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绿色创新发展研究院
Institute for Global Decarbonization Progress

POLICY BRIEF | April 2026

From Fuel to Feedstock:

China's Fossil Fuel Turning Point and Implications for Subnational Decarbonization in Carbon-Intensive Industries

ABOUT iGDP

The Institute for Global Decarbonization Progress (iGDP) is a non-profit think tank focusing on green and low-carbon development. Established in 2014, iGDP is committed to China's decarbonization and the global effort to address climate change. iGDP provides policymakers, impact investors, and practitioners with forward-thinking solutions and knowledge products from an international perspective.

AUTHORS

YANG Li Deputy Executive Director for Research and Programs yangli@igdp.cn

LI Xindi Project Lead for Energy Transition lixindi@igdp.cn

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DESIGNER

BAO Linjie

ENGLISH EDITORS

XU Yiqing, Diego Montero

Contact igdpoffice@igdp.cn

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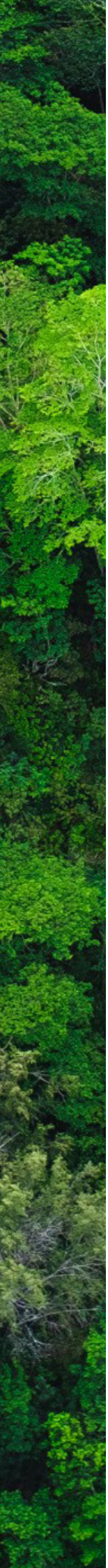

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INTRODUCTION

According to information released by the National Energy Administration (NEA) of China, 2025 marked the first time that the increment in energy used as feedstock surpassed the total growth in fossil fuel consumption [1]. This indicates that fossil energy used as fuel is entering a stage of "absolute decline," with the utilization structure shifting toward feedstock applications.

Meanwhile, China's 15th Five-Year Plan outlines green hydrogen as a forward-looking "industry of the future," with a strategic focus on developing the green hydrogen-ammonia-methanol value chain [2]. As these industries move toward large-scale commercial operation by 2035, they are expected to significantly substitute fossil energy in both fuel and feedstock applications, thereby reducing the role of fossil fuels as feedstock.

Against the backdrop of this structural shift and the accelerated development of green hydrogen, ammonia, and methanol, local governments—particularly provinces with a high share of energy used as feedstock—will face new challenges in implementing "dual control" targets for carbon emissions and intensity.

