'ENERGY STRATEGY IN POST MAO CHINA: SECURING OIL RESOURCES'

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MASTER OF PHILOSOPHY

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DECLARATION

I declare that the dissertation entitled, 'Energy Strategy in Post Mao China: Securing Oil Resources' submitted by me for the award of the degree of Master of Philosophy of Jawaharlal Nehru University is my own work and has not been previously submitted for any other degree of this or any other university.

Panu Ongri Pazo

Certificate

We recommend that this dissertation may be placed before the examiners for evaluation.

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Chairperson

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Supervisor

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Preface

China's energy strategy developed simultaneously with the open door economic policy. As growth and development of the nation was the main objective, there arose a growing need to manage and control energy resources. As there had been no concrete policy and body framed in the past for managing these resources China's strategy to acquire petroleum was open to several methods. It adopted various means to acquire these resources particularly in oil.China was developing rapidly after the Maoist era and as the same leaders had no experience in the area of petroleum the leaders and the policy makers felt the need for a freer reign and a more flexible approach to build their petroleum industry. As a result, China's petroleum production technology adopted in the 1980s had reached that of the developed countries during the 1970s; an initiative that closed the gap of about thirty years. By the 1990s, the upstream, midstream and downstream activities of petroleum production were at parity with most developed countries. However, the underside to the usage of this technical know-how was that it was limited in scale and not evenly distributed. In the early 1990s the strategy of a flexible energy policy had a reverse effect when the country began to face an energy crisis as the nation's domestic oil supply failed to meet its demands and in 1993 China was forced to obtain oil from abroad. The petroleum crisis of 1993 has led to an even more intense effort of China to maximise its domestic production and further its acquisition from foreign sources.

Given the rapid economic growth and the need to maintain it China requires enormous amount of energy. Its pursuit for oil resources and stabilising a constant supply however is met by challenges of environmental degradation and pollution. China ranks as the highest emitter of sulphur dioxide (SO2) followed by the United States while it ranks as the second highest emitter of carbon dioxide (CO2) after the United States. While the urban Chinese citizens' thirst for better living standards has put further pressure on the government for better facilities and a cleaner environment. China also requires a stock reserve of petroleum if any crisis should arise in the future

The dissertation enquires into China's energy strategy to enhance its oil producing capacity within its territory and obtaining oil resources from foreign sources. It covers approximately two and a half decades beginning from Deng Xiaoping's period.

The first chapter attempts to locate China's energy strategy within the broad framework of the interdependency theory and trace the linkages between China's oil

requirements in the domestic context and its dependency on foreign sources. The theoretical framework is based on the strategic options available for China. Broadly, two strategic options have dominated the debate on China's energy strategy, a confrontational, aggressive approach or a cooperative and mutual process. Objective of securing foreign sources, diversifying its supply, building pipelines, enhancing domestic production, constructing strategic stockpiles of petroleum reserves and several issues to maintain petroleum security come under the two strategic options of a cooperative approach. The second section deals with oil in the global context. It enquires into the global oil consumption pattern and how fossil fuel has been an important determinant for the growing Asian economies and will continue to be the dominant source of energy in the region. The study looks into the four key challenges faced by the world's oil industry as it discusses the growing oil scarcity, achieving energy security, controlling environmental degradation and predictions on peak oil production. The section further enquires into how the Asia economies will dominate the petroleum trade in the next two decades which subsequently could lead to a stiff competition between the developed and the newly developing counties in acquiring petroleum resources. In the third part Keohane and Nye's theory of complex interdependency is applied to the Chinese context. However, it does not attempt to falsify the theory but rather is used to analyse Chinese engagement with other nations while negotiating oil contracts.

Having provided the theoretical basis in the first chapter, the second chapter discusses the causes of China's growing need for more oil. The first section of the chapter studies the demand and supply of energy resources in China, giving an overview of the energy sector and the composition of China's energy basket. Coal has always been the dominant energy resource as China is the highest producer of coal in the world but the demand for coal has fallen from 71 percent in the early eighties to 65 percent in 2004, while oil comprised of 22 percent of the total energy consumption in the early 1980s but fell to 19 percent in the late 1980s but again increased to 24 percent in 2004. In this backdrop as the gap between the demand and supply of oil over the years has been widening the domestic production has been enhanced by use of better technology but provides little reassurance to the producers as more and more oil is being imported from foreign sources. While the Chinese government has taken initiatives to contain the crisis, it has been slow and controlled by many factors such as restructuring oil prices to international standards as it would be pressurising the citizens to purchase oil at unaffordable prices. The demand for oil skyrocketed mainly because in 1992, automobiles were allowed to be privately

owned and statistics showed automobiles in China amounted to 1 million units in 1992 and current study showed 36 million cars in 2006. The central theme of the chapter deals with China's economic growth and oil consumption in relation to the changing structure of the energy institutions and organisations. The absence of a ministry of energy or a body solely responsible for making energy policies in China has created a crisis for proper administration of energy resources. Be that as it may, the petroleum sector has three main semi-government bodies the China National Petroleum Corporation (CNPC), China National Petrochemical Corporation (Sinopec) and the China National Offshore Oil Corporation (CNOOC). The Ministry of Energy was abolished in 1993 and the National Development Reform Council (NDRC) set up the Energy Bureau which was a substitute to the Ministry. The Energy Bureau is faced with limitation of framing energy polices such as pricing which is set by the Office of the National Energy Leading Group). The existence of several bodies has created clash of interests and competition within the administrative bodies such as allocation of funds and distribution of power and functions. The three main oil companies, CNPC, Sinopec and CNOOC have a corporate structure and semi-government status has been an impediment for proper functioning as it has to take into account the foreign policies and other governmental guidelines in its commercial transactions. The third section on China's energy strategy since 1978 comprises of the goals and objectives to ensure a stable and balanced energy environment and China's attempts to acquire oil from varied sources thereby reducing its vulnerability. It studies the methods of acquiring resources from within its territory and from abroad. By 2000, it had acquired petroleum production rights from all the major oil producing companies and continues to expand its growth through further ventures.

The third chapter delineates China's energy strategy which aims to secure its resources from within and without. China has been actively involved in signing more foreign joint ventures in exploration and production thus enhancing its production and meeting its petroleum demands. The first section provides an overview of the growth and the developments of the oil industry from 1979 to 2003. Important watersheds in the petroleum industry's production have been highlighted in this section. Initially, China's oil production accounted for a very small part of the nation's natural resources. In 1970 the total crude oil production was only 30.65 million tons, by 1980 the production had climbed to 105.95 million tons, 1990 recorded 138.31 million tons and by 2000 China produced around 163 million tons of crude oil. The discoveries of oilfields like Shengli, Dagang, Liaohe in the mid-1970s boosted the production

level of the nation where big oilfields like Daqing and Karamay were already existing. A section on some important onshore and offshore oilfields fields have been incorporated in this section. As national oil biddings are one of the important elements to recognize China's energy strategy (as it diverted from the principle of self-sufficiency) and yet is a part of the developments, oil biddings have proved to be a benchmark to the growth of the petroleum industry. National oil biddings mark China's first foreign oil joint venture events. It began in the early eighties with companies like Total, Atlantic Richfield Company and British Petroleum. Tracing the bidding regions of the offshore oil exploration, China had taken cautious steps in opening up its offshore areas. The offshore areas were incorporated mainly as a safe experiment to allow foreign investment and better technology from foreign petroleum companies. On studying the development of China's petroleum industry since 1979, certain trends could be traced. On the other hand issues of petroleum development have bedevilled the economic growth as China's automobile industry and other large-scale industries are dependent on an uninterrupted supply of oil. To sum up China's progress for securing its oil resources various methods such as constructing pipelines across the nation, enhancing efficiency through proper management, oil pricing mechanism, adopting better technologies and conservation have been adopted. The final section is based on how the Chinese have been attempting to attract foreign collaboration. Its participation in the domestic and as well as foreign collaboration has been vigorous.

The following two hypotheses form the basis for the study. The first being a rapid and sustained economic growth in China for the last twenty five years has put enormous pressure on its energy security. As China is evolving into an industrial economy, energy security will continue to dominate its policy agenda. The second, Beijing's two pronged strategy of expanding domestic and international energy sources is redefining the energy architecture in Asia and the world.

The central concern of this dissertation is to locate not only China's energy capability and strategy but also to comprehend the management of the main source that sustained China's economic growth. There are primarily three research questions that the study attempts to enquire into. Firstly, what is the nature of energy strategy in China? Secondly, what have been the changing patterns in China's energy policy since 1978? And thirdly, in the era of globalization, whether the premise of 'energy security' has been a sticking point or a way forward to China's development? Firstly, China's petroleum consumption will continue to grow as China's energy strategy is driven by the goal for economic development. The pursuit for oil and natural gas from

any region will dominate their main agenda of energy strategy. Secondly, China's energy policy over the years has developed to one that focuses more on conservation, efficiency and shift to cheaper sources like gas and other renewable sources. Thirdly, energy insufficiency has made China more vulnerable and therefore diversion of capital and resources may be untenable for their economic goals but it also gives China an opportunity to wield its influence of cooperation for its own agenda.

In the background of establishing the hypotheses and enquiring into the queries of China's energy security the study aims to look into five main aspects of China's petroleum industry. The five objective are; first, the research would study the link between China's economy and energy resources by looking into the growth and development of the economy; second, to study China's production of oil both in its domestic and foreign exploration; third, distinguish the impact of the dependent variables in the domestic front: economic growth, institutional restructuring and changing demands of energy (automobile market and other oil consuming products); fourth, to see the changes in the dependent variables in the international front: economic trade, environmental concerns and the changing foreign policy trend; and six, to examine China's onshore exploration and offshore ventures.

The methodology adopted will be two-pronged. In the domestic front, 'oil' security (independent variable) will be studied in co-relation to dependent variables like economic growth, the changing demands for more efficient energy (from coal to oil and natural gas), the changing institutional framework i.e. the creation of CNPC, Sinopec and CNOOC and their respective functions. In the international front the importance of 'oil' resource as a determinant of China's foreign policy decision making process. The scope of this study is to find out how oil as a determinant of foreign policy has influenced China's relation with the foreign oil producing nations as China's approach has consisted of both military confrontation and cooperative measures. The study in this area will also look into the participation of China in global energy security as China is aware that it cannot be completely self- sufficient. Its role is also crucial as it ranks among the top five consumers of energy in the world and holds stakes in the energy market.

Chapter 1

Energy Strategy in China: The Two Contexts and Theoretical Debates

Introduction

Though China has witnessed tremendous growth over the past few decades during the same period it is faced with a shortage of energy supply, particularly oil. On a global scale oil is the highest demanded energy resource among all types of energy. Oil demand has become a national issue in China and if it is not addressed adequately it will constrain the nation's economic growth. The theme of securing oil resources is obscure as it is not only an economic commodity but is shaded with other issues like geopolitics, oil-diplomacy, long term agreements with oil-supplying countries, the domestic energy-industry's international competitiveness and predetermined projection of future import and export of the oil trade. Competition from other fast developing countries and the steep rise in the world oil prices has driven China to pursue more rigorous strategies to ensure energy security.

The first part of the chapter explicates China's energy strategy and the plausible alternatives it has at its disposal and also charts out the geographical location of the oil deposits within China's territory as it has played an important role in issues of regional economic development within the mainland. China's offshore claims in the South China Sea where there are potential oil deposits have also generated territorial disputes with neighbouring countries. Since the late 1970's China's energy strategy changed in accordance with its open market policy. This policy of China's, over the decades has undergone several adjustments vis-à-vis foreign investors as its oil sector has also been engaged in the world oil market. The second part of the chapter, an overview of world oil industry with a comparative study of some important oil consuming and producing regions of the world is examined to situate China's desperate need for oil in the larger contexts of a developing crisis in the global oil economy and the power of technology in addressing such a crisis. The third part attempts to locate China's energy strategy in the broader theoretical discussion on complex interdependency and China's interpretation of engagement with other nations particularly in its insufficiency for oil resources. While the complex interdependency theory as a western concept is an appropriate theoretical model for studying the relations of engagement of a nation's economic activities with the world economy, however, it cannot correctly evaluate China's interdependence with the rest of the world. Chinese notion of interdependence is shaded by neo-mercantilism wherein military measures are

plausible to safeguard its national interests. The premise to this argument is substantiated in its energy strategy, discussed in the first part of the chapter.

I. Energy Strategy in China – the Context

Since 1993, with China becoming an importer of energy, and in particular of oil, two schools have emerged in analysing China's strategy. The two archetypes are at variance with each other on the grounds of whether China's strategy will drive it to be belligerent or to be benign based upon the nature of the problem it faces. Analysts belonging to the first school envisage its oil demands to drive it to be belligerent, revisionist policies and could prompt it to pursue destabilising policies on a world scale. With the ongoing naval build up to protect the offshore oil rich areas in the neighbouring region and the sale of arms to nations that provide oil, China may pursue military tactics in the future. The other school speculates China's rise to be a benign status quo power and contend to its reliance on foreign oil to facilitate "its deeper integration into the international system". It is expected that cooperation will be the main standpoint as neighbouring states like India, the South East Asia and other developing nations share similar interests as free flow of oil from the gulf is a vision visualized in the future (Downs 1998: 21-22). While the central arguments of these two schools hold water to a certain extent, the reality is beyond that. China's strategy can be traced to follow a distinct trajectory which is moving away from US dominated regions and also at times attempting to compete with the US through several biddings in some regions. There is an underpinning of counterforce acting against US hegemony.

