

U.S.-China Coal Regions and the
Energy Transition Track II Dialogue

3rd Dialogue

U.S. – China Coal Economy Overview:
Understanding the Key Challenges

September 28/29, 2022

(For Internal Reference Only)

INTRODUCTION AND BACKGROUND

On September 29, Beijing time/September 28, Washington, D.C. time, the Energy Foundation China, the China Coal Society, and the Jackson Hole Center for Global Affairs jointly organized the third session of the U.S.–China Coal Regions and Energy Transition Track II Dialogue. The session, entitled The Role of Business in the Energy Transition, was designed to focus on comparing experiences in private sector trends, policy impacts, business leadership, and case studies. More than 50 Chinese and American stakeholders, policy-makers, and experts attended the meeting.

Experts actively discussed the current state of affairs and transition away from coal production in multiple regions across China and the U.S. The robust discussion included national policy impacts, technological advances in renewable energy, and examples of how former coal-producing communities have evolved in recent years.

■ The overall track two dialogue has

three main objectives:

- Build a common understanding of the similar challenges faced in Chinese and U.S. coal-producing regions, based on a selection of case studies, and to present concrete situations from an on-the-ground perspective.
- Start a conversation between U.S. and China, especially among experts and subnational actors from coal-producing regions that produces insights and recommendations for policymakers in both countries.
- Create a foundation and link directly between U.S.–China coal regions and policymakers to strengthen information flow, policymaking, measures that can directly assist coal communities, and bilateral climate action

■ KEY MESSAGES:

Shared themes identified by U.S. and China speakers and participants throughout the third dialogue included the need for reliable and consistent energy production to meet the needs of regional populations, the importance of technological innovation in maintaining a constant source of energy production and transmission, and the realization that renewable energy production is expanding rapidly around the globe. Both sides also expressed the desire to become leaders in renewable energy technology and capabilities and the resolve

to learn from other regions' experience on how to promote a just transition to renewable energy production.

A. GENERAL COAL PRODUCTION STATUS AND DIRECTION

Both the U.S. and China are aware of the need to transition away from coal production for myriad reasons including shifting global energy markets and meeting climate change and environmental quality goals. However, coal accounts for 95% of fossil fuel reserves in China, and coal production in China represents 80% of the national energy generation capacity. In the discussions, coal industry leaders point to Xi Jinping's emphasis on coal's importance to the nation's energy security and citizens' livelihoods. At the same time, President Xi has pledged to "strictly control" coal and start cutting its use starting in 2026 to ensure that carbon dioxide (CO₂) emissions peak and start declining before 2030.

Despite China's current reliance on coal, the 14th Five-year Plan (2021 – 2025) calls for at least 50% of incremental energy sources to be renewable. The capacity for renewables is up to 42.5% of total utilization. Additionally, according to the Dialogues discussion, at least 75% of investment by some major energy companies is currently in renewable energy sources, rather into fossil fuel and coal infrastructure assets. Meanwhile, as coal plants become more efficient, the number of coal workers has decreased—down from 500 workers per shift to 100 per shift in one case, and with a decline of more than 30,000 workers in another company's scenario.

It is estimated that by 2050, 80% of the world's energy will be produced from renewable sources. On the U.S. side, coal production has already peaked and is on the

decline, with a decrease of 54% between 2008 and 2020. Although market forces and the rise of natural gas have been major factors, large corporations in a variety of industrial sectors (from Starbucks to ExxonMobil) are also leading the push towards renewable energy sources. The “quest for net-zero” is driven by the demands of companies’ customers and stakeholders to protect investments while reducing climate impacts.

Currently 17.5% of the U.S. electrical grid comes from renewable energy sources (including wind, solar, and hydropower). The cost of solar power is expected to drop rapidly until 2030 and continue falling through 2050. The reliability and variability of renewable production is being addressed by significant advances in battery energy storage systems (BESS). With new policy changes enabling BESS to be charged by grid-based power, the demand for BESS is expected to grow from under 5 GW worldwide to 600 GW in 2030.

Challenges and Opportunities

A massive policy change occurred in the U.S. in August 2022 with the passage of the Inflation Reduction Act (IRA). The code provides tax credits (30% for the next 10 years) to incentivize the production of alternative and renewable energy and the development of these projects and/or related clean energy equipment and processes. This new law provides significant tax incentives for renewable energy production, carbon sequestration, technological research and development, and financial assistance to promote the just transition for communities to succeed in a changing energy landscape. Billions of dollars have been set aside to close gas/coal wells not in use, to provide employment opportunities, and also to incentivize carbon capture and storage (CCS) technologies.

Although renewable energy projects are being developed across the U.S., the regions with the greatest production potential are often located far from the major U.S. population centers. Significant investment in upgrading the U.S. electrical grid will be required to efficiently transmit power to regions of higher demand. One proposal by the National Renewable Energy Lab includes the construction of a high voltage direct current (HVDC) macrogrid system connecting the entire country. However, an investment of this magnitude would require substantial political will and collaboration across political parties with disparate interests and voting patterns. Meanwhile, other alternative technologies and materials are being developed including geothermal, hydrogen fuel, direct air capture, and autoclaved aerated concrete (AAC).

