by 2030 and 11–28% by 2040.

Background

After World War II, the Polish government nationalized assets in the energy sector and developed modern coal-mining facilities as part of a massive coal-based energy system. The excessive dependence on coal and the inefficient use of fossil fuels led to high energy intensity and many environmental issues. The political and social reform in the 1990s brought about changes in Poland's energy economy. Although the fast-growing demand for coal and electricity declined with economic reform, the restructuring of the energy system was time-consuming and expensive and remains ongoing. To date, Poland has yet to propose a binding date for phasing out coal. Meanwhile, national coal production in Poland increased by 6.7% YOY in 2021, by comparison, national coal-fired power generation spiked by 15.7% YOY in the same year, indicating a bumpy road ahead for the coal phase-out.

The decision-making process

Poland's political and economic reform at the beginning of the 1990s created conditions for new policies in the energy sector. Its Energy Law, which complies with domestic and European principles of sustainable development, was passed by the Polish Parliament in 1997. In 2009, the Ministry of Economy passed the Energy Policy of Poland until 2030 (PEE 30), which set national targets for energy efficiency and renewable development. The PEP 2040 targets now include reducing GHG emissions by 30% relative to 1990 levels, cutting the share of coal in power generation to 56% by 2030 and building the first nuclear power plant with a capacity of 1–1.6 gigawatts by 2033.

The Polish government has been in talks with the EU regarding the implementation of the bloc's 'Fit for 55' package of 2030 measures, and, as the most coal-reliant member state, will be the largest beneficiary of the program's transition support investment package.

2 China and Europe at different stages of transition

There is no 'one-size-fits-all' solution for coal transitions. Identifying a specific country's current stage of economic and energy development is crucial for making practical and effective policy decisions. Although the EU has set an overall target of phasing out coal by 2030, the EU's policy package to facilitate the transition has different requirements and support mechanisms depending on a region's specific level of coal reliance.

2.1 Countries on different tracks to achieve carbon and climate neutrality

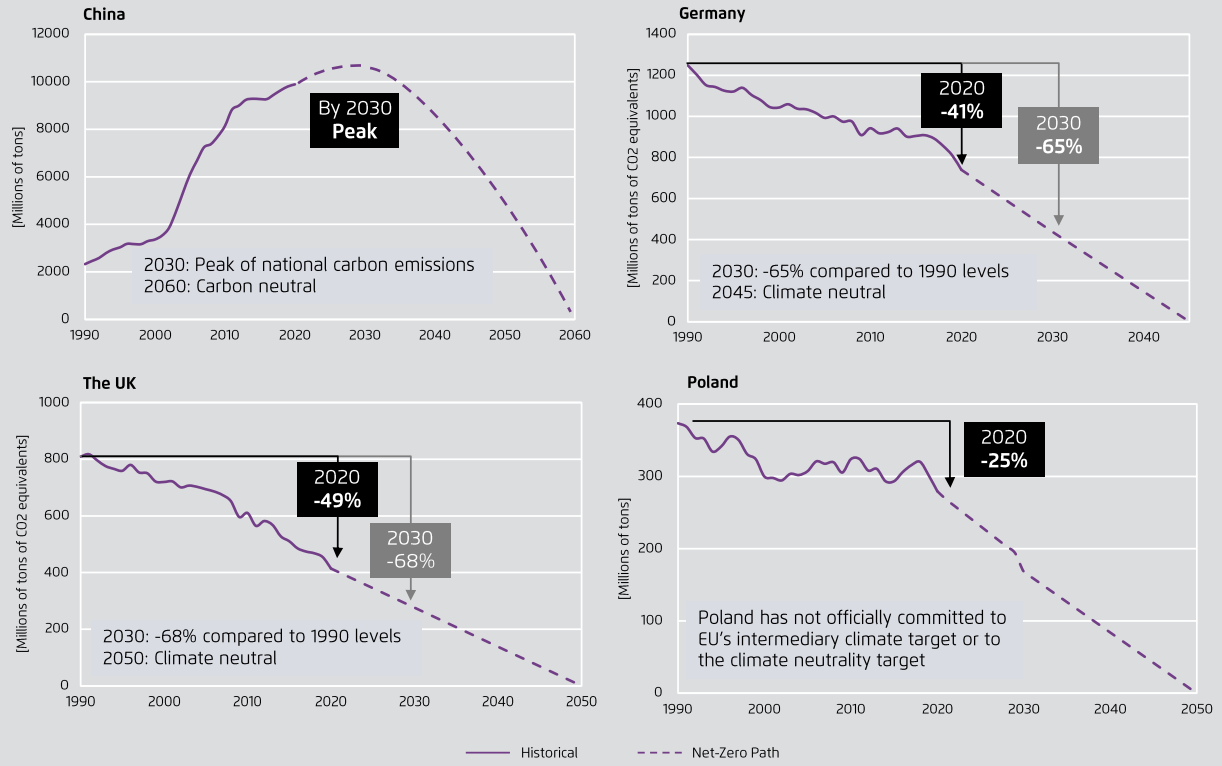
China's mid-to-long term climate targets reflect the country's unique status as a fast-growing 'hybrid superpower'[1] and the change of mentality in climate governance amid rising national confidence. China's mid-term target is to peak its carbon emissions by 2030, which is less ambitious than its 2060 neutrality pledge. Beyond 2030, a rising 'superpower mentality' among a younger generation of Chinese leaders is expected to bring the country's emissions on a faster downward trajectory. Indeed, China's post-2030 trajectory will have to be much steeper than the climate neutrality paths of any advanced economy. This unprecedented task will require China to reach peak emissions sooner rather than later.

