



Program Information Document (PID)

Concept Stage | Date Prepared/Updated: 17-Jul-2019 | Report No: PIDC26703



BASIC INFORMATION

A. Basic Project Data

Country China	Project ID P170663	Project Name Shanxi Energy Transition and Green Growth Development Policy Operation (P170663)	Parent Project ID (if any)
Region EAST ASIA AND PACIFIC	Estimated Board Date Dec 12, 2019	Practice Area (Lead) Energy & Extractives	Financing Instrument Development Policy Financing
Borrower(s) People's Republic of China	Implementing Agency Shanxi Provincial Development and Reform Commission, Shanxi Provincial Finance Bureau, Shanxi Energy Bureau, Shanxi Natural Resource Department, Shanxi Social Protection Department, Shanxi Ecology and Environment Department, Shanxi Water Resource Department		

Proposed Development Objective(s)

The objective of the operation is to accelerate Shanxi’s transition to a lower coal economy, while diversifying economic growth and employment opportunities, thereby making significant contributions to global climate change mitigation and air quality improvement in Shanxi.

Financing (in US\$, Millions)

SUMMARY

Total Financing	200.00
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DETAILS

Total World Bank Group Financing	200.00
World Bank Lending	200.00

Decision

The review did authorize the preparation to continue

B. Introduction and Context

Country Context

- China’s high growth has led to severe global and local environmental problems and energy security concerns.** Since the start of the open-door policy in 1980, China has experienced the fastest economic growth in the world and its energy sector has come a long way--energy consumption increased 7-fold to fuel an economy that increased 32-fold

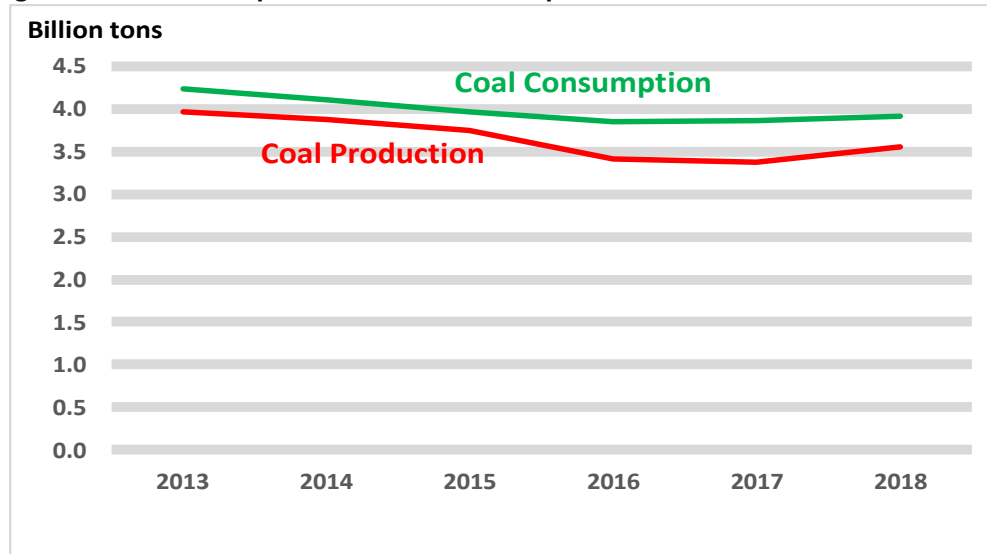


and satisfy the needs of an urban population that nearly quadrupled, reaching 60 percent of China's population in 2018. However, this remarkable growth and rapid urbanization have led to twin energy challenges -- a heavy environmental price and concerns over energy security. China has many of the world's most polluted cities and is the world's largest emitter of greenhouse gases (GHGs). In addition, China has become the world's largest energy consumer, and imports more coal and oil than any other country in the world.

