Green Practice in the Transformation and Development of Resource-Based Cities: A Case Study of "Datong Blue" in Shanxi Province (Postprint)

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Abstract

Smog constitutes a prominent issue of atmospheric pollution in China and represents a common challenge confronting numerous provinces and municipalities across the nation. Local governments must judiciously manage the interrelationships among public demands, environmental protection pressures, and economic growth. As a nationally significant coal industrial base, a vanguard of transformation and comprehensive reform in Shanxi Province, and a representative resource-dependent urban region, Datong City has established the renowned brand of "Datong Blue" throughout the country. This article systematically summarizes and synthesizes the green transformation and practical experiences of "Datong Blue" across nine dimensions: conceptual framework, supporting pillars, core elements, implementation measures, strategic levers, developmental pathways, institutional guarantees, foundational basis, and methodological approaches, aiming to provide scientific evidence and reference for the green development of Shanxi Province and analogous regions.

Full Text

Abstract

Haze is a prominent problem in China' s air pollution and a common challenge faced by many provinces and municipalities nationwide [1-5]. Haze control has become a hot topic of national concern and public attention [6-12]. In response to the haze issue, local governments face increasing environmental protection pressure as they must be accountable to the public, while the performance-oriented mindset of "pursuing development and GDP" persists at certain stages. Therefore, local governments must properly balance public demand, environmental protection pressure, and economic growth. As an important national

coal industrial base, a frontier for comprehensive transformation and reform in Shanxi Province, and a typical resource-based city, Datong has established a well-known brand called "Datong Blue" across the country. This paper summarizes and synthesizes the green transformation and practice of "Datong Blue" from nine aspects: concept, support, core, measures, grasping point, path, guarantee, foundation, and approach, aiming to provide scientific basis and reference for green development in Shanxi Province and similar regions.

Keywords: resource-based city, Datong Blue, green practice, ecological civilization construction

Introduction

In 2016, under the influence of multiple rounds of adverse meteorological conditions, all 11 prefecture-level cities in Shanxi Province except Datong activated orange and red alerts for haze. As the northernmost city in Shanxi, Datong is adjacent to Beijing-Tianjin-Hebei, connects Shanxi, Hebei, and Inner Mongolia, and is located in a basin. As a typical coal resource-based city, its meteorological diffusion conditions hold no inherent advantages. Nevertheless, Datong managed to break through the haze siege, achieving 314 days of excellent air quality (Grade II or above) throughout the year—exceeding the provincial target by 53 days and its self-imposed goal of 300 days by 14 days. The air quality excellence rate reached over 86 percent, nearly 15 percentage points higher than the provincial target. This created the "Datong Blue," a stark contrast to its former image as a "coal capital," ranking Datong' s air quality first in Shanxi Province. Datong not only provides resource and energy security for the Beijing-Tianjin-Hebei region but also solidifies the ecological foundation for green development in the area through "Datong Blue." Led by the Institute of Geographic Sciences and Natural Resources Research of the Chinese Academy of Sciences, the compilation of the "Datong Ecological Civilization Construction Plan" and "Datong Regional Development Strategy Research" provided top-level design and implementation pathways for Datong' s transformation from a "coal capital" to a "green capital," launching "Datong Blue" as its most competitive ecological product. Since December 2016, Xinhua Net has published three consecutive articles on "Datong Blue," attracting nationwide media attention [13]. How can resource-based cities achieve a "glorious" transformation? Where does "Datong Blue" come from? How can green development concepts and pathways be implemented? These are the questions this paper seeks to address.