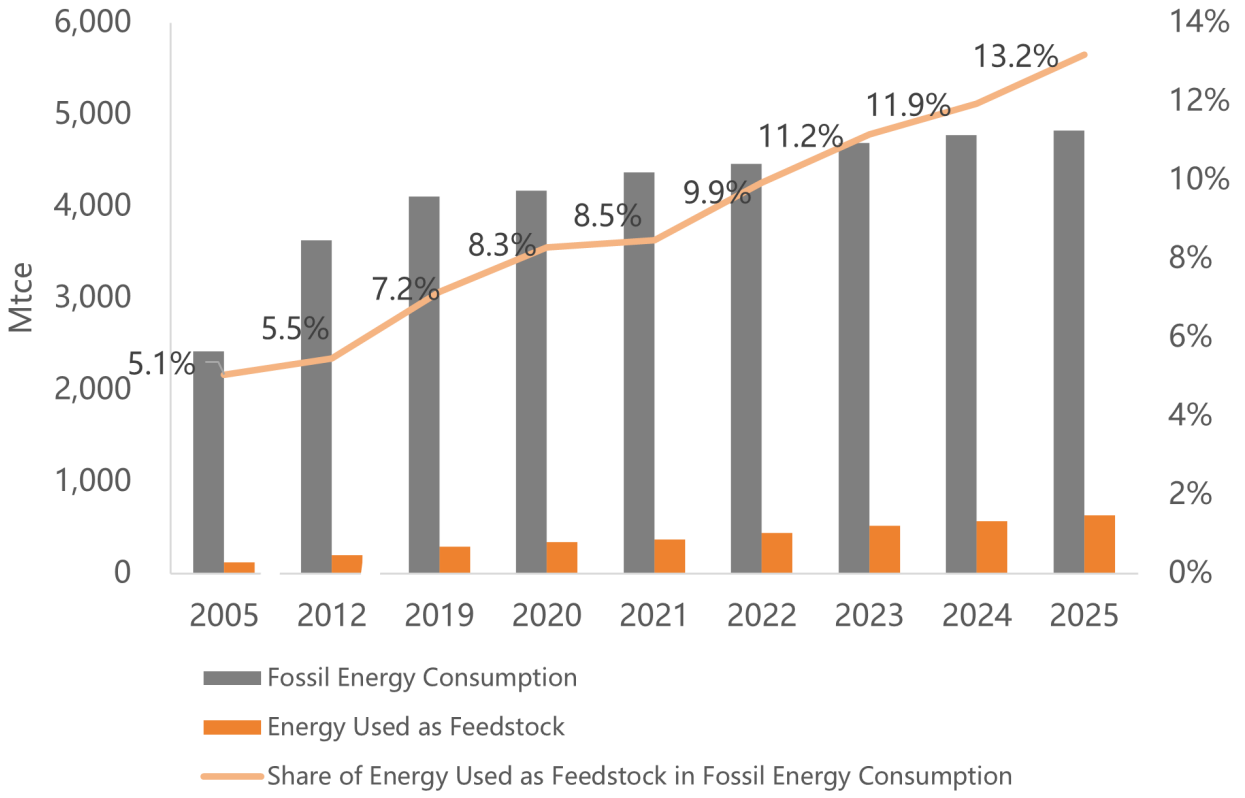
This policy brief examines the shift from fuel to feedstock in China's fossil energy use, identifies provinces facing elevated risks of fossil feedstock lock-in, and offers policy recommendations to support industrial decarbonization through the deployment of green hydrogen, ammonia, and methanol.

Energy Used as Feedstock in China Has Grown Rapidly

2025 marked the first time that growth in energy used as feedstock (66 Mtce) exceeded the total increment in fossil fuel consumption (50 Mtce) [1].

Energy used as feedstock is accelerating: the 4.2 percentage point increase from 2019–2025 far outpaces the 1.4 percentage point rise recorded over the preceding 14 years (2005-2019)(Figure 1).

Figure 1 | ***Trends in Fossil Energy Consumption and Energy Used as Feedstock, 2019–2025***