The energy transformation started earlier in European countries than in China. The GHG emissions of Europe experienced a fast-growing period during the economic recovery after World War II. Europe's total emissions are now on a clear downward track, which has emboldened countries to make net-zero pledges. The EU and UK have pledged that they will achieve climate neutrality by 2050. As the largest economy in Europe, Germany has sped up its target date by five years. To align with the new deadline, the German government has also increased its 2030 GHG reduction. Germany's coal phase-out plans must be adjusted accordingly against the backdrop of rising energy security anxiety.

Not all European countries are actively accelerating their climate actions toward climate neutrality. Less wealthy countries in Eastern Europe with heavier reliance on coal, such as Poland, the Czech Republic, etc., face greater challenges to becoming climate neutral by 2050. The member states are currently in talks with the EU on receiving support from richer member states. Although Poland has upgraded its national energy plans and raised its climate ambition, Europe's civil society is pressing Poland to push harder for a transition that is compatible with a climate-neutral EU.

1 See China's Global Climate Boost, https://www.project-syndicate.org/commentary/china-carbon-neutrality-pledge-european-union-by-kevin-tu-2020-11

Figure 3: GHG emissions of selected countries



BP 2021 (China and Poland), Umweltbundesamt 2021 (Germany), Department for Business, Energy & Industrial Strategy 2021 (UK)

2.2 Different intermediate climate targets mean different priorities in a coal transition

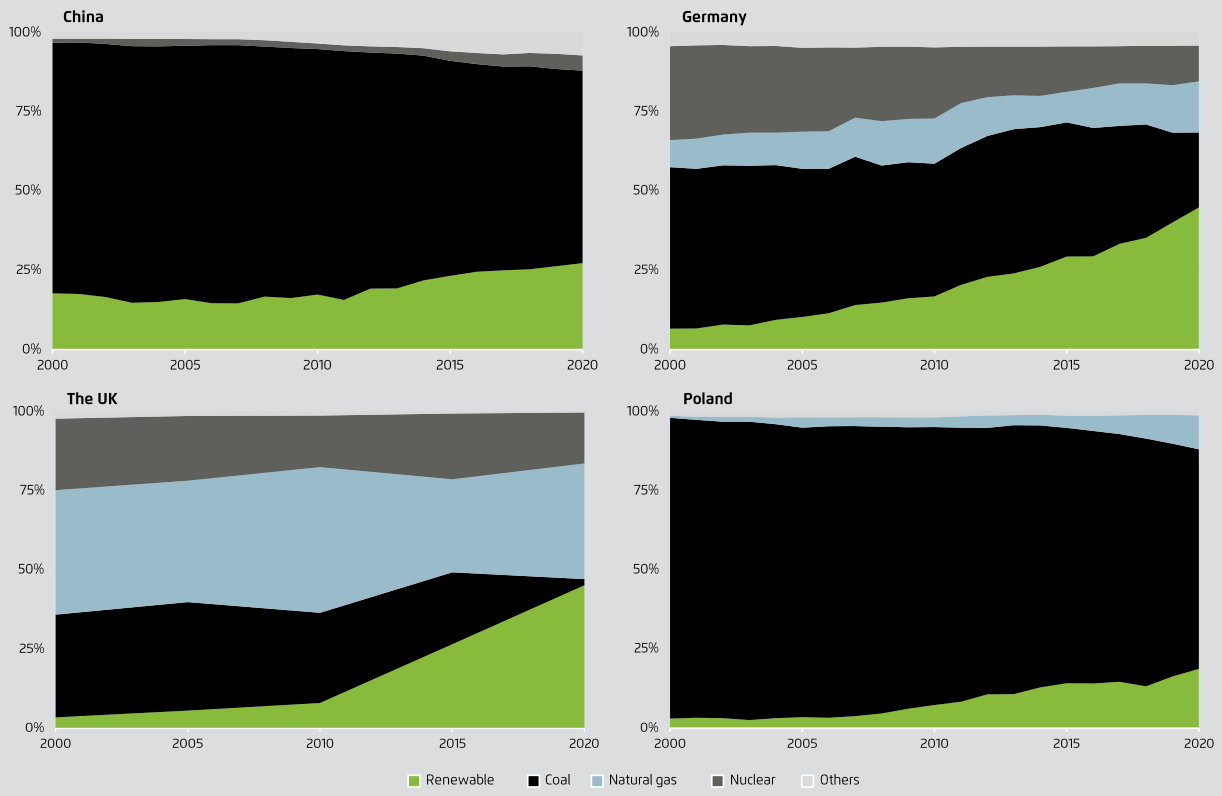
The mid-term neutrality efforts of both China and Europe focus on coal. The most challenging task for China is to put the brakes on its increasing fossil fuel consumption. While the share of coal in total energy consumption is declining, the absolute volume of coal consumed has increased for the fifth year in a row since 2017. In particular, China's coal consumption grew by 4.6% in 2021, marking the highest level of annual growth since rebounding in 2017.

