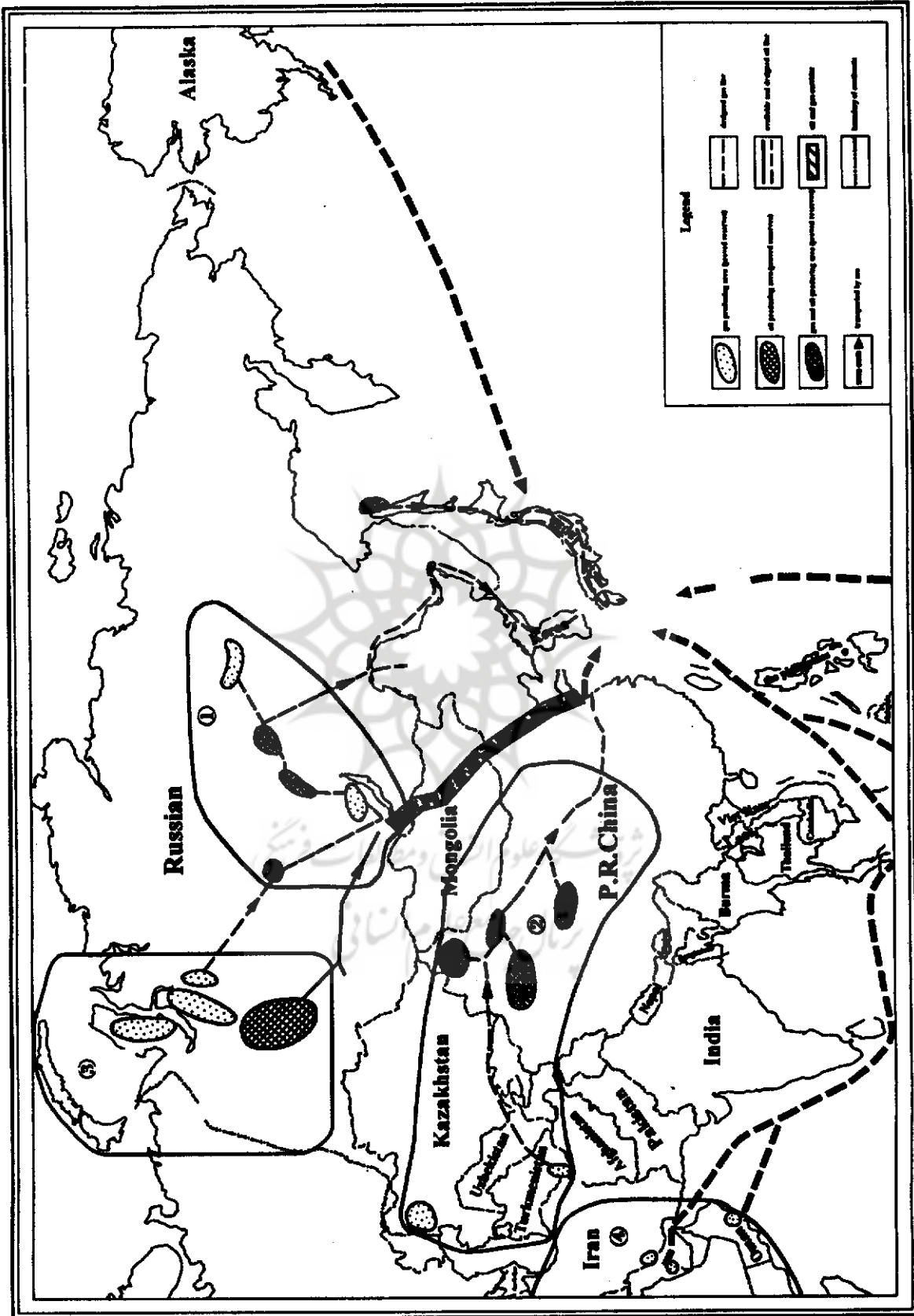
