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

2nd Dialogue

## U.S. – China Coal Communities and Economic Diversification Strategies

# BACKGROUNDER

(For Internal Reference Only)

This backgrounder document is in support of the second session of the 2021-2022 U.S.-China Coal Regions and Energy Transition Track II Dialogue: Coal Communities and Economic Diversification Strategies. The U.S.-China Coal Regions and Energy Transition Track II Dialogue's goal will be to help stakeholders and policymakers in U.S.-China coal-producing regions understand the key themes and trends underway both in U.S. and China; to help develop new policy outcomes that can benefit coal communities facing the energy transition; and create a durable bridge between stakeholders in U.S.-China producing coal regions.

This background document provides an overview and history of economic diversification planning and strategies in the U.S. and China for coal-producing regions; particularly as it relates to preparing for the energy transition underway.

This document is organized in the following sections:

1.Introduction and Background.
2.U.S. Overview of Political Leadership and Economic Diversification Strategies for Coal Communities.
3.State and Regional Economic Diversification Profiles .

## Introduction and Background

The boom-and-bust cycles of coal have long been known and lived by those working in and living in coal producing communities. For years, coal-producing parts of the U.S. have talked about the need to foster economic diversification for the inevitable coming coal busts, but the public consensus tends to assess political action as consistently lacking. An old saying in the U.S. goes something along the lines of "Lord, please give me just one more boom and I promise that I won't waste this one."

In China, some of the same sentiments were voiced by the speaker from Shandong province in the most recent dialogue of these sessions. Speaking of the obstacle to the energy transition posed by "mindsets," this speaker described challenges of "confidence" and "pessimism" which coal communities in China face as part of this transition.

Long term, both U.S. and China coal communities face a future which will be very different in many ways from their past, and that past solutions will no longer work.

Abbreviations List:

| | | | |
|---|---|---|---|
| ACC: | Assistance to Coal Communities | ENDOW: | Economically Needed Diversity Options for Wyoming |
| ACE: | Affordable Clean Energy | ENGAGE: | Empowering the Next Generations to Advance and Grow the Economy |
| AML: | Abandoned Mine Land | EPA: | U.S. Environmental Protection Agency |
| AMLER: | Abandoned Mine Land Economic Revitalization | IWG: | Interagency Working Group |
| ARC: | Appalachian Regional Commission | OSMRE: | Office of Surface Mining Reclamation and Enforcement |
| EAA: | Economic Adjustment Assistance | POWER: | Partnerships for Opportunity and Workforce and Economic Revitalization Initiative |
| EDA: | Economic Development Administration | | |

# U.S. Overview of Political Leadership and Economic Diversification Strategies for Coal Communities

In the United States at a federal level, shifting politics and priorities of the two main political parties have shaped efforts to stimulate economic diversification in coal communities. For example, the Trump Administration, which viewed the continued use of coal as a national priority, used the U.S. Environmental Protection Agency (EPA) to revise regulations for power plants to ensure that coal-powered plants could remain operational for as long as possible, and endeavored to loosen restrictions related to oil and gas leases and permitting on federal lands. These priorities could be directly contrasted with the Obama Administration's political priorities to phase down coal-use due to climate change concerns through the Clean Power Plan (more details to follow) and supporting POWER Initiative.

The policy and regulatory environment surrounding coal and other natural resources has frequently shifted with changing presidential administrations. The environmental movement in the U.S. began in the 1970s during President Richard Nixon's administration. The Clean Air Act of 1970 led to significant emissions reductions (up to 70%) of six major pollutants—carbon monoxide, lead, ground-level ozone, nitrogen dioxide, particulate matter, and sulfur dioxide. In 1979, President Jimmy Carter declared a goal of increasing domestic energy production to reduce reliance on foreign oil. He called for increased use of coal to bridge the gap between oil dependence and growth of renewable resources. In the 1980s, President Ronald Reagan reduced federal government regulations of the coal industry and pushed to expand mining operations under more state control.

The 1990 Clean Air Act amendments made by President George H.W. Bush used a market-based approach to halve sulfur dioxide emissions from coal-fired power plants which had been causing harmful acid rain. The Act introduced a national permit market where utilities could buy and sell the right to pollute. Companies could use their permits to cover their emissions, or sell any permits they did not use at the market price. This approach encouraged utilities to improve their production processes and find cleaner strategies, such as switching to lower-sulfur coal. At the same time, new technology led to a drop in natural gas prices. This further accelerated around 2005 when fracking became popular thus leading to significant reduction in coal's share of the power market. In the mid-1990s, about 75 percent of fossil power was generated by coal, 20 percent by natural gas and 5 percent by petroleum. By 2012, about 55 percent was fired by coal, 45 percent by natural gas and a negligible share from petroleum.

## Barack Obama Administration (2009-2016)

In 2015, President Barack Obama announced the Clean Power Plan (CPP)—the first federal program to limit carbon pollution at U.S. power plants. The EPA adopted the CPP under the Clean Air Act. Despite many state challenges, the Supreme Court upheld the CPP's legality in a 2016 ruling. The plan set flexible standards that enabled each state to develop its own methodology to achieve reduced emissions.

The Obama Administration's Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) Initiative was first announced in March 2015 as "coordinated multi-agency effort to help workers and communities that have been adversely impacted by changes in the coal industry and power sector." Led by the White House, POWER engaged several federal agencies to make targeted investments to help coal-affected regions support economic diversification efforts. POWER projects are a diverse lot and include efforts to promote new industries, such as tourism, UAV

development, and agriculture; new infrastructure projects; and workforce training and retraining.

The POWER Initiative was part of a much broader POWER Plus Plan set forth by the U.S. government to ease the economic effects of energy transition in coal industry-dependent communities in the United States, especially in Appalachia. The POWER Plus Plan aimed to address the coal sector's decline through coordinated multi-agency funding for economic revitalization, social welfare efforts, and environmental improvements including carbon-capture technologies. However, many elements of the proposed plan were never enacted. The POWER initiative is currently run as a regional effort through the Appalachian Regional Commission (ARC--see more info below).