Most European countries have largely decoupled their economic growth from energy consumption. Their fossil-fuel consumption, especially coal demand, has been steadily declining. However, the EU's 2030 target of at least a 55% reduction of GHG emissions relative to 1990 levels has created a more stringent task for all the member states. A complete coal phase-out in the EU power system by 2030 is an important enabler for achieving the new 2030 target. Nevertheless, against the backdrop of a worldwide energy shock last year, national coal demand in the UK increased by 2.3% YOY. Meanwhile, national coal production in major EU coal economies generally shows an upward instead of a downward trend in 2021.

After Germany's belated announcement, in late 2021, that it would join the 2030 coal phase-out, only five

EU member states – Bulgaria, the Czech Republic, Poland, Romania, and Slovenia – have yet to set a date for phasing out coal by 2030. According to Agora's recent report 'Phasing out Coal in the EU's Power System by 2030', a coal phase-out plan across the EU would require a policy package covering three major areas: replacing coal with renewables, ensuring security of supply, and a just transition. Poland, in particular, faces several challenges: coal's dominance in the country's energy mix (41.6%), high prices for electricity and heating, poor air and water quality, and a lack of technology industries.

Figure 4: Power generation by source



China Electricity Statistical Yearbook 2021 (China), AG Energiebilanzen 2020 (Germany), IEA (UK), Ember 2021 (Poland)

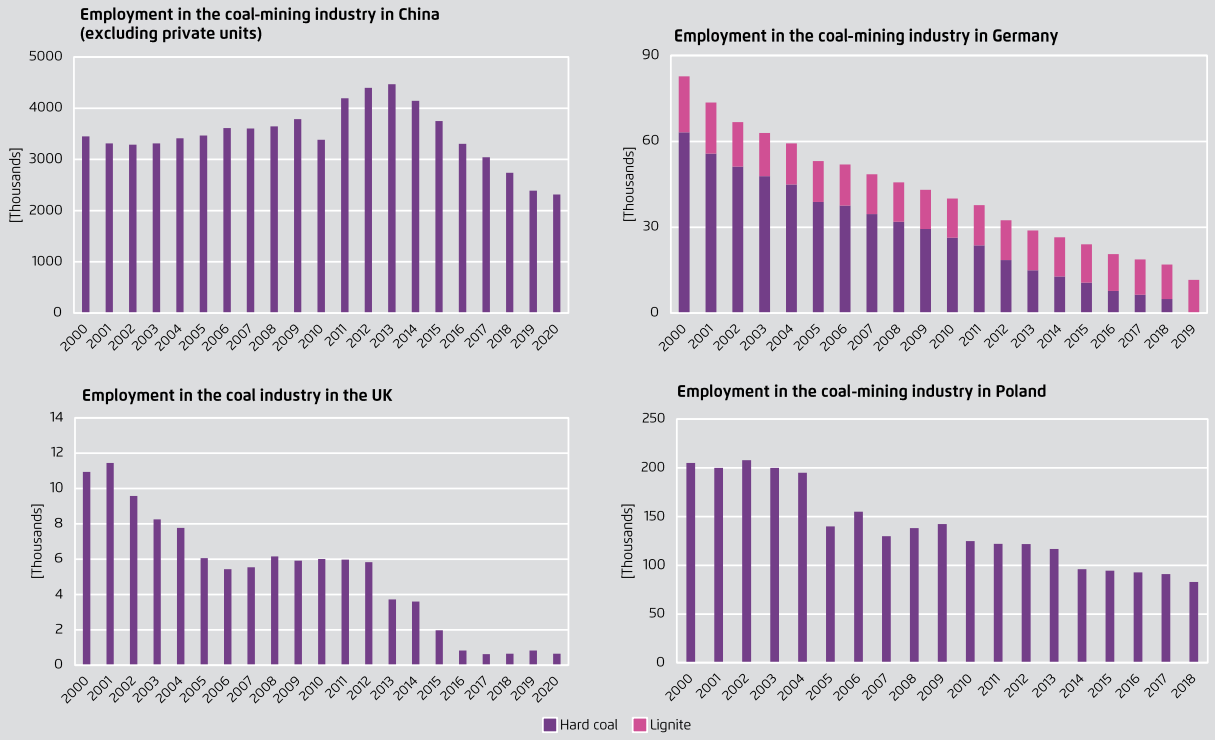
3 Common challenges faced by China and Europe

Although different countries have prioritized different tasks, China and Europe are coping with many similar challenges on their coal transition paths that merit further exchange and collaboration. Among all the challenges faced, ensuring a just transition away from coal could be the most important shared concern for both sides. The transition fund of the EU and the transition budgets of individual EU member states set aside considerable resources to help local communities meet the possible challenges of a coal transition.