Concept: Upholding Ecological Civilization Construction and Practicing Green Development

The 18th National Congress of the Communist Party of China proposed establishing the ecological civilization concept of respecting, accommodating, and protecting nature, and adhering to a civilized development path featuring productive development, affluent living, and healthy ecosystems. General Secretary Xi Jinping emphasized that "we want both lucid waters and lush mountains, and

mountains of gold and silver; better still, we want lucid waters and lush mountains, not mountains of gold and silver; for lucid waters and lush mountains are indeed mountains of gold and silver." Since the 18th Party Congress, Shanxi Province has implemented the new ecological civilization concept with high ideological and action consciousness, vigorously promoting ecological civilization construction around the development concepts of "innovation, coordination, green development, opening-up, and sharing" proposed by General Secretary Xi Jinping, taking the opportunity of building a national comprehensive transformation and reform pilot zone. Datong has established the development goal of "one great Datong" and insists on transforming ecological advantages into economic advantages. The city has embraced the concept that "a good ecological environment is the fairest public product and the most inclusive welfare for people' s livelihood," implementing the "136" development strategy: "1" refers to building a regional central city connecting the capital in the east, the Silk Road in the west, central Shanxi in the south, and Mongolia-Russia in the north; "3" represents three main threads—establishing the ideology of "harmony with heaven, earth, and humanity" to follow natural laws for sustainable development and build a beautiful Datong, following economic laws for scientific development and build a prosperous Datong, and following social laws for inclusive development and build a happy Datong, ensuring all citizens have a sense of gain and happiness; "6" denotes six measures—taking transformation development as the primary task to consolidate development advantages, taking reform and innovation as the primary driver to expand development space, taking public needs as the primary pursuit to improve people' s livelihood, taking ecological conservation as the primary requirement to build a green capital, taking safety and stability as the primary guarantee to create a harmonious environment, and taking comprehensive and strict Party governance as the primary responsibility to purify the political ecosystem. This strategy makes ecological city establishment the main thread of urban development, with the goals of building a beautiful, prosperous, and happy Datong.

Support: Enhancing Air Self-Purification Capacity and Developing Differentiated Industries

Haze control effectiveness is a long-term, complex systematic project that fundamentally relies on Datong' s enhanced self-purification capacity. Based on topography, precipitation, and atmospheric circulation, the municipal Party committee and government established the development principle of ecological leadership, environmental priority, and air quality precedence, consistently expanding urban green areas, restoring natural vegetation and forests, and constructing urban isolation belts and wetland parks to effectively reduce the urban heat island effect. These measures form the supportive conditions for "Datong Blue" with demonstrably good results. Focusing on the Yu River and Kouquan River basins, Datong formulated the "Two Rivers Basin" plan and implemented wetland projects with a total investment of 480 million yuan, as well as artificial wetland construction and basin sewage collection projects for water environment

improvement, addressing the shortcoming of insufficient ecological water replenishment in northern cities and greatly improving ecological conservation and air self-purification capacity. Simultaneously, the city launched the "Ring Ancient City" and "Ring Wenyong Lake" dual-ring actions with a total investment of 69 billion yuan for 27 key projects. The "Ring Ancient City" action includes 12 projects with 11.3 billion yuan investment, while the "Ring Wenyong Lake" action includes 15 projects with 5.77 billion yuan investment. These projects cover ancient city development and protection, cultural tourism, ecological wellness, convention centers, technology industrial parks, and new energy, forming the ecological skeleton for Datong' s urban development. The ancient city revival guards the "heart" of development, while the Wenyong Lake ecological construction strengthens the "lungs" of respiration, creating a new urban development ecological pattern that forms the foundation of "Datong Blue."

To improve infrastructure, 13 municipal wastewater treatment plants have been built and operated, achieving full coverage of wastewater treatment plants in all counties and districts. Municipal solid waste treatment plants and kitchen waste treatment plants have been successively put into operation, treating 360,000 tons of household waste and 55,000 tons of kitchen waste annually. The under-construction construction waste resource integration project, with a total investment of 740 million yuan, had its first phase put into production in June 2017. Upon completion, it can treat 1.5 million tons of urban construction waste and 500,000 tons of road asphalt concrete waste annually, producing recycled aggregates, active micro-powder, inorganic materials for highways, dry-mixed mortar, high-performance concrete, concrete products, ceramsite, and garden soil. A sludge disposal project with a total investment of 68.9 million yuan began static debugging in January 2017 and started operation in March, capable of treating 200 cubic meters of sludge daily.