B. CASE STUDIES OF TRANSFORMATION:

China

While Chinese companies continue to build new coal plants, they are also diversifying their industrial reach with emphasis on different industries. Chinese businesses have invested significant financial resources into developing intelligent mining practices, modern cleaner coal technologies, coal preparation (removing ash, sulfur, and other debris) improvements, and new coal chemical/petroleum chemical applications. Companies have extended their industrial chains through producing new materials such as nylon, fiberglass, and railway profilings. Companies are investing in modern logistics and trade through enhancing emerging global industries within their extensive portfolios. Large businesses are also developing vertical and horizontal industrial networks including educational/vocational training programs and healthcare initiatives.

Several Chinese coal companies have become global enterprises with operations spanning from Australia to North America, so the cleaner coal technologies have been implemented at plants around the world. Additionally, major companies are diversifying their portfolios by developing renewable energy production through onshore and offshore wind and PV solar. Stringent national policies have been enacted that require power plants to operate using less energy. However, the primary drivers within the Chinese coal industry have been instigated from within coal companies rather than due to major policy change or government investment.

U.S.

Coal mines are large employers that also contribute significantly to tax revenue, so the consequences on communities can be devastating when they shut down. In West Virginia, the number of coal workers peaked at around 131,000 in 1940. Due to technological advances and declining coal production, the number of workers had fallen to under 22,000 by 2008. The region now suffers from serious environmental and social problems including depopulation, drug addiction, low levels of education, and ecological degradation. One organization working to improve conditions is the Coalfield Development Corporation. With funding from the national government, state government, and private grants/donations, the corporation has trained 1,500 people in new economic sectors, grown 50 new businesses, created 500 new jobs, attracted \$130 million in new investment, and revitalized 310,000 square feet of formerly abandoned property. They have remediated the local environment through tree planting, rotational agriculture, and cleaning up acid mine drainage while creating new businesses including tourism opportunities in the region.

The social, economic, and environmental challenges faced by West Virginia after the coal industry's decline serve as a cautionary tale. Officials urged other regions to learn from their experience by starting early to proactively create new opportunities and positive change in former coal-producing communities. In Wyoming, one example of proactive industrial development is Project Bison — the world's largest planned direct air capture project that will be built in 2023. Another example is the Natrium advanced nuclear reactor demonstration project planned to be built at a retiring coal plant in Wyoming by 2025.

OVERALL THEMES/CONCLUSION:

China and the U.S. continue to be at different stages in regard to coal power production and transitioning to alternative energy sources. As emphasized by Xi Jinping, coal remains extremely important to China's energy security and human livelihoods. Due in part to its geologic resource availability, China remains reliant on coal and is focusing on improving coal production by making it cleaner, more efficient, and less energy-intensive. Meanwhile, Chinese businesses are also investing heavily in renewable energy. China's national policies to reach peak carbon use by 2030 and become carbon neutral by 2060, set the national goals.

The U.S. policy landscape has recently changed dramatically with the passage of the Inflation Reduction Act (IRA). The law passed by Congress and the Biden Administration has had an immediate impact on the energy economy at a local and national scale. The rapid private sector reaction shows how quickly the energy landscape can change based on tax incentives and national policies. However, the U.S.'s trajectory away from coal had already been occurring rapidly since around 2007 due to external economic factors including the increased availability and lowered cost of natural gas, which is abundant in the U.S. but in short supply in China. Therefore, the countries' geologic/natural resource factors must be accounted for in addition to any potential policy changes.

Technology and infrastructure challenges remain significant factors as well. Although the U.S. has abundant renewable resource capacity, the availability varies significantly based on geographic region. The areas with highest resources are often not near the majority of the population centers. The electrical grid in the U.S. is currently insufficient to

transmit significant additional renewable power from the source to the demand. Significant changes in BETT (both technological and policy-based) will have significant impacts but must be accompanied by grid infrastructure upgrades to be fully realized. Enhanced infrastructure will also require additional technological advances and sustained political will.

The case study of West Virginia's experience after transitioning away from coal provides an example for other current coal-producing regions to study. While revitalization programs are working to transform communities, they face an uphill battle due to significant social, economic, and environmental hardships. West Virginia serves as a cautionary tale and inspires other regions to get started early on their plans for a just transition in order to avoid negative impacts from the inevitable transformations in the energy industry.

The conclusion of the third dialogue reminds us about the purpose of these sessions—to learn from each other about best practices, policies, and technological advances that can serve to aid the just transition in current and former coal-producing regions. Despite geopolitical challenges, the private sectors in the U.S. and China continue to work together on technological and industrial opportunities to transform energy production and reduce negative environmental impacts. In a dynamic energy landscape, we must keep an eye on the future while we work to improve the present situations in our respective communities.

NEXT STEPS:

China and the United States share common challenges in the energy transition of the coal regions. In the future, under the guidance of the Sino–U.S. Glasgow Joint Declaration, on the basis of existing cooperation, both countries can further carry out the Track II dialogue, deepen the cooperation among experts and non–state entities (provincial and state level, Inter–enterprise). The Energy Foundation China, Jackson Hole Center for Global Affairs and the China Coal Society will continue to promote the Track II Dialogue and bilateral cooperation on the coal and energy transition and other climate issues. Based on participant feedback, the organizations are working to create a network of professionals who can further connect on their own to discuss issues pertinent to their work in advancing the transition.