3.1 Employees in coal-related industries

While considering the impacts of the transition, policymakers must prioritise communities and livelihoods. Employees in coal and its related industries are geographically concentrated around the areas where coal mines are located. The localized concentration of coal-related jobs creates a particular set of challenges that must be considered when implementing a transition in coal regions. This pressure is shared by coal regions in China and Europe alike.

Figure 5: Employment in the coal industry



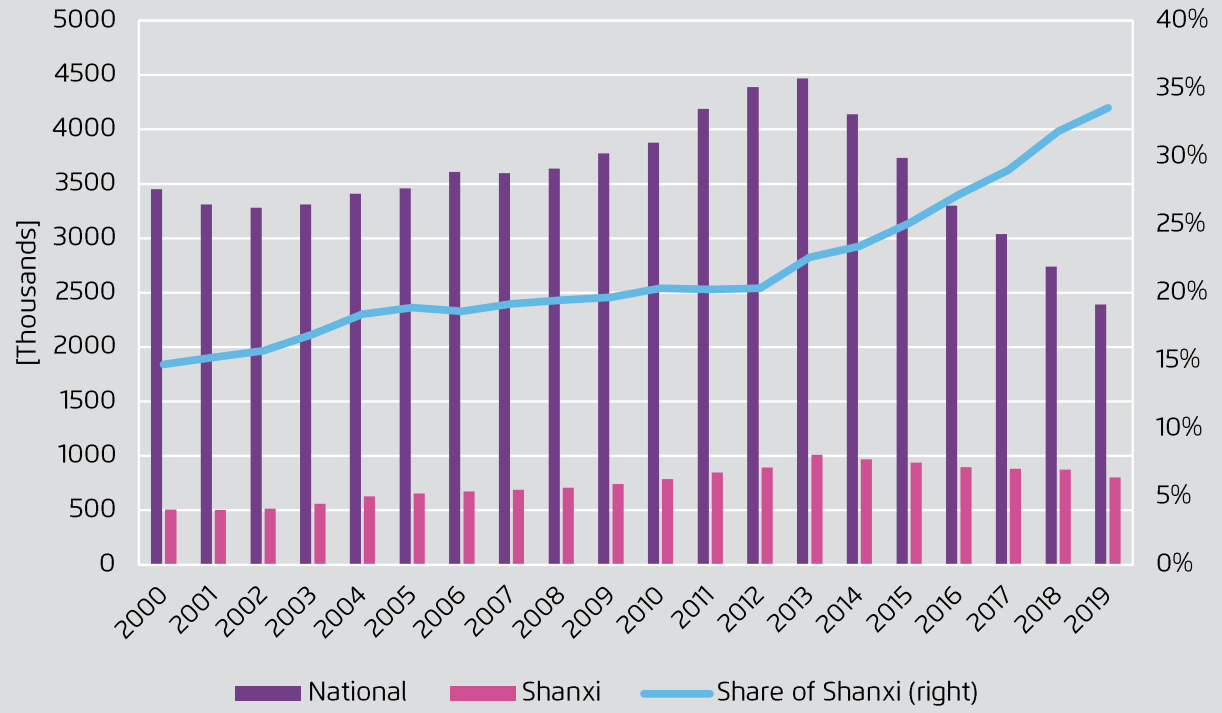
China Labour Statistical Yearbook 2020 (China), Statistik der Kohlenwirtschaft 2021 (Germany), Department for Business, Energy & Industrial Strategy 2021 (UK), Statista 2020 (Poland, 2000-2017), Euracoal (Poland 2018)

The positive news is that the number of people employed in the coal industries of both China and Europe is declining thanks to efficiency improvements and the decommissioning of obsolete capacities. Nevertheless, while the number of national coal jobs has fallen, coal employment is becoming more concentrated in coal-producing regions. For example, the share of coal industry workers in Shanxi (China's second-largest coal-producing province) has grown even faster over recent years due to the sharp drop in coal jobs in other parts of the country where excess capacity has been cut (see Figure 6).

Another challenge for both China and Europe is identifying accurate employment and workforce skillset statistics for evaluating the effects that the

transition would cause, especially for people who are indirectly employed by the coal sector. Because of the coal industry's long and complex value chain and the different methodologies used by economic studies, the available statistics for most countries cover only key industries such as coal mining and power sectors. We need more studies examining regional and age breakdowns, skill categories, and position levels in a wide range of industries that are directly and indirectly related to coal.

Figure 6: Employment in China's coal-mining industry



Presentation slides of Challenges Faced by Shanxi Province Regarding Coal-related Employment and Potential Solutions from the second Europe-China dialogue on Coal Just Transition.