2. **Coal is the largest source of GHG emissions in China, and energy transition from coal to clean energy in China is the most important climate change mitigation action in the world.** China emits more GHGs than the US and Europe combined. Coal consumption contributes to 70 percent of CO₂ emissions in China. China heavily relies on “king coal” to meet its energy demand, consuming more coal than the rest of the world combined. A low-carbon growth path in China relies on reining in energy demand and shifting away from coal to renewable energy and gas, which makes the largest contribution to reduce GHG emissions in China. In addition, the Beijing-Tianjin-Hebei region (referred to as Jing-Jin-Ji) and its neighboring region, including Shanxi province, is experiencing severe air pollution, with annual average fine particulate matter (PM_{2.5}) **concentration** far exceeding the national and the World Health Organization (WHO) PM_{2.5} standard. Coal is also the largest source of air pollutant emissions of particulates, SO₂, and NO_x in China. Therefore, energy efficiency (EE) and clean energy are “win-win” options to mitigate both air pollution and climate change simultaneously.
3. **The Government of China has undertaken one of the most aggressive energy efficiency and clean energy campaigns in the world.** The Government of China (GoC) set mandatory energy intensity (energy consumption per unit of gross domestic product (GDP)) reduction targets of 16 percent for the 12th Five-Year Plan (FYP) (2011-2015) and 15 percent for the 13th FYP (2016–2020). As a result, China cut energy intensity by 18.4 percent during the 12th FYP period and 11.2 percent from 2015 to 2018. China currently has the world's largest installed wind and solar photovoltaic (PV) capacity, with 184 gigawatts (GW) of wind and 175 GW of solar PV as of 2018. Non-fossil fuel accounted for 14 percent of the total primary energy consumption in 2018, on track to achieve the targets of 15 percent by 2020 and 20 percent by 2030.
4. **The GoC also adopted a total energy consumption cap of 5 billion tons of coal equivalent by 2020 and a coal consumption cap of 4.1 billion tons by 2020 under the 13th FYP, in addition to reducing the share of coal in the primary energy mix.** As shown in Figure 1, the total energy consumption in China increased from 4.3 billion tons of coal equivalent (tce) in 2015 to 4.64 billion tce in 2018, within the 13th FYP total energy consumption cap of 5 billion tce by 2020. Coal demand in China peaked in 2013 at 4.24 billion tons, then declined to 3.85 billion tons in 2016, but slightly rebounded to 3.91 billion tons in 2018, still below the peak value in 2013 and under the 4.1 billion tons of coal cap by 2020. The increase in coal consumption in China over the past two years was largely driven by the increase in electricity demand. The share of coal consumption in the primary energy mix also significantly reduced from 66 percent in 2013 to 59 percent in 2018. In contrast, most other Asian countries have substantially increased both the total coal consumption and the share of coal in primary energy mix over the past few years.
5. **Coal production in China has also reduced thanks to the GoC's efforts of coal mine closure, and China has become the largest coal importer in the world.** Coal production in China also peaked in 2013 at 3.97 billion tons, has steadily reduced since then to 3.37 billion tons in 2017, with a slight comeback in 2018 at 3.55 billion tons. As a result, China imported 282 million tons of coal in 2017, becoming the largest coal importer in the world. Due to increasing coal demand and declining coal production over the past few years, coal prices have jumped substantially since 2016 from 370 Yuan/ton (\$55/ton) in February 2016 to 600 Yuan/ton (\$90/ton) at the end of 2016, and remained stable around 560-580 Yuan/ton (\$84-\$86/ton) since then. The international coal prices followed China's trend at around \$90-\$100/ton in 2017 and 2018.



Figure 1. China’s coal production and consumption have declined from 2013 to 2018



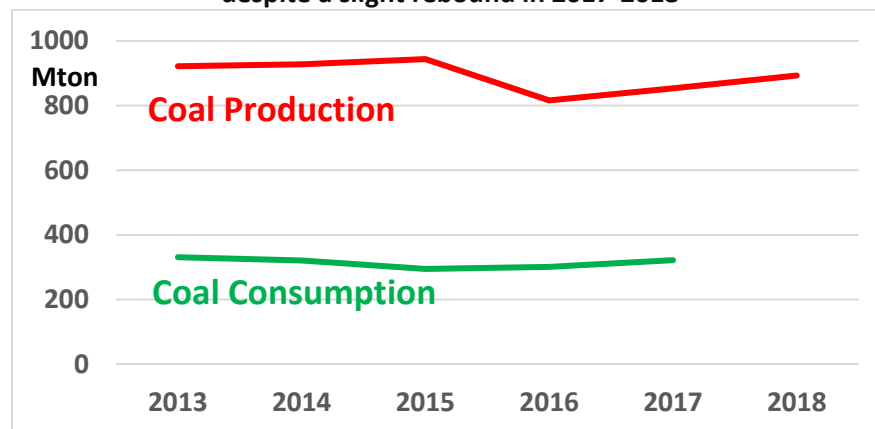
6. **The GoC has adopted a combination of regulatory measures and financial incentives to achieve its EE and RE targets.** The GoC has: (a) allocated the quantitative energy intensity reduction targets to each province (and the provincial governors are held accountable to achieve the target) and 17,000 priority energy-consuming enterprises (which account for two thirds of the national energy consumption) to achieve the energy intensity reduction targets in the 12th and 13th FYP; (b) provided output-based financial incentives per tce of energy savings for EE investments to both industrial enterprises and energy service companies (ESCOs) from 2007 to early 2015; (c) adopted feed-in tariffs (FITs) for wind, solar PV, and biomass power, as well as FIT-premiums and mandatory grid access for distributed RE generation; and (d) piloted competitive auctions for 13 GW of solar PV to reduce costs of solar PV, and Shanxi province participated the most in the national solar PV auctions. The lowest price achieved in the most recent round of solar PV auctions in 2018 was 31 fen/kWh (4.5 US cent/kWh), reduced by more than half of the current PV FIT, and on par with the average coal power purchase price. GoC is also planning to pilot wind auctions. The World Bank/Global Environmental Facility (GEF)-supported China Renewable Energy Scale-Up Program (CRESP) Phase II has been supporting the Chinese government on these important RE policies such as FIT and RE auctions.
7. **China’s Nationally Determined Commitment (NDC) committed to reducing carbon intensity by 40–45 percent from 2005 to 2020 and 60–65 percent from 2005 to 2030, and carbon emissions peaking by 2030.** Carbon intensity (carbon emissions per unit of GDP) in China declined by 46 percent from 2005 to 2017, exceeded the 2020 NDC target ahead of time, and on track to achieve the 2030 NDC target. The 13th FYP set a target to reduce carbon intensity by 18 percent from 2016 to 2020. Similar to the administrative approach to implement the energy intensity reduction target, the carbon intensity reduction target under the NDC was also allocated to each province as a mandatory target.
8. **The GoC has also placed a high priority on air pollution control and declared a “war on air pollution”.** Concerned with the adverse health and environmental consequences from the severe air pollution, the GoC has declared a “war on air pollution” and has been implementing a series of mitigation actions. The Air Pollution Prevention and Control Action Plan (APPCAP) issued by the State Council in 2013 mandated the Beijing-Tianjin-Hebei region to reduce its annual average PM_{2.5} concentration by 25 percent between 2012 and 2017, which was successfully achieved. In 2017, the GoC set new goals to reduce PM_{2.5} concentrations by around 40 percent from the 2013 level by 2020, and issued the second Air Quality Action Plan 2018-2020 (the “Three-Year Action Plan to Protect Blue Sky”) to ensure the