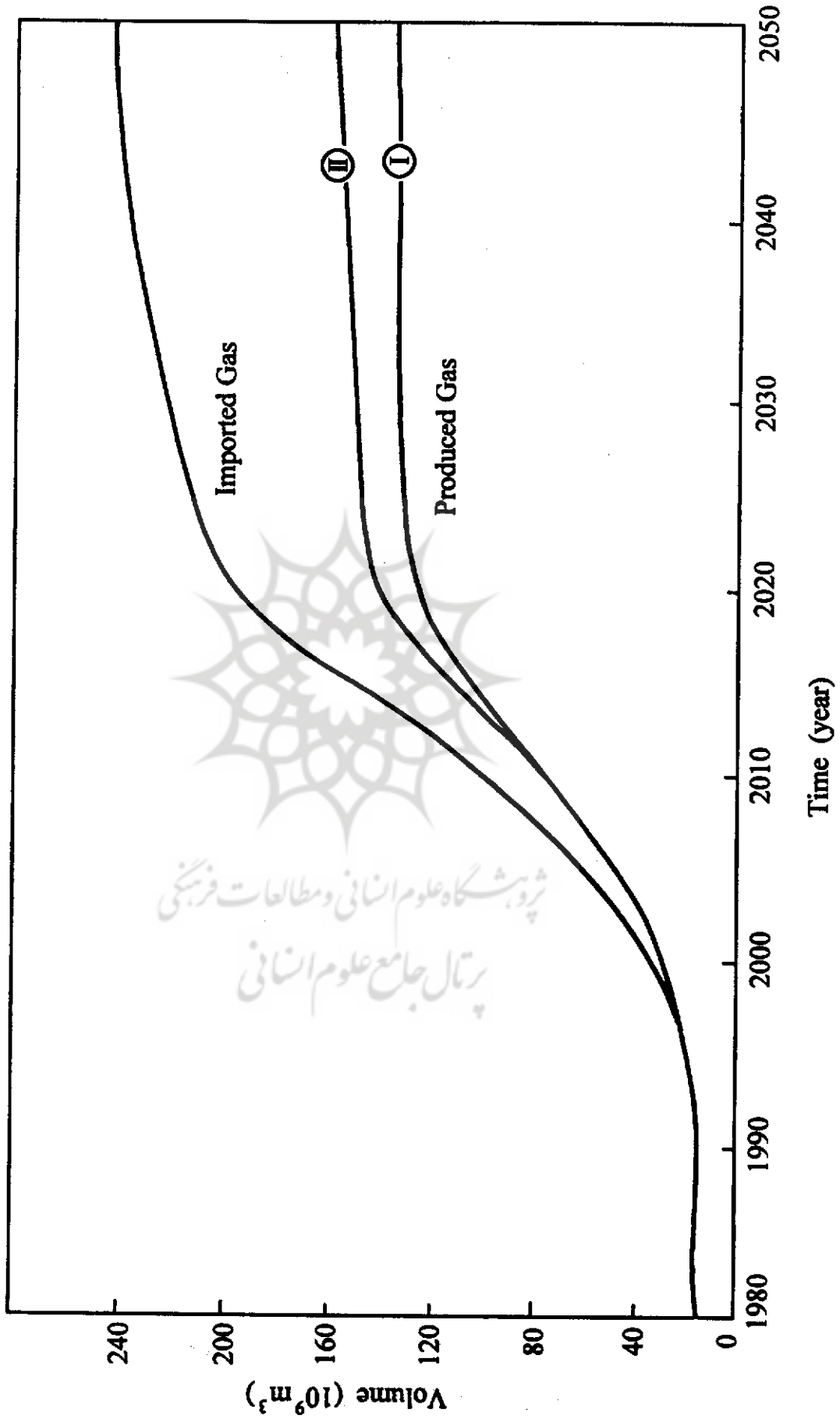