3.2 Traditional coal-based energy companies

Traditional energy companies are key stakeholders in the coal transition. To maintain their competitiveness in the future market, large fossil-fuel companies are shifting to low-carbon portfolios. But fossil-fuel companies in both Europe and China have faced a variety of challenges in the process.

A particular challenge is mentality. China's energy market is dominated by large state-owned enterprises (SOEs), which are mostly based on coal and have been less responsive to the fast changes in the energy landscape than their counterparts in the private sector or elsewhere in the world. For China's coal-fired power plants, declining operating hours, rising fuel costs, and tightly regulated retail power prices have led to increasing financial difficulties. Those

challenges are more pronounced when it comes to coal-producing regions where energy-transition-related challenges have been further exacerbated by socio-economic issues and local capacity shortages.

In Europe, traditional energy companies have faced similar dilemmas. Europe's civil society is acutely aware of the climate crisis and has been a strong source of pressure on energy companies to modernise their business model. The liberalized energy market and emissions trading schemes in the EU and UK have also accelerated the business transformation of these companies. Many have started to shed their coal assets long ago, and by 2020 EU coal-fired power generation had declined by 63% relative to 1990 levels.[2] However, while energy giants are going greener, there is still a significant share of operational coal assets because some were only sold to other smaller operators rather than closed, and others have not yet been scheduled for decommissioning. The COVID-19 pandemic and Russia's war on Ukraine have slowed the business sector's ongoing transformation and will be seen to have extended the EU's reliance on fossil fuels in the short-term. According to the Net-Zero Commitments Initiative, only 9 out of the 21 main European power utilities have announced a coal phase-out plan before 2030 (as of January 2022).[3]

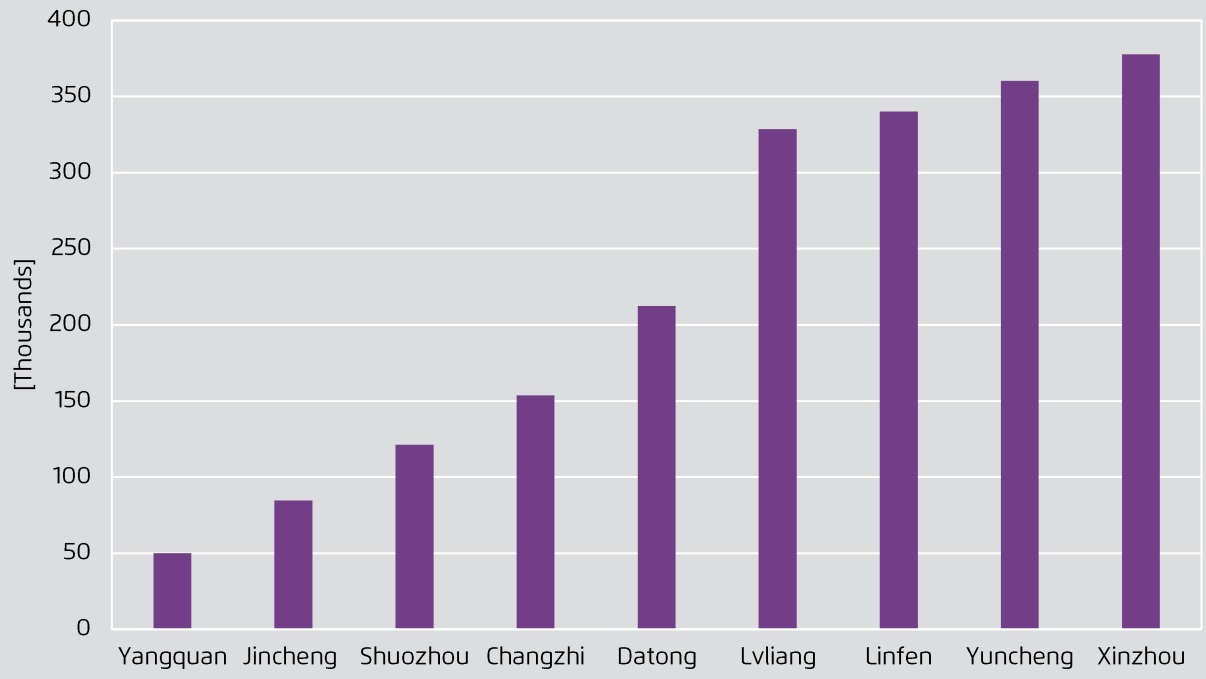
3.3 Coal-producing regions

When it comes to implementing the transition, the governments of coal-producing regions play a leading role. Regional governments need to address not only employment and coal assets, but also business survival and economic and social sustainability. Fear of losing the traditional economic driver is the major barrier to change for coal-producing regions. Some cities that relied on coal in the past century, especially those in north and northeast China, have been left with depleted mines, an ageing population, and a depressed economy.

2 See IEA data.

3 See Limited Utility: The European Energy Companies Failing on Net Zero Commitments: https://beyond-coal.eu/2022/01/25/limited-utility-the-european-energy-companies-failing-on-net-zero-commitments/

Figure 7: Population decreases across nine municipalities in Shanxi, 2010–2020



Presentation slides of Challenges Faced by Shanxi Province Regarding Coal-related Employment and Potential Solutions from the second Europe-China dialogue on Coal Just Transition.