In terms of guiding differentiated industrial development, Datong' s three-industry ratio has adjusted from 5.3:50.7:44 to 5.8:36.5:57.7 (2016 data). Regarding industrial structure optimization, non-coal industrial added value accounts for 50.9 percent of industrial enterprises above designated size, an increase of 13.6 percent year-on-year, while coal industrial added value accounts for 49.1 percent, a decrease of 13.6 percent. To build high-quality industrial chains, Datong promotes coal supply-side structural reform with cultural tourism as the lead and modern services as support, comprehensively implementing the "three cuts, one reduction, and one supplement" policy, reducing coal capacity by 29.76 million tons. The city persistently transforms its development mode by implementing quality improvement projects for traditional advantageous industries, modern service industry development projects, strategic emerging industry cultivation projects, energy industry innovation projects, and characteristic agricultural efficiency projects, constructing a modern industrial system with distinctive features, diversified support, rational layout, and high-end chains.

Core: Adjusting Industrial Structure, Optimizing Energy Composition, and Promoting Industrial Energy Conservation and Emission Reduction

Datong has made "gradual improvement of ecological and environmental quality as a binding requirement for regional development," using environmental protection to force the elimination of backward industries while actively guiding and promoting transformation and structural adjustment in traditional industries. First, the city insists on synchronizing environmental impact assessment for industrial parks with project environmental assessment. In the construction of equipment manufacturing parks, pharmaceutical parks, new energy parks, metallurgical industrial parks, coal chemical parks, Longquan industrial parks, and Tashan circular industrial parks, planning environmental impact assessment is given priority, with pollution control facilities strengthened during project civil construction to create intensive and diversified industrial platforms. Second, Datong guides advantageous projects and comprehensive projects to complement each other and advance together. Within park-based platforms, the Datong comprehensive energy base project—Tashan Phase II $2\$\times 660,000kWthermalpowerunitofDatongCoalMineGroup—hasoneunitgrid-connectedandanotherintrialoperation;theYanggao2\times\$350{,}000$ kW project of Datong Coal Mine Group has basically met hydraulic test conditions. The new energy base construction project—National Advanced Technology Photovoltaic Demonstration Base in coal mining subsidence areas Phase I 1-million kW project—has been successfully grid-connected. The city' s total wind power installed capacity reaches 1.65 million kW, and photovoltaic power installed capacity totals 1.55 million kW, accounting for 23 percent (7.24 million kW) and 53 percent (2.92 million kW) of Shanxi Province' s total respectively. A batch of advantageous industrial projects including the 25.8 billion yuan Datong Coal Mine Group-CNOOC 4 billion cubic meter coal-to-gas project, Jinbei Logistics Park, Datong General Aviation Manufacturing Industrial Park, prefabricated green building integrated industrial base, and Datong Panda Power Station are vigorously advancing, complementing and mutually promoting traditional industry upgrading and transformation, forming a virtuous cycle where both coal and non-coal industries are strengthened simultaneously and industrial structure is sustainable.

Measures: Strengthening Eight Control Measures and Conducting Iron-Fisted Pollution Control

Environmental protection enforcement is not a "cotton swab" but a "killer weapon" —it represents "hard-hitting" project targets and "solid" measures. In recent years, Datong has strengthened eight control measures: coal control, gas treatment, vehicle management, dust suppression, emission reduction, enterprise management, early warning, and elimination of "small and indigenous" enterprises, continuously intensifying air pollution control while making tangible efforts in greening and ecological conservation.