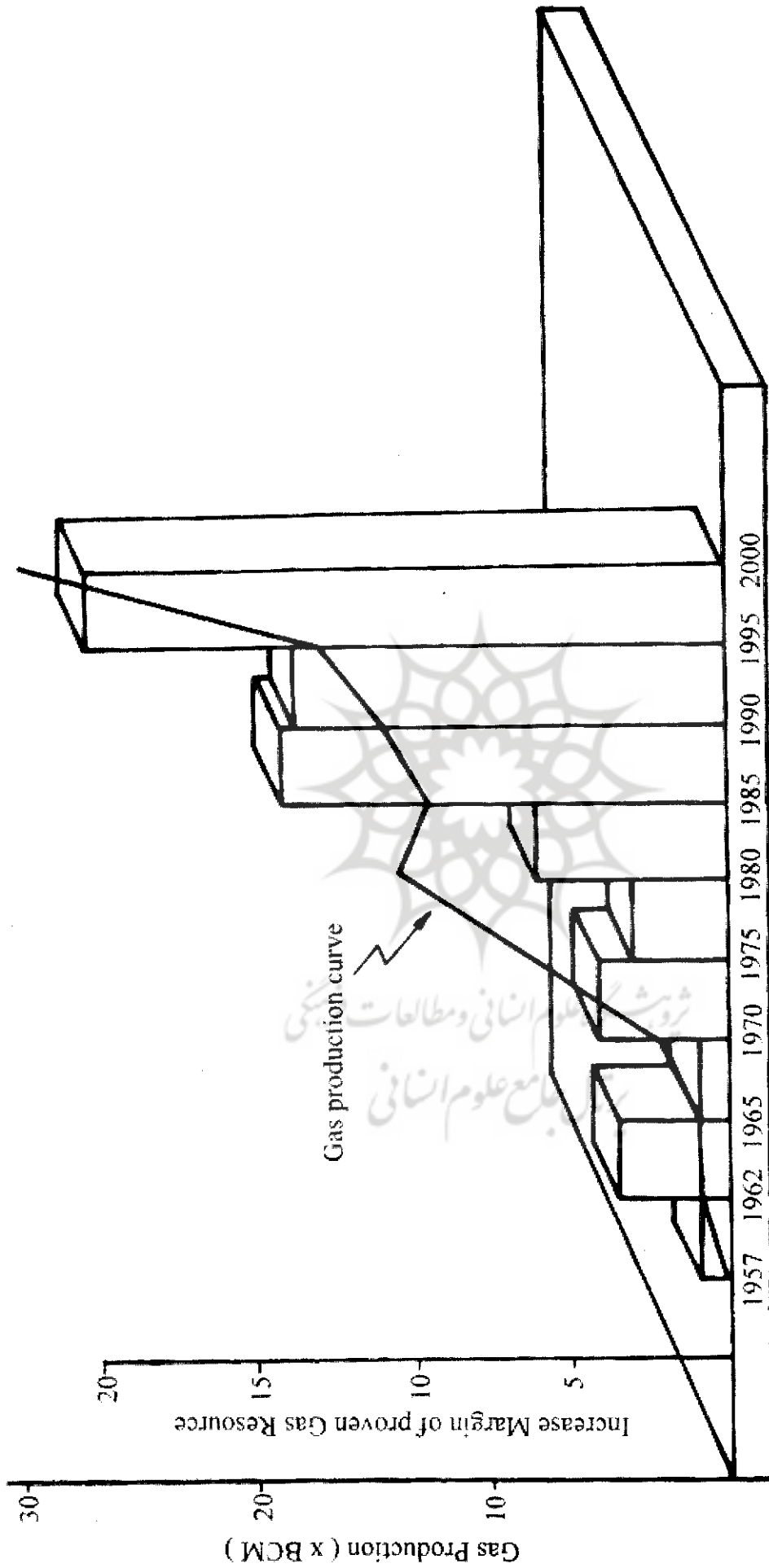
# Envisaged Map of Oil and Gas Corridor in Northeast Asia