Shanxi, whose population has been ageing for almost 20 years, has seen jobs dwindle over the past decade (see Figure 7). The workforce losses are largely due to weak economic growth. Compared with the coastal provinces in the southeast and even its surrounding regions, Shanxi is less attractive to new industries due to its lack of comparative advantages. More specifically, Shanxi lags behind other regions in terms of qualified workers and innovation capacity, digital and transportation infrastructure, public funds, etc. Traditional coal regions are in urgent need of a regulatory framework that improves their comparative advantages for economic restructuring. These wider economic goals are also important aspects of planning an energy transition.

Under Germany's ambitious climate targets, coal regions in Germany faced a similar situation. The average per capita GDP of Germany's three major coal (lignite mining) regions, namely Lusatia, Central German, and Rhenish coal districts, all remain below the national average. For example, Lusatia suffered from a massive loss of employees in the lignite industry, falling from 80,000 in 1990 to 7,000 in 2000.[4] The negative economic and social consequences worsened as the coal industry became the main target of climate efforts and its profits declined. Demographic losses led to a sharp increase in the average age of residents and a lack of working-age people. Realizing that this ran contrary to the energy transition goal and to local economic development goals in general,

4 https://www.agora-energiewende.de/en/publications/a-future-for-lusatia/

Lusatia and the federal government worked with key stakeholders involved to enact gradual structural change and enhance the region's attractiveness.

4 Potential solutions and lessons learned

The three dialogues Agora co-hosted with EFC discussed the above challenges and proposed some solutions based on relevant experiences and lessons in China and Europe.

4.1 Involving key stakeholders in discussions for a just coal transition

In China, ensuring employment has long been the top priority of national and local policies. Although the government has not developed any specific energy transition policies for employment, some employment-related policies guided by China's supply-side reform strategy are actually in line with the principles of a just transition. In 2016, the Chinese Ministry of Human Resources and Social Security implemented a training program for employees of enterprises with overcapacity issues. This program targets the coal and steel industries and workers in SOEs. However, experts at our workshops agreed that employment transitions for the coal sector need a more tailored approach that considers all the industries and stakeholders of the coal value chain, from the national to the regional level.

Germany has been good at involving various stakeholders in its coal phase-out debate. The Coal Commission consisted of 31 members, representing the vast majority of social and economic interests (the energy sector, lignite mining regions, industry, environmental associations, trade unions, the scientific community, and coalition parties). In its final report submitted to the federal government, the commission comprehensively addressed the concerns of all the parties. Its policy suggestions were accepted by the coal industries and regions that would suffer most from the phase-out plan.

Alongside the national-level framework, regional stakeholders play a key role in helping affected communities. Because regional governments are more familiar with their own economic and industrial circumstances, it would make more sense if they were responsible for designing their local employment transition plans. At the same time, regional employment data and detailed information are more readily available than nationwide statistics.

As Germany's lessons from the transition in Lusatia show, central planning alone risks failing to involve those directly affected, which is why regional structural change should be managed locally.

In Shanxi, civil society and grass-root research institutes have been working closely with local energy companies on building up employee capacity. Coshare, a Shanxi-based civil society organization, organized bottom-up training programs for more than 3,000 companies in 11 municipalities. Courses include carbon accounting, hazardous waste management, and corporate carbon-neutral transition strategies, aiming to help workers adapt to a future job market in an energy sector undergoing transformation.

Nevertheless, an attractive labour market cannot be built solely at the regional level. Joint efforts from national and regional governments, the international community, civil society, businesses, and academic institutions are needed to foster a thriving environment for those most affected by the transition. This requires the long-term planning of non-coal-based economic development to create opportunities for re-employment while coal-based industries phase down.

4.2 Economic diversification in coal regions

As discussed above, the traditional economies of coal regions in transition, whether in China or Europe, inevitably decline as coal-based economic activities fall off, unless there are new diverse economic activities to replace the coal sector. Developing new modernized economic drivers beyond coal, therefore, is crucial for a just coal transition.

In 2017, China's central government designated Shanxi as an energy reform hub and the provincial government launched an initiative to replace traditional economic drivers. This resolute show of political will has created a solid foundation for economic diversification in the region. The current challenge for Shanxi is to identify new non-coal sectors that come with strong, low-carbon growth potential.

Shandong, one of China's largest coal-consuming provinces, has had some success in identifying new economic sectors based on local resources. As the third largest provincial economy in China, Shandong has strong manufacturing capacities, including in chemicals, metallurgy, machinery, automobiles, and building materials. Shandong drew on those strong capacities becoming the first province in China to map out a development plan for the hydrogen economy. For now, Shandong's hydrogen is largely based on industrial byproducts, coal and natural gas, with applications mostly related to fuel cells. Over the long term, the sources of hydrogen are expected to gradually shift from fossil fuels to renewable energy and its applications will expand to the steel industry, heavy-duty freight and port transportation, power storage, etc. Shandong's bottom-up push for a hydrogen economy fits in well with its existing energy supply chain, especially with regard to manufacturing capacity. Shandong has positioned itself to be a pioneer in low-carbon manufacturing. For Shanxi, structural changes could draw on the region's traditional role as an energy producer but follow an innovative, decarbonized path.