The first school uses the following details to support its argument. China's ambition to assert its military power over the disputed territorial claims in South China Sea, East China Sea and the offshore continental shelf and apathy to international norms and regulation by inking cooperation deals with oil rich but menacing regime governments. It aims to build a 'blue water navy' and the military budget has been rising ever since. The South China Sea, where there are potential oil deposits, has been the main flashpoint for five other claimants, Viet Nam, the Philippines, Brunei, Malaysia and Taiwan who have also laid claim to this area. In 1988, the Chinese and the Vietnamese forces confrontation led to the death of 150 soldiers over the Spratly Islands dispute. In 1995, Filipino fishermen were removed from the Mischief Reefs by the Chinese army on the alleged reasons of territorial claims. The Mischief Reefs lie about 150 miles from the Philippines oil reserves of Palawan Island. Two months later Taiwan fired artillery on a

Vietnamese supply ship. The tension in the Mischief Reefs also aroused the interest of Japan as it held business stakes in the Philippines area of the Palawan shelf. In 1995, a Chinese oil drilling ship was spotted in the Japanese claimed area of the Senkakus as the Chinese began oil exploration in this disputed territory which Japan claims and in 1974 the two countries had faced a military confrontation over the territory (Calder 1996: 61). Added to China's belligerent strategy Chinese oil bidding have led scholars to speculate on their actions as negligent when in 1997, the Chinese concern for securing their oil supplies in Iraq and Sudan overrode the international concern of branding these countries as perilous regimes.

The second school is based on China's alternative choice for regional and international cooperation. Chinese leaders have reiterated in the past their need for a peaceful international environment to expand its economic reforms and therefore military confrontation and hegemonic intents in the region remains as a diminutive possibility based on the rationality of the transfer of resources for reform to be a much expensive affair in the pursuit of its foreign policy objectives as it is not beneficial to the overall economic modernisation that it pursues. The instability in the region would hinder any progress for China's economic modernisation efforts. However, Wu and Mesquita argue that China's belligerent stand (especially in the South China Sea over the Spratly Islands) is driven more by other issues like sovereignty of the nation and historical experiences (Wu and Mesquita 1994: 382-383). Sovereignty has always been a sensitive issue for the Chinese leaders and the general population which if in consequence to maintaining its sovereignty fails to take a stand in the contested territories of the South China Sea would be interpreted as a sign of weakness by Taiwan and Tibetans and also considered unpatriotic by the Chinese themselves. The historical experiences of European imperial expansion in the nineteenth and twentieth centuries would prompt the Chinese leaders in the twenty-first century to take all possible measures in order to deter any kind of foreign exploitation and also to build an image of nationalism which is a dominant factor to the leadership personalities in China. According to the authors Beijing is bound by the rationality of maintaining a stable economic environment and therefore threats of military measures would be made but not carried out. Maintaining their territorial sovereignty through threats of militarily action is also to avoid any possibility of domestic political dissent. What remains germane to this argument is that although the use of force may not occur, China's foreign policy of military action is guided more as an extension of its domestic policy (Ibid).

China has adopted a multi-pronged strategy to secure oil resources. Reduction of dependence on foreign sources is sought by maximizing domestic production, both on-shore and off-shore, "securing foreign sources by acquiring production sources and facilities as well as the product, building a strategic stockpile reserve and enhancing the physical security of stocks and sources on hand" (Cole 2003: 15). According to Mahalingam (2005: 405) China's efforts to ensure energy security comprises of the following initiatives: firstly, "liberalisation of investments in exploration and production to increase domestic availability, secondly, enhancement of domestic supplies through overseas oil acreages, thirdly, rationalisation of consumption through price signals, by integrating domestic prices to global markets, fourthly, diversification of supply sources through strategic, diplomatic and commercial alliances, fifthly, establishment of pipeline infrastructure to access domestic and neighbourhood resources, sixthly, conservation and demand – side management measures." Being aware of its vulnerability Beijing has taken several initiatives in the diplomatic, strategic, commercial and scientific front. It has opened up upstream activities (operational stages in the oil and gas industry that involve exploration and production and most oil companies are known as "integrated" because they combine upstream activities with downstream operations, which take place after the production phase through to the point of sale) to foreign investment and the energy rich countries through diplomacy. A new theme was adopted by the Chinese government that relied on encouragement of investment by national companies in overseas oil reserves which would help them secure its energy supplies. Speed (2005: 3) stated that with the ongoing increase in oil imports by China and the rising prices of oil forced China to add to its agenda the need to build a strategic stockpile in 2002.

In the Fourteenth Congress of the CCP the China Petrochemical Corporation planned to accelerate its production by two phases. Firstly, by the year 2000, the annual processing capacity target was 200 million tons, with ethylene production to reach at 5 million tons and secondly, by 2010, the annual processing capacity of crude oil ranging between 300-350 million tons and ethylene production to touch 8-10 million tons. It aimed to reach the level of the developed countries. Following Deng Xiaoping's theory of building socialism with Chinese characteristics, the development strategy intended to be guided by the eight word principle: *large, advanced, series, extension, group management, international management, stock management and diversified management* (Sheng 1994 : 14-15).

Regional Dynamics.

While coal and gas are concentrated in the north and north-west and hydropower energy is prevalent in the south and south-west there is a problem of distance as the industrial areas are concentrated towards the coastal regions, especially the south-eastern coastal province of Fujian and Guangdong. In addition to it there is an imbalance of resource endowment and processing capacity (Calder 1994: 57 and Findlay and Watson 1997: 125). While the south-eastern industrialised region produces no oil the major supply is from the north-eastern region of the Tarim and the Shengli Basins which lately is facing a decline in production. Earlier experts believed that the Tarim Basin reserves could top Saudi Arabia's proven reserves of nearly 250 billion barrels. However, the prospecting in this region is torturous due to the desert conditions and the location of oil in the deep, small and hard to find pockets. The infrastructure of pipelines, roads and telecommunication needed would prove to be too expensive as it accounts for seven percent of China's oil production (Calder 1994: 57). Cole (2003: 20) states that current slogan for China's petroleum industry is "Stabilize the East, Develop the West" where more investment is being put in the older fields especially the Tarim Basin in Taklamakan Desert while other smaller targets are Turpan-Hami and Tuha basins.

Since the import of oil from foreign sources in 1993, western scholars have invalidated the Chinese doctrine of self-sufficiency *(zili gengsheng)* and have instead proposed a development model grounded on economic interdependence and engagement with the rest of the world. Accordingly, China has diversified its imports of oil from several nations and regions to avoid vulnerability to oil shocks "could be an extension of a policy of self reliance, given China's recognition that its domestic oil and natural gas supplies are unlikely to meet its ultimate goals" (Chang 2001: 233). China's stakes in the foreign oil reserves includes in almost all the oil producing regions of the world; the Middle East, Latin America, Africa, Central Asia and the Caspian region, the South China Sea with Malaysia and also has collaborated with the foreign oil companies of the United States, Britain, France, Italy, Australia, India and with indigenous companies of the oil producing countries.

II. Oil in the Global Context.

Oil is by far the largest category of trade in natural resources globally, and functions as a variable shedding light on three aspects of North-South differences and relations. 'First, because of the energy's central role in industrial development', energy consumption 'reflects the

"differing levels and patterns of industrialization"' in the global North-South. Second, it allows us to describe the dynamics of North-South trade in 'oil'; the most important "periphery" commodity. Third, it reflects the shifting patterns of energy use following the price shock of 1970s (after the price stability of 1950- 1972). The reverberations from these "shocks" provide useful clues about the nature of the world political economy and the role of energy in it' (Goldstein and Huang 1997: 242). The pursuit of the US to control oil producing nations by overthrowing existing political regimes and establishing puppet governments has created instability in several parts of the world. After the oil shock in 1970s and 1980s global oil consumption dropped from 46 percent in the early 1980s to 39 percent in the late 1980s and has been constant ever since. Natural gas increased from 19 percent in the early 1980s to 23 percent currently. The use of coal increased from 25 percent in early 1980s to 27 percent and eventually falling to 24 percent. Nuclear power has risen from 3 percent to 6.5 percent. Hydro power use has been constant at 6-7 percent (Goldstein and Huang 1997: 242).

The developing nations over the years have taken over the developed nations in oil consumption. With the fast growing economies of Asian nations, oil will remain as the dominant source of energy. The world oil consumption from 1990 to 1998 increased by 6.1 million barrels per day from 65.4 to 71.5 million barrels per day of which 5.4 million barrels (89 percent) of the increased amount was represented by the Asia-Pacific region. It consumed 27 percent of the total global oil supplies in 1998 (Takagi and Fujii 2000: 260). The ready availability of oil has prompted these fast growing economies to resort to it as their major source of energy to fuel their growth. The tedious effort to switch towards other alternatives in a condition of rapid industrial growth has created a strong dependence on oil. According to the International Energy Agency (IEA) "[f]ossil fuels, including oil, coal and gas will remain the dominant source of energy, accounting for more than 90 per cent of the projected increase in demand (Dorian et al., 2006: 1984). This is due to the lack of development in technology and also due to the low investment in other alternative sources. Oil consumption will rise due to the increasing demand of the transport sector. Renewable energy-including solar, wind and geothermal – provide just 3 per cent of current world energy demand, excluding biomass. The cost of a unit of electrical output generated by solar, wind or geothermal generally exceeds that of oil, coal or gas fired electricity. Until the cost become more competitive with fossils fuels, their rise will remain limited while fossil fuels, including oil, coal and gas will remain the dominant source of energy, accounting for

more than 90 per cent of the projected increase in demand. Oil consumption will rise due to increase in demand of the transport sector.

James P. Dorian et al. (Ibid: 1984-1986) have charted out four key challenges in the world's energy industry. These are: growing oil scarcity, achieving energy security, combating environmental degradation and meeting the world's peak oil production. As the peak oil production is calculated over a certain period of time and is known only after studying the world production over a period of time, where oil production would be highest some scholars predict that the world's oil production would peak around 2010 while other oil experts predict that global oil production will peak during 2030. Be that as it may, given the maximum benefit that peak oil production would occur in a few decades oil producers are bound to face problems of "producability" and "accessibility" (Ibid: 1985). Problems of oil reserves is not the only criteria for the rising prices and its availability, given a situation where oil remains to be in surplus, other problems such as production and exploration of the untapped reserves are also vital factors in determining the supply of oil. Jaffe and Manning have contended the experts who advocate the theory of scarcity of oil. In 1972 an association of oil experts called Club of Rome wrote in the report "Limits to Growth" that 550 million barrels of oil were remaining and the world would run out of its oil resource by 1990. From 1979 to 1990 600 billion barrels of proven reserves was recorded and in 2000 more than a trillion barrels of proven reserves were recorded. The rise was expected to increase even as the global consumption reached 73 million barrels per day by 2000. International Energy Agency recorded 2.3 trillion barrels in ultimate recoverable reserves and with the use of tar sands and shale the reserves were expected to reach 4 trillion barrels (Jaffe and Manning 2000: 17).

Politics among nations, fiscal regimes and economic influences play an important role in the global oil market. China's share in oil demand accounts for almost one-third of the total oil demand. According to the US based Energy Information Agency, consumption of oil in China may rise from 6.3 to around 13 million barrels per day or more by 2050 (Dorian et al 2006: 1985).

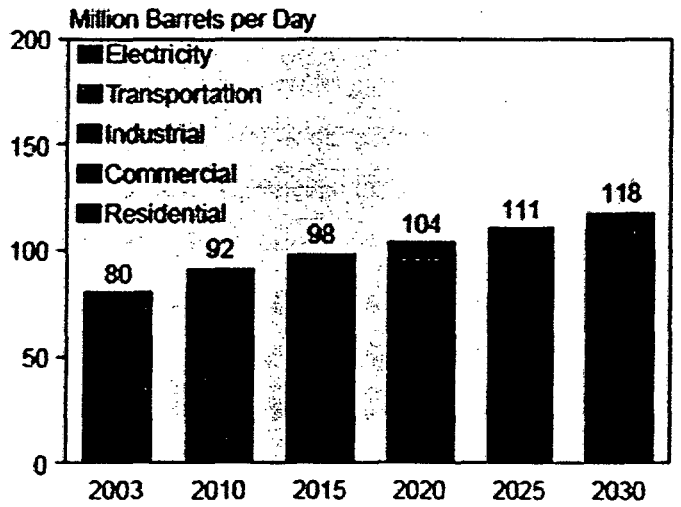
The second challenge is that of achieving energy security which is deeply rooted in the economic growth of a nation. This "has led many countries to seek secure and reliable supplies of energy through various means including diversification of oil supply sources, achieving more balanced energy mix and energy conservation". Securing oil resources to fuel the economy has been an important state policy as it has direct linkages with several other aspects of

national policies like employment, price stability of commodities, investments in energy related infrastructure. Energy security policies differ among countries. For example, China has diversified its oil import from more than twenty countries. Apart from shifting to alternate sources, China has also made efforts towards enhancing its domestic production. Countries like the United States and Japan have begun pursuing geopolitical competition among the developed and fast developing nations. Japan has convinced Russia to transport its oil to Daqing, China or Vladivostok, Russia so that oil can be shipped to Japan. This was in a bid to offer billions of dollars for social projects to Russia. Oil reserves in Russia and Central Asian countries have attracted many nations and this has given to the strategic movement away from the unstable Middle East. Global cooperation between producer and consumer nations has been an effective method to tackle the energy crisis. Thirdly, the Kyoto Protocol and its signatories have made efforts to control environmental pollution and thereby have called for a more sustainable global environment. However, the longer the delay for transition towards an eco-friendly environment, the more difficult and costly it will become to implement the policies. The Kyoto Protocol emphasizes on the reduction of carbon in the atmosphere and for countries like China which uses coal as their major source, it has become a pressing need to develop non-pollutant fuels. Nuclear option has been a major breakthrough in such cases and the use of hydrogen fuel cells and other efficient and cost-effective substitutes are also being pursued. The fourth challenge of meeting the needs of the developing countries is becoming more acute as development and economic drive is rapidly gaining pace especially in the Asian nations. Hamdi El Banbi (1996: 270-271) analyzed the performance of the Asian nations and estimated that these "economies will account for about 50 per cent of the projected increase in energy demand in the year 2015. Energy growth is expected to reach 4.3 per cent annually compared to 1.3 per cent for the OECD members and 2 per cent for the world". Basic energy requirements in the form of electricity are essential to sustain rural development. But 'oil' being the energy commodity of the rich is mainly concentrated in urban areas. The transport sector has been the highest consumer of oil and with this trend China and India are predicted to consume about one third of the total oil production. Apart from the large markets, mid-sized markets of Thailand and Malaysia are also experiencing a transportation boom.