In 2015, Congress directed the Economic Development Administration (EDA) to allocate funding to the Assistance to Coal Communities (ACC) fund through the Economic Adjustment Assistance (EAA) program. The ACC initiative provides flexible funding for projects that support economic diversification, job creation, capital investment, workforce development, and re-employment opportunities for coal-impacted communities. Federal assistance may support communities with economic transitions due to declining population, economic output, or private investment. The ACC initiative helps communities deal with changes in resource-based industries, while the EAA program provides communities with assistance in response to other industry shifts, events, and factors.

## Donald Trump Administration (2017-2020)

Under President Donald Trump, the EPA repealed the Clean Power Plan in June 2019 and replaced it with the Affordable Clean Energy (ACE) rule. The ACE rule established emissions guidelines, including heat rate improvements, for states to use when developing plans to limit carbon dioxide emissions at their coal-fired power plants. Although many components of Obama's Power Plus Plan were dropped during the Trump administration, several components continued including the ACC program within the EDA, the POWER Initiative under the ARC, and a funding program for abandoned mine land (AML) reclamation.

### ACC and POWER:

The Assistance to Coal Communities (ACC) program continued to provide funding to locally driven efforts to communities and regions severely impacted by the declining use of coal through activities and programs supporting economic diversification, job creation, capital investment, workforce development and re-employment opportunities.

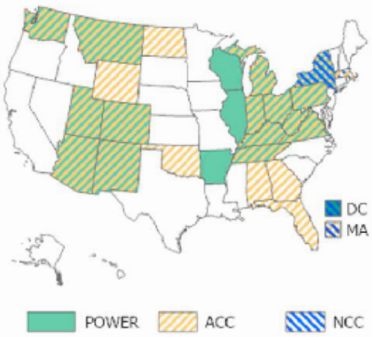



Figure: EDA's ACC, NCC, and POWER Initiative Projects, by State FY2015–FY2020

Source: Map created by CRS from EDA grant award data, February 2021.

Notes: The location of POWER grants indicate awards made by EDA in FY2015 and FY2016. Map includes EDA POWER grants and excludes grants awarded by other federal agencies through the POWER Initiative. Awards include technical assistance projects, which could include national organizations located outside of a coal-impacted area.

**Abandoned Mine Land:**

Since 2016, Congress has approved funding for economic development to states for reclaiming abandoned mine land (AML). Previously, grants had been made available to eligible states and tribes to address the hazards and environmental degradation posed by abandoned mine sites under the Surface Mining Control and Reclamation Act of 1977. The AML Reclamation Program is funded by fees paid by coal mine operators.

Companies pay a per-ton fee (set by Congress) to the Office of Surface Mining Reclamation and Enforcement (OSMRE). The OSMRE is part of the U.S. Department of the Interior, and is responsible for regulating surface coal mining in the United States, as well as funding the restoration of abandoned coal mines:

- $0.28/ton on surface mined coal
- $0.12/ton on deep-mined coal (subsurface)
- $0.08/ton on lignite

### Joe Biden Administration (2021 – present)

On January 19, 2021, a Washington D.C. district court vacated the Trump administration's ACE rule due to a "mistaken reading" of the Clean Air Act. On January 27, 2021, President Biden signed Executive Order 14008 - Tackling the Climate Crisis at Home and Abroad which among other activities established the Interagency Working Group (IWG) on Coal and Power Plant Communities and Economic Revitalization. The future of coal communities has been identified as a national priority of the Biden Administration.

In the early days of the Administration President Biden issued an executive order to pause coal leasing on federal lands – directly impacting communities such as Wyoming that mine heavily from federally owned lands.

In November 2021, Congress passed the $1.2 Trillion Bipartisan Infrastructure Deal (Infrastructure Investment and Jobs Act) which promises to rebuild America's roads, bridges and rails, expand access to clean drinking water, expand high-speed internet, tackle the climate crisis, advance environmental justice, and invest in forgotten communities. The needs of coal communities featured significantly in the deal, with specific funds allocated for clean energy ($65 billion), rural broadband ($65 billion), electric vehicle charging ($7.5 billion), and abandoned wells ($11.3 billion).

As part of the American Rescue Plan to combat the effects of the COVID-19 pandemic, the EDA's Coal Communities Commitment allocates $300 million of its $3 billion appropriation to support coal communities as they recover from the pandemic and to help them create new jobs and opportunities including new industry sectors. This commitment builds on the "Initial Report to the President on Empowering Workers Through Revitalizing Energy Communities" as developed by President Biden's Interagency Working Group.

Specifically, the EDA will dedicate $100 million of its Build Back Better Regional Challenge funds and $200 million of its Economic Adjustment Assistance funds to directly support coal communities.

## China Overview of Political Leadership and Economic Diversification Strategies for Coal Communities

From the point of view of natural conditions, coal's absolute dominant position in

China's energy structure is determined by its feature of abundant coal, poor oil and little gas, and the dominant position of coal will not change in a long period of time in the future. China is rich in coal resources, and its output ranks first in the world. However, the distribution of coal resources in China is extremely uneven, showing the characteristics of rich in the north and poor in the south, and more in the west and less in the east. The coal resources in the north of the Kunlun Mountain-Qinling Mountain-Dabie Mountain line account for 94% of the national coal resources, while the coal resources in the south of the line account for only 6% of the national coal resources□ but the consumption is mainly concentrated in the eastern coastal and southern regions. The reverse distribution of coal supply and demand has formed a pattern of "coal from north to south and coal from west to east" in China.

China's domestic political stability, and there are lots of coal industry policies which are beneficial to the healthy development of the coal industry. The stable political situation provides a favorable environment for development of coal industry. Therefore, China's coal community system and economic diversification has always been continuous. Since the founding of the nation, it experienced the planned economy period, expanding period and low carbon development period. In general, China's coal community system and economic diversification can be divided into two stages: the planned economy stage before 1994 and the market economy stage since 1994.