continuation of the nationwide systematic air quality planning; set specific targets for reducing SO₂, NO_x, and PM_{2.5} and other air pollutants; cover three key regions of air pollution control including the JJJ region particularly Shanxi; and focus on clean heating in the winter to address air pollution. The Bank’s Program-for-Results operation on Innovative Financing for Air Pollution Control in JJJ has made important contributions to this important agenda, including in Shanxi.

9. **President Xi called for an “energy revolution”, and Shanxi is committed to becoming a pioneer of energy revolution.** The “energy revolution” encompasses radical changes in energy consumption, energy supply, institutional reform, and energy technology innovation, as well as strengthens international cooperation. In September 2017, Shanxi province proposed, and the State Council approved them to be a “pioneer” province to implement the “energy revolution” as guided by President Xi.
10. **Shanxi is the second largest coal-producing province in China and its production surpasses India, the second largest coal producer in the world.** Shanxi has rich coal resources with 271 billion tons of proven coal reserves. As shown in Figure 2, Shanxi produced 893 million tons of coal in 2018 – a decline from a 944 million tons peak in 2015. Coal has dominated Shanxi’s economy for decades – with coal mining accounting for 45 percent of the provincial industrial value added in 2017. More than 60 percent of the coal produced in Shanxi is exported to other parts of China. Shanxi’s coal consumption peaked at 330 million tons in 2013, and has declined since then, but rebounded to 322 million tons in 2017. Coal consumption dominated for 84.6 percent of Shanxi’s primary energy mix in 2017, despite a decline from 89.1 percent in 2013.

Figure 2. Shanxi’s coal production and consumption have declined from 2013 to 2018, despite a slight rebound in 2017-2018



11. **Heavy reliance on coal in Shanxi has resulted in severe air pollution.** Shanxi has the worst air pollution in China, with the highest SO₂ concentration. Four of the top ten most polluted cities in China are in Shanxi, according to the Ministry of Ecology and Environment (MEE) Air Quality Ranking of 169 Cities in July 2018. Since 2013, with the launch of China’s nationwide campaign on air quality control, air quality has improved in most provinces and cities, but Shanxi was the only province that exceeded the national standards for SO₂ in 2017. As a result, Shanxi has twice lung cancer rate than the national average.
12. **Shanxi is one of the most water-scarce provinces in China and long-term coal mining generates some inevitable negative effects on water resources.** The total available water resource in Shanxi Province is estimated at around 13 billion m³ (BCM), with an estimated per capita water availability of 352.65 cubic meters per year, well below the



average “water-scarcity” standard of 1,000 cubic meters of renewable fresh water per person per year. Coal mining has contributed to the low water availability and affected water quality. Severe water resource limitations and water pollution from the coal sector are key factors in the transition toward a more resource efficient, lower coal dependent economy. As a result, the most important actions are: (a) reducing total water withdrawals by the coal sector; (b) increasing efficiency of water use in both coal mining and power generation; and (c) reducing water pollution from both coal mining and power generation.