World Oil Demand

The IEO (International Energy Organisation) 2006 predicts that growth in world oil demand will average by 1.4 per cent every year from 2003 to 2030. As the figure 1.1 depicts that the transport sector is the largest consumer of oil, consuming one half of the total oil production while the industrial sector accounts for 39 per cent. As far as the transport sector is concerned, there are controlled measures to check the over consumption of oil. The new direct-injection engines in Japan and Europe have captured the market and the adoption of post-internal-combustion cars and hybrid cars, fuel cell cars are already gaining popularity in the developed countries (Jaffe and Manning 2000: 20).

Figure 1.1: World Oil Consumption by Sector, 2003- 2030



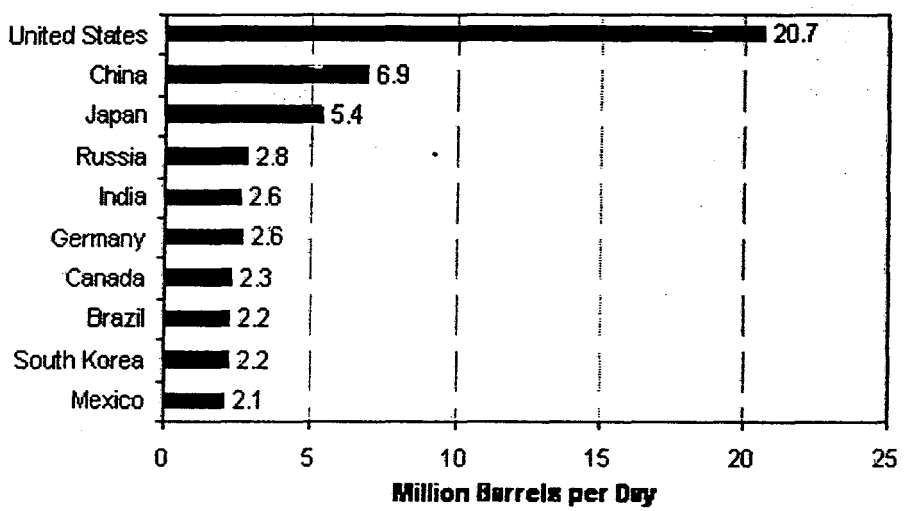
Source: 2003: Derived from Energy Information Administration (EIA), International Energy Annual 2003 (May-July 2005), www.eia.doe.gov.iea/ Projections: EIA, System for the Analysis of Global Energy Markets (2006) in Chapter 3: World Oil Markets, *International Energy Outlook* 2006, p. 26, Accessed on 02 February 2007.

In 1981, the big oil majors such as the Middle East, Venezuela, Indonesia, the northwest African nations and Mexico produced most of the oil but consumed very little of its production, while the developed countries which accounted for a small production of oil consumed 80 percent of the world oil output. As consumption of oil from 1975-1981 rose by 36 percent, the known reserves increased by 20 percent. The largest was the US, as the largest importer and consuming an average of 800 million tons per year from 1975-1979 (Cai 1981: 26). In 2003, the world oil demand was 80 million barrels per day and it is expected to rise to 98 million barrels per day by 2015 to 111 m/b per day by 2025 and by 2030 it is estimated that oil demand will rise to 118 m/b per day. The pattern of oil consumption is mostly concentrated in OECD America and the non OECD Asian nations. The rate of growth in oil consumption level of the OECD countries of Europe and Asia is 0.2 and 0.3 percent respectively. While the non-

OECD Asian nations average a 3.0 percent growth per year. China and India account for 5.5 percent increase from 2003 to 2030.[1] The threat of an oil glut has over the recent years been from Asia as its primary dependence is the Middle East.

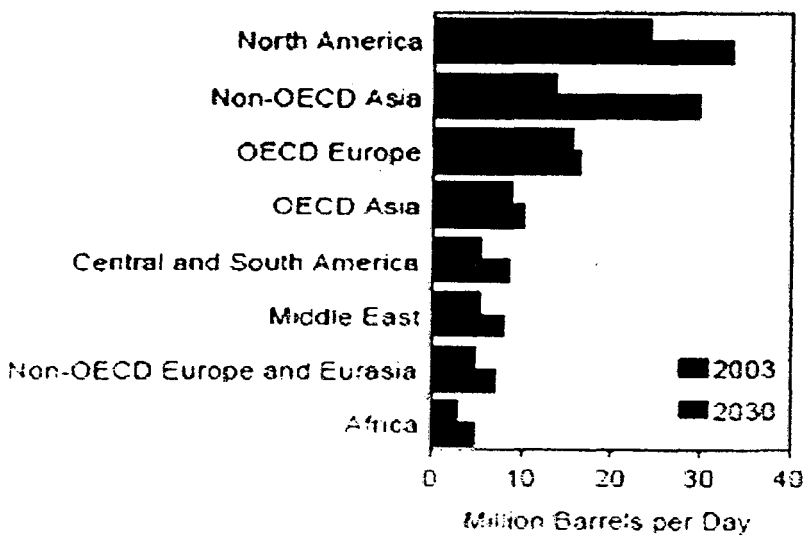
China's petroleum imports are expected to grow four folds from 2003 to 2030. In 2003 China imported 0.9 m/b per day and by 2030 it is estimated to reach 5.8 m/b per day.

Figure 1.2: World's Top Ten Oil Consumers



Source: EIA Short Term Energy Outlook (November 2006)www.eia.doe.gov/iea. Accessed on 02 February 2007, Energy International Administration, International Energy Outlook, in Chapter 3: World Oil Market, *International Energy Outlook* 2006.

Figure 1.3: World Oil Consumption by Region and Country Group, 2003- 2030



Source: 2003: Energy Information Administration (EIA), International Energy Annual 2003 (May- July 2005). www.eia.doe.gov/iea/. 2030: EIA, System for Analysis of Global Energy Markets (2006) in Chapter 3: World Oil Markets, *International Energy Outlook* 2006. p. 27. Accessed on 02 February 2007

[1] Figures from Energy Information Agency World Energy Markets http://www.eia.doe.gov/oiaf/ieo/ index. html

Worldwide Petroleum Trade

Since oil is fungible and traded in world commodity markets, there is much uncertainty associated with projections of future patterns of oil trade; however, anticipated changes in the world's oil trading patterns-particularly, the shifting regional dependence of importing regions on producing regions-may have important geopolitical ramifications. However, the major supply of oil for next two and half decades will continue to be from the OPEC nations and particularly from the Persian Gulf region. There has been a shift of oil supply from the OECD nations to non- OECD Asia. This significant shift expected in the balance of OPEC export shares between the OECD and non-OECD economies is a direct result of the economic growth anticipated for the non-OECD nations, especially non-OECD Asia. OPEC petroleum exports to non-OECD economies is projected to increase by 13.6 million barrels per day from 2003 to 2030, with more than 85 percent of the increase going to the non-OECD economies of Asia. In 2003, China imported 0.9 million barrels per day of oil from Persian Gulf OPEC members and is likely to import about 8.4 million barrels per day from OPEC in 2030, 69 percent (5.8 million barrels per day) of which is expected to come from Persian Gulf producers. West African producers, including Nigeria and Angola, are also presumed to increase their export volumes. Caribbean Basin refiners will account for most of the increase in North America's imports of refined products. With a moderate decline in North Sea production, OECD Europe will import increasing amounts from Persian Gulf producers and from OPEC member nations in western Africa. Substantial imports will also come from the Caspian Basin. OECD Asian nations are expected to increase their already heavy dependence on OPEC oil. The non-OECD economies of Asia will more than double their total petroleum imports between 2003 and 2030 if their growth remains undisturbed.[2] China's oil share in energy consumption is almost the world average but it is estimated to rise with the industrial growth trend and will surpass the current average rate (Fan He 2006: 98).

The development of oil exploration technology widened the scope for other nations to join in the oil race. The use of computer – assisted, three dimensional imaging lets the geologists see the underground pockets of potential reserves and better platform designs and drilling methods have prolonged the life of an oil well recovering from 20-30 percent to 50-60

[2] Figures and stastistics from "World Oil Markets", *International Energy Outlook, 2006* Energy Information Administration, Washington. DC, U.S. Department of Energy.

percent of oil. Drillers have become six times more successful at finding oil. The new entrants into oil exploration were the regions of Gulf of Mexico, eastern Canada and western Africa, onshore exploration were central Africa, South America, and the frontier region of Soviet Union and the Arctic(Jaffe and Manning 2000: 19-20).

III. Theoretical debates

The pursuit of oil by nations to fuel their economies as highlighted has made the present era an epoch of 'Oil age'. International relations in the contemporary context differentiate between the developed North and the underdeveloped South on the level of industrial development and economic growth. Oil has become the most important economic commodity in international relations and has taken the form of political nuances bearing shades strongly motivated by bargaining capacity and its coveted nature. Kubrusi and Mansur consider oil as a political resource where "[O]il production, distribution pricing and exploration involve complex issues of economics. But they are no means of purely economic questions and to view them in terms of theoretical and practical economics is to adopt a distorting and misleading perspective. Natural resources mainly belong to governments. Decisions concerning the pace of exploration and development and rates of extraction are now assumed by governments in the producing states. Even pricing policies are politically motivated. Regulation and taxation of the oil industry are a matter of political policy... it is about the political economy of oil" (Kubrusi and Mansur 1994: 313-314).

The analysis of oil as an economic factor in determining nation's policies takes into account a number of factors like economic growth and development, existent politics between governments, international and regional organizations and non-state actors in the form of multinational corporations and civil societies. The theoretical study in this context is based on complex/ interdependency theory of the liberal school and in the context of oil, the theory has strong undercurrents of oil being an factor for China to look beyond its own potentials because oil being an economic commodity can be employed firstly, as a bargaining resource, secondly, as a transnational concern and also as a non-military security issue of a positive sum game. The meeting point of the premise of complex interdependency is grounded on the inseparability of politics from economics. It goes one step further to understand that politics does not always involve government(s) but "rather as a particular process; i.e. political is defined by the function of the actor" (Tooze 1981: 126).

According to Tooze (1981: 121) there are two categories of change in economic theory: cyclical change and structural change. Cyclical change applies to the change which is "expected, predictable and not too much of a problem given counter cyclical government policies" while the latter much more difficult to explain, is an a priori significant change, and is of a different quality and... involves relatively lasting shifts in the way resources are used." The first category of change may overlap the second type. Tooze being one of the pioneering scholars of international political economy in his work has critiqued on the obsolete method of analyzing the state as the sole unit of analysis and how non state actors determine the path of international politics and issues. He has taken economic factors and their role as one of the most important determinants of power demonstration. He argues that "Power itself can be economic, without reflecting military capacity. The USA is 'powerful because of the nature and size of its domestic market, OPEC states wield 'power' because of their control over resources; knowledge comprises power resources. Moreover, not only states have economic power: economic power is exercised in each and every economic exchange and level of production" (Tooze: 122-123).

