

PEOPLE'S REPUBLIC OF CHINA
SUSTAINABLE DEVELOPMENT STRATEGY OF OIL-GAS RESOURCES

Future Plans

a) To strengthen Exploration and Development of Domestic Petroleum Resources

Considering the national safety and economic development, the long-term reliable supply of oil-gas energy must keep a foothold on the exploration and development of domestic petroleum resources in China. Effective measures must be taken to make full use of residual resources of the old oil fields in the east, strengthen the exploration in the new areas and new strata, especially the west and the offshore.

- To increase the investment in the oil-gas resources exploration for reinforcing the **Strategic Perspectives Assessment (SPA)** in new areas which are less explored, specifically including basins in Tibet, basins in the south, East Sea basin, the deep-water basins in the South China Sea, the northeastern rift basins and some basins on two sides of Qinling-Dabie Mountains.
- To tap further the residual oil-gas resources of the old oilfields and carry out the exploration of the new strata and fields, for example, the deep zones in the eastern basins, Pre-tertiary strata in the offshore, etc, in order to increase the successive reserves and defer the decrement of the old oilfields.
- To improve the recovery technologies and raise the recovery factor, moreover, to strengthen development of oil-gas resources in the low permeable reservoirs and heavy oil.

b) To Develop and Promote Gas Consumption

In many countries, gas is used widely as a clean and efficient energy. So gas consumption has increased rapidly, and its share in the total world primary energy consumption has risen for half about the century. In the last decade, the gas use in the whole world increased by 2.5 % annually, while in Europe, Asia and Pacific regions, it was above 4 %. The gas share in the world primary energy consumption came up to 24 % or so. But in China, the growth of gas consumption is relatively low, less than 1 % annually; its share in China's primary energy use is only 2.8%. For the sustainable economic development and environmental protection and improvement, it is the most important for China develop vigorously gas market.

- To strengthen gas exploration so as to increase the reserves and production, which provide the sufficient reserves for developing the gas market and raising the gas use;
- To enhance the construction of the gas pipelines and promote development of the gas market;

- To improve the energy structure and increase gas share in the total primary energy consumption.

c) To Actively Explore and Develop Oversea Oil-Gas Resources

For the stable supply of petroleum resources, it is suggested that China should actively participate in the globalization allocation of oil-gas resources and go abroad to explore and develop the overseas petroleum resources. It is also an indispensable demand to ensure the petroleum supply, decrease the risks of the crude oil import and guarantee the economic safety of China.

Specifically, overseas exploration and development of oil-gas resources should mainly concentrate on three areas: the Middle Asia and Russia, the Middle East and North Africa; South America. By participation in overseas petroleum exploration, China will endeavor to construct three overseas petroleum production bases in 15 to 20 years. It is expected to achieve 219 million barrels of share oil and over 1,059 Bcf of share gas in the 2010.

d) To Enhance Sci-Tech Innovation

The sci-tech innovation is key to accelerate the progress of energy industry in the new century and also key to realize the sustainable development of petroleum resources.

The sci-tech innovation includes the followings:

- To improve the exploration theories. Under the new circumstances, new theory and new methods must be adopted to guide exploration of oil-gas resources;
- To strengthen research of the key technologies in order to increase the successful rate of exploration, including mountain seismic, deep drilling, comprehensive well logging and basin modeling, etc.;
- To innovate the oil production techniques, including raising recovery efficiency, developing the low permeable reservoirs and heavy oil, and producing and transporting the oil-gas resources under the complicated geographical and topographic conditions.

e) To Protect Environment

The petroleum exploration should not damage the environment. Every energy policy should be compatible with environment. China's energy strategy must abide by the principle of "protection in development and development in protection".

- To protect the environment against pollution in exploring and developing petroleum resources. The petroleum resources shouldn't be exploited at the cost of the environmental pollution. So, in exploration and development of the petroleum resources, available measures must be adopted to protect the natural environment such as water, soil and forest, etc.
- To increase the investment for improving ecological environment. Grass and trees should be planted if possible in the suitable fields, so as to protect the water resources and improve the biological diversity.