Combining the efforts of different governmental levels is essential to take full advantage of all available resources for economic diversification. In Germany, the federal and regional governments, together with the EU commission, have worked closely to develop guiding principles for the transformation of mining regions. The basic principle is to allow the regional government to build its own plans based on existing resources, capacities, and preferences. The federal government's key role is to set targets and lay out a legal framework in support of the regional transition, and to provide substantial financial resources to induce additional diverse private investment and economic growth, as well as to fund the compensation of affected communities. In addition, the German federal government has directly supported the creation of up to 5,000 additional jobs by re-locating federal administration to the mining regions. This practice is already fairly common in China, especially when municipal governments develop new districts on the outskirts of existing urban centers. This could also be duplicated in central SOEs, especially those in the energy sector, when relocating their headquarters to support national and regional energy transitions. Similarly, the EU's role in regional transition is to assess the level of impact, create dialogue between member states and affected regions, provide funds for the hardest hit regions, and leverage private and public financing.

In building new sustainable business activities, European countries have also put great emphasis on expanding research capacity and developing modernized transport and technical infrastructure. These measures can be expensive and take years to bear fruit, but they possess great potential to make a region much more attractive to investors and more economically dynamic. Good infrastructure retains talent and local businesses, while local research institutions can put findings directly into local development, building strong partnerships with local businesses.

In China, national-level research institutions on the energy transition are clustered in Beijing; at the provincial level, research capacity is relatively weak, especially when it comes to independent institutions. As there are 34 universities in Shanxi, promoting and strengthening their engagement with the energy transition, along with the economic and social transformations that accompany it, will benefit the province's capacity to innovate.

4.3 Coal-based energy companies must move the corporate transition agenda forward

In leading European countries, coal power companies began to initiate changes long before politicians announced a legally binding roadmap for the energy transition. This is in contrast to China, where the top-down approach means that its energy SOEs typically wait for a political signal from the central government before they start to act. For large companies in the coal sector, a top-down approach is expected to be slower and therefore risk more stranded assets.

With Europe's broad social consensus regarding climate change, and looking at business opportunities in the clean energy sectors, most large European energy companies have already developed new investment and branding strategies focused on sustainability. E.On in Germany and Enel in Italy have led the way since the 2010s, becoming companies focused on green energy and digital energy. RWE, one of Germany's largest energy suppliers and operators of coal mines, shared its coal-exit roadmap as part of our dialogue series. RWE announced that it would shift its strategic focus to renewables. For now, more than 57% of its employees remain in the coal power business (in Germany) and the nuclear power business (in the Netherlands). After Germany passed the coal-exit regulation, RWE developed further detailed plans for phasing out lignite and hard coal. With the government's new ambition to phase out coal by 2030 – eight years sooner than previously planned – RWE and other German energy companies are expected to adjust their roadmaps accordingly.

The new business context together with media and society has put significant pressure on European companies to accelerate the pace of their actions. Coal companies in Germany and Poland are critiqued for not moving fast enough. As the most important stakeholders in the coal transition, German utility companies are now required to share their progress with the government: utilities that want to receive compensation for phasing out their coal plants must provide a plan on how to retain their employees in alternative industries such as renewables, hydrogen, grid infrastructure, etc.

China's 2060 climate neutrality pledge provides the country's coal-reliant SOEs with a clear direction going forward. The companies must share more responsibilities with the government and play a leading role in exploring a feasible path toward corporate neutrality.

4.4 Financial and policy tools key to facilitating change

Funding is needed not only for low-carbon and zero-carbon solutions, but also for helping carbon-intensive industries whose phase-out without a just transition will negatively impact society and the economy. The EU's Cohesion Funds contain three pillars for supporting the transition: the Just Transition Fund to alleviate hardship in the regions hit most by the transition and for assisting carbon-intensive industries undergoing transformation; InvestEU to increase private investment; and a public sector loan facility with the European Investment Bank to leverage public financing. Although the Just Transition Fund accounts for only 5% of the total budget of the Cohesion Funds, it supports regions that are most affected in EU member states. Countries that are heavily dependent on coal, such as Poland, Germa-

ny, and Romania, receive a much higher share of the fund. The fund mainly contributes to building a resilient future by reskilling employees from coal-related industries with the aim of diversifying the economies of coal regions.

In China, by comparison, various funds go into the coal regions. The main challenge at the regional level is to integrate transition funding with existing resources and to develop a coherent funding management mechanism to make full use of the resources and to leverage more investments. Experts at our workshop proposed developing a funding platform for coal-reliant regions to better manage their resources.