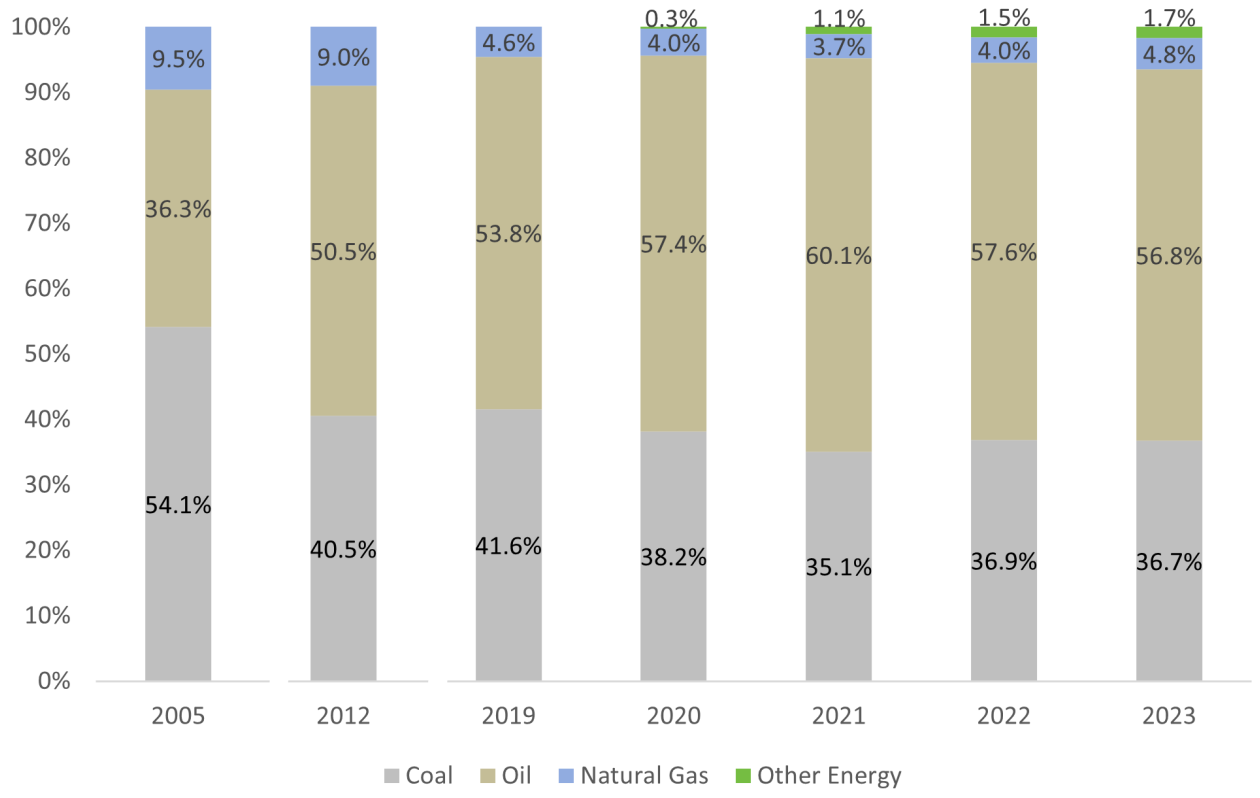
Data source: iGDP, compiled based on the China Energy Statistical Yearbook and publicly available information [1].

In China, feedstock energy is dominated by oil products and coal. As shown in Figure 2, from 2019 to 2023, oil accounted for the largest share of energy used as feedstock, consistently remaining between 54% and 60%, driven by integrated refining and petrochemical processes.

Coal followed as the second-largest source with a share of 35%–42%, mainly supporting coal-to-chemicals development and serving as a reducing agent in blast furnace-basic oxygen furnace (BF-BOF) steelmaking.

In contrast, natural gas represented a relatively small share, holding steady at approximately 4%–5%. Meanwhile, while the share of other energy sources remained low, it showed an upward trend, rising from 0.3% to 1.7%.

Figure 2 | ***Composition of Energy Used as Feedstock, 2019-2023***



Data source: iGDP, compiled based on the China Energy Statistical Yearbooks.