13. **Shanxi is committed to transforming from a leader in coal to a pioneer of energy revolution, as the most important means to reduce air pollution and mitigate climate change in Shanxi.** Shanxi province has issued a series of policies and regulations to implement the energy revolution to reduce coal domination in its economy, cut down energy intensity and transition from coal consumption to clean energy, cap coal production, close coal mines, and improve air quality, as detailed in section 3 of the government program. Since coal is the largest source of GHG emissions in Shanxi, a transition to a lower coal economy makes the largest contribution to reduce GHG and air pollutants emissions.
14. **Shanxi’s transition to a lower coal economy faces challenges.** First of all, the provincial government faces the pressure to maintain their target GDP growth rate and avoid job losses, as non-coal industries are still emerging slowly. Shanxi has a GDP per capita of \$6850 in 2018, lower than the national average of \$9770, ranking 25th out of 31 provinces and municipalities in China. Shanxi had about 870,000 coal mine workers in 2018, accounting for 4.6 percent of the provincial employment, and 26.6 percent of the total coal mine employment in China. In addition, Shanxi is also pressured to produce more coal to meet the national energy demand for enhancing energy security. As unsafe and lower coal quality mines are closed in other parts of China, coal production in China now concentrates on higher quality and safer mines in top three provinces (Inner Mongolia, Shanxi, and Shaanxi), which account for more than 70 percent of the total coal production in China. This pressure led to an increase in Shanxi’s coal production from a historically low 816 million tons in 2016 to 893 million tons in 2018¹.
15. **But it is in Shanxi’s interest to shift away from coal, and such a transition without disruption of its economy and jobs will set a benchmark to other coal-producing provinces in China and other coal-dominant countries in the world.** Technological progress has made cleaner energy affordable and cost-effective. In the medium to long term, coal demand in China will drop, an economy with heavy reliance on coal production is not sustainable. Therefore, under this proposed program, the Bank intends to help Shanxi’s energy transition from coal to clean energy and economic transition from coal to new drivers for growth and jobs in the non-coal sectors, which will have a wide replication potential in China and the world.
16. **This operation builds on Bank’s long-term partnership and engagement with Shanxi province.** The CRESP Phase II Project has been supporting Shanxi to develop Energy Transition roadmap and action plan. The Bank has had a long-term engagement in Shanxi on coal bed methane (CBM), with two investment projects—Shanxi Gas Utilization Project and Shanxi CBM Development and Utilization Project--helping Shanxi capture and utilize CBM. The Bank also provided policy support and technical assistance on energy efficiency in Shanxi under the Bank/GEF Provincial Energy Efficiency Project.

Relationship to CPF

17. **The proposed operation supports the World Bank Groups’ (WBG) broader strategy of engagement in China.** The

¹ Total coal production from coal mines with an annual income above 20 million RMB in Shanxi was 893 million tons in 2018, but the total coal production from all coal mines was 926 million tons in 2018.



operation furthers the WBG twin goals of ending extreme poverty and boosting shared prosperity and is fully aligned with the key priorities identified in the Systemic Country Diagnostic (Report No. 113092-CN) and the Country Partnership Strategy for China (Report No. 67566-CN) by strengthening the policy and institutional framework for clean energy and green growth. This context informs the concept of the proposed operation and its relationship to other ongoing and prospective activities in the World Bank portfolio in China. The Bank will further help disseminate the most successful Chinese experience in scaling-up and mainstreaming clean energy.

18. **The operation also contributes to WBG global priorities in climate finance and clean energy.** At the COP 24 meeting in December 2018, the WBG announced 2025 Climate Change Targets and Actions that the WBG will significantly boost climate financing to \$200 billion over five years from 2021 to 2025. This DPO contributes to WBG's corporate climate financing targets. In addition, the proposed operation will support the World Bank Group's corporate commitment to increasing EE and RE lending, and providing sustainable energy for all. The operation also contributes to the energy revolution priorities of the GoC and Shanxi provincial government, and address air pollution and climate change during the 13th FYP.

C. Proposed Development Objective(s)

19. The objective of the operation is to accelerate Shanxi's transition to a lower coal economy, while diversifying economic growth and employment opportunities, thereby making significant contributions to global climate change mitigation and air quality improvement in Shanxi.