From 1949, when the People's Republic of China was founded, to 1994, when coal prices were liberalized, China was in a planned economy. During this period, the state established the Ministry of Fuel Industry（燃料工业部）, the Ministry of Coal Industry（煤炭工业部）, the Bureau of Energy（能源局） and other state organs to carry out unified planning and management of the coal industry. In 1982, the "Sixth Five-year Plan"（六五计划） explicitly proposed to build a coal heavy chemical industry base centered in Shanxi, including western Inner Mongolia, northern Shaanxi, Ningxia and western Henan. In 1983, the Ministry of Coal issued a series of policies: Report on Eight Measures for Accelerating the Development of Small Coal Mines（《关于加快发展小煤矿八项措施的报告》）, Notice on Further Relaxing Policies and Developing Local Coal Mines（《关于进一步放宽政策、放手发展地方煤矿的通知》）, and Notice on Actively Supporting the Masses in Running Mines（《关于积极支持群众办矿的通知》）, which significantly increased the supply of coal. By 1985, the output of township coal mines reached 2.83×108 t, an increase of 1.13×108 t over 1983. But at the same time, the development of small coal mines leads to waste of resources and damage to the environment, and the production safety problem is aggravated. In 1986, the Mineral Resources Law of the People's Republic of China(《中华人民共和国矿产资源法》) was adopted, clarifying the principle of paid use of resources. In 1988, the Ministry of Energy（能源部） and China Unified Coal Distribution Corporation（中国统配煤矿总公司） were established. Since then, the coal industry has formed a multi-headed management system and lost the functions of unified planning, unified opening and unified management. In 1994, with the exception of electricity coal prices, all coal prices were liberalized, the pace of reform and development of the coal industry was accelerated, and the planned economy management system that had been in operation for more than 40 years was gradually broken.

Since 1994, it has been the development stage of market economy. In 1995, the coal industry began to transform into an enterprise. In 1996, the state organs issued "about to modify the decision of the mineral resources of the People's Republic of China"（《关于修改〈中华人民共和国矿产资源法〉的决定》） and the matching many supporting laws and regulations□ such as the measures for the administration of registration of prospecting blocks for mineral resources（《矿产资源勘察区块登记管理办法》）, measures for the Administration of registration of exploitation of Mineral resources（《矿产资源开采登记管理办法》）, the measures for the administration of the exploration right or mining right transfer（《探矿权、采矿权转让管理办法》）, the

regulation on administration of mineral resources compensation levy（《矿产资源补偿费征收管理规定》） and so on. In 1997, 32 state-owned key coal mines began to establish companies and go public. In 1998, the Ministry of Coal Industry was abolished and the State Administration of Coal Industry（国家煤炭工业局） was established. It has formed China's current coal management system, which has decentralized power, simplified administration and laid off staff, and separated government from enterprise, which has played a certain role in promoting the development of the coal industry. In the same year, The State Council issued the Notice of The State Council concerning the Closure of Illegal and Irrational Coal Mines（《关于关闭非法和布局不合理煤矿有关问题的通知》）, and decided to close 25,800 small coal mines by the end of 1999. In 2007, China ended more than 50 years of government-led ordering of coal; The annual "National Coal Order Fair"（全国煤炭订货交易会） was changed to "National key coal production, transportation and Demand convergence meeting"（全国重点煤炭产运需衔接会）, highlighting the enterprise's dominant position in the market. In 2012, The General Office of the State Council issued the Guiding Opinions on Deepening the Market-oriented Reform of Thermal Coal（《关于深化电煤市场化改革的指导意见》）, canceling key contracts and realizing the integration of thermal coal prices. In 2013, coking coal futures contracts and thermal coal futures contracts were successfully listed on the DCE（大商所） and The Zhengce（郑商所）, respectively, giving further play to the basic role of the market in allocating resources.

Since the 11th Five-Year Plan, with the guidance and encouragement of national policies, China's energy resources have shown a trend of diversified development. Natural gas, hydropower, nuclear power and other renewable resources have developed rapidly, and the trend of replacing dirty coal is increasingly significant. Since then, with the support of various policy documents (see below), China's energy economy has been rapidly transforming, with coal's share in total primary energy consumption decreasing from 69.2% in 2010 to 64% in 2015, and further falling to 57% in 2020. At the same time, the share of clean energy consumption in total energy consumption rose from 20.5% in 2017 to 25.5% in 2021.

### The Fifth Five-Year Plan Period (1976-1980)

In the early days of the founding of the People's Republic of China, the coal industry formulated the principle of "large, medium and small coal mine infrastructure construction"（矿井基本建设“大中小且举”的方针）, taking measures according to local conditions, and establishing enterprises based on the geographical distribution of resources, which eventually led to several problems such as numerous coal enterprises, small scale and difficult to cross-regional expansion. In addition, before the 1980s, China's coal resources were basically mined for free, which led to low barriers to entry of the coal industry, clusters of small coal mines, low coal extraction rate and serious waste of resources.

### The Sixth Five-Year Plan Period (1981-1985)

During this period, a series of distinctive individual and partial reform measures were adopted, such as quota of output（产量包干）, quota of profit and loss（盈亏包干）, quota of wage per ton of coal（吨煤工资含量包干）, quota of construction of small and medium-sized coal mines（中小型煤矿建设包干）, the implementation of the system of rotation of farmers（农民轮换工制度） and the relaxation of the policy of running mines（办矿放宽政策）. During the Sixth Five-year Plan period, a series of guidelines for creating a new situation in the coal industry were basically formed.

### The Seventh Five-Year Plan Period (1986-1990)

During this period, the Mineral Resources Law of the People's Republic of China（《中

华人民共和国矿产资源法》） was adopted in 1986, which clarified the principle of paid use of resources. In 1988, the Ministry of Energy（能源部） and the China Unified Coal Distribution Corporation（中国统配煤矿总公司） were established. Since then, the coal industry has formed a multi-headed management system, losing the functions of unified planning, unified opening and unified management. The overall quality of the coal industry has been greatly improved.