Regarding coal control, Datong has completely eliminated coal-fired boilers under 10 tons, accelerated the transformation of boilers above 20 tons, decommissioned 3,000 coal-fired boilers in recent years, reducing coal consumption by approximately 1.89 million tons and cutting emissions of smoke dust by 9,070 tons, sulfur dioxide by 15,120 tons, and nitrogen oxides by 6,840 tons. For gas treatment, all public buses have been replaced with new energy and pure electric vehicles, with a total investment of 534 million yuan—including 620 natural gas buses (285 million yuan), 184 hybrid buses (120 million yuan), and 150 pure electric buses (129 million yuan). In vehicle management, five departments (environmental protection, public security, commerce, finance, and transportation) jointly promoted the elimination of yellow-label vehicles and old vehicles, decommissioning 30,182 vehicles in the past two years (14,497 yellow-label vehicles and 15,685 old vehicles). For dust suppression, the city launched the "Green Net Action" as part of iron-fisted pollution control, requiring all exposed earth in construction sites to be covered with green nets, comprehensively rectifying construction dust. A total of 61 construction sites were inspected, 45 rectification notices issued, and 181 hazards identified and corrected. In emission reduction, ultra-low emission upgrading projects were implemented for five power enterprises including Shanxi Zhangdian Datang Tashan Power Generation Company, reducing sulfur dioxide by 17,140 tons and nitrogen oxides by 7,100 tons; denitrification projects were completed at three cement enterprises including Guangling Jinyu Cement Company, reducing nitrogen oxides by 810 tons; county-level centralized heating replacement projects reduced sulfur dioxide by 136 tons, nitrogen oxides by 34 tons, and replaced 8,550 tons of raw coal; clean energy transformation projects reduced sulfur dioxide by 531 tons and nitrogen oxides by 116 tons. For enterprise management, all 52 national-controlled pollution sources established both paper and electronic archives, with on-site automatic monitoring equipment installation rate, acceptance rate, and comparison assessment rate all reaching 100 percent. Drone enforcement, grid-based law enforcement, and online pollution source monitoring constitute strong comprehensive enforcement measures. In early warning, environmental protection and meteorological departments jointly established a heavy pollution weather consultation mechanism, using dual platforms of meteorological forecasting and heavy pollution weather warning to conduct multiple rounds of consultations and strengthen response measures based on air quality potential analysis. In 2016, under adverse meteorological conditions, over 500 environmental law enforcement officers were dispatched to streets, communities, and pollution point sources, implementing "five inspections" (night, surprise, daily, patrol, and supervision inspections). A total of 300 enterprises were inspected, including 84 water-related enterprises, with administrative penalties totaling 6.99 million yuan (including 2.9 million yuan in daily penalty fines). Regarding the elimination of "small and indigenous" enterprises, the city 深入开展 the "Iron-Fisted Pollution Control Action," shutting down 77 "small and indigenous" enterprises (43 small coal washing plants and 34 iodine stone kilns). These eight control measures form the fundamental basis of "Datong Blue" and initially realize Datong's ecological development philosophy.

In enhancing greening and ecological conservation effectiveness, Datong emphasizes that "the environment is people's livelihood," "green mountains are beauty," and "blue sky is happiness." In 2016, the ancient city wall was closed and the moat fully connected. The 9-kilometer-long moat, with a main channel width of 20 meters, encircles the ancient city like a jade belt, recreating the historical appearance of the Ming Dynasty wall and greatly conserving the ancient city's ecology. The north city wall belt park added 179,700 square meters of green area, and the west city wall belt park added 222,000 square meters, forming a green barrier around the city that ecologically purifies the ancient city air. In 2016, Datong completed 530 million yuan in landscaping projects, adding 1.1678 million square meters of green area in built-up areas. The built-up area's green coverage rate, green space rate, and per capita park green area reached 40.96 percent, 36.84 percent, and 15.27 square meters respectively, representing increases of 0.87 percent, 0.88 percent, and 0.48 square meters per person year-on-year, achieving remarkable results in greening and ecological conservation.