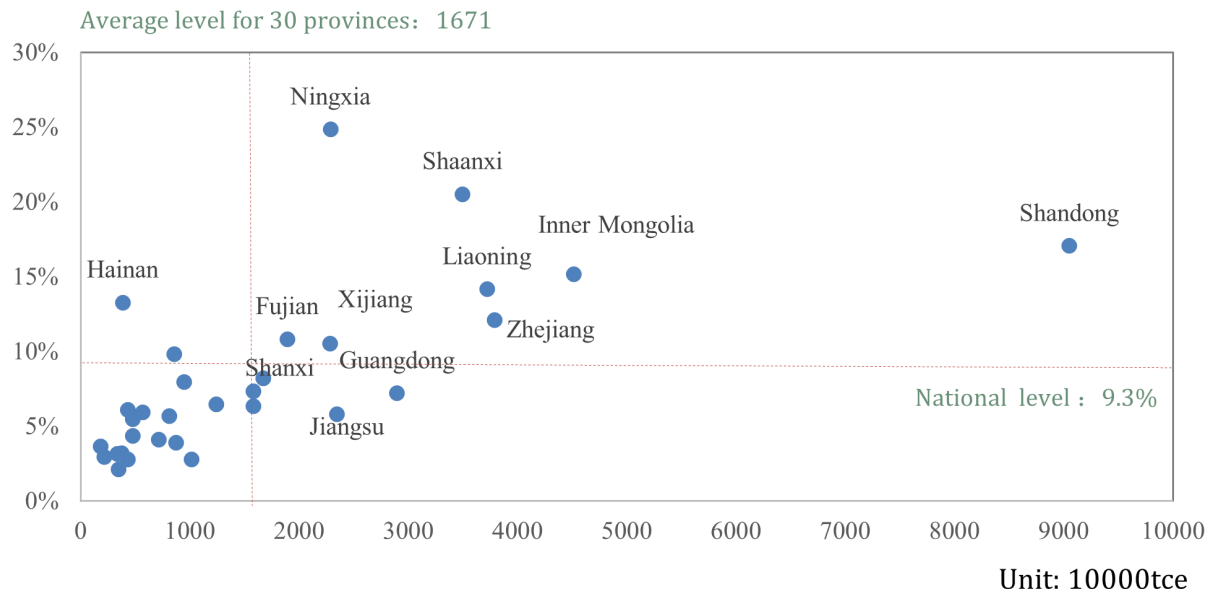
Subnational Profiles: Classification of Provinces with High Feedstock Use

The national shift in fossil energy utilization from 'fuel' to 'feedstock' will manifest as distinct regional imbalances, deeply rooted in the geographical variations of China's energy resource endowments and industrial distribution. Therefore, it is critical to identify provinces with a high share of energy used as feedstock relative to their total final energy consumption. This requires a data-evidence analysis of the proportions of coal, oil, and natural gas used as feedstock within their respective total final consumption. Such an assessment is essential for identifying regions at high risk of fossil feedstock lock-in and for strategically prioritizing the deployment of the green hydrogen, ammonia, and methanol industries.

Provinces with High Feedstock Use[1]

Based on the two key metrics—the absolute scale of energy used as feedstock and its share in the provincial energy mix—eight out of the 30 provinces with available 2023 statistical data exceeded national averages in both metrics. These provinces are Shandong, Inner Mongolia, Zhejiang, Liaoning, Shaanxi, Ningxia, Xinjiang, and Fujian. Notably, Shandong ranks first in terms of the total volume of energy used as feedstock, while Ningxia holds the highest share of feedstock use relative to its overall energy consumption(Figure 3).

Figure 3 | ***Feedstock Energy Use and Its Share in Total Energy Consumption across 30 Provinces , 2023***



Data source: iGDP, compiled based on the China Energy Statistical Yearbook [3].