### The Eighth Five-Year Plan Period (1991-1995)

From 1985 to 1995, it was the reform period of reform of input-output general contracting for unified distribution of coal mines（统配煤矿投入产出总承包改革）. The main method was to integrate production, construction and operation, carry out the contract management responsibility system（承包经营责任制） under the unified responsibility of the departments, and establish the contract relationship（发包承包关系） between the coal departments and enterprises. After two rounds of contract period until the end of 1995, most coal enterprises adopted various contracting modes such as group contracting(集团承包), risk mortgage contracting(风险抵押承包), collective or individual contracting（集体或个体承包） and leasing operation（租赁经营） depending on different conditions.

### The Ninth Five-Year Plan Period (1996-2000)

According to the reform ideas of "industry management, asset supervision, classified guidance, policy support, bring to market", reform the profit and loss management mode. Implementing the policy of "grasping large coal enterprises and releasing small coal enterprises"（抓大放小）, China actively piloted the transformation of large coal enterprises into shareholding companies, and liberalize and invigorate small coal enterprises by adopting various forms of operation.

### The 11th Five-Year Plan Period (2006-2010)

Since the 11th Five-Year Plan, with the guidance and encouragement of national policies, China's energy resources have shown a trend of diversified development. Natural gas, hydropower, nuclear power and other renewable resources have developed rapidly, and the trend of replacing dirty coal is increasingly significant. Although coal's share of total primary energy consumption has declined, its era of dominance is far from over.

### The 12th Five-Year Plan Period (2011-2015)

China officially identified 14 large coal bases in 2011. In the 12th Five-Year Plan for the development of Coal industry（《煤炭工业发展“十二五”规划》）, China proposes to build 14 large-scale coal production bases. In the 13th Five-Year Plan for the development of coal industry（《煤炭工业发展“十三五”规划》）, it is proposed to focus on 14 large coal bases, optimize the layout of coal production, and control the output of coal outside the large coal bases within 200 million tons. Since 2011, 14 large coal bases have accounted for more than 90 percent of the country's total coal output. China's 14 large coal bases refer to northern Shaanxi Base, Lianghuai base, Shendong base, Northern Shanxi Base, Eastern Shanxi Base, central Shanxi Base, eastern Ningdong base, Henan base, Central Hebei base, Huanglong base, western Shandong base, Xinjiang base, eastern Mengmeng base and Yunnan-Guizhou base. These coal bases cover 106 major coal mining areas. The proportion of production capacity of each coal base is shown in Figure

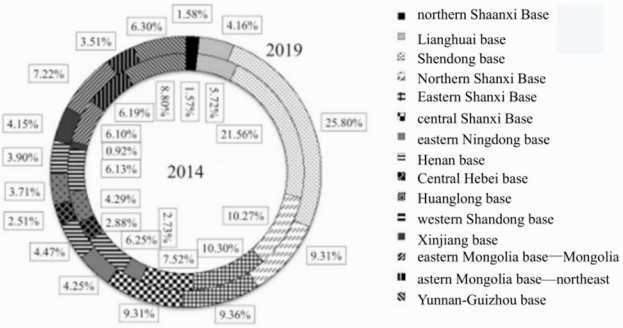



Figure The proportion of production capacity of each coal base

During this period, a series of policy documents were issued and specific emission reduction measures for the coal industry were put forward. Some detailed policy documents are as Table 1:

Table Some detailed policy during 2011-2015

| Name | Time | Contents |
|---|---|---|
| Guiding Opinions on Furthering the Construction of Coal Trading Market System（关于深入推进煤炭交易市场体系建设的指导意见） | 2014 | Further promote market-oriented reform of coal. |
| Coal Power Energy Conservation and Emission Reduction Upgrade and Transformation Action Plan (2014-2020)（煤电节能减排升级与改造行动计划（2014-2020 年）） | 2014 | Advanced and efficient desulphurization, denitration and dust removal facilities（脱硫、脱硝、除尘设施） shall be constructed simultaneously for new coal-fired generating units（燃煤发电机组）, and flue gas bypass channels（烟气旁路通道） shall not be installed; Approval of new coal-fired power generation projects is prohibited, except for cogeneration（电热联产）. |
| Strategic Action Plan for Energy Development (2014-2020)（能源发展战略行动计划（2014-2020 年）） | 2014 | Access standards for coal-fired power units will be raised to ensure that the coal consumption of new coal-fired power units is lower than 300 grams of standard coal per kilowatt-hour and their pollutant emissions are close to those of gas-fired units（燃气机）; Vigorously develop natural gas and clean energy. |

## The 13th Five-year Plan to Date Period until Today (2016-2022)

Xi Jinping chairman in 2017 Put forward that "green water castle peak is the mountains of gold and silver" and "adhere to the concept of green development, promote the revolution of energy production and consumption, building low-carbon clean, safe and efficient energy system". During this period, China put low carbon, energy saving in the extremely important position, and introduced a large number of relevant policy documents, as shown in the Table 2:

Table Some detailed policy during 2016-2022

| Name | Time | Contents |
|---|---|---|
| Guiding opinions on the development of coal and electricity joint operation（关于发展煤电联营的指导意见） | 2016 | Priority should be given to the planning of coal and electricity co-owned projects（煤电联营项目） in line with key directions. In terms of power grid dispatching, priority should be given to the arrangement of coal and electricity integration（煤电一体化） and the electricity online access of other coal and electricity co-owned projects. |
| Measures for the administration of comprehensive utilization of coal gangue（煤矸石综合利用管理办法） | 2016 | Encourage the use of coal gangue for underground filling, power generation, production of building materials, recovery of mineral products, production of chemical products, road construction, land reclamation, etc. |
| A three-year action plan to win the battle against the blue sky（打赢蓝天保卫战三年行动计划） | 2018 | Eliminating coal-fired units with a capacity of 300,000 kw; No more new coal-fired boilers of less than 10 tons per hour; In key areas, coal-fired boilers below 35 steam tons per hour will be basically phased out, and all coal-fired boilers above 65 steam tons per hour will be upgraded to conserve energy and emit ultra-low emissions; Gas boiler（燃气锅炉） basically completed low nitrogen transformation; By the end of 2020, all coal-fired boilers and small coal-fired power plants with a heating radius of 15 kilometers for cogeneration power plants with a capacity of 300,000 kw and above in key areas will be shut down and integrated. |
| Several views on promoting the healthy development of non-water renewable energy generation（关于促进非水可再生能源发电健康发展的若干意见） | 2020 | improve subsidies and promote green electricity certificate trading. |
| Peak Carbon 2030 Action Plan（2030 年前碳达峰行动方案） | 2021 | Strictly control the scale of coal power for trans-regional renewable energy power transmission; In principle, the proportion of renewable energy power in new channels should not be less than 50%; Reduce and limit coal use in key coal industries. |
| Opinions on fully, accurately and comprehensively implementing the new development concept to achieve carbon peak and carbon neutral work（关于完整准确全面贯彻新发展理念做好碳达峰碳中和工作的意见） | 2021 | To coordinate the development of coal and power generation and ensure supply and peak regulation, strictly control the installed scale of coal and power generation, and speed up the energy-saving upgrading and flexible transformation of existing coal and power generation units; Gradually reduce or even ban loose burning of coal; Take steps to replace renewable energy, vigorously develop wind, solar, biomass, Marine and geothermal energy, and increase the proportion of non-fossil energy consumption. |
| Opinions on improving the institutions, mechanisms, policies and measures for energy, green and low-carbon transformation（关于完善能源绿色低碳转型体制机制和政策措施的意见） | 2021 | Establish a long-term mechanism for the green development of coal mines, optimize the distribution of coal production capacity, and intensify efforts to "increase coal production capacity and pressure small ones, increase the quality and eliminate the bad ones"（上大压小、增优汰劣） in coal mines, so as to promote clean and efficient utilization of coal. |
| The 14th Five-Year Comprehensive Work Plan for Energy Conservation and Emission reduction（"十四五"节能减排综合工作方案） | 2021 | To promote the transformation of coal saving and consumption reduction, heating and flexibility（节煤降耗改造、供热改造、灵活性改造"三改联动"） of existing coal generating units, and continuously promote the transformation of ultra-low emissions of coal generating units; Promote green electricity certificate trading. |
| Policies to promote the steady growth of industrial economy（促进工业经济平稳增长的若干政策） | 2022 | Offer 200 billion yuan to support clean and efficient use of coal; Upgrade coal-fired power units that consume 300 grams of standard coal per kilowatt-hour or more. |
| Notice on further improving the coal market price formation mechanism（关于进一步完善煤炭市场价格形成机制的通知） | 2022 | Guide coal prices to operate within a reasonable range, with medium - and long-term trading prices ranging from 570 yuan to 770 yuan per ton (tax included) being reasonable. |

# State and Regional Economic Diversification Profiles

Numerous economic diversification efforts are also underway at the state and regional level to provide assistance to coal communities. These efforts have several features in common:

▪ Role of community colleges. Community colleges have played a prominent role in stimulating workforce training programs and coordinating private sector investment and involvement in economic development initiatives at the state and local level.

▪ Alternative energy sources. Many state and local economic diversification initiatives have targeted investment in alternative energy development. In Wyoming, for example, these efforts have included new initiatives in nuclear power and carbon capture, utilization, and storage. Elsewhere, mine reclamation and renewable energy development (e.g., wind) have provided a focus for economic diversification strategies involving displaced coal workers.

▪ Local comparative advantages. Economic diversification initiatives at the state and local level have also sought to identify local comparative advantages. These include transportation in Wyoming, which enjoys a strategic location in the center of the country to fill gaps in the supply chain, and [one or two examples from other states].

## Wyoming

The nation's least populated state with 578,000 residents, Wyoming has been the top coal-producing state since 1986, accounting for about 39 percent of all coal mined in the United States in 2019, and having more than one-third of U.S. coal reserves at producing mines. Wyoming produced 218 million tons of coal in 2020, a 21 percent decline from 2019, and down from a high in 2008 of 468 million tons. In 2019, 5,399 people were working in Wyoming's coal industry, down from 6,287 in 2008.

Sixteen coal mines are in operation in Wyoming, located in three counties: Campbell, Lincoln, and Sweetwater. The majority of the coal, however, is produced from the 11 mines in Campbell County location for the Powder River Basin, using surface mining techniques. Nearly all of the coal mined in Wyoming is shipped via rail to destinations across Wyoming and 27 other states. The top consumers of Wyoming coal are coal-fired power plants in Texas, Missouri, Wyoming and Illinois. While the majority of the coal is used to generate electricity at power plants, it is also delivered to industrial plants and commercial facilities.

**ENDOW:**

The Economically Needed Diversity Options for Wyoming (ENDOW) Initiative began in 2017 under the direction of Governor Matt Mead. ENDOW coordinates and expands ongoing efforts throughout Wyoming in providing a comprehensive approach to diversifying the state's economy. In 2018, the ENDOW executive council created a 20-year economic diversification strategy document. The document outlines a detailed vision for economic growth that includes Innovation Centers (ICs), Industrial Focus Zones (IFZs), and Regional Opportunity Areas (ROAs). These distinct areas focus on accelerating development of an entrepreneurial ecosystem and encouraging value-added and other industrial development through infrastructure and policy change. Specific areas highlighted for economic development include natural resources, tourism, manufacturing, agriculture, and the knowledge economy. The report also declared the need for policy change regarding tax structure as a requirement to stabilizing Wyoming's budget in a future with fewer state revenues from minerals.

In coordination with ENDOW, the governor hosted a summit in 2018 called ENGAGE (Empowering the Next Generations to Advance and Grow the Economy) that specifically aimed to learn from a younger demographic (18-35 year olds) of Wyomingites about how to attract and retain young adults to businesses throughout the state.