Grasping Point: Total Pollutant Emission Reduction and Multi-Pollutant Coordinated Automatic Monitoring

Reasonable regional environmental quality targets are determined, and comprehensive air pollution control schemes are established based on environmental capacity calculations corresponding to these targets. First, total pollutant emission reduction forces enterprises to use clean energy. Energy conservation and emission reduction actions are carried out with active participation in emissions trading market transactions. Strict emission standards, online monitoring, and cleaner production audits are implemented to achieve city-wide total quantity control. Second, the city gives full play to the networking mechanism between urban districts and counties. Regional joint prevention and control generates positive externalities for environmental governance, helping achieve pollution control targets at lower costs. A scientific and systematic environmental monitoring system is established to conduct coordinated control of multiple pollutants including sulfur dioxide, nitrogen oxides, and particulate matter. Third, the city strengthens the construction and management of desulfurization, denitrification, and dust removal facilities at coal-fired power plants and cement factories. All seven urban thermal power plants with a total capacity of 7.17 million kW meet new national emission standards; all or some units at Guodian Datong Power Generation Company, Zhangze Power Group Tongmei Tashan Power Plant, Tongmei Group Tongda Thermal Power Company, and Datang International Yungang Thermal Power Company have completed ultra-low emission transformation. The cement industry has completed denitrification facility construction and dust prevention facility upgrading. According to the "Datong Key Industry Volatile Organic Compounds Comprehensive Improvement Implementation Plan," 12 key units in pharmaceuticals, surface coating, and organic chemicals have comprehensively implemented volatile organic compounds pollution control. Thirty key enterprises in Datong conducted cleaner production technological transformation, with 29 implementing 59 medium- and high-cost

solutions from cleaner production audits, achieving a 93.2 percent implementation rate and exceeding provincial targets.

Path: Adjusting Energy Consumption Structure and Promoting Environmental Protection

To improve air quality, the Datong Municipal Party Committee and Municipal Government have designated an 89-square-kilometer no-combustion zone where raw coal use is strictly prohibited and clean energy is promoted. Over the years, more than 3,000 coal-fired boilers have been dismantled, and 57.8 million square meters of cogeneration central heating have been developed, achieving 99.7 percent central heating coverage. Natural gas users have reached 684,000 households with 98.7 percent coverage. Renewable energy is vigorously promoted in new buildings, reaching 81 percent application rate. Comprehensive energy consumption per 10,000 yuan GDP decreased by 3.2 percent year-on-year.

While vigorously promoting ancient city revival, Datong addresses coal-burning pollution from ancient city bungalows. The ancient city originally had 40,000 bungalow households producing 1,280 tons of sulfur dioxide, 290 tons of nitrogen oxides, and 1,920 tons of smoke dust annually—extremely severe pollution from non-point sources. Through government subsidies, special fund support, and matching funds from relevant counties, the city distributes one ton of environmentally friendly coal free of charge to each bungalow household in the ancient city every winter, allowing them to purchase two additional tons at preferential (cost) prices. In just two years (2015–2016), Datong allocated 20 million yuan for environmentally friendly coal subsidies. This beneficial policy was further expanded to urban villages and urban-rural fringe areas during ancient city revival, benefiting 22,000 bungalow households in these areas. Statistics show that ancient city bungalow households have decreased from 40,000 to 1,000, reducing sulfur dioxide emissions by 1,250 tons, nitrogen oxides by 282 tons, and smoke dust by 1,870 tons. The 22,000 bungalow households in urban villages and fringe areas using environmentally friendly coal reduced sulfur dioxide by 246 tons, nitrogen oxides by 80 tons, and smoke dust by 527 tons. Additionally, to effectively improve energy structure and living environment, Datong has piloted "coal-to-electricity" heating electrification projects for 2,050 households in villages including Daquanshan in Yanggao County and Jingzhuang in Hunyuan County. Upon completion, these projects are expected to save 6,400 tons of standard coal annually (equivalent to 9,100 tons of raw coal), reducing sulfur dioxide by 145.6 tons, nitrogen oxides by 26.7 tons, and smoke dust by 218.4 tons annually.

