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UDC 33

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MAJOR ACHIEVEMENTS AND CHALLENGES OF UPSTREAM AND DOWNSTREAM OIL AND GAS ENTERPRISES IN CHINA

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The article considers the main aspects of development and problems of China's oil and gas industry. Proven oil and gas reserves, the country's resource endowment, China's place in the international market, the problems of global competition in this industry. Also studied are the measures for environmental protection in connection with oil and gas production

Since its inception, China's oil and gas industry has gone through many years of development and achieved a series of remarkable achievements, but also faced many severe challenges. This section will explore in detail these achievements and the stories behind them, as well as the complex challenges currently faced by the industry.

Achievements. Domestic Resource Development and Reserve Growth.

As of the end of 2023, China's proven oil reserves reached about 3**,**5 billion tons and natural gas reserves were about 6**,**2 trillion cubic meters. Such a storage scale not only ensures a stable supply in the domestic market, but also enhances the country's energy security capabilities. For example, in the past decade, through continuous technological innovation and the application of exploration methods, a number of large oil and gas fields have been discovered, including oil fields in Xinjiang and Inner Mongolia, which greatly enriched China's energy map (Figure 1).

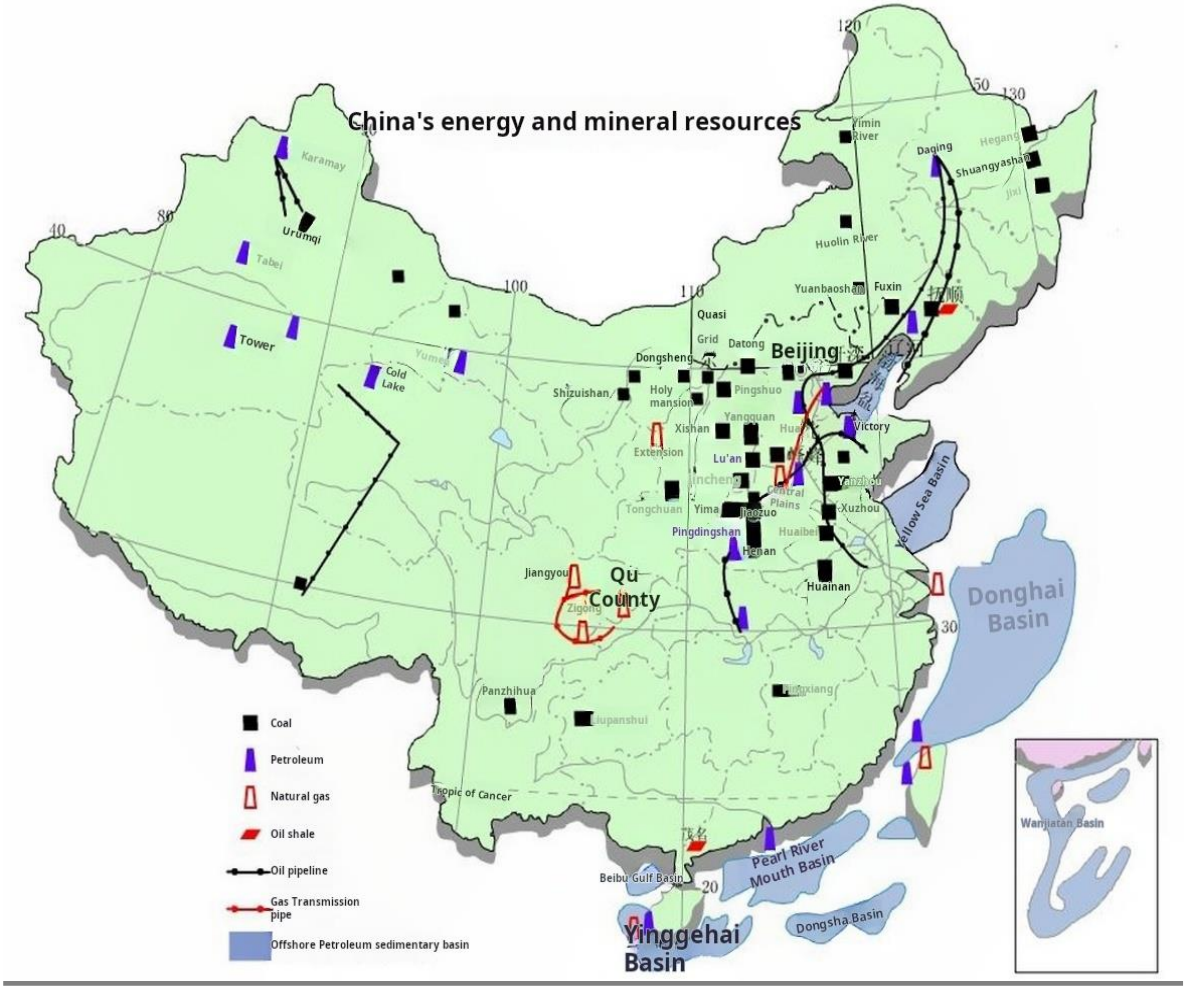

Figure 1 – Map of China's energy distribution, 2023 [1]

Overseas Investment and International Cooperation.