In 2021, Wyoming proclaimed May 9-15 as Economic Development Week alongside the Wyoming Business Council and Wyoming Economic Development Association. The Wyoming Business Council (WBC) is the State of Wyoming's Economic Development Agency. Since its establishment in 1998, WBC has been entrusted with helping to overcome Wyoming's most persistent and difficult challenge: developing a diverse economy. The Wyoming Economic Development Association (WEDA) is a 501(c)6 non-profit established in 1985. It is a professional association representing nearly 200 economic development members and organizations that support economic development through their local economic development groups. "Economic development is the core of well-being and quality of life for Wyoming businesses and communities," Governor Mark Gordon said. "Wyoming is blessed with an abundance of natural resources and an adventurous lifestyle. Economic development helps add value to Wyoming's potential through business recruitment and existing business expansion, entrepreneurial development and collaboration between business and industry, community organizations, government entities, and stakeholders."

## West Virginia

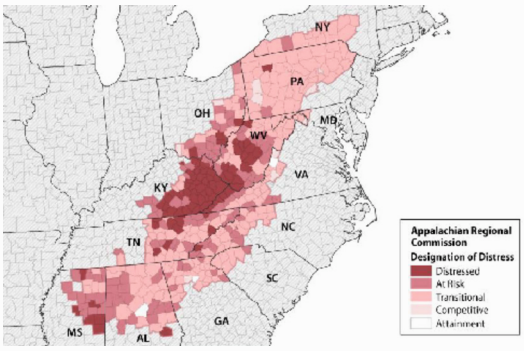
West Virginia, with a population 1.8 million, is the nation's second-largest coal producer and accounted for 13 percent of U.S. total coal production. Coal-fired electric power plants accounted for 91 percent of West Virginia's electricity net generation in 2019, renewable energy resources—primarily hydroelectric power and wind energy—contributed almost 6 percent, and natural gas provided more than 3 percent.

The West Virginia Coal Industry provides approximately 13,000 jobs between underground and surface mining and the state leads the nation in underground coal production. There are currently 10 coal fired electric generating facilities located in West Virginia.

In 2019, coal mining generated approximately $9.1 billion in total economic activity in the state and supported nearly 27,000 jobs with total employee compensation of $2.1 billion. Mining also generated around $514 million in severance taxes and other state and local taxes. A recent study commissioned by the West Virginia Coal Association and conducted by the West Virginia University Bureau for Business and Economic Research, shows in 2019 the coal economy generated approximately $14 billion in economic activity for the state. This amounts to approximately 17 percent of the state's total economic output or one out of every six dollars generated. For context, total economic output for the state (GDP) was around $77 billion.

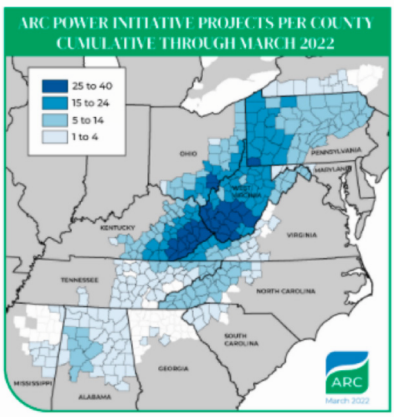
**POWER Initiative:**

The POWER Initiative, begun under the Obama Administration, continues to be run regionally by the Appalachian Regional Commission (ARC). The ARC was established in 1965 to address economic challenges in the Appalachian region. The ARC's jurisdiction spans 420 counties in Alabama, Georgia, Kentucky, Ohio, New York, Maryland, Mississippi, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. The ARC is an independent federal agency but is run as a federal-state partnership between the member states and the federal government with shared administrative costs.




Source: Compiled by CRS using data from the Appalachian Regional Commission and Esri Data and Maps 2018.
Notes: West Virginia is the only state with all counties within the ARC's jurisdiction.

The ARC's POWER Initiative program directs federal resources to projects and activities that revitalize coal-impacted communities. Prioritized projects produce multiple economic development outcomes (including regional economic growth; job creation; and/or employment opportunities for displaced workers), are specifically identified under economic development plans, and have been collaboratively designed by state, local, and regional stakeholders. Since 2015, the POWER Initiative has invested nearly $316.6 million in 393 projects across 358 Appalachian counties. Those "investments are projected to create or retain more than 36,600 jobs, leverage more than $1.5 billion in additional private investment into Appalachia's economy, and prepare tens of thousands of workers and students for opportunities in entrepreneurship, broadband development, tourism, and other industry sectors."




Source: https://www.arc.gov/arcs-power-initiative/

In March 2022, $21 million in grant funding was awarded to 21 projects across the region. POWER investments typically require matching grants to ensure collaboration and program sustainability. The ARC funds three classes of grants as part of the POWER Initiative: (1) implementation grants, with awards of up to $1.5 million; (2) technical assistance grants, with awards of up to $50,000; and (3) broadband deployment projects, with awards of up to $2.5 million.

In addition to federal funding, West Virginia offered an innovative campaign in 2021 to encourage economic diversification in the state. Through the Ascend West Virginia program, remote workers from any industry could apply to move to West Virginia. After relocating, the workers would receive $12,000 in cash and $8,000 in other benefits such as free outdoor recreational activities, social programming, and entrepreneurial assistance. Over 7,500 workers applied for the program with 53

selected to move to West Virginia in its first year.

In June 2021, West Virginia House of Delegates leaders created an informal workgroup focused on listening to and developing proposals to help West Virginia's coal communities – a Coal Communities Workgroup. Via a listening tour, the group has gone into communities, communicate with officials at all levels, and to make determinations and recommendations to the West Virginia House of Delegates for legislative proposals in the 2022 session.

**Pennsylvania:**

Pennsylvania, has a population of 12.8 million and has been coal mining for more than 200 years. Today, it is the fourth largest coal-producing state in the nation – producing 50 million tons in 2019 - and the only state that produces anthracite coal in addition to bituminous coal. Pennsylvania is the third-largest net supplier of energy to other states, after Wyoming and Texas.