Guarantee: Transmitting Pressure, Assuming Responsibility, and Implementing Environmental Protection Main Body

Deepening ecological civilization system reform, Datong firmly consolidates the "four beams and eight columns" of the ecological civilization system, achieving institutionalization and legalization of ecological civilization construction. The

Datong Municipal Party Committee and Municipal Government attach great importance to environmental protection, striving to build a work mechanism where Party and government share responsibilities, each post bears dual responsibilities, rights and responsibilities are consistent, and all parties jointly manage. The Datong Environmental Protection Work Leading Group has been established, issuing the "Datong Environmental Protection Work Responsibility Regulations (Trial)," "Datong Environmental Protection Inspection Implementation Plan," "Datong Environmental Protection Inspection Implementation Plan," and "Datong Water Environment Rectification Plan." The Secretary of the Municipal Party Committee and the Mayor serve as group leaders, personally overseeing environmental protection work; the Municipal Party Committee Secretary-General and the Executive Vice Mayors in charge of public security and environmental protection serve as deputy group leaders, specifically managing environmental protection; the Director of the Municipal Environmental Protection Bureau serves as office director responsible for coordination; heads of various departments are leading group members fulfilling environmental protection duties; Party committees and governments at all levels strictly fulfill environmental protection main responsibilities, transmitting pressure level by level, actively implementing measures, and strengthening environmental protection main body. All counties, districts, and departments attach great importance to environmental protection, forming a responsibility system that extends vertically to the bottom and horizontally to all sides—this is the organizational guarantee for "Datong Blue."

The city strengthens environmental protection and green assessment system construction by establishing and improving a green GDP assessment system with economic development and environmental protection as core objectives, firmly establishing correct performance views, resolutely rejecting GDP that pollutes the environment and destroys ecology, and striving to create GDP featuring lucid waters and lush mountains for sustainable development that gives people real sense of gain and happiness. Adhering to problem orientation and bottom-line thinking, mobilizing the masses, strengthening supervision, and fighting a tough battle for environmental protection, Datong strives to create a new era of clear waters and blue skies.

A city-wide pollution prevention and control joint prevention and control mechanism has been established based on the principle of combining territorial management with regional coordination. Three major mechanisms—collaborative pollution control, joint law enforcement, and emergency response linkage—improve regional control effectiveness. Unified rules are formulated for monitoring, supervision, and evaluation of pollution prevention across districts and counties. Key enterprises and industries receive focused monitoring. Currently, a basic air pollution joint prevention and control network covering all districts and counties has been formed, moving away from the previous "fighting alone" model to seek joint prevention and control among all city entities.

Foundation: Unity of All People and Public Participation

"Datong Blue" is a green achievement jointly guarded by all sectors of society and the broad masses in Datong. The city encourages public participation in supervising pollution issues through media exposure, regular reporting, and smooth reporting channels to enhance public environmental participation.

A regional environmental supervision mechanism has been established emphasizing information transparency to ensure accuracy and consistency of public information. Unified supervision standards are established, including relevant law enforcement regulations and management measures, forming consistent law enforcement standards and scales. The Air Pollution Prevention and Control Leading Group Office regularly publishes lists of penalized coal-fired boilers, reports on straw burning hotspots, and environmental violation enterprise rectifications and penalties, accepting social supervision. Datong has issued an environmental pollution reward reporting method, establishing a 5 million yuan pollution reporting reward fund. The city has achieved seamless connection among three platforms: the 12345 government hotline, 12369 environmental hotline, and 12369 environmental protection WeChat, handling over 2,000 environmental petitions annually, with each case receiving follow-up and a 100 percent case completion and 回访 rate.

Public participation mechanisms are promoted through extensive public participation and environmental protection publicity activities aimed at creating a national environmental protection model city. The "Datong Daily" has opened columns such as "Environmental Protection Inspection"and "Blue Sky Action"to release the latest environmental protection information promptly. Datong Television reports on "model creation" themed publicity activities. Major electronic screens, hotels, restaurants, and shops display environmental protection slogans to raise environmental awareness across society. The city carries out ecological civilization "ten entries"activities, distributing the "Ecological Civilization Manual"free to rural areas, schools, communities, and government agencies—entering 50 schools, 82 enterprises, 98 communities, 115 shops, 63 government agencies, and 628 villages. The "Little Hands Holding Big Hands, Jointly Building Blue Sky and Clear Water" "Environmental Protection Little Guardians" activity is organized, along with green creation activities that have established 20 green families, 13 green enterprises, 15 green hotels, 3 municipal-level ecological towns, and 25 municipal-level ecological villages.