Other scholars discuss the issues which are not always linked to security only. Factors like economic and political interdependence characterizing a transnational and international nature, international regimes regulating a common concern and finally the overlapping attributes of domestic and international problems. Oil being a natural resource is unevenly distributed in the world which has created a crisis of scarcity and abundance. However, more than the availability of oil, the crisis is coupled with its demand in industrially developed as well as developing nations. The linkage between politics and economics is an inevitable process, as Carr demonstrated; "The science of economics presupposes a given political order" (Ibid: 126). Economic liberalism according to Jackson and Sorenson is the dominant role of the individual consumer and producer (Jackson and Sorenson 1999: 117). As exchange of goods and services is the primary objective in a market, the individual rationality to benefit from the investment drives each actor to gain more. This thereby leads to a free market economy and capitalism. Free market economy and capitalism does not rule out the regulations of the government and as political underpinnings are inherent to economic policies, there is minimum required intervention from the government for better performance of the economic activities. This version of economic liberalism is known as conservativism/ neoliberalism which were practiced by Margaret Thatcher and Ronald Reagan. Economic liberals argue that market regulates itself best without any state intervention on the basis of market laws. As economic

exchange is a positive sum game, the rationale of benefiting or profiteering is always the main driving force to create a market and expand it. The liberals believe that the creation of the world into a single market thereby enhances better markets, more opportunities and a more extensive positive sum game (Tooze 1981: 126). However, a free market is a condition of exchanges between states which are equal in their resources wherein the terms of trade are almost equal but as no nation is equal it becomes rational for smaller and weaker states to protect themselves from bigger powers thereby driving the state to function as the securer of national interests. The oil crisis in the 1970s and the 1980s is a case in point where the smaller and the weaker OPEC nations which were rich in oil reserves quadrupled the oil prices particularly targeting the markets of the more industrially developed nations.

The liberals "tend to view the economic system through the eyes of the consumer by maximizing production possibilities, competition and are ready to discount vulnerability issues in order to pursue efficiency and abundance" (Buzan 1994: 92). The benefit of a liberal economic system where the market laws, with minimum interference of the state, determine the system solves many problems of resource and development and also takes many economic issues off the state's agenda. Firms trade with few restrictions. Thereby, they prevent states from going to war, maximize flow of capital, technology and ideas. Liberal economists argue that the large gains of the market help to deal with problems of inequality, hardships and problems of adjustments that the market inevitably generates. Open capitalist states do not view security much as an issue to as most interaction are not seen as threatening.

Three characteristics are dominant in Complex Interdependence liberalism. Firstly, the transnational actors have become increasingly important in determining the dynamics of market. Secondly, while military force is less useful than economic and institutional instruments. Lastly military security is considered less important as welfare issues have become more dominant factors (Jackson and Sorenson 1999: 117).

According to Robert Keohane and Joseph Nye, interdependence is different from interconnectedness as the former implies in a nutshell *'mutual dependence'* while the latter implies disjointed or dispensable dependence. A case of asymmetrical trade in oil between the producer and the consumer or trade of vital products among nations depicts interdependency whereas trade of luxury goods like fur, jewellery, perfume, whose interrupted flow would not necessarily bring a major change is known as interconnectedness.

When this theory was developed in the mid 1970s, international interaction among states was undergoing a rapid change as explained by the interdependence paradigm and was challenging the existing realist approach. The commodity of oil and its trade brought a dramatic change in IR theories and inter-state relations. During this decade, the oil price shocks that occurred in the international market prompted IR theorists to construe international relations in terms of international political economy. Ten years later in 1987, Keohane and Nye reviewed their work "Power and Interdependence" and the applicability of the interdependence theory in the contemporary context admitted to have ignored the tradition of realism and had instead fitted the realist assumption for the analysis of interdependency politics, according to K J Holsti and Stanley J Michalak the assumption made "straw – men" of realism in a condition it was never intended for (Keohane 1987: 729).[3] Secondly, interdependency fell into the neo – functionalist strand of liberalism advocated by Ernst B Haas and Deutche who contended against the state as the basic unit of analysis and national – interest as the primary objective of the state (Keohane 1993: 385- 386). Interdependence was creating or understanding the strategic and bargaining relationship among nations where collective action were to comprise from an international economic system to ecological system which is threatened by industrial effluents. It depicts collective cooperation as the central theme.

One of the primary characteristics of interdependency theory is the question of *'mutual benefit'*. As interdependence among nations restricts autonomy, 'it is possible to specify a priori whether the benefits of a relationship will exceed the cost' or not (Keohane 1977: 9). In doing so the states seek to maintain maximum autonomy and simultaneously also the highest mutual patterns of cooperation. Securing oil resources from foreign sources determined politico-economic dimensions of this model. Interdependency of oil resources is the manipulation of benefit accrued by the actors according to this arrangement. This will depend on the values of the actors as well as on the nature of the relationship. Therefore, there are two methods of analyzing the cost and benefit of interdependence; "the first focuses on the joint gains and joint losses to the parties involved. The other stresses relative gains and distributional issues" (Ibid: 10). The first analysis only validates the overall gains over overall losses, ignoring the second analysis of the total distribution of gains. According to the authors, interdependence lies in between the asymmetry of production and distribution on the one hand and the symmetry of bargaining costs and benefits among nations.

[3] wherein the authors have cited from K J Holsti, (1978) "A New International Politics?" *International Organisation, 32, Spring*, p. 525 and Michalak, "Theoretical Perspectives" et al.

In the framework of interdependency theory, power is an essential component. It is more complex from the realist paradigm as it involves asymmetric interdependence and is translated as the control of resources or the potential to affect outcomes. The bargaining process in a condition of interdependency is the usual method of translating potential resources into effects and a lot is lost in translation. In an asymmetrical condition the country which is less dependent upon a resource has better bargaining capacity. However, bargaining cannot be simply nullified to resource acquisition and dependency. Linkage issues of resources, which may be in the form of domestic pressure and foreign policy imperatives may also enhance or deter the bargaining framework on interdependent relationship. For example, interest and pressure groups within the country or neighbouring countries may disrupt the process.[4] The degree of dependence determining a nation's power has two dimensions, *'sensitivity'* and *'vulnerability'*. Sensitivity depicts the stability or constancy of a nation's policy. It assumes that the framework remains unchanged. According to Keohane and Nye, sensitivity is economic, cultural and political. The vulnerability dimension of interdependence rests on the relative availability and costliness of the primary resource to the alternative resources that various actors have to resort to. When external changes are imposed upon actors it suffers liability costs in adjusting to new conditions. Taking the time period as a factor in the adjustment to a new condition determines the sensitivity dependence. Thereby the costliness that the nature of a new condition appropriates determines the vulnerability of the actor. Vulnerabilities focus on which actors are the '"definers of the *certris paribus* clause" or can set the rules of the game' (Keohane 1977: 15). In the analysis of power structure in interdependence, vulnerability according to Keohane and Nye is more important. The sensitivity measures only the dependence while the vulnerability measures the cost (in time and money) to obtain substitutes.

To analyze the effective nature of power in the condition of asymmetric interdependence depends upon bargaining outcomes. Power, according to the authors is at variance from terms of resources (potentials) and influences (outcome). Interdependence does not predict the success and failure of outcomes between the asymmetric relationship among powerful states and weaker states. "It merely provides a first approximation of initial bargaining advantages available to either side" (Ibid: 19).

Complex interdependency is different from interdependency in a number of ways.

[4] For further elaboration read section 2- The research program of power and interdependence a critique in Keohane. Richard and Joseph Nye (1987) "Power and Interdependence Revisited", *International Organisation*, 41, 4, Autumn. pp. 732- 737.

While interdependency is a very broad term signifying the nature of relationships driven by bargaining and reciprocal behaviour, it may range from political military relationship as in the case of NATO while it may refer to political - economic exchange as experienced in the East Asian region; ASEAN. Complex interdependency is an ideal type of international system where the exchange between countries is by more than the agencies of the state which include civil organizations and economic corporations. Contact and exchange is not the monopoly of the state. There is no hierarchy of issues and finally military force, which bears a larger cost of bargaining and being also in the control by the state, is often ruled out. Complex interdependency is characterised by three assumptions. Firstly, *multiple channels of interactions*, secondly, *the absence of hierarchy* and thirdly, *the minor role of military force.*

Multiple channels of interaction illustrate the increase in the dealings between states. Communication between states has changed from representatives of the government coming together to non-governmental agencies sharing similar interests. Bureaucratic dealing with one another over meetings, phones and big organisations, MNCs, banks that pursue interest related activities have made various governments sensitive towards one another. These organisations work as 'transmission belts' as they affect both the domestic and interstate policies of nations and have also blurred the distinction between domestic and foreign policy.

The second characteristic of the absence of hierarchy of issues is a distinction from the realist argument that international politics need not always be motivated by the high politics of military confrontation and explanation of interstate relationship can have economic, social and environmental dimension. In the contemporary context there are threat issues which may prove to be more expensive than employing a military solution. That foreign policy of a nation is determined by domestic conditions and issues that are politically driven will inevitably overlap into other areas of influence. Politics for Keohane and Nye does not stop at the waters edge. The growing number of international and regional regimes that focus on a myriad of issues has proved that the relationships have made boundaries obsolete and integration of nations into a global village is not implausible.

The third and the final characteristic dimension of complex interdependency is the minor role of the military. The security dilemmas according to realists drive states to maintain their survival and "military force is always the central component of national power" (Keohane 1987: 28). Fears of attack have declined over the decades. Economic and ecological welfare have overridden the notion of individual survival and thereby led to the global politics of collective

survival. As military approach proves to have costly effects, the solidarity of cooperation has set in among nations. Yet however, it does not mean that conflicts are absent. Conflicts are inevitable but the methods of meeting out the differences have changed. It is important to understand the use of force is not completely plausible. The degree of issue in politics calls for the usage of either the realist (use of force) model or the complex interdependency approach. Realist model of use of force is usually applicable only in situations of last resort while complex interdependency model is generally applicable when nations translate their resources to bargaining tools and thereby result in an outcome different from what was initially conceived.

The origin of the complex interdependency theory bore mainly from the events of the 1970s where classical realism advocated by Morgantheau was being challenged. The trends of interstate relations were bearing economic overtones. As realism is the extreme manifestation of an aggressive policy, complex interdependency stretches to the other end of the spectrum. However, Keohane and Nye have been careful to state that either of the arguments cannot be nullified for the other to exist because both are ideal and reality exists somewhere in between the two. The complex interdependency theory opposes the realist assumption of politics on three premises to their argument. First, states are the dominant actors in world politics, secondly that the use of force is the most effective instrument of state policy while employing other methods are not preferred and thirdly, issues follow a hierarchy of importance in world politics, wherein military security is considered more crucial than economic and social security. The realist assumption can be contended at all the three levels. Firstly, the state is not the only actor in world politics as the role of economic corporations and civil movements also shape world politics to a large extent. The primary objective of the state is not to protect its territory and interest from real and perceived threats as the realist understand. Secondly, the use of force is not the most effective instrument of state policy. Each situation demands the need for different forms of approach. Thirdly, issues may not only centre on military confrontation and also that non – military issues have become more prominent, for example, pollution and human rights issues. Complex interdependency and realism are both ideal in their content but the former possess a large framework of actors and instruments and thereby provides a more lucid understanding of world politics. Situations, however, do not fall on any one of the other but falls largely in between the two premises. Complex interdependency theory, unlike realism, is a welfare game and not a status game.

China and Interdependence

Economic engagement at the level of determining the 'sensitivity' and 'vulnerability' of a nation's dependence on a particular resource or commodity is one of the main tenets of Keohane and Nye's proposition on the theory of interdependency and complex interdependency. Neither do issues necessarily follow a hierarchical agenda nor is there a clear cut determination of problems falling in the domestic and foreign policy realm and military security of a nation is not always the overarching objective of the state policy. In this context as China's economic engagements with the rest of the world have witnessed over two and a half decades, yet its behaviour in an interdependent situation continues to be scrutinized by scholars, who at times simplify the exercise to the cold war theme of 'containment' and 'engagement' policy. Keohane and Nye's theory of interdependence and complex interdependence is however, applicable to states that have adopted democracy and pluralism. As China has strong tendencies of inclining towards realist approaches, it is argued that neither interdependence nor realism can explain China's behaviour in international politics.

From a theoretical perspective, reliance on foreign sources violates the Maoist doctrine of self-reliance (*zili gengsheng*) which was the guiding principle for economic development during the 1960's and 1970's. "Self- reliance does not mean "total independence," but rather refers to the ability to "keep the initiative in one's own hands"" (Liberthal in Downs 2006: 11). The concept of interdependence also challenges the Chinese values of independence, sovereignty, and self – reliance. In the Chinese terminology, 'independence' (*duli zizhu*) means to 'maintain independence and keep the initiative in one's hand', sovereignty (*zhuquan*) implies exclusive power without any foreign interference and self – reliance (*zili gengsheng*) meaning to 'strive for regeneration through one's efforts" (Yahuda 1997: 8). Yahuda asserted that "for Chinese nationalist, interdependence is therefore associated with foreign interference (Ibid)." The nationalists face a dilemma of remaining closed towards foreign interference to uphold the integrity of their cultural identity but at the cost of development or to remain open and acquire modern technology, ensuring the defence of their culture and prevent the humiliation that history has taught them. Lucian Pye (1993: 442) explains the manner of employing the Chinese methodology of viewing interdependence as the *ti- yong* (essence- utility) formula of adapting the universality of modernisation but in Chinese conditions; the *ti* representing the universality and the *yong* as an embodiment of Chinese characteristics. Mao Zedong's principles held to the belief of an independent China that remained secluded from foreign influences, while on the

other hand Deng Xiaoping accepted foreign influences. On October 10, 1978 in his talk with the press delegation from the then Federal Republic of Germany, Deng espoused, "to achieve the four modernizations, we must be adept at learning from other countries and we must obtain a great deal of foreign assistance. As a starting point in our development, we should introduce advanced technology and equipment from the rest of the world" (Deng Xiaoping 1983). In 1987, his address in the UN stated that 'to achieve genuine political independence a country must first lift itself out of poverty; it should not erect barriers to cut itself off from the world" (Yahuda 1997: 10).