Key Results



Indicator Name	Baseline	Target
Reduced share of coal mining industry in GDP	13.2% (2017)	11.5% (2020)
Increased share of non-coal industry in GDP	Xx (2017)	Xx (2020)
Reduced CO2 emissions from the Program	123 million tons/year (2018)	Xx (2021)
Reduced Particulates Matters from the Program	74.3 thousand tons/year (2018)	Xx (2021)
Reduced share of coal consumption in primary energy mix	84.6% (2017)	80% (2020)
Increased renewable energy and gas installed capacity in power capacity mix	32% (2018)	35% (2020)
Reduced energy intensity per unit of GDP	7.45% (2015-2017)	16% (2015-2020)
Reduced carbon intensity per unit of GDP	9.45% (2015-2017)	18% (2015-2020)
Increased clean heating coverage in city centers in Shanxi	70% (2018)	100% (2021)
Increased coal bed methane production	12 billion m3 (2018)	20 billion m3 (2020)
Increased number of coal mines closed and coal production capacity reduction	36 (2018) 23.3 million ton (2018)	Xx (2021) Xx (2021)
Increased percentage of the laid-off workers reemployed in the non-coal sector	xx (2018)	Xx (2021)
Increased percentage of the laid-off workers receiving training and certification	Xx (2018)	Xx (2021)
Increased percentage of coal mines undertaking land reclamation before closing	Xx (2018)	Xx (2021)
Reduced SO2 emissions as a result of implementation and enforcement of provincial air pollution control policies	Xx (2018)	Xx (2021)
Reduced total water withdrawal for coal sector	0.38 BCM (2018)	Xx (2021)
Increased water recycling rate of coal mine drainage	60% (2018)	Xx (2021)

D. Concept Description

20. This operation is a programmatic DPF with two phases over a 18-24 months period. While Shanxi has made good progress on energy transition as described above, they still need to take deeper reform measures to transition away from coal, particularly focusing on reducing coal consumption, scaling up clean energy, and creating a suitable business environment for job creation in non-coal industries and service sectors. These policy actions would have more transformational impacts on the transition to a lower coal economy in Shanxi. After carefully considering alternative lending instruments, it was decided that a two-phase DPL is the most effective and innovative lending instrument to allow the Bank to provide the appropriate and necessary support for Shanxi to develop and implement more ambitious targets and policy actions to achieve their energy transition. In addition, the second-phase DPL coincides with the upcoming 14th FYP (2021-2025), when the government will issue new targets and



policies. This provides an excellent opportunity for the Bank to provide value added inputs to shape the energy transition agenda over the next five years.

21. In parallel, the Bank team is mobilizing \$15 million of Technical Assistance (TA) grants from the UK funding/ESMAP (\$10 million) and GEF (\$5 million), as complementary but separate activities, to support Shanxi in developing and implementing appropriate policy actions, building the implementation capacity of concerned agencies and stakeholders and undertake the analysis that would put the province on a successful transition path. The TA relates to supporting the economic transition; the Energy Transition Fund to be established; the greening of the energy consumption mix in the province; managing the social and environmental impacts stemming from coal mine closing; and the development of alternative employment opportunities for the economic transition from coal. These policy support and technical assistance activities will help Shanxi achieve the triggers in the second phase of the DPF, and also provide implementation support.
22. A successful energy transition in Shanxi would have global significance. The energy transition to shift away from coal to clean energy in Shanxi province will not only significantly reduce greenhouse gas emissions, which has global public goods benefits, but also reduce air pollution, which has public health benefits. Shanxi's energy transition will have a wide replication potential in other coal-producing provinces of China (e.g. Inner Mongolia) and other coal-dependent countries in the world.

LINK TO GOVERNMENT PROGRAM AND OPERATION DESCRIPTION

23. Shanxi government's program to become a pioneer of the energy revolution centered on three key areas: (1) economic transition to non-coal industries and phasing out energy-intensive industries; (2) energy transition from coal to clean energy (renewable energy and gas), improve energy efficiency, and cap total energy consumption and coal consumption; and (3) cap coal production and close coal mines. The policies and targets are detailed in the State Council Decree No. 42 "*Supporting Shanxi to Deepen Reform and Promote Energy and Economic Transition*", Provincial Decree No. 49 "*Implementation Plan of the State Council Decree No. 42*" and Provincial Decree No. 50 "*Action Plan for Shanxi to Become a Pioneer of Energy Revolution*", both issued in September 2017, as well as the Shanxi government's policy *Piloting Comprehensive Reform for Energy Revolution in Shanxi* and the detailed Implementation Plan being developed.
24. To be closely aligned with the government's program, the DPF in Shanxi is based on four pillars:
 - Establishing a framework to guide economic and energy transition to maintain and diversify economic growth and employment opportunities;
 - Transitioning energy consumption from coal to clean energy, including renewable energy, coal bed methane, energy efficiency, and clean heating, to replace coal consumption;
 - Reducing coal production capacity in an inclusive and sustainable way, with focus on coal mine closures and associated labor and social protection policies for laid-off workers and environmental remediation and land reclamation; and
 - Transitioning to environmentally friendly and resource efficient economy focusing on air and water quality improvement.
25. The project design is informed by the experience accumulated through sustainable energy and climate change operations in other countries, as well as other subnational development policy operations in China. Experience has confirmed that strong ownership of the operation is particularly critical to the success of development policy



lending. The operation is encouraged by the commitment of Shanxi Province to transform itself from a leader in coal to a leader in energy revolution that could be followed by other coal-dependent provinces and countries.