Way: Accelerating Ecological Transformation and Cultivating Environmental Protection Industry

"Datong Blue" demonstrates to some extent Datong' s persistent transformation journey as a resource-based city practicing green development, vigorously implementing ecological transformation with perseverance and long-term commitment, representing a phased achievement that the Datong Municipal Party Committee and Municipal Government deeply recognize. Regarding how to pro-

tect the "Datong Blue" achievement, enhance its brand value, and organically combine environmental protection industry cultivation with coal-burning pollution control, Datong has made beneficial attempts by vigorously promoting clean coal, coal-to-gas, and coal-to-electricity, achieving a "two birds with one stone" effect. This breaks the "bottleneck" restricting environmental protection industry development and promotes fundamental solutions to coal-burning pollution. The city continues intensifying ecological environment governance, advancing iron-fisted pollution control and comprehensive improvement, horizontally building industrial clusters, vertically extending industrial chains, developing diversified mid-to-high-end modern industrial systems, and creating beautiful landscapes with lucid waters and lush mountains. In 2017, Datong will continue deepening and refining the urban development topic of "ecological transformation," promoting transformation and upgrading, cultivating environmental protection industries, and accelerating sustainable development.

First, the city cultivates strategic emerging industries by strengthening cooperation with information technology enterprises and investment institutions such as Vimicro, Inspur, and Baidu, striving to establish big data industry bases and vigorously develop the digital economy. The city actively promotes projects such as general aviation industrial parks and high-efficiency monocrystalline photovoltaic modules, supporting the development of coal-to-natural gas, coal-to-olefins, and other coal chemical products. Second, Datong innovates its energy industry by strictly controlling total coal capacity and promoting clean and efficient coal utilization, commencing construction of the second phase of the national photovoltaic demonstration base and the Jinbei wind power base project, and actively developing high-load energy industries focusing on electric vehicle industry development. Third, the city transforms and upgrades traditional advantageous industries by relying on CRRC Datong Electric Locomotive Company to develop electric locomotive and urban rail transit equipment manufacturing, supporting the construction of Zhongyin Wool and Cashmere Industry Chain Production Base, and strengthening the pharmaceutical industry with key projects such as Shanxi Kubang' s annual production of 80 tons of pharmaceutical intermediates and Hunyuan Zhengbeiqi development. Fourth, Datong supports green environmental protection industries by increasing clean energy substitution for scattered coal according to Shanxi Province' s air pollution prevention action plan, implementing coal-to-gas and coal-to-electricity projects, continuing to expand clean energy promotion, and relying on clean stove and clean coal technology support from the Chinese Academy of Sciences to promote energy-saving stoves and clean coal use. The city promotes coal-to-gas and coal-to-electricity projects and comprehensive utilization of bulk industrial solid waste such as coal gangue, fly ash, and desulfurized gypsum. Relying on Peking University Engineering School' s fly ash new wall material R&D technology, Beijing SDL Company' s project in Jijiazhuang Township, Datong County, with a total investment of 101.876 million yuan, has been accelerated to produce new wall materials using fly ash as the main material, cultivating green environmental protection industries. Fifth, the city strengthens its cul-

tural tourism industry by emphasizing castle development, border culture, and Great Wall tourism, relying on ancient capital lantern festivals to promote folk culture and build the "Datong Year" brand, promoting Wangfu Sheng Guo Banquet to showcase traditional Datong craftsmanship, and promoting industrialization of folk arts. Sixth, Datong expands characteristic modern agriculture by refining coarse cereals, optimizing fruits and vegetables, strengthening animal husbandry, and developing medicinal materials, promoting the creation of national-level planting and processing demonstration parks, cultivating enterprises developing "medicine and food homology" products, and increasing the supply of green and high-quality agricultural products.

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Note: Figure translations are in progress. See original paper for figures.