In 1979, China adopted the open-door policy which in many ways became pivotal to the economy. However, in 1986, the aftermath of the Tiananmen crisis, with sanctions and harsh measures from the developed nations, it transformed this 'open – door policy' to a strategy of western ideologues who sought to revolutionize China through 'peaceful evolution' (Ibid: 6-7). Although, much criticism was laid on this premise, China continued to follow its 'realist approach' and further followed a more integrated policy of economic interdependence. The stricture of policy of economic reforms and openness (*kaifeng*), focuses more on domestic deviation rather than foreign dependence. Deng stressed on the stability of the nation when he stated that the 'state apparatus was "powerful to deal with any kind of deviation"' (Deng 1987: 12). Rapid economic integration during the early 1990s was not motivated by the objective of following a global order but rather to maintain internal stability and simultaneously to deter the forces of western dominance. Maintaining a stable domestic environment brought legitimacy to the government which remained different from the archetype of western democracy.

The Chinese leaders separate their understanding of 'learning' from 'adapting'; 'while 'learning' involves a fundamental change of assumptions and approaches, whereas the latter requires no more than adjusting to changing circumstances while retaining the existing *Wetangschauung* intact (Yahuda 1997: 13). While being open to economic reforms, China has restricted its political reforms but as these features are interrelated and may overlap in many cases, the government has gone ahead with certain social reform policies and also have brought transparency to their legal and regulatory system. With constant interaction with the rest of the world, it was imperative to make these changes to ensure that foreign investment was secure. Other areas of reforms in social welfare and insurance policies are based greatly on the western experience. Another aspect of China's interaction with the rest of the world is its intellectual borrowings. This could be discussed more on the lines of 'adapting' and 'learning'. While many

Chinese go abroad for education and acquire direct experiences it has contributed to the Chinese experience of the institutionalizing their economic, political and cultural policies and processes within China and its interaction with the outside world. China's participation with the other nations is grounded on the strictures of economic exchange. Yahuda (Ibid: 15) refers to Robert Kleinberg's work *"China's 'Opening' to the Outside World: the experiment with foreign capitalism"* and contends that 'an extensive analysis of China's conduct of international economic relations described it as basically neo-mercantilist' where it strives for maximum benefit with minimum responsibility. China has a culture of entitlement which has been displayed on several occasions in the past as their right to be treated favourably, a diplomatic stance of China to be compensated for its past humiliations and struggles. China continues to follow a separate trajectory of development keeping economic relations healthy, political reforms as an internal issue and maintaining their identity distinctly characterised by strong nationalistic tendencies. The interaction with other nations does not give a complete picture of 'complex interdependence' as Keohane and Nye would have envisioned. Be that as it may, 'complex interdependence' by Chinese methods does not rule out the possibilities of a military conflict. Beijing may show a response to interact and cooperate with the rest of the world, but if their sovereignty (*zhuquan*) is disrupted, it does not rule out military measures.

IV. Summary

The above study attempts to dovetail the subject of oil politics in international relations and China's position in the world petroleum trade. Securing a reliable source of oil supply remains one of the most important objectives of the PRC government as it is linked directly with economic development. The strategy adopted by the Chinese for securing these resources has followed different trajectories and remains ambiguous to indicate any definite course of action in the future. It has shown both belligerent and cooperative behaviour in the past while acquiring oilfields over disputed territories with neighbouring countries and has also aggressively bid in foreign oilfields. The chapter traces the linkages of Chinese strategy and its interpretation of engagement with foreign sources on the one hand and the world oil production, demand and trade on the other. However, a single variable of China's military power over smaller states or its economic strength to obtain oil in exchange for aid would be simplifying the problem. This chapter intends to lay the groundwork for the second chapter. It provides the theoretical framework to the second chapter which is grounded on government policies and

initiatives. It will discuss China's energy demand and supply in detail and the bodies that regulate and administer China's oil industry and the initiatives and trends that the government has adopted so far to secure its oil supply from foreign sources.

Chapter 2

China's Energy Strategy: Demand, Supply and Institutional Structure

Introduction

After the death of Mao, the leadership under Deng Xiaoping concentrated solely on economic growth and aspired for the development of China to reach the levels of the developed countries. However, the underside of giving too much attention to industrial growth had serious implications on the other areas. One of the hardest hit sectors among the many was the energy industry. A fixed economic policy of achieving high growth rates neglected the management of energy resources. Inefficiency and wastage of the resources caused it to face a crisis in 1993, which made the government recognise its flawed approach and take remedial steps. Although, the energy policy continues to face a crisis of coherent and consistent guidelines, as the function are divided among several ministries and bodies, the government has begun to adopt several initiatives for proper management of energy utilisation. The central theme of this chapter is the status of energy, particularly petroleum sector vis-à-vis economic development and the inevitable increasing dependency on imports highlighting China's vulnerability to oil resources, which if it fails to meet this challenge, the repercussions that would follow would be severe not only to domestic supply but also on global supply.

The second chapter comprises of three main sections: the first section explains the demand and supply of energy resource with two sub-sections (a) primary energy and (b) oil. The second section deals with the energy institutions and organisations of the oil industry. The third and last section enquires into China's energy strategy since 1978 and discusses China's varied attempts to acquire foreign oil sources.

The first part of this chapter is a brief background to the economic development and energy usage. It is a precursor to the central theme; petroleum demand in the context of economic growth and how China's involvement in the global oil market could bring stability to their domestic requirements, reduce their vulnerability to Middle-East sources and also control foreign sources, which could cushion the economy in the event of an oil crisis.

Economic Growth and Oil Consumption

In the past two decades China recorded Gross Domestic Product (GDP) growth rates averaging 9.2 percent per annum (Fan He 2006: 94). As the GDP quadrupled, the energy

consumption only doubled during the period (Sinton 2005: 3). The primary energy consumption in 1983 was 470 million tons of oil equivalent (mtoe) and by 1996 it doubled to 930 mtoe. Currently, China is the second largest consumer of energy after the United States accounting for 13.6 percent of the world total (Fan He Ibid: 93). Prior to 1978, the challenge for the Chinese government was to lay the foundation for the extraordinary economic growth. However, the Chinese government at present is faced a more pressing challenge; that to sustain economic growth with low polluting levels. But China's position towards having a non-pollutant environment remains at odds with the developed countries (Smil 1998: 949). The Beijing Declaration of 1991 pronounces that as the "rich countries are responsible for the rise in the greenhouse gases both in terms of current emissions and in a cumulative sense, and hence it concludes that the developing countries need not do anything to limit their emissions, as well as its historical cumulative emissions" (Ibid). However, in the twenty-first century China has made unspecified efforts to reduce its greenhouse emissions.

I. Demand and Supply of Energy Resources in China – An Overview of the Energy Sector

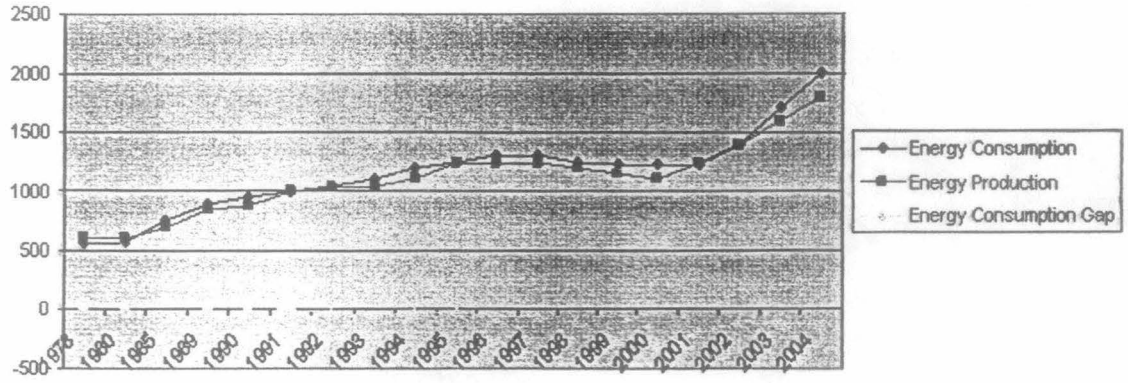
Primary Energy

China's energy sector is characterised firstly by, the over supply of coal, secondly, rapidly growing electricity- generating capacity, thirdly, a net oil- importing industry and lastly, a rapidly expanding natural gas sector (Yanrui 2004: 95). On the demand side the "total primary energy consumption in China increased from less that 18 quadrillion Btu (British thermal unit) in 1980 to 37.1 quadrillion Btu in 1996. It is projected to reach 98.3 quadrillion Btu by 2020" (Downs 2006: 3-4). From 1978 to 2004, China's energy consumption increased by 245 percent while the energy production during the same period increased by 194 percent (He and Qin 2006: 94).

China was self sufficient in energy producing approximately 10 percent of world energy sources and consuming 10 percent of world energy consumption. In 1992- 1993, China began to import its oil resources as its energy production dropped below its consumption. Ever since then, the widening gap between production and consumption has been increasing. Currently, China imports 10 percent of its total energy. The rise in the demand for energy is more than just the expansion of the transportation sector and is more broadly based and reflective of ongoing changes in economic activity and living conditions. China's energy consumption is

expected to grow at an annual average rate of 3.5 percent in the next 10-20 years (Ibid: 93- 94) while Yin and Gates also predict that total energy demand will grow anywhere between 2.5 and 3.5 percent annually through 2015-2025 (Yin and Gates 2006: 78). According to Medlock (2005: 275) Chinese total energy supply increased from 493 million tonnes of oil equivalent (mtoe) in 1980 to 905 mtoe in 1999 an average increase of 3.2 percent per year.

Figure. 2.1 China's Energy Production and Consumption 1978 – 2004



Source: Fan He and Donghai Qin (2006) "China's Energy Strategy in the Twenty-First Century", *China and World Economy*, 14 (2) p. 94.

In 2003, China's energy basket constitutes 73.9 percent of raw coal, 15.0 percent of crude oil, 2.9 percent of natural gas and 8.2 percent of electricity (China Energy Databook 2004). In the early 1980s, 71 percent of coal was consumed and it later increased to 75 percent in the late 1980s. Currently, dependence on coal has declined and is approximately 65 percent. Oil consumption in the early 1980s was 22 percent and declined to 19 percent in the in the late 1980's. As of current statistics there has been a rise in oil consumption to 24 percent. The use of hydropower has also increased dramatically wherein from 1980 to early 2000s has experienced growth from 3 percent to 7 percent. The use of hydropower is expected to rise as an important energy resource in the coming years. Natural gas has remained constant between 2- 3 percent since the early 1980s to 2003. Nuclear energy has a fraction of share of 1 percent and other alternatives like solar, wind, geothermal and biomass occupy 0.3 percent of the energy mix. While the world energy mix comprised of 25 percent of coal in the early 1980s and experienced a slight increase to 27 percent in the late 1980s. Presently, the consumption rate is 24 percent. World oil consumption, during the early 1980s was 46 percent and dependence on oil declined to 39 percent and has remained so. The use of natural gas has increased from 19 percent in the early 1980s to 23 percent currently. Global hydropower has remained constant at about 6- 7 percent and nuclear power in early the 1980's was less than 3 percent but has dramatically increased to

6.5 percent nowadays. Global renewable resources amount to a small share of 1 percent (All figures from He and Qin 2006: 96 – 98).

The use of coal as a main source of energy is still a dominant feature in China's energy consumption but the trends show that the use of coal is being replaced by other alternative sources. Erica S. Downs (2006:5) projects China's energy demand for each source from 1996 to 2020. Coal which is the most commonly used resource in 1996 accounted for 72 percent, oil 20 percent, gas 2 percent and other alternatives took about 6 percent. By 2020, the consumption of coal is estimated to reduce to 65 percent, oil 19 percent, gas to rise to 11 percent and other alternatives to 5 percent (Ibid). Estimates of China's Tenth Five – Year Plan 2001-2005 declare that by the year 2020 imports of 500 million tons of oil and 100 billion cubic metres of gas will be required to cater to the growing domestic demand. According to these estimates China's imports of oil and gas will rise by 72 percent and 50 percent respectively of total consumption by 2020 while western experts estimate China's imports to be 30 percent for gas and 60 percent for oil, especially when the world oil production will reach to an estimate of 4 billion tons per day by 2020 from where 1.5 billon tons will be exported to all countries (Singh 2006: 1)[5]. The change in the energy structure from conventional fuels to cleaner ones is also driven by environmental concerns. As the urban population is growing more conscious about their living conditions, issues like acid rain, daily air quality reports are of immediate concerns to them. China is the highest emitter of sulphur dioxide (SO2) and the second highest emitter of Carbon Dioxide (CO2).