PRIOR ACTIONS, RESULTS AND ANALYTICAL UNDERPINNINGS

26. The Bank team has discussed with the relevant government agencies the proposed prior actions and triggers. All the prior actions except for one and about half of the proposed triggers have been confirmed with the provincial government. The confirmation of the remaining proposed triggers would need further analytical work, discussions and agreement with high-level decision makers of the provincial government during project preparation.

Prior actions and Triggers	
Prior Actions under DPF 1	Triggers for DPF 2
Pillar 1: Establishing a framework to guide economic and energy transition to maintain and diversify economic growth and employment opportunities	
Objective A: This pillar aims to set the overarching framework and targets to guide Shanxi’s economic and energy transition, while maintaining and diversifying economic growth and employment opportunities.	
Prior Action #1: Provincial Government has submitted to the Central Government for approval a policy “Piloting Comprehensive Reform for Energy Revolution in Shanxi” and adopted a Provincial Decree “Implementation Plan of Piloting Comprehensive Reform for Energy Revolution in Shanxi” [Approval from the Central Government completed, but Provincial Decree not yet issued]	<p>Trigger #1: Provincial Government adopts investment criteria for clean energy and non-coal industries under the Energy Transition Fund to be established [confirmed]</p> <p>Trigger #2: Provincial Government adopts an Action Plan to improve the investment climate and introduce policies to promote non-coal industries [to be better defined]</p>
Pillar 2: Transitioning energy consumption from coal to clean energy	
Objective B: This pillar aims to accelerate energy transition from coal to clean energy (renewable energy and gas), resulting in significant CO2 and air pollutants emission reductions.	
Prior Action #2: Provincial Government has adopted: (a) a three-year plan for air pollution control setting forth policy measures for energy transition to shift from coal to renewable energy and gas in the energy mix; and (b) a three-year clean heating plan setting targets for clean energy coverage and providing financial incentives and pricing policies and enforcement mechanisms to expand clean heating in the province (evidence: Provincial Decree No. 30 issued on July 29, 2018 “Three-year Action Plan for Shanxi to Protect Blue Sky” and Provincial Decree No. 485 issued on July 13, 2018 “Clean Heating Implementation Plan in Shanxi”).	<p>Trigger #3: Provincial Government sets a target to double renewable energy capacity from 2021 to 2025 in the 14th FYP and adopts renewable energy policies under grid parity to achieve the targets [RE targets to be confirmed and RE policies confirmed]</p> <p>Trigger # 4: Provincial Government sets a carbon intensity reduction target from 2021 to 2025 higher than the national target in the 14th FYP and adopts a climate change action plan that contributes to NDC [to be confirmed]</p>
Prior Action #3: Provincial Government has adopted a coal cap policy to keep the total coal consumption not increasing by mandating reduction or replacement of coal consumption for all newly built, expanded, or rebuilt coal-consuming	Trigger # 5: Provincial Government sets a target to reduce coal consumption from 2021 to 2025 in the 14 th FYP and adopts a coal cap policy to achieve the targets [confirmed]



Prior actions and Triggers	
<p>projects (evidence: Provincial Decree No. 266 issued on May 9, 2018 “<i>Implementation Plan of Coal Consumption Reduction or Replacement</i>”)</p>	
<p>Prior Action #4: Provincial Government has adopted a plan to deepen coal bed methane (CBM) reform and scale up coal bed methane production that (a) set targets for coal bed methane utilization; (b) introduced competitive auction for licensing to the right to explore and capture CBM; and (c) streamlined the approval procedures for exploring and capturing CBM (evidence: Provincial Decree No. 16 issued on January 23, 2018 “<i>Deepening Coal Bed Methane/Natural Gas Reform Implementation Plan</i>”)</p>	<p>Trigger # 6: Provincial Government adopts coal bed methane licensing policies to remove the barriers to scale up coal bed methane capture and utilization [confirmed]</p>
<p>Pillar 3: Reducing coal production capacity in an inclusive and sustainable way</p> <p>Objective C: This pillar aims to transition away from Shanxi’s coal-dominated economy by reducing coal production capacity, re-employing laid-off workers from closed coal mines to non-coal sectors, and managing the environmental and land restoration of closed coal mines.</p>	
<p>Prior Action #5: (a) Provincial Government has adopted a labor program promoting employment of laid-off workers; (b) PFB and DHRSS have established an earmarked employment subsidy fund for job creation and training of laid-off workers; (c) DHRSS has adopted a program to strengthen social protection for laid-off workers (evidence: Provincial Decree No. 2 issued on January 24, 2019 “<i>Implementation Opinions on Promoting Employment in the Current and Future Periods</i>”, Provincial Decree No. 1 issued by PFB and DHRSS on January 14, 2019 “<i>Approach of Employment Subsidy Fund Management</i>”, and Provincial Decree No. 11 issued by DHRSS on February 15, 2019 “<i>Notice on the Relevant Issues Concerning the Transfer and Continuation of the Social Security Relationship of Laid-off Workers of State-Owned Enterprises</i>”)</p>	<p>Trigger # 7. Provincial Government adopts an improved resettlement, training and re-employment program for laid-off workers with a budget allocation from the employment subsidy fund and the unemployment insurance fund to promote skills development and re-employment in non-coal sectors [confirmed]</p>
<p>Prior Action #6: Provincial Government has established a funding mechanism that mandates mining companies to allocate a formula-based percentage of their income for environmental remediation and land reclamation of coal mine areas (evidence: Provincial Decree No. 3 issued on January 8, 2019 “<i>Notice of Fund Management for Mining Environmental Clean-Up and Restoration</i>”)</p>	<p>Trigger #8: Provincial Government appoints a Coal Mine Closure leading agency and coordination committee to clarify agencies’ roles and responsibilities and improve coordination among relevant agencies to manage labor and environmental impacts of coal mine closure [to be confirmed] Trigger # 9: Provincial Government adopts coal mine closure technical regulations and standards to guide environmental remediation, land reclamation and safety [confirmed]</p>
<p>Pillar 4: Transitioning to environmentally friendly and resource efficient economy</p> <p>Objective D: This pillar aims to improve air and reduce negative ecological impacts on water resources associated with energy transition.</p>	