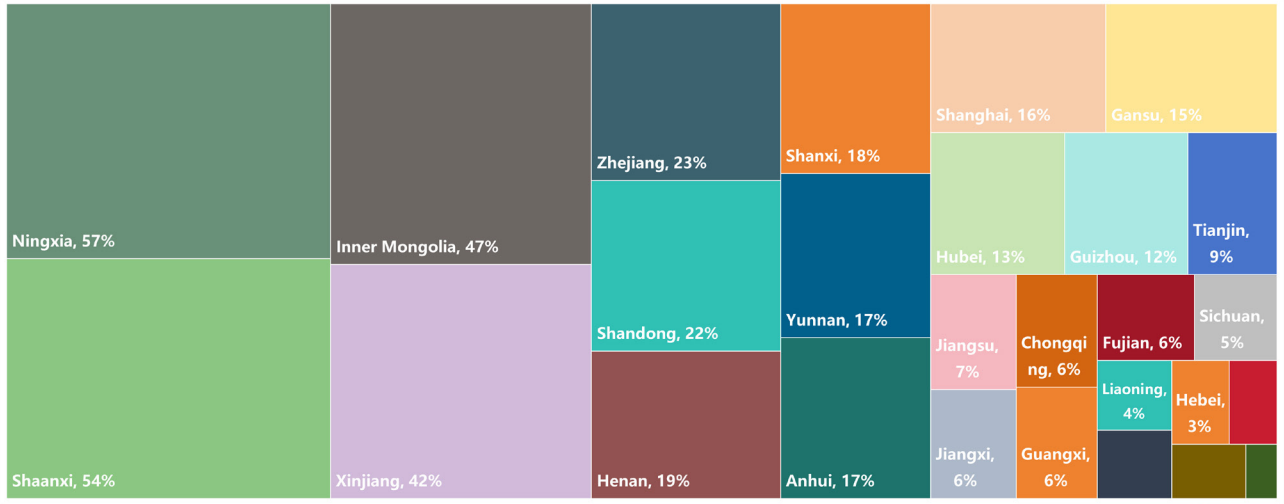
1 Both the total volume of energy used as feedstock and its share in provincial total energy consumption exceed the national average.

Provinces with a High Proportion of Coal Used as Feedstock

In terms of the share of coal used as feedstock relative to total final coal consumption, the top ten provinces in 2023 were Ningxia (57%), Shaanxi (54%), Inner Mongolia (47%), Xinjiang (42%), Zhejiang (23%), Shandong (22%), Henan (19%), Shanxi (18%), Yunnan (17%), and Anhui (17%)(Figure 4).

With the exception of Zhejiang—a coastal industrial powerhouse—the remaining provinces are China's primary coal-producing regions. Leveraging their rich resource endowments, these areas have established extensive coal-to-chemicals clusters. Notably, Ningxia, Inner Mongolia, Shaanxi, and Xinjiang serve as China's four major 'Modern Coal-to-Chemicals Industry Demonstration Zones'.

Figure 4 | ***Share of Coal Feedstock Energy Use in Provincial Final Coal Consumption, 2023***



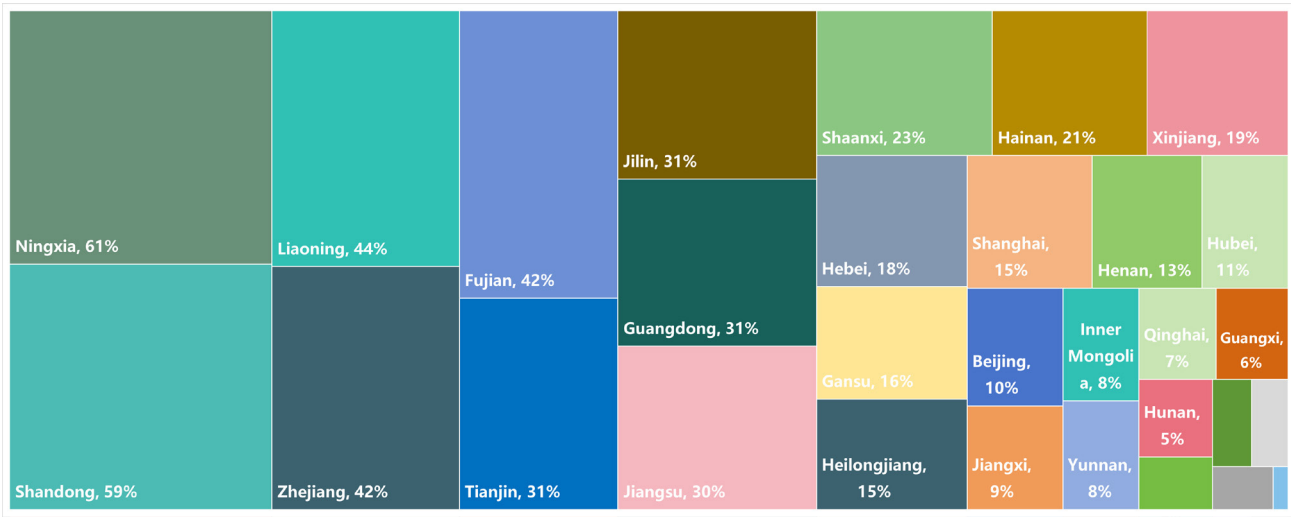
Data source: iGDP, compiled based on the China Energy Statistical Yearbook.