[5] See for example, *Guojia nengyuan jieyue yu ziyuan zhong he liyong shiwu guihua* (The National Tenth Five Year Plan foor Saving Energy and Comprehensive Use of Natural Resources). Guojia jin maowei, November 2001 (National Trade and Economic Commission, November 2001), at http://wwwchinaacp.com/newcn/chinacp/policy-of-setc13.htm; *Guojia Fazan jihua weiyuan hui shiwu guihua zhanlue yanjiu xiache* (National Development Plan Commission Strategic Study of the Tenth Five Year Plan). Beijing, Zhongguo renkuo chubanshe (China Population Press, 2000) p. 531; Shang Weiguo, "Zhungguo shiyou: Shi guan zhan lue anquan", (China's Oil: A Issue of Strategic/ Security Importance). *Shijie Zhishi* (The World Knowledge), 2002, Issue 21, p. 34; Wang Jian, "Zhungguo nengyuan de quanqi gongqui xingshi",(Long Term Situation of Chinese Energy). *Zhongguo hongguan jinji xingxi wang* (Information Network of China Academy of Macro Economics), 12, July 2001 in Singh, Swaran (2006) "China's Energy Security and Sino- Indian Relations", conference paper presented in *India China Thaw- A Symposium on India's Changing Relations with China, Seminar.*) New Delhi, pp. 1-15.

Table 2.2 Primary Energy Production in China (Physical Units)

Year	Coal Raw Mt	Crude Oil Mt	Natural Gas bm3	Electricity TWh
1978	618.00	104.05	13.73	44.60
1979	635.00	106.15	14.51	50.10
1980	620.15	105.95	14.27	58.21
1981	621.64	101.22	12.74	65.55
1982	666.33	102.12	11.93	74.40
1983	714.53	106.07	12.21	86.36
1984	789.23	114.61	12.43	86.78
1985	872.28	124.90	12.93	92.37
1986	894.04	130.69	13.76	94.53
1987	927.97	134.14	13.89	100.01
1988	979.88	137.05	14.26	109.15
1989	1,054.14	137.64	15.05	118.39
1990	1,079.88	138.31	15.30	126.72
1991	1,087.41	140.99	16.07	125.09
1992	1,116.38	142.10	15.79	132.47
1993	1,150.67	145.17	16.77	154.38
1994	1,239.90	146.08	17.56	182.16
1995	1,360.73	150.04	17.95	203.41
1996	1,396.70	157.33	20.11	202.30
1997	1,372.82	160.74	22.70	211.49
1998	1,250.00	161.00	23.28	222.90
1999	1,045.00	160.00	25.20	218.76
2000	998.00	163.00	27.20	239.15
2001	1,160.78	163.96	30.33	294.90
2002	1,380.00	167.00	32.66	313.10
2003	1,667.00	169.61	35.02	326.70

Source: Table 2A 1.1 Primary Energy Production (Physical Units), Chapter 2 Energy Production, *China Energy Databook* 6.0, 2004, pp. 2-3.

On the supply side of primary resources, China is endowed with rich energy resources in absolute terms but on a per-capita basis it struggles to remain sufficient. Coal is the dominant energy resource providing approximately 60 percent and is envisaged to be a major source of energy in the foreseeable future (Downs 2006: 6). Oil and gas are, however, insufficient and will need to be imported. China's oil supply situation is precarious as there are speculations of the government's figures which are said to be exaggerated to attract foreign investments while the oil companies keep it low to strengthen their bargaining power vis-à-vis the Chinese government (Ibid). Oil production in China once had expectations to match the production levels of Saudi Arabia and was predicted to be one of the highest oil producing countries by the mid 1980s. This was, however, only to be met with disappointment soon afterwards. The details of the total oil production, distribution and the limited reserves will be

discussed in the following section. Natural gas production in China is gaining demand as it is cheaper and less harmful to the environment but the downside of it is faced with problems of shortage of investments, infrastructure, and technology. Proven gas reserves are listed as 41 trillion cubic feet, 0.8 percent of world total. It is estimated that China's p1roduction of natural gas will increase from 654.6 billion cubic feet in 1995 to 3.8 trillion cubic feet in 2020 with the rise in demand from 654.6 billion cubic feet in 1995 to 5.5 trillion cubic feet in 2020 (Ibid 7 – 8).

'Energy intensity' (the standard marking the energy efficiency) is considered to be one of the major problems in China. It is inefficient according to western standards but according to its coal dominated energy condition, energy efficiency is quite commendable. This change can be traced back to the 1980s and 1990s. According to Speed (2005: 1) when economic growth was running at 5 percent to 10 percent per year the energy consumption lay in the range of 5 percent to 8 percent. The energy efficiency which is based on the amount of energy used for each unit of GDP declined at a rate of 5 percent to 6 percent per year (Ibid). During the 1990s, Chinese oil production grew at 1.6 percent annually while demand grew by 6.7 percent (Chang 2001: 213). But then, with such an extreme difference of production and consumption, some scholars have pointed out the lacunae in the lack of competition and not in the lack of reserves, which has resulted in little incentives for progress. The petrol prices are regulated below international prices which has cultivated a habit of wastage (Ibid). The government in the late 1990s had set extremely low quotas for crude imports which flooded the coastal areas and cut down production of the domestic companies. Although, restrictions on crude oil imports have been lifted, the government now has hiked the restrictions on the import of petroleum products to protect its domestic companies (Cole 2003:22).

Efficiency can be broken into two categories; productive and allocative efficiency. "Productive efficiency seeks to minimize the costs and inputs of a given unit of production while allocative efficiency focuses on the equation of supply and demand" (Sinton 2005: 4). The oil industry in China is not only thwarted by inefficiency of prices and wastages but other factors like diplomatic and foreign policy shortcomings which make the already unhealthy industry further tow a line of lax energy policies. Institutional anomalies such as state control have put the oil industry to a straitjacket, wherein profit is overridden by foreign relations. As China imports oil, it also exports and Japan is the highest importer of Chinese oil. In early 1999 Japan which relies on Daqing crude oil was restricted its supply of 120,000 – 160,000 bbl per day. CNPC announced that the sale of its oil in the domestic market was more profitable than the sale at low

world market prices but finally after much protest from the Japanese to the State Bureau of Petroleum and Chemical Industries, CNPC concurred as it had to take into consideration the government's foreign policy concerns while making sales decisions. Other anomalies that are prevalent are the rampant presence of small-scale refineries all over the country, some of which are conduits for smuggled oil. These small refining plants are unprofitable but, however, as they exist on the policy of free-riding, closing these refineries would cause unemployment (Cole 2003: 22 – 23). Chinese firms probably average $ 1.5 to produce a barrel of oil; western companies typically spend $ 1.2. The refineries which operate at losses were met with a government stricture stating that by March 2000 if they failed to meet a certain quality standard they would be shut down.

Table. 2.3. Energy Consumption in China - 1990 and 2010

		1990			2010			
		Amount mt.	Share %	China's share in world consumption %	Amount mt.	Share %	China's share in world consumption	Annual growth %
China								
Total		682	100	8.5	2,484	100	19.1	6.7
	Oil	113	16.6	3.7	447	18	9.8	7.1
	Solid fuels	498	73	21.8	1,689	68	43.3	6.3
	Gas	12	1.8	0.7	75	3	2.7	9.6
	Electricity	59	8.7	5.7	273	11	15.0	8
World								
Tota l		8059	100		12,990	100		2.4
	Oil	3061	39.4		4547	35		2
	Solid Fuels	2286	29.4		3897	30		2.7
	Gas	1678	21.6		2728	21		2.5
	Electricity	1034	13.3		1818	14		2.9

Source: Findlay, Christopher and Andrew Watson (1997) "Economic Growth and Trade Dependence in China" in Goodman, David and Gerald Segal, *China Rising- Nationalism and Interdependence*, London, Routledge Publishers, p. 126.

Oil

Demand for petroleum will increase by 50 percent by 2020. In the year 2000 more than 368 million bbl was imported and will double by 735 million bbl by 2020 accounting for 50 percent increase (Cole 2003: 15). The IEA has projected the demand for oil to be estimated to reach 4 million barrels a day by 2010. By 2020 with similar energy consumption patterns the

estimate is projected to be 8 million barrels a day (Mahalingam: 2005: 403). According to Medlock (2000: 291) in 2010, oil demand is estimated to be between 6.59 and 8.15 million bpd vis-à-vis the GDP rates of 3.7 percent and 8.3 percent. By 2020, demand for oil is expected to be between 9.12 and 15.4 million barrels per day with similar GDP growth rates.

This would further make China more vulnerable as its dependence on imports would reach half of their total oil consumption (Cole 2003: 15). In 2004, China's oil consumption was 8.2 percent of the world total oil consumption and its oil imports were 7.1 percent of the world's total (Fan He 2005: 98). On the other hand the domestic output of oil is over 2,353 million barrels of refined petroleum products in 2001 (Cole 2003: 15). Total crude oil production in China was about 3.3 million barrels per day in 2001 and in 2004 China's domestic production amounted to 175 million tonnes which supported 60 percent of the domestic demands, with the rest being imported (Mahalingam 2005: 295). Medlock predicts that oil supply will remain 3.3 million barrels per day (bpd) till 2010, others forecast it to range from 3 mbd to 3.7 bpd. The Department of Energy forecasts it to 3.6 million bpd (Medlock 2000: 299). China's oil production is concentrated in a small number but highly productive fields. The majority of China's oil output is from Daqing fields. Shengli and Liaohe which produce about 24 per cent of China's oil production (Ibid: 295).

Table 2.4 Projected Chinese Crude Oil Requirements by Sector

Year	Case	Primary Oil Requirement	
		Mtoe	Mbpd
1995		175.48	3.36
1999		219.40	4.41
2010	Low	305.04	5.99
	Reference	359.65	7.06
	High	420.41	8.25
2015	Low	359.24	7.05
	Reference	460.02	9.03
	High	579.87	11.38
2020	Low	420.32	8.25
	Reference	382.25	11.43
	High	787.95	15.47
Average annual Percentage change	Low	3.14%	
	Reference	4.76%	
	High	6.28%	

Source: Medlock III, Kenneth, et al (2005) "The Present Status and Future Prospects of Energy in China", *Asian Energy Markets- Dynamics and Trends*, The Emirates Centre for Strategic Studies and Research, p. 293

Daqing produced about 1.4 million barrels per day and about 50,000 barrels per day in early 2002. a part of it was exported to Japan and the majority was transported to the North and North-East China. Shengli produced about 5,19,000 barrels per day which about 2,20,000 barrels per day remained in the home province, Shangdong for refining. The remaining is transported by pipeline to the coast or to the refineries along Yangtze (Ibid). Liaohe produces approximately 2,68,000 barrels per day and is shipped mainly by pipelines to refineries in the lower Yangtze region. Daqing and Shengli have been over drilled as their production has been stagnant for more than six years. It is estimated that production rates of these two fields will also fall. The domestic oil production especially from the mature fields in the recent years has been stagnating which has prompted China to focus drilling around the Xingjiang province and the western parts of the country (Mahalingam 2005: 403).

The comparatively smaller fields after Daqing in north east China, Shengli in Shangdong and Liaohe in Liaoning province in Xinjiang Autonomous Region are three giant crude oil basins; Tarim, Junggar and Tu-Ha. Currently, production in these oilfields is limited but it is predicted that production will cross 1 million barrels per day by 2008.

Tong Lixia (2006: 34) traced the oil consumption growth rate dropping sharply from 15.3 per cent in 2004 to 2.1 percent in 2005 and credits it to the tightening oil supplies rather than a decline of demand.

II. Energy Institutions and Organisations in China

With the policy of liberalisation, China's centrally planned economy underwent a major transformation. Similarly, the energy sector also witnessed several changes with the creation of three main government corporate bodies China National Petroleum Corporation (CNPC), China National Offshore Oil Corporation (CNOOC), and the China National Petrochemical Corporation (Sinopec) to conduct the energy-related activities. The Ministry of Energy was abolished in 1993 and currently China does not have a Ministry of Energy and the lack of it is one of the main causes for the failure to formulate effective energy policies. In lieu of a Ministry of Energy, the Energy Bureau under the NDRC is responsible for providing the guidelines to the nation's energy strategy. However, the Energy Bureau does not have complete control of energy policies. While it is responsible for some features of the energy sector, the energy pricing is set by a different institution (Office of the National Energy Leading Group). With a growing concern for an economy which has a growth rate of approximately 9-10 percent

an uninterrupted supply of energy is a key feature to prevent any instability. Several scholars in the past have argued for a creation of a stronger and efficient body. Their position has remained unchanged but the creation of a new energy ministry is one of the central issues the Chinese government has been working upon and probably in a few years it will be established. On 24th January 2006, the Chinese government set up a drafting team for Energy Law. Although this effort may take some time it is expected to bring a better and more efficient policy to securing China's energy needs.

To give a background to the process of institutionalization of the energy body, the parent office which is the National Development and Reform Council (NDRC) has undergone several adjustments in the past. The NDRC's predecessor was the State Planning Commission (SPC), which was founded in 1952. The State Planning Commission was renamed as the State Development Planning Commission (SDPC) in 1998. After merging with the State Council Office for Restructuring the Economic System (SCORES) and part of the State Economic and Trade Commission (SETC) in 2003, the SDPC was restructured into the NDRC.

The (NDRC) is a macroeconomic management agency under the State Council, which studies and formulates policies for economic and social development, maintains a balance of economic aggregates and guides the overall economic system restructuring[6]. Under the NDRC there are two offices which deal with the national energy policy; (i) Energy Bureau[7] and (ii) Office of the National Energy Leading Group[8].