Prior actions and Triggers	
<p>Prior Action #7: Provincial Government has adopted an air pollution control policy to (a) improve enforcement mechanisms for compliance and non-compliance, and hold city and county leaders accountable for air quality improvement; and (2) strengthen fiscal incentives and encourage diversified financing sources for air pollution control measures (evidence: Provincial Decree No. 31 issued on June 27, 2018 “<i>Provincial Air Quality Improvement Accountability Management Measure</i>”, and Provincial Decree No. 15 issued by Provincial Environmental Protection Bureau (EPB) and Finance Bureau on January 24, 2019 “<i>Shanxi Air Quality Fiscal Incentives and Penalties Management Measure</i>”)</p>	<p>Trigger # 10: Provincial Government issues air pollutant emissions standards to iron and steel and recycled rubber sectors [to be confirmed]</p>
<p>Prior Action #8: Provincial Government has adopted a policy to encourage coal mines to save water through (a) promoting increased water efficiency; and (b) prioritizing utilization of recycled coal mine drainage water (evidence: Provincial Decree No. 284 issued in October 31, 2018 “<i>Implementation Plan on Building a Water-Saving Society in Shanxi</i>”)</p>	<p>Trigger # 11: Provincial Government establishes specific requirements for water use efficiency of coal mining [confirmed]</p>

E. Poverty and Social Impacts and Environmental Aspects

Poverty and Social Impacts

27. **Poverty:** Social impact on poverty from this operation is generally very positive. First of all, the DPO will result in much better air and water quality to the provincial public citizens including the poor in rural and urban areas in long term. In the meantime, measures of conveniently accessible and clean energy under the transition from coal to electricity and gas directly target the rural population and urban poor to improve their life quality. In the three years, all the urban poor citizens and more than half rural people throughout the whole province could utilize accessible pipe-gas or cheaper electricity with governmental subsidies.
28. The possible negative social impacts on the poor may occur on two aspects: unemployment and socioeconomic risks for workers in the closed coal mines and industries and for local development at the closed sites; and the cost of installing the energy facilities and energy price increase. To address the two risks, the DPO designs two action measures. The first one is to support the job creation, training and providing social safety net to avoid and mitigate and offset the possible negative impacts. The second prior action is to implement preferential policy as an action plan for clean heating in Shanxi province, dated on July 18, 2018, to determine roles and shares of and subsidies from various level of government from province to county, covering cost from facilities building and operation of involved enterprises, and energy equipment installation in-house and utilization cost in the poor households, which ensures they could use safer and clean energy without increased energy bills.
29. **Social:** To achieve the PDO, prior actions and future triggers, all policy oriented, are mainly relevant to: transition from coal to clean energy including renewable energy and coal bed methane, capping coal consumption and production; closure of some coal mines and phase-out of high energy-intensive industries; and waste related facilities; reclamation of closed coal mine area; and mitigating social impacts of laid-off workers for coal mine closure.