In China, multilateral banks also offer loans and grants to support the transition. The Asia Development Bank (ADB) dispensed $9 billion over the 2016–2020 period for China's economic, societal, and environmental development. Part of the funds went to the early decommissioning of coal assets and to alleviating negative impacts on people and communities. ADB's project evaluation and performance assessment schemes are a good starting point for building a provincial funding management mechanism.

A key lesson from Germany is worth noting: simply compensating mining regions for their economic losses was not enough; effective financial tools are also needed to make the best use of these funds. The Chinese government has promoted green financing as an important tool for the energy transition. So far, this has worked well, but experts caution that green financing alone is insufficient to support the transformation or phase out of traditional carbon-intensive industries and have recently pushed for 'transition financing'.[5] Innovative financial tools are urgently needed to facilitate decisive actions among key stakeholders.

Market-oriented policies have also proven successful in building non-coal economic drivers in coal-reliant regions. The UK, once the largest coal consuming economy in history, is having little trouble transitioning its economy away from coal today. This is mainly thanks to its Electricity Market Reform, which consists of four market-based instruments: contracts for difference,[6] a capacity mechanism, a carbon floor price, and an emissions performance standard. These instruments have enabled the development of the UK's thriving offshore wind industry.

During the 13th FYP period, some coal-producing and coal-consuming provinces in China had to adopt administrative measures to meet the energy and environmental targets imposed by the central government. While this type of manoeuvring could be effective over a short period, the results are unlikely to be long-lasting or to help to achieve structural transitions. Market-oriented policies, like the carbon emission trading system, could take longer to implement but can have a lasting effect provided they have a proper design and the right supporting mechanisms. Europe's experiences suggest that a balanced mix of government interventions and market mechanisms is crucial to moving the regional energy transition agenda forward.

5 'Transition financing' is a financing tool that supports the phase-out or transformation of carbon-intensive sectors. Unlike green financing, transition financing targets traditional industries and the main coal-consuming and -producing regions.

6 For more, see 'A 2-Stage Revolution', a presentation slide on the UK's transition from coal to electricity at the first Europe-China dialogue on Coal Just Transition.

5 Concluding remarks

A just transition for coal is a crucial topic in today's energy debates. Coal-reliant regions, which made impressive contributions to urbanization and industrialization in the past, will witness major social and economic changes along with the ongoing energy transition. Clarifying the roles to be played by national and regional authorities is an important prerequisite for good governance. The federal or central government's role is to monitor and coordinate the process, while state and provincial governments should have the authority and supporting resources to make more policy decisions locally.

The involvement and commitment of the public is crucial to the success of a just transition. Long-standing divisions over the burdens of a coal phase-out exist among coal companies, communities, and individuals. To avoid prolonging the conflicts, regional and local authorities, industries, businesses, civil society, and research institutions should all be involved in the discussions.

Funding availability is a key for facilitating the transformation. Sufficient funding sources and dedicated funding management mechanisms should be developed to support business innovation, build up local capacity, improve regional infrastructure, and provide adaptation aid, re-employment training, and early retirement compensation for the targeted communities.

Transformation does not happen overnight. A smooth and just transition toward a sustainable energy system is more than a matter of energy; it's an issue concerning social and economic development. Accordingly, politics and the economy have a profound influence on the just transition process. Besides the internal challenges discussed by the three dialogues, the global transition away from coal must also overcome a variety of external problems. The ongoing COVID-19 pandemic has slowed the pace of the energy transition. Economic recessions and disruptions in the global supply chain make fossil-fuel dependent countries more hesitant to get rid of cheap traditional energy sources. In 2021, coal power generation made up 15% of the EU's total electricity generation, only a modest drop of 3 percentage points from pre-pandemic (2019) levels.[7] China also experienced a significant uptick in coal consumption over the past year amid a worldwide consumption growth.

Finally, Russia's war on Ukraine has increased energy security concerns across the globe, especially in key energy consuming and importing economies. The geopolitical disputes have added various uncertainties to the fossil-fuel energy market while making the energy secure potential of clean energy more attractive. History indicates that the crisis could have a profound impact on the evolution of the energy sector. Against the backdrop of the pandemic-induced economic slowdown, major economies have made various net-zero pledges. How Russia's war on Ukraine will impact global climate ambitions and leading countries' net-zero strategies remains highly uncertain in the short-term, but is expected to ramp up net-zero-related endeavours of major energy consuming economies in the medium- to longer- term. Above all, it is important to emphasize that future efforts to implement a just transition should consider the potential impacts of unexpected global disruptions, with their short-term aftermath not necessarily consistent with longer-term policy implications.

7 https://ember-climate.org/insights/research/european-electricity-review-2022/

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Agora Energiewende
Anna-Louisa-Karsch-Straße 2
10178 Berlin, Germany
P +49 (0) 30 7001435-000
F +49 (0) 30 7001435-129
www.agora-energiewende.de
info@agora-energiewende.de

Energy Foundation China
CITIC Building, Room 2403
No. 19, Jianguomenwai Dajie
Beijing, 100004 P.R. China
P +86-10-5821-7100 | F +86-10-6525-3764
www.efchina.org | china@efchina.org