As China faces a severe predicament in the fact that an energy law is still to be enforced, the NDRC appointed a team of experts from 15 government departments to draft the law. The team, which has been approved by China's Cabinet, the State Council, includes officials

[6] (www.ndrc.gov.cn/brief/default.htm)

[7] The Bureau of Energy (National Oil Reserve Office) studies the energy development and utilization both at home and abroad. It brings forward energy development strategies and major policies; formulates development plans of the energy sector, and helps to chart out policy guidelines in the energy sector. It also helps to administer oil, natural gas, coal, power and other parts of the energy sector and national oil reserve; and formulates policy measures for energy conservation and renewable energy development (http://en.ndrc.gov.cn/mfod/t20050519_0901.htm).

[8] The Office of the National Energy Leading Group is the main body to the Bureau of Energy. It is responsible for the day-to-day work, supervises the performance of decisions; monitors the status of energy security, conducts forecasting and early warning on macro and major energy issues, and proposes countermeasures to the Energy Bureau. It also organizes relevant departments to study energy strategies and plans; studies major policies related to energy development and conservation, energy security and emergency preparedness, and international energy cooperation (http://en.ndrc.gov.cn/mfod/t20060829_82145.htm).

from the Ministry of Finance, the State Electric Power Regulatory Commission, and the State Council's Legislative Affairs Office.

China's oil industries are almost exclusively owned by the government, with the exception of a limited number of joint ventures. The excessive intervention of the government had given to wasteful investment and lack of business alliances. There are three main oil and gas companies in China, China National Petroleum Corporation (CNPC), China National Petrochemical Corporation (Sinopec) and China National Overseas Oil Corporation (CNOOC). These three bodies were established during the 1980s, the CNOOC was founded in 1982, which controlled most of the offshore business, China National Petrochemical Corporation (Sinopec) was founded in 1983 which was responsible for refining and marketing and the China National Petroleum Company (CNPC) created from the Ministry of Petroleum Corporation was responsible for exploration and production onshore and the shallow offshore areas (Downs 2006: 13).

The oil industry was thwarted with competition of improper fund distribution. As CNPC had to sell the domestic oil produce to CNOOC and other industries at a price set by the Chinese government which was a fraction of the open market price, it acquired insufficient profits[9]. However, in 1996 and 1997, the Chinese government relaxed the (first tier) price of oil enhancing the profit margin for CNPC which earned for the first time a threefold increase in its profits from $6 billion in 1993 to $21 billion in 1997. This sudden acquisition prompted the CNPC under the leadership of Zhou Yongkang to invest in foreign overseas projects lest the government claimed the profits back (Ibid: 14).

(a) China National Petroleum Company (CNPC.

Among the three oil companies of China CNPC is the most important one and has the largest share of interest in the onshore oil segment. The CNPC was created on 27th July, 1998 with total assets amounting to 470 billion yuan. Initially, CNPC was a quasi – government department before the reorganisation began. The company had limited rights to foreign trade and therefore was unable to compete in the world markets. It controlled the upstream activities of the industry but after the reorganisation, its functions changed from production, sales and domestic and foreign trade. The government functions were delegated to the State Economic and Trade Commission. Most of the onshore oil is produced by CNPC. The China National Oil

[9] The government had a two tier pricing system, the first tier was for the domestic consumers and the second tier was for export and foreign consumers.

Development Corporation (CNODC), a subsidiary of CNPC is the contracting agent for cooperation with foreign companies in the onshore oil industry. CNPC is the main body which conducts China's foreign exploration. CNPC holds oil concessions in Kazakhstan, Kyrgyzstan, Venezuela, Sudan, Iraq, and Peru (Cole 2003: 16 – 17).

(b) China National Petrochemical Corporation (Sinopec)

China Petrochemical Corporation, the sole initiator of Sinopec, is a super-large petroleum and petrochemical group restructured and established by the State in 1998 on the basis of the former China Petrochemical Corporation. It is a state-owned company invested by the State, functioning as a state-authorized investment institution in which the State holds the controlling share.

China Petroleum & Chemical Corporation (Sinopec) Company was set up on 25th February, 2000 by China Petrochemical Corporation (Sinopec Group which was established on the same day with the CNPC). Sinopec's activities are integrated upstream, midstream and downstream operations, prominent core businesses and a comprehensive marketing network. Sinopec holds both domestic and foreign shares and is an integrated energy and chemical company. The scope of its business mainly covers oil and gas exploration, development, production and marketing; oil refining; production and sales of petrochemicals, chemical fibres, chemical fertilizers and other chemical products; storage and pipeline transportation of crude oil and natural gas; import, export and import/export agency business of crude oil, natural gas, refined oil products, petrochemicals, chemicals, and other commodities and technologies; research, development and application of technology and information. It is China's largest producer and supplier of oil products (including gasoline, diesel and jet fuel, etc.) and major petrochemical products (including petrochemical intermediates, synthetic resin, synthetic fibre monomers and polymers, synthetic fibre and chemical fertilizer). It is also China's second largest crude oil producer. Similar to its international peers, Sinopec has set up a standardized structure of corporate governance and adopted a management system of centralized decision-making, delegated authorities in management and business operations handled by specialized business units. It has more than 80 subsidiaries and branches including wholly-owned, equity holding and equity participating companies, engaged in oil and gas exploration and production, refining, chemicals, marketing, R&D and foreign trade. With main assets located in the east, south and middle part of China, these subsidiaries and branches focus their business in these regions which

have the most developed and active economy in China. Sinopec implemented the scientific outlook on development. While sticking to the business philosophy of competition and openness, the Company adopted the development strategy of resource and market expansion, cost reduction, profitability improvement and prudent investment. It is the Company's business tenet to maximize profits and shareholders' returns. Moreover, Sinopec strived for operating mechanism featuring market-orientation externally and synergy-driven internally. Upholding the operating principle of standardization, discipline and integrity, Sinopec has strived to develop itself into a multinational corporation with prominent core business, quality assets, innovative technologies, professional management and sound financial practice. Sinopec's Shanghai Petrochemical Company and Zhenhai Oil Refining Company had already international capital market when Beijing Yanshan General Petrochemical Corporation, Shangdong Qilu Petrochemical Group and other petrochemical companies also followed suit in 1997. This has enhanced the petrochemical industry to reap more profits, production capacity to increase and expand the petrochemical base by establishing several large scale centres for oil refining and ethylene production. (Petrochemical Sector Ups International Cooperation, Beijing Review).

(c) China National Overseas Oil Corporation (CNOOC)

The State Council of China formed China National Overseas Oil Corporation (CNOOC) in 1982 to conduct exploration and production in China's offshore areas, both independently and as the exclusive Chinese partner for foreign entities. Since CNOOC's founding, China has experienced rapid economic growth, which has generated a strong increase in demand for petroleum and other primary energy sources. Between 1990 and 1999, China's gross domestic product (GDP) increased at an annual rate of 10.4%, making China one of the fastest growing economies in the world. During the same period, petroleum consumption increased at an rate of 6.3% and China's oil production grew at a compound annual rate of 1.7%. Since 1996, China has been a net importer of oil, further increasing the significance of exploration and development, and offshore activities have become critical to China's crude oil production. The CNOOC is the dominant offshore petroleum company, the second largest natural gas company and the third largest petroleum company in China. As of 2003, CNOOC has interests in 45 maritime oil and gas properties in the Bohai, South China and East China Seas.

In the 14th Congress of the CCP the China Petrochemical Corporation planned to accelerate its production in two phases. Firstly, by the year 2000, the annual processing capacity

target was 200 million tons, with ethylene production to reach at 5 million tons and secondly, by 2010, the annual processing capacity of crude oil to be in the range between 300-350 million tons and ethylene production to touch 8-10 million tons. It aimed to reach the level of the developed countries.

III. Energy Strategy in China since 1978

By 1978 China had recorded 26 oilfields with a total annual output of over 100 million tons of crude oil. In 1983, when China was beginning to face industrial development problem vis-à-vis energy efficiency, Wang Qingyi and Gu Jian, the deputy-secretary-generals of the China Energy Research Society, stated the targets for the energy development strategy by 2000 as, firstly to "strive to satisfy the demands of economic development and of raising the standard of living; secondly, to establish an energy system in which energy resource development is coordinated and the productive capacity and utilization rate are high; and thirdly, to solve the energy problem in the rural areas and end the deterioration of the ecological environment caused by the serious shortage of rural energy resources" (Wang Qingyi and Gu Jian 1983: 16). According to Fan He and Donghai Qin (2006: 99), there are three major goals for China's energy strategy: (i) ensuring China's long-term economic growth; (ii) reducing China's energy vulnerability; and (iii) protecting the environment and avoiding ecological degradation and diseases. The first goal aims for maintaining social stability. As the economic, political and social domains are intrinsically interrelated, a high economic growth is indispensable. Since problems of unemployment, non-performing loans in the banking sector and the income gap between the rich and poor will directly affect the proper functioning of the state. China will have to pump in more investments into the energy sector unlike the past till the late 1990s, where China's investment in the energy sector was minimal. Subsequent to the needed investment, pricing policies will also have to be adjusted as the domestic prices have always been lower than the international prices. In November 2001, Zhang Ziyang, the then Vice minister of State Economic and Trading Corporation (SETC) announced the enhancement of several factors for an effective energy strategy. He stated that "China must increase its efficiency in energy consumption, expand domestic exploration and production of crude oil and natural gas, promote the diversification of state oil and gas companies to endeavour beyond China's borders, move to market oriented pricing of oil and gas, encourage the development of domestic natural gas infrastructure, and promote alternative energy technologies" (Medlock III: 299). Such ambitious

goals are thwarted by "capital constraints within China's major industries, general ineffectiveness of oil sector corporate reforms, concern about the patchwork of regulatory environments that multi-province pipeline face, cautious interests among foreign investors in acreage offered for exploration, and the prospects that oil prices could remain low over the longer term" (Ibid).

The insufficiency of domestic oil supply in 1993 caught the Chinese foreign policy makers in a dilemma of being dependent on foreign sources as it was also an implicit suggestion of putting the nation in a vulnerable condition of adhering to unwanted external forces. However, following the concept of *'ti-yong'* Deng Xiaoping advocated this theory for China to maintain its characteristic nature by following its own methods while interacting with other nations and bodies. The Chinese have adopted various means to secure its foreign dependence on oil through investment in overseas oil exploration and development projects, discussions on the feasibility of several transnational oil and gas pipelines, plans to establish a strategic petroleum reserve, construction of refineries capable of handling crude oil from the middle east, development and shift in the dependence on oil to gas and gradual opening of onshore areas to foreign companies for exploration and development.

One of the motivating factors for investing in overseas projects apart from the insufficiency faced in domestic consumption was the initiation of CNPC to gain control of the oil industry in China.[10] The initial investment was conducted more as an experiment in overseas exploration and production. It was more risk free and focussed on small scale projects such as oil recovery from fields that were already in the production stage. It also purchased shares and operation rights in these fields (Downs 2006: 15).

China's first foreign involvement of foreign oil was in Canada in 1993 where it purchased an oil reserve, and then in Russia, Mongolia, signed a production-sharing contract in Thailand, successfully bid to improve oil recovery in a field in Peru in 1993, signed an agreement to explore oil in central Papua New Guinea in 1994, Iraq, Sudan, and Venezuela (Downs 2006: 15 Smil 2004: 21 and Chang 2001: 233). These foreign oil projects were expected to supply about 5 million tons (mt) by 2000 and 15 mt by 2010 (Smil 2004: 21). The first overseas investment of the CNOOC was in 1993 in Indonesia where it acquired a 32.58 percent share interest from Arco in the Straits of Malacca and in 1995 it further purchased a share interest of 6.93 percent becoming the major shareholder (Downs 2006:15). In 1997, apart from

[10] The CNPC did not enjoy much profit as the CNOOC due to the controlled pricing policies of the domestic market.

the countries where China was already involved in, China National Petroleum Corporation (CNPC) began aggressive bidding for foreign oil acreages and share oil ventures and acquired investments in Argentina, Bangladesh, Columbia, Ecuador, Indonesia, Iran, Kazakhstan[11], Malaysia, Mexico, Mongolia, Nigeria, Pakistan, Turkmenistan and United States (Mahalingam 2005: 404). In Kazakhstan and Venezuela and Iraq and Sudan, the CNPC pledged over $8 billion (Downs 2006: 15). The Chinese concern for securing their oil supplies in Iraq and Sudan overrode the international concern of branding these countries as perilous regimes.