Fig. 4



Forecasted Graph of Gas Volume Produced and Imported By China Fig. 3



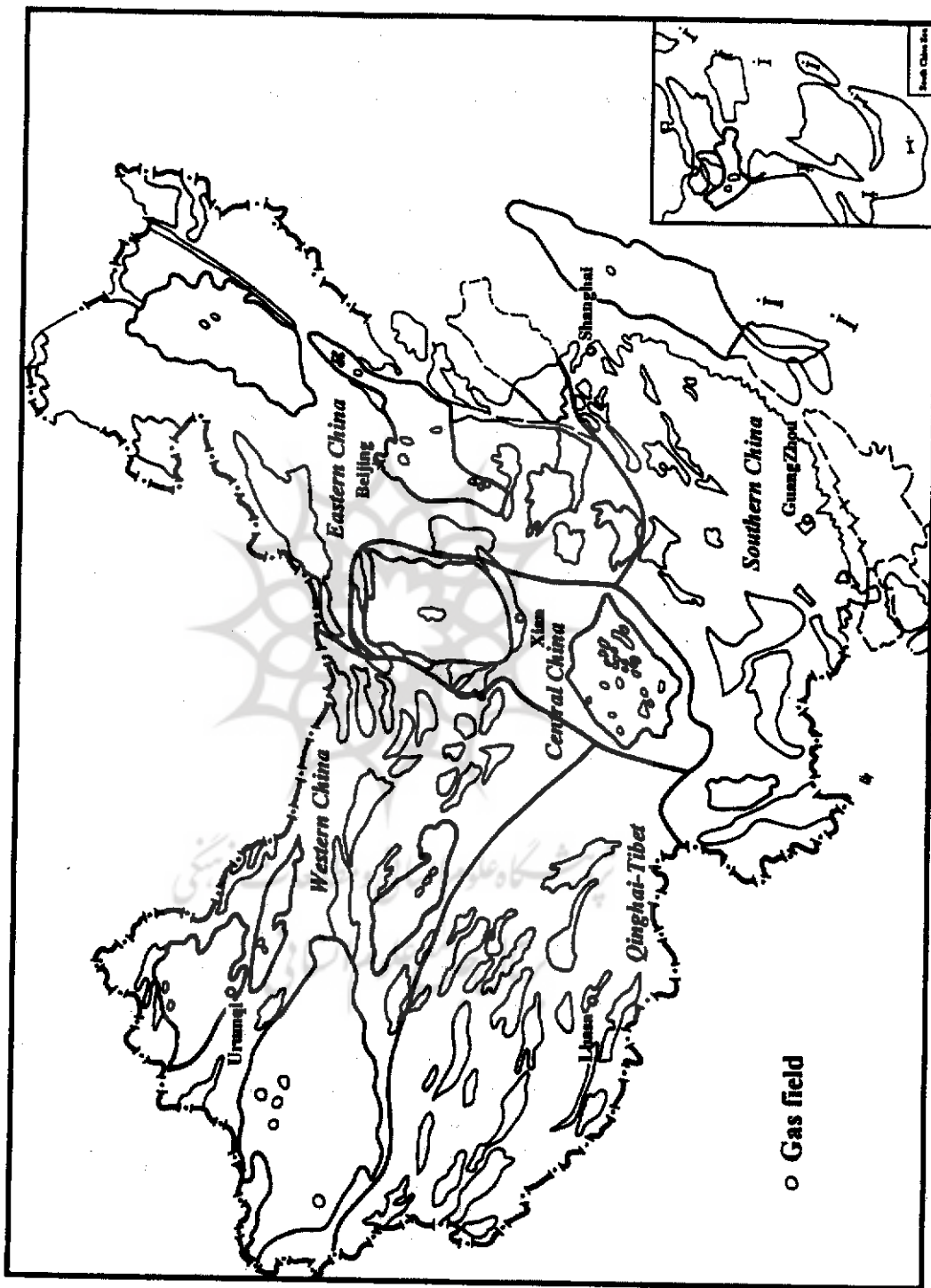


**PREDICTION ON NATURAL GAS PRODUCTION  
AND INCREASE MARGIN OF PROVEN GAS RESOURCE  
P.R. CHINA**

Fig. 2

# Distribution of Natural Gas Provinces in China

Fig.1



gas resources; and

● **Northwest China (Region IV)**, including the paleo-cratonic inherited basins widely distributed in Northeast China, such as Tarim and Ordos large basins and some Meso-Cenozoic medium-small sized basins, where the main genetic types of natural gas are high mature cracking gas and humic (including coal measures) thermal degradation gas, whose natural gas resource potential is close to half of the predicted total of China.