- The natural resources in the working areas should be comprehensively utilized under the permissible conditions.

f) To save Oil-Gas Resources

Saving oil-gas resources is one of the important ways for China to solve the problem of the energy shortage and promote the sustainable development.

Saving oil-gas resources should mainly focus on the followings:

- The recovery factor of proven oil reserves should be raised. As mentioned above, the average recovery factor is 30 %, lower than the average of 33 % in the world. It is estimated that increasing 1 % of recovery factor equals to increasing oil production about 1,460 million barrels. The potential of raising the recovery factor is massive.
- Strong and effective measures should be taken to recycle the emissions and residual oil from the refinery and surface oil from the flowing wells, at the same time to reduce the crude oil wastage in the oilfields. Gas emission into air without recycling reaches about 35.3 Bcf each year. The wastage of crude oil in the oilfields reaches 58 to 73 million barrels annually. To increase the comprehensive recycles for all the wastages will save the crude oil by 58.4 to 73 million barrels and 35.3 gas annually.
 - To improve the oil refining technologies could highly raise the oil use efficiency to save crude oil by 73 million barrels or so annually.
 - Some certain methods must be taken to regulate industrial structure, strengthen developing with low energy consumption, decrease manufacturing with low quality and high energy-consumption, improve transportation system and reduce the high oil-consumption vehicles. All these measures could save the refined oil by 146 million barrels or so annually.
 - To sum up, by varies of saving policies and measures, the whole country could save about 131 -146 million barrels of crude oil and about 146 million barrels of refined oil, therefore the pressure from import will greatly decrease. Furthermore, the economic safety would be guaranteed to some extent.

Policy Recommendations

a) To strengthen planning and administration of the petroleum resources

- To strengthen the unified program and administration of the petroleum resources and change the status of dull administration by many government departments;
- To change the government's functions and decrease the administrative approval rule as far as possible in order to realize the macro-administration and to standardize the resources conservation;

- To improve petroleum resources market and to make full use of capital market for realizing the reasonable disposition of resources.

b) To formulate the policies to encourage the petroleum exploration and establish a multi-source energy supply system.

- To establish the risk fund of petroleum exploration for a special purpose to carry out strategic investigation in the new areas, new fields and new strata and support the study of basic geology, resources assessment, etc.
- To establish the risk investment mechanism to encourage the petroleum companies to carry out exploration in new areas.
- To implement favorable fiscal policy, such as tax reduction, tax-free and balance tax, to encourage developing the difficultly produced reserves, so as to improve the resource efficiency.
- To implement positive policies to encourage the oil companies to "go abroad" to participate in the global resources disposition and establish steady oversea petroleum supply Bases. By strengthening the domestic petroleum exploration and development, China must strive to find large oilfields to realize the increase of the reserves and production and to decrease the import risk. Simultaneously, China should carry out the oversea exploration to increase the external share of oil reserves and production and play a positive role in resources globalization.

So a multi-source of energy supply system will be established, including petroleum resources from the domestic and overseas, from the new explored areas and old oilfields.

c) To increase the investment in technology innovation

A new technology system should be established, which helps to improve the exploration and development oil-gas resources. The government should positively participate in the technology innovations to quicken the transformation from the sci-tech achievements to production forces. The government should also popularize the practical techniques and encourage the oil companies to use the new techniques. Some initially key technologies patented by China should be developed actively. The policies should support the companies to invest in environment protection and research.

d) To strengthen the environment protection in petroleum exploration and development

The government should adopt an overall view and renew the traditional concepts, meanwhile attach importance to environment protection and the ecological construction so as to realize the sustainable development of economy and environment; the petroleum companies should pay attention to environment protection and be committed to the ecological construction; The propaganda should be fully conducted to heighten the public consciousness of environment protection and make it a conscious behavior of the whole society.