Pennsylvania is second only to Texas in estimated proved natural gas reserves, which nearly tripled from 2012 to 2018 because of natural gas development in the Marcellus Shale. In 2010, coal provided 48% of the state's electricity net generation and natural gas accounted for 15%. By 2019, coal had declined to 17% of the state's net generation and the share of natural gas generation nearly tripled to 43%. Pennsylvania ranks second in the nation, after Illinois, in nuclear power generating capacity. Many of Pennsylvania's coal-fired power plants have been retired with the increased availability of competitively priced natural gas, and nearly 3,000 megawatts of the state's coal-fired summer generating capacity shut down between 2015 and mid-2020. In the same period, almost 9,500 megawatts of natural gas-fired capacity came online, and almost all the generating capacity from natural gas. In 2019, natural gas-fired power plants were the largest provider of in-state electricity for the first time, taking over the top spot from nuclear power. Coal-fired power plants were the third-largest providers of in-state electricity

The Pennsylvania coal industry supports about 17,000 people employed directly and indirectly including 5,300 mining jobs in 2019 (3,800 underground, 1,500 surface). Further, for a state with a 2020 GDP of nearly $700 billion, coal mining still accounts for nearly $7 billion in economic activity in the state.

In January 2022, Governor Tom Wolf announced $25 million in funding for 13 environmental restoration projects focused on economic development or community revitalization through the 2020 Abandoned Mine Land Economic Revitalization (AMLER) Program (formerly known as the AML Pilot Program). In addition to increased healthy and environmental safety, the improvement projects will include benefits such as increased farmland for local cattle industries, additional green space for recreation and tourism facilities, and additional land for public hunting and fishing. A project to transform abandoned mine land into a utility-scale solar project is expected to create up to 300 full-time jobs during construction.

## Province and Regional Economic Diversification Profiles in China

Various economic diversification efforts are also made at the province and regional level in China to provide assistance to coal communities. These efforts have several features in common:

- Develop low carbon economy. This can be achieved by using new and clean energy,

and developing CCUS technology.

▪ Promote other industries. Policies are made to push the development of other industries other than the mining industry. Besides, the construction of first and third industry is always combined with new technology, industrial cluster development and industrial chain development.

## Shanxi

Shanxi produced 988 million tons of coal in 2019, ranking second in the nation, and accounting for 26% of the country's coal production. With nearly 40% coal-bearing area, Shanxi is a typical resource-based area. Economic diversification methods have been considered by Shanxi, mainly including conducting energy revolution, and issuing policies to promote development of other industries.

First, conduct energy revolution. In May 2019, the 8th Meeting of the Commission for Deepening Overall Reform of the CPC Central Committee（中央全面深化改革委员会第八次会议）approved The Opinions on the Pilot Comprehensive Reform of Energy Revolution in Shanxi.（《关于在山西开展能源革命综合改革试点的意见》）Shanxi became the first comprehensive reform of the energy revolution pilot since President Xi Jinping proposed the term of "energy revolution" in June 2014.

A significant way of energy revolution is using clean energy. The wind and solar power generation in Shanxi continues to grow from 2015 to 2019. In 2015, the amount of wind and solar power generation in Shanxi ranked eighth and fourteenth in the country, while in 2019, the amount of both power generation in Shanxi ranked seventh, which shows the great advance in clean energy. Besides, the growth rates of installed wind power generation capacity in Shanxi have been increased at a rate around 20% since 2018, and the rate exceeded 50% in 2020. The installed solar power generation in Shanxi almost doubled from 2016 to 2017, and maintained growth rates above 20% since 2018. Shanxi announced that new energy will gradually become the dominant energy, and coal power will gradually evolve from the main power source to regulatory and guarantee power source. According to Shanxi Daily, by June 2021, the installed capacity of new energy in the province reached 33.845 million kilowatts, accounting for 31.2% of the total installed capacity. It is expected that by 2025, the installed capacity of new energy in the province will reach 78 million kilowatts, accounting for more than 40%. By 2030, the installed capacity of new energy in the province will exceed 100 million kilowatts and become the largest power source.

Companies in Shanxi also contribute to energy revolution by technology innovation. In terms of electricity power substitution, Jineng Holding Coal Group Yanzishan Mine Sewage Treatment Plant（晋能控股煤业集团燕子山矿污水处理厂）innovatively used sewage source heat pump technology. In winter, heat is extracted from sewage for residence heating. While in summer, the indoor heat is extracted and released into the water to achieve the effect of refrigeration. In terms of CCUS, Datang International Yungang Thermoelectric Company（大唐国际云冈热电公司）captures CO2 into high value-added carbon nanotubes, light foam materials, with related technology leading in China.

Secondly, policies have been made to promote economic diversification. In 2010, National Development and Reform Commission (NDRC) approved to set up "Shanxi Province national resource-based economic transformation comprehensive supporting reform pilot zone".（山西省国家资源型经济转型综合配套改革试验区） This is the first resource-based economy reform pilot in China. Shanxi government also issued policies on economic diversification, which are shown in the table 1. These policies have the following aims: Integrate into national regional strategies, and

promote the development of service industry, especially innovative services.

The economic diversification has shown some achievements in service industry. The added value of the service sector increased from 589.1 billion yuan in 2015 to 903 billion yuan in 2020, and the share of traditional services such as transportation, wholesale and catering services dropped from 33.9% to 28.7%. Modern service industries such as cloud computing, big data and e-commerce are developing at a faster pace, and new forms and models of business such as online shopping and online medical sharing economy are emerging rapidly. Their added value has accounted for more than 50% of regional GDP for many years in a row, and by 2020, they created half of all jobs. Besides, tourism has been put a lot significance for economic development in Shanxi. In the context of Covid-19, Shanxi is trying to combine tourism with the internet, the establishment of "Shanxi smart tourism cloud platform"（山西智慧旅游云平台）enabled tour around Shanxi through one online platform.