China is rather rich in natural gas resource, but its geological conditions are much complicated. Historically its exploration progressed slowly due to insufficient exploratory input. But in the past decade, this input was increased, resulting in a rapid increment in natural gas reserve, equivalent to the total gas reserve discovered before. So far, 2000 BCM of proved and possible gas reserves have been found in the discovered gas fields and 800 BCM of associated gas reserve in oil fields of China.

Natural gas fields are mainly located in Sichuan and Ordos basins of Central China, and Tarim, Junggar and Qaidam basins of Northwest China. Continental shelf gas mainly distributes in Yinggehai, Qiongdongnan and East China sea basins. Oilfield associated gas reserves mainly exist in the coastal oil-bearing provinces.

## II. Natural Gas Production in China

101 gas fields in China have been so far put into production. The annual gas production rates of China, including that from the gas fields and the associated gas from the oil fields are 20 BCM, in addition to 6 MM tons of LPG per year for domestic demand. Natural gas is

mainly transported by 100 to 700 km pipe line networks, such as the newly constructed Turpan-Urumqi gas line of Xinjiang Uygur Autonomos Region, Sebei-Germu gas pipe line of Qinhai province and the under-construction Qinzhi-Xian-Beijing gas pipe line.

## III. Growing Trend in Natural Gas Production and Demand of China

In the past decade, a number of large and medium sized gas fields have been found in succession in Ordos, Tarim and Qaidam basins of Northwest China, and in Yinggehai-Qiongdongnan basins of China's continental shelf, some of them have been put into production, and gas production from them will be increased rapidly. It is predicted that in the year of 2000, annual gas production of China will be up to 30 BCM (Fig.2), by 2010 to 80 BCM and by 2020 to 1200-1400 BCM (Fig.3). Considering the increase rate (8% per year) of our national economy which, as a result, will increase the natural gas demand, so the predicted demand of gas for the year of 2000 would be 40 BCM, of which 10 BCM are from domestic fields or imported LPG and LNG, that for 2010 would be 100-120 BCM and that for 2020 would be 200 BCM. This means there will be a gap between demand and supply of natural gas, and the necessary measures to be adopted should be: (1) to increase the input to natural gas exploration and to intensify the pipe line network construction; (2) to recover coal-bed gas. China is very rich in coal. Some commercialized tests of coal-bed gas recovery are under going. It is expected that by the year of 2010, a certain scale of coal-bed gas production will be realized; and (3) to join in international cooperation to import natural gas to

China.

## IV. The Framework for Meeting the Increasing Natural Gas demand of China and East Asia

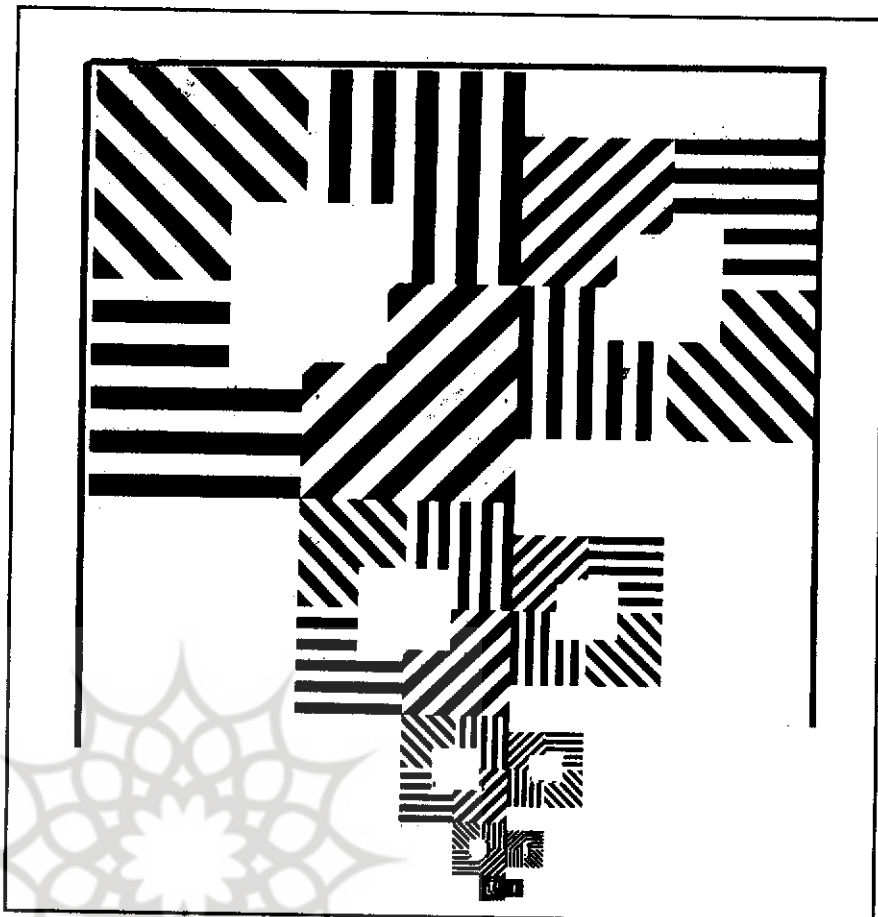
According to various predictions, East Asia will be the region of the world in 21 century where the natural gas demand will increase fastest. Its gas demand in 2010 would exceed 300 BCM, meanwhile natural gas produced from eastern Asian countries (regions) will only take 10% in energy structure due to their historical retard in resource development, which is much less than the world average value (23%), and China's natural gas will take even smaller proportion in Chinese energy structure, only 2-3%. However, during the period of 1996 to 2000, both natural gas production and demand in these countries will increase annually by 10%, at the same time, the natural gas demand in some eastern Asian countries or regions.