With the advancement of the "Belt and Road" initiative, Chinese oil and gas companies are playing an increasingly important role in the international market. At present, Chinese companies have participated in more than 200 oil and gas project cooperation in more than 30 countries and regions, with a cumulative investment of more than US$100 billion. This has not only enhanced the global influence of companies, but also brought economic benefits and technical support to the host countries. In particular, long-term and stable energy supply relations have been established in Central Asia, Russia and other regions, which has played a positive role in alleviating the contradiction between domestic supply and demand [1].

Technological innovation promotes industrial upgrading.

In recent years, China's oil and gas industry has achieved key technological breakthroughs in deep-sea drilling, shale gas extraction and other fields, and gradually formed a technical system with independent intellectual property rights. Take marine engineering equipment manufacturing as an example. From the initial reliance on imports to the current ability to independently develop, design and build ultra-deepwater semi-submersible drilling platforms, and successfully applied to the development of deep-sea oil and gas fields in the South China Sea; at the same time, in the field of unconventional oil and gas resources (such as shale gas), after unremitting efforts, China has become the second country in the world after the United States to achieve large-scale commercial development, and its technical level is in a leading position [2].

Environmental protection measures enhance social responsibility.

Faced with increasingly stringent environmental protection requirements and social expectations, Chinese oil and gas companies have actively fulfilled their social responsibilities and made significant contributions to energy conservation and emission reduction. For example, clean production technologies are widely used in the production process to reduce the emission of greenhouse gases such as carbon dioxide; in addition, investment in pollution control facilities has been increased to ensure that the wastewater discharge rate remains above 98 % and the proper disposal rate of solid waste reaches 100 % (Table 1). These measures have not only improved the quality of the surrounding environment, but also won recognition and praise from all walks of life [1, 2].

Challenges. Resource endowment constraints.

Although China's oil and gas industry has made great progress, it is undeniable that domestic resource endowment conditions are relatively limited, which is mainly manifested in the following aspects: ***Increased environmental pressure.***

Oil and gas extraction activities will inevitably have an impact on the natural environment, especially when large-scale operations are carried out in ecologically fragile areas, and the relationship with environmental protection must be handled with caution. The main problems currently faced include: ***Intensified global competition.***

Against the background of the reconstruction of the global energy market structure, Chinese oil and gas companies must not only cope with the competitive pressure from traditional oil-producing countries, but also be wary of the impact of the rise of new energy. Specifically manifested as (Table 1).

Table 1 – China's oil and gas development statistics [2]

Category	Segment	Data indicators	Numeric
1	2	3	4
Achievements	Growth in domestic resource development and reserves	Oil reserves (as of the end of 2023)	About 3,5 billion tons
Achievements	Domestic resource development and reserve growth	Natural gas reserves (as of the end of 2023)	About 6,2 trillion cubic meters
Achievements	Overseas Investment and International Cooperation	Number of participating countries and regions	More than 30
Achievements	Overseas Investment and International Cooperation	Number of oil and gas project cooperation	More than 200
Achievements	Overseas Investment and International Cooperation	Cumulative investment amount	Over 100 billion US dollars

End of table 1

1	2	3	4
Achievements	Technological innovation promotes industrial upgrading	Ultra-deepwater semi-submersible drilling platform application	South China Sea Deepwater Oil and Gas Field Development
Achievements	Technological innovation promotes industrial upgrading	Large-scale commercial development of shale gas	Became the second country in the world to achieve this after the United States
Achievements	Environmental measures enhance social responsibility	Wastewater discharge rate that meets standards	More than 98 %
Achievements	Environmental measures enhance social responsibility	Proper disposal rate of solid waste	100 %
Challenge	Resource endowment constraints	Remaining recoverable reserves trend	Declining year by year
Challenge	Resource endowment constraints	Geological conditions	Complex structural belts or deep strata
Challenge	Resource endowment constraints	External Dependence	high
Challenge	Increasing environmental pressure	Soil and water pollution risks	exist
Category	Segment	Data indicators	Numeric
Challenge	Increasing environmental pressure	Biodiversity impacts	Occupies a large amount of land and disturbs the balance of the ecosystem
Challenge	Intensifying global competition	Characteristics of international oil prices	Frequent price fluctuations
Challenge	Intensifying global competition	Market share competition	fierce
Challenge	Intensifying global competition	Energy transition pressure	Demand for traditional fossil energy is expected to decrease

In summary, China's oil and gas industry has made a series of brilliant achievements in the past few decades and has made great contributions to national economic construction and

social development. However, in the new historical period, how to overcome existing difficulties and meet future challenges will be a major issue facing every practitioner. This requires not only the joint efforts of the government and enterprises, but also the joint efforts and support of the whole society.

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ОСНОВНЫЕ ДОСТИЖЕНИЯ И ПРОБЛЕМЫ ПРЕДПРИЯТИЙ НЕФТЕГАЗОВОЙ ОТРАСЛИ В КИТАЕ

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В статье рассматриваются основные аспекты развития и проблемы нефтегазовой отрасли Китая. Разведанные запасы нефти и газа, ресурсообеспеченность страны, место данной отрасли Китая на международном рынке, проблемы глобальной конкуренции. Также представлены мероприятия по охране окружающей среды в связи с добычей нефти и газа.