30. The actions and triggers are to bring long term positive social impacts on improvement of air and water environment quality, and increasing the coverage of clean and convenient energy for the whole provincial population, including the poor, women, minority and other vulnerable groups. Further, two proposed prior actions are designed or implemented directly to target the poor and/or rural citizens: i) Provide social safety net, training, and re-employment for laid off coal miners, which is specially proposed to assist and benefit the vulnerable workers in the closure process to reduce poverty; ii) Reduce the total coal consumption and expand clean heating. The action provides subsidies for in-house facilities and annual heating fee for citizens including the poor, and free installation of in-house facilities for reorganized poor households and elder care centers.
31. However, these actions and triggers also probably have effects to turn out to be negative if not well addressed, such as: land acquisition and resettlement; unemployment and income reduction; increase of energy price; safety and health impacts in the closure, construction and operation; change of energy access and use right in rural and suburban area; impacts on poverty, minority, gender and other vulnerable group; etc. Based on analytic knowledge from the provided documents by the provincial authorities and past and current projects of the Bank in the province, the provincial social system, from law to institution and performance, has addressed or could address the most of the above negative impacts to make the program social impacts manageable, and further well handled with some additional social policy and/or institution-related measures to incorporated into program design and implementation in the next step.
32. Therefore, an assessment on social impacts needs a joint effort from the Bank and the province side. The development policy operation will be carried out to appropriately identify and analyze the positive and negative social impacts, as discussed above; assess the provincial systems mitigating the negative impacts and enhancing positive impacts; explore gap-filling measures, where gaps exist, to be reflected in the program design and operation. In the process of the assessment, extensive consultation and participation as well as information disclosure will be conducted with various stakeholders, and the assessment will be disclosed.
33. Considering the above significant social impacts in large geographic area throughout the whole province as a result of the program, the social risk seems high. The province and its energy sector-related authorities, however, have engaged the Bank for a long history and have a strong capacity and commitment. Hence, the overall social risk is substantial.

Environmental Impacts

34. The main prior actions and triggers in Pillar 1 of establishing the framework to guide economic and energy transition; Pillar 2 of transitioning energy consumption from coal to clean energy; and Pillar 3 of reducing coal production capacity in a sustainable and inclusive way may have positive environmental impacts through closing coal mines, shifting from coal and clean energy in the province to reduce the share of coal consumption, expanding clean heating in the 8 most polluted cities, and implementing comprehensive reclamation and repurposing of abandoned and subsidence coal mine areas, and restoring ecological systems and increasing the areas with natural habitats or forests in the coal mine areas. Pillar 4 of transitioning to environmentally friendly and resource efficient economy would benefit the environment and the health of the people, through issuing and adopting more stricter emission standards, as well as implementation of water pollution action plan. Other policy actions supported by the operation have been found to be environmentally neutral. Among the four Pillars of this Operation, Pillar 1 and 2 will make significant contributions to global climate change mitigation and air quality improvement in Shanxi.



35. Therefore, the prior actions and triggers supported by the proposed DPO, especially prior actions 6 to 8, are not expected to have any significant adverse impact on the environment, forests and other natural resources in Shanxi Province. Instead, in a long run the policy actions and triggers should bring positive environmental benefits to the environment and people’s health through air and water pollution control measures and environmental restoration activities conducted for coal mine closure. All the policy actions supported throughout the DPO are policy-oriented, which do not support direct investment in environmentally impactful investment or involve policy actions with significant adverse environmental consequences. As mentioned, The Bank is mobilizing substantial amount of GEF grants and UK funding to support Shanxi in developing more policy actions, building the implementation capacity of concerned agencies and stakeholders and undertake the analysis that would relate to the greening of the energy consumption mix in the province; the social and environmental effects stemming from coal mine closing, and standards and technologies to manage them; the development of alternative employment opportunities related to the economic/industrial transition from coal. For coal mine closure in particular, the proposed TA activities will help to materialize the guidelines into operational procedures, the technical regulations and standards on land reclamation and repurposing. When mining companies submit their Mining Reclamation Plans to Department of Natural Resources and Department of Ecology and Environment for review and approval, technical standards for sustainable land reclamation, repurposing, and environmental clean-up should be in place to guide the evaluation and approval process. Therefore, it is expected that the implementation of measures to support coal mine closure, promotion and development of renewable energy, and strengthening the efficiency and sustainability of social protection system will pose no risk to the environment.
36. However, these actions and triggers also could bring negative environmental impacts and results, if implementation of the proposed policy actions are not adequately managed and monitored, especially when there are no proper technical and environmental, health and safety guidelines, such as for coal mine closure and comprehensive remedy, treatment and ecological restoration of mining subsidence areas. There is no requirement of environmental impact assessment for coal mine closure in Shanxi. The environmental management responsibility lies with the project implementation agency, and local Ecology and Environment Department (EED) is responsible for monitoring and evaluation in the course of implementation. Therefore, it is essential to enhance the technical and environmental support through provision of technical and design guidelines upstreaming and mainstreaming the environmental requirement into decision making and preparation stage, e.g. through provisions in closure plans in form of environmental targets, obligations, remedies or standards. Furthermore, the environmental monitoring and evaluation should be carried out throughout the implementation and operation.
37. In the process of project preparation, consultation and stakeholder engagement as well as information disclosure will be conducted, once the project document is drafted.
38. The overall environment risk is proposed as substantial.

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