There may be two channels to import natural gas to meet the domestic gas demand: one is to transport the rich natural gas by pipe line from western Asia, central Asia and Siberia to eastern Asia; the other is to ship the LNG to eastern Asia.

Considering the huge demand of natural gas, it is obviously that transporting gas by pipe line is more optional (Fig.4). The feasibility studies for piping natural gas from Russian Siberia to China and South Korea and from Turkmenistan of central Asia to China and Japan are under going. If Iran's abundant gas can be input into the central Asia to eastern Asia gas pipe line, the construction for that line would be much more economically feasible, and this may make the line become a big energy artery connecting western Asia and eastern Asia.

## Development Trend in China's Natural Gas Resources, Production And Demand

Hu Jianyi Meng Muyao Liu Minzhong  
(China National Petroleum Corporation)



### I. China's Natural Gas Resources and Their Distribution

The genetic types of natural gas resource of China are various. Their distributions are also various in measures, basins and regions. The gas-bearing horizons, which are various in depth from very shallow to super deep in China are the Proterozoic, Paleozoic, Mesozoic and Tertiary and Quaternary of Cenozoic. Natural gas genetic types include biogenic gas, bio-degradation gas, sapropel-prone thermal degradation gas, humics-prone (including coal measures) Thermal degradation gas and high temperature cracking gas. They are widely distributed in the basins and regions of different types. Different types of natural gases have their own distribution patterns in depth and

sequences. There may be several types of gases in a given region or basin and one type of gas may occur in many areas.

After evaluating the temperature of gas generation and assessing the gas resource of different sequences, regions, basins and genetic types, combined with the factors related to the gas evolution, accumulation and preservation, natural gas potential resources have been predicted for different regions, basins, sequences and genetic types. The total natural gas resources in China are 38,000 billion cubic meters (BCM).

Natural gas of China, based on its geologic origin and geographical distribution, mainly exists in the following big regions (Fig.1):

● **Continental shelf (Region I)**, including Yellow sea, East China sea, Zhujiankou, Yinggehai, Qiongdongnan

basins, where the main genetic type of natural gas is humics-prone (including coal measures) thermal degradation gas, and the main target strata are the Tertiary whose predicted resource potential amounting to 8.12% of China's total natural gas resources;

● **East China oil region (Region II)**, including Songliao, Bohai Gulf, Northern Jiangsu, Jiangnan and Nanyang oil provinces, where the main genetic type of natural gas is thermal degradation oil-associated gas, and the main target strata are the Cretaceous and Tertiary: resource potential, 10.68% of the total of China;

● **South China (Region III)**, including the broad Paleozoic marine formation distribution region in south to Yangzi river, where the main natural gas genetic type is high mature cracking gas whose resource potential being up to 31.59% of China's total