Provinces with a High Proportion of Oil Products Used as Feedstock

Regarding the share of oil products used as feedstock relative to total final oil consumption, the top ten provinces in 2023 were Ningxia (61%), Shandong (59%), Liaoning (44%), Zhejiang (42%), Fujian (42%), Tianjin (31%), Guangdong (31%), Jiangsu (30%), Shaanxi (23%), and Hainan (21%)(Figure 5).

The high rankings of Ningxia and Shaanxi are primarily driven by their modern coal-to-chemicals industry, where oil products are predominantly utilized as chemical intermediates. Coastal provinces such as Shandong, Liaoning, Zhejiang, Fujian, Tianjin, Guangdong, Jiangsu, and Hainan leverage their superior port infrastructure and strategic locations to host large-scale refining and petrochemical clusters. As China's critical petrochemical bases, these regions have established industrial structures where the use of oil as industrial feedstock plays a dominant role.

Figure 5 | ***Share of Oil Feedstock Energy Use in Provincial Final Oil Consumption, 2023***



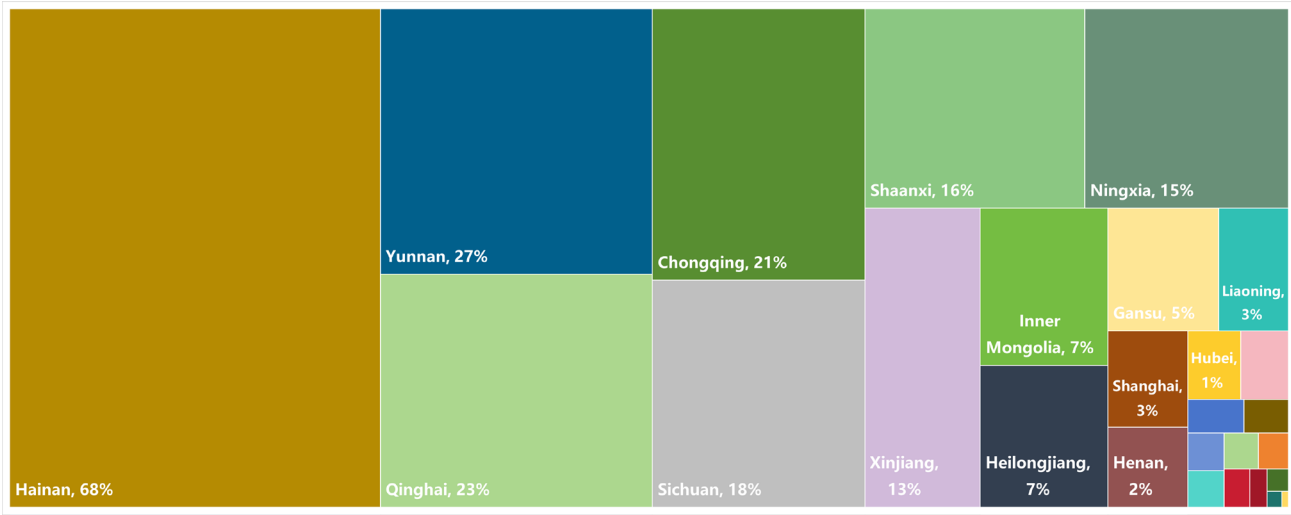
Data source: iGDP, compiled based on the China Energy Statistical Yearbook.