Table Economic diversification policies issued by Shanxi Province

| Name | Time | Contents |
|---|---|---|
| Shanxi Province national resource-based economy transformation comprehensive supporting reform experimental implementation plan（2016-2020）【山西省国家资源型经济转型综合配套改革试验实施方案（2016-2020）】 | 2016.4 | Supply-side structural reform, Science and technology innovation, Financial revitalization and other general directions. |
| Shanxi Province National Resource-based Economy transformation comprehensive supporting reform experiment 2016 action plan（山西省国家资源型经济转型综合配套改革试验 2016 年行动计划） | 2016.4 | Plans about major directions, including supply-side structural reform, etc., in 2016. |
| Made in China 2025 Shanxi Action Plan（中国制造 2025 山西行动纲要） | 2016.4 | Aimed at establishing important manufacturing base in China. |
| Opinions on shanxi's integration with Bohai Rim Region（关于山西融合环渤海地区的实施意见） | 2016.5 | To undertake the relocation of industries from Jing-Jin-Ji Region, and to become the engine of the transformation of Bohai Rim Region and a demonstration area for ecological progress. |
| Development plan of modern Service industry in 14th five-year plan of Shanxi Province（山西省"十四五"现代服务业发展规划） | 2021.6 | Key service industries enter the first phalanx in China; Increase research and development spending by an average of 20%; Create a number of leading enterprises in innovative services. |

## Shaanxi

Shaanxi is another typical resource-based area. Yulin, Xianyang, Yan'an are the top three cities with proven coal reservation. The reserved coal in Yulin accounts for 86% of the province. As for crude oil, it mainly distributed in Yulin and Yan'an. Shaanxi natural gas resource is the largest integrated gas field in China, and the gas source center is in the Jingbian County and Hengshan District, both of which belong to Yulin.

In the context of "dual carbon" target, as a developing resource-based city, economic diversification has become one of major concerns of Yulin. One way to achieve energy transformation is to implement low carbon economy. A prominent part in Yulin is developing CCUS technology. The CCS (CO2 capture and storage) project under construction by National Energy Group Guohua Jinneng Company（国能集团国华锦能公司）is the largest post-combustion CO2 capture project in China at present.

The CO2 capture demonstration project provided by National Energy Group Jinjie Corporation（国能集团锦界公司） with an annual output of 150,000 tons, is the largest carbon capture project of coal-fired power plant in China. In this project, the carbon dioxide is resolved by the adsorption property of amine and finally made into liquid carbon dioxide for oil flooding, achieving not only carbon reduction but also water saving.

Also, the utilization of new and clean energy is accelerated in Yulin. 18 billion yuan was invested to establish the Huaqin Hydrogen Energy Industrial Park（华秦氢能产业园）. In 2019, the consumption of wind and solar energy in Yulin has reached 5.639 billion kilowatt-hours, 520 million kilowatt-hours more than last year. Up to now, Yulin has built wind power installed 11.13 million kilowatts (wind power 5.95 million kilowatts, and solar 5.18 million kilowatts). During the 14th five-year period (2021-2025), Yulin plans to add wind power installed 7 million kilowatts, and solar power installed 19 million kilowatts. By the end of 2025, the total installed capacity of wind and solar power is planned to reach 37 million kilowatts. Also, Yulin plans to build two new energy bases with 10 million kilowatts capacity in Dingbian County and Yushen Industrial District（定边县和榆神工业园区）.

As for Shaanxi province, energy transformation also made some achievements. The installed wind power generation capacity of Shaanxi ranked 18th in 2016, and ranked 11th in 2020. The installed solar power generation capacity of Shaanxi ranked 13th in 2016, and ranked 12th in 2020. Both have made a progress. By 2025, Shaanxi province plans that the total installed power capacity will exceed 136 million kilowatts, including 65 million kilowatts of renewable energy capacity.

Service industry also contributes to the economic diversity of the province. From 2016 to 2020, the service industry in Shaanxi has developed rapidly, and now it has become the largest industry in the province industrial structure. According to Shaanxi Province 14th Five-year Plan for high-quality development of service industry（陕西省“十四五”服务业高质量发展规划）, by 2025, the added value of the service industry in Shaanxi province will strive to exceed 1.8 trillion yuan, with the added value of the service industry accounting for about 50% of the province's regional GDP, and the added value of produce services accounting for about 50% of the added value of the service industry.

## Inner Mongolia

Inner Mongolia is another resource-based region, and it has the highest coal production in China.

Inner Mongolia also committed to the development of new and clean energy. The energy supply structure of Inner Mongolia has been continuously improved, and the growth of the manufacturing industry has accelerated significantly. In particular, in the past five years, the added value of the non-coal industry in Inner Mongolia has accounted for more than 60% of the added value of the industries above designated size, and the situation that coal dominates the region has been significantly changed. Tiechen Intelligent Company（铁辰智能公司）in Ordos City has completed an investment of 500 million yuan in new energy unmanned mining vehicle project, which has an annual production capacity of 11,400 sets of new energy mining vehicles. A further 1 billion yuan investment is planned by Zhungeer Banner to develop “wind, solar and hydrogen storage vehicle” industry cluster.

As an area with developed animal husbandry, another way of economic diversification in Inner Mongolia is to enrich milk and diary industrial chain infrastructure. Yili Modern Wisdom Health Valley（伊利现代智慧健康谷）is a key project during the

period from 2021 to 2025. According to the construction plan, Yili Modern Wisdom Health Valley will focus on six functional areas, including green and intelligent factories with whole industrial chain, diary industry innovation base, global milk industry big data and scientific research center, compound tourism destination, high-end comprehensive health care project and urban vibrant community.（全产业链绿色智能示范工厂，乳业创新基地，全球乳业大数据和研发中心，复合型旅游目的地，高端综合康养项目，以及城市活力社区）It will become a new benchmark for the high-quality development of industrial clusters and the integrated development of the first, second and third industries. Moreover, the construction of Yili Modern Wisdom Health Valley will create more than 500 thousand new jobs, and generate over 100 billion of GDP.

In addition, Inner Mongolia put efforts into scientific and technological innovation to promote high-quality economic development. This mainly reflects on the economic diversification in rare earth industry. Baotou City has made breakthroughs in cutting-edge technologies and is pushing the industrial chain to the downstream. Baotou Iron and Steel Group（包钢集团）managed to use the technology into medical area, and developed the first magnetic resonance diagnostic vehicle in China.