Provinces with a High Proportion of Natural Gas Used as Feedstock

In terms of the share of natural gas used as feedstock relative to total final consumption, the top ten provinces in 2023 were Hainan (68%), Yunnan (27%), Qinghai (23%), Chongqing (21%), Sichuan (18%), Shaanxi (16%), Ningxia (15%), Xinjiang (13%), Inner Mongolia (7%), and Heilongjiang (7%)(Figure 6).

These provinces generally possess abundant natural gas reserves, a significant portion of which is utilized as industrial feedstock in the petrochemical sector. Notably, natural gas consumption in Hainan Province is dominated by its use as a chemical feedstock; its feedstock proportion reaches an exceptional 68%, roughly equivalent to the combined shares of the provinces ranked second through fourth.

Figure 6 | ***Share of Natural Gas Feedstock Energy Use in Provincial Final Natural Gas Consumption, 2023***



Data source: iGDP, compiled based on the China Energy Statistical Yearbook.

Conclusion and Policy Recommendations: Accelerate the Transformation of Decarbonization Pathways for the Petrochemical Sector

As fossil fuels are increasingly used as feedstock rather than fuel, sectors such as petrochemicals must proactively deploy industrial decarbonization strategies.

Under the "dual control" framework for carbon emissions, fossil fuels used as feedstock—previously exempt from energy consumption quotas—will now face much stricter constraints on process-related CO_2 emissions. Local governments must not only push existing enterprises to accelerate the green transition of their technical processes but also impose more rigorous market-entry standards and carbon constraints on new projects.

National authorities are currently exploring the implementation of monitoring, evaluation, and assessment mechanisms for the "minimum share of non-electric renewable energy consumption" among key energy-intensive enterprises. Crucially, it has been clarified that green hydrogen, ammonia, and methanol used as industrial feedstock can be credited toward renewable energy consumption targets [4]. In this context, it is imperative for local governments to facilitate the deployment of green hydrogen–ammonia–methanol projects and expand the supply capacity of renewable-based feedstocks to meet these regulatory requirements.

Accordingly, it is recommended to accelerate "green hydrogen + petrochemical" pilot projects in regions with strong industrial foundations and abundant non-fossil energy resources, such as Shandong, Inner Mongolia, Liaoning, Zhejiang, Shaanxi, Xinjiang, and Hainan. By systematically exploring pathways to substitute traditional fossil feedstocks with green hydrogen, ammonia, and methanol, these regions can reduce industrial process emissions at the source. For instance, provinces such as Inner Mongolia have taken the lead in developing relevant infrastructure, progressively building full value chains—spanning production, storage, transport, and application—to secure a competitive market advantage in this next generation of industrial development.

Box | Inner Mongolia's 15th Five-Year Plan for the Green Hydrogen Industry

Leveraging its unique resource endowments, Inner Mongolia is committed to establishing itself as a pioneer zone for the green hydrogen industry. During the 15th Five-Year Plan period, the region aims to build a nation-leading hydrogen industry cluster through a "demand-driven production" (off-take-based) strategy.

The Plan emphasizes enhancing the adaptability of hydrogen equipment to the variability of renewable energy. By expanding application scenarios—including transportation, natural gas blending, and coupling with the chemical and metallurgical sectors—the region will scale up green hydrogen consumption.

Meanwhile, utilizing its abundant wind and solar resources, Inner Mongolia will accelerate the construction of three major inter-provincial green hydrogen pipelines, including the Ulanqab–Beijing-Tianjin-Hebei route. These initiatives mark Inner Mongolia's transition from pilot exploration to the orderly development of a comprehensive hydrogen value chain.

Source: [5]

Reference

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Tel | 86-10-8532 3096
Fax | 86-10-8532 2632
E-mail | igdpoffice@igdp.cn
Web | www.igdp.cn
Add | 6-2-62, Jianguomenwai Diplomatic Residence Compound, 1 Xiushui Street, Chaoyang District, Beijing, 100600 P.R. China