In June, the same year, the CNPC acquired 60 percent share in Kazakhstan's Aktyubinskmunaigaz Production Association, which controlled three large oilfields in northwestern Kazakhstan (Zhaazhol, Kenkiyak One and Kenkiyak Two) which had a recoverable capacity of 1 billion barrels (Ibid: 15). China's stake in Kazakhstan is also very high. It has built a pipeline from Uzen fields in eastern Kazakhstan, holding equity stake for transporting oil to its western China refineries and consumption centres. It has also undertaken a joint venture with Kazakhstan to transport crude oil from Aktyubinsky to Attrayu. China did make attempts to bid for shares in Kashagan, one of the biggest oil fields in Kazakhstan but so far have not been successful (Mahalingam: 405). China won the bidding for Kazakhstan's Aktyubinskmunaigaz Production Association oilfields over Texaco, Amoco and the Russian oil company Yujnimost in a deal that contracted China to invest $4.3 billion over a 20 year period and an addition of $585 million between 1998 and 2003, guaranteed pension and housing to 5000 of the employees, paid Aktyubinskmunaigaz's debts of $71 million, invested 10 million in its ecology projects and made commitment to pay royalties to the government. A pipeline construction was also included but due to the heavy expenditure, it did not materialise. In September 1997, in the bidding for the Uzen fields, CNPC made an upfront payment of $52 million for a $400 million contract. CNPC was estimated to have invested $1.3 billion to $4.38 billion in total for the Uzen fields contract winning the bid from a joint bid from Petronas and Unocal and another from Amoco. It pledged an 8 percent of its net profit to the government of Kazakhstan, clear Uzen's debts of $6 million, invest $10 million in training oil technicians and provide $27 million for social causes. In addition, it proposed an oil pipeline from Uzen to Aktyubinsk fields and from Uzen to Iran via Turkmenistan, providing Kazakhstan access to the Persian Gulf supplies (Downs: 16). China has signed many energy trade deals with Russia. Ones such project proposed 40,000 bpd (costing $ 1.7 billion) from East Siberia to Beijing.

[11] CNPC has exclusive rights for developing Uzen fields on the eastern shores of Caspian Sea in Kazakhstan.

China's involvement in Kazakhstan and other Central Asian republics can be traced on political grounds. Firstly, the oil resources in the region were an attraction to other nations and therefore would create regional politics which China wanted to avoid. Secondly, as the Central Asian countries are dominantly Islamic and share a cultural affinity with the Uyghur population, it remained imperative to maintain strong ties with these countries as China has faced terrorist activities and nationalistic movements for Turkestan from the Uyghurs. Thirdly, the establishment of the Shanghai Cooperation Organisation (SCO) was created with the intention of a China-centric region.

In Russia China has put forward a strong bidding for a pipeline from Angarsk to Daqing. Russia had made proposals to build a pipeline to Nakhodka with Japanese support but the pipeline has its route towards the Pacific coast which is closer to China rather than Japan (Mahalingam: 405). The Russia-China pipeline is more promising. It is planned to connect Angarsk in Siberia to China. Two routes have been charted out; one touching Mongolia and the other through the North Eastern province, away from Mongolia. The pipeline was estimated to cost $2 billion and was expected to transport 220 million barrels of oil per year (Downs 2006: 29).

In June 1997, CNPC bid for the Caracoles field for $241 million in Venezuela which produced 2,700 barrels per day and was estimated to produce 50,000 barrels per day and Intercampo unit for $118 million which had substantial potential for production (Ibid: 17). China's signed a pipeline deal with Venezuela and Columbia which transported oil from Venezuela to the Columbian coast thereby bypassing the US controlled Panama Canal (Mahalingam: 404- 405).

China holds a substantial part of its oil stakes in the Middle Eastern countries – notably, Oman, Yemen, Iran and Saudi Arabia. The oil supply from the Middle East accounts for 61 percent in 1998 and is projected to increase to 80 percent by 2010. Countries like Sudan, Angora and Oman have been suppliers to China in a big way. However, China's cooperation with these oil producing nations will set back important relations like that of the United States as the latter has condemned some of them as rogue states (Mahalingam: 405). In Sudan, after the US severed its commercial relations with nations accused of supporting terrorism, Occidental Petroleum, a US based Oil Company was replaced by CNPC. In March 1997, CNPC formally acquired 40 percent share in Sudan's Greater Nile Petroleum Operating Company (GNPOC) consortium. The contract covered the exploration for Heglig and Unity Fields in Sudan and

construction of a 940 mile pipeline from the fields to Marsa al-Bashair, a station located near Port Sudan on the Red Sea. CNPC shared the project with Indonesia's Petronas (30 percent) National Oil Company of Sudan (5 percent) and a Canadian company Talisman Energy Company (25 percent). The capacities of the two fields were estimated to be 8.5 billion barrels and 12.5 billion barrels respectively. The CNPC and the China Petroleum Engineering and Construction Company helped built a pipeline also between May 1998 and May 1999. China's total investment in Sudan by 1999 was projected at $700 million. Besides the oil projects in Heglig and Unity fields, CNPC also was involved in constructing a 50,000 barrels per day refinery near Khartoum and was due to start functioning by mid 2000 (Downs: 17).

China's interest in Iraq can be considered to be a long standing goal and even before the UN sanctions were lifted, CNPC and China North Industries Corporation (NORINCO) on a joint venture with other Chinese companies signed a 22 year production sharing contract with Iraq to develop half of the al-Ahdab field, the country's second largest oilfield, after the sanctions were lifted. Its recoverable reserve is estimated at 1.4 billion barrels and peak production is speculated to be 90,000 barrels per day. The two companies set up a new company al-Waha to develop the al-Ahdab field costing around $1.3 billion. Other oilfields in Iraq where CNPC hopes to gain a share are the Halfaya, Luhais and Suba and the exploration of the remote western desert (Downs: 17).

Figure 2.5: The Proved Oil Reserves and China's Imports in 2004.

Source: BP (2005); China Customs (2004 – 2005) in Fan He and Donghai Qin (2006) "China's Energy Strategy in the Twenty-First Century", *China and World Economy*. 14 (2) p. 101.

Sinopec through Sinochem acquired oil and gas fields in Tunisia and also bid for America's Uncoal for $13 billion (which was drilling in the offshore areas of Southeast Asia) but later did not materialise. Sinopec in 2004 signed 21 deals with Iran, Brazil, Saudi Arabia, Angola and Nigeria. In 2005, it had recorded US $ 7 billion in 30 countries and 65 energy cooperation projects. China National Overseas Oil Corporation (CNOOC) acquired 5 major oilfields from Indonesia worth $ 85 million which produced 40 million barrels of shared oil. This was an attractive bid for China as the prices of oil were low during the time of purchase. CNOOC also holds gas agreements with Australia (Mahalingam: 404- 405).

Table 2.6 Selected Chinese International Oil Exploration and Development Projects

Country	Year	Description
Angola	1998	Letter of intent signed for joint construction of a refinery in Lobito City and the purchaser of crude oil
Canada	1992	CNPC Canada purchased reserves for $6.64 million (Canadian).
Canada	1993	CNPC Canada purchased reserves for $5 million (Canadian).
Egypt	1998	The Great Wall Oil Well Drilling Company, a subsidiary of CNPC, and two Egyptian companies signed an agreement to form a joint – investment company; the Chinese side will own a 51 percent share to develop oil and natural gas.
Italy	1997	CNPC formed a joint venture with the Italian oil company Agip to develop oilfields in Central Asia and Africa.
Kazakhstan	1997	CNPC purchased 60 percent of Aktyubinskmunaigaz Production Association for $4.3 billion. CNPC also agreed to assume $71 million of debt, pay $320 million in cash upfront, guarantee pensions and housing for approximately 5000 employees, invest in environmental protection measures, and pay royalties to the Kazakh government. Aktyubinskmunaigaz controls three oilfields (Zhanazhol, Kenkiyak One, and Kenkiyak Two) with estimated recoverable reserves of 1 billion barrels.
Kazakhstan	1997	CNPC purchased 51 percent of Uzen fields for $1.3 billion plus a promise to conduct a feasibility study on a $3.5 billion oil pipeline to China. Uzen has estimated recoverable reserves of 1.5 billion barrels.
Kuwait	1995	China Petroleum Engineering Construction Company was awarded two construction contracts for $788 million.
India	1998	CNPC nd India's Oil and Natura: Gas Corp. ONGC Videsh set up a joint venture to explore for oil in western Kazakhstan, where it has a concession.
Indonesia	1993	China National Offshore Oil Company (CNOOC) purchased a 32.58 percent interest in an oilfield in the Straits of Mallacca. In 1995, an additional 6.93 percent interest was purchased.

Iraq	1997	A consortium of Chinese oil companies represented by the CNPC and North China Industries Corporation signed a 22 – year production – sharing contract to develop al – Ahdab field. The consortium's share is 50 percent. The field will be developed for an estimated cost of $1.3 billion after UN sanctions are lifted. It has recoverable reserves of 1.4 billion barrels and a peak production potential of 90,000 barrels per day.
Mongolia	1998	China's Haufu Industrial Company and Mongolia's Oyuni Undraa Suuba Company signed a $29.7 million contract for oil extraction and the joint construction of a refinery in southeastern Mongolia.
Papua New Guinea	1994	CNPC joined a consortium with other foreign firms, including China International Trust and Investment Corporation, Marubeni, and America Garnet Resource, and won two exploration blocks offshore of Gulf Province in 1994 (Block 160) and 1995 (Block Kamusi).
Nigeria	1997	CNPC began oil exploration in the Chad Basin under an agreement with the Nigerian National Petroleum Company. In 1998, CNPC purchased two blocks – OML 64 and OML 66 – in the Niger River Delta.
Peru	1993	Sapat Development Corporation, a subsidiary of CNPC, brought the Talara Block for $25 million.
Sudan	1997	CNPC acquired a 40 percent stake in the Greater Nile Petroleum Operating Company consortium to explore and develop the Heglig and Unity fields, which could hold 8.5 billion barrels to 12.5 billion barrels of oil. A 1513.4 kilometres pipeline project from the fields to the Red Sea was completed in May 1999. CNPC is also assisting with the construction of a 50,000 billions per day refinery near Khartoum.
Taiwan	1998	Taiwan's Chinese Petroleum Corp. and CNOOC formally implemented a 1996 contract to explore for oil in the South China Sea.
Thailand	1993	CNPC signed a production sharing contract to develop Sukhothai field.
Turkmenistan	1998	China Oil and Building Corporation invested $14 million to restore oil wells.
Venezuela	1997	CNPC bought two marginal fields for $359 million. It purchased a field in the Intercampo Norte with a current output of 6700 barrels per day for $118 million and the Caracoles Block with a current output of 2700 barrels per day for $241 million.

Source: Downs, Erica S. (2006) *China's Quest for Energy Security*, Santa Monica, CA; Rand Publications, p.21-23.

China has diversified its oil supply and has been involved in acquiring more shares in oil production from foreign sources for several reasons. Firstly, the dependence on Middle – East has made China vulnerable to an oil crunch in the future and hence it has been involved in other oil potential regions. Secondly, the involvement of China in foreign markets will give it some influence to control any oil price or supply fluctuation. By maintaining a stable external

environment, the domestic market is ensured a regulated market. If there is an oil crisis, the government can still cushion the domestic market by maintaining the standard price, while controlling domestic oil prices. However, Downs remains sceptical on China's slow development of projects and hence would not be able to meet the oil demand in a situation of an oil shock. Huge transportation and logistical problem may force the Chinese industries to sell the produced oil in foreign markets as it would not be cost – effective to transfer the oil to China. An efficient market which does away with the regulated prices but instead if the standard world oil price is adopted it may prove to develop into a more efficient market (Downs 2006: 20 & 23). Another strategy adopted by the Chinese government is the gradual shift from dependence on oil to dependence on gas. The hindrance of high costs of investments and proximity from the production to consumption areas are still posed as big challenges by the government.

Pipelines

The pipeline project was an initiation to avoid the sea lanes of the Persian Gulf and the Straits of Mallaca that is controlled by the US. As China's navy is weak, and is ambitious to build a 'blue – water navy' it however lacks the technology and equipment to match up to the standards of the US or any potential rival. In a bid to secure its supplies it is developing its navy but scholars have contended that concentration on the defence industry which is non – productive is not the prior agenda for China. The resources are instead preferred to be invested in the growth of the economy.

The Chinese pipelines are predominant between Kazakhstan and Russia. In 1996 a Chinese group initiated the construction of a 'pan-Asian continental oil bridge' comprising a network of pipeline from the Middle – East to Central Asia and Russia, China and possibly Korea, Japan and Taiwan. It was projected to supply 20 percent of Asia's oil requirements. The Uzen – Aktyubinskmunaigaz pipeline network plan for the 'pan – Asian continental oil bridge' which was proposed by China in helping to reconstruct Kazakhstan was dismissed as it was not feasible (Downs 2006: 24 – 25).

For the Russia–China pipeline which plans to connect Angarsk in Siberia to China two routes have been charted out; one touching Mongolia and the other through the North Eastern province to Daqing. The estimated cost $2 billion and was expected to transport 220 million barrels of oil per year which is a feasible project as both the oilfields Angarsk and Daqing are abundant in oil reserves and is cost effective (Downs 2006: 29).

IV. Summary

As this chapter charts out China's crisis of an ever growing need for more petroleum in relation to economic conditions as a central theme, China continues to face a lack of concrete energy strategy policy in managing its oil resources. Although in other areas such as renewable energy, policies and laws have been formulated for its better management, the Chinese government has not prepared any policy guideline so far although many independent bodies such as the China Energy Group of the Lawrence and Berkeley National Laboratory at University of California in a tie-up with Peking University, RAND Corporation and several other research institutes from around the globe have researched and come up with proposals for a more effective course of action. The National Bureau of Statistics (NBS) does publish the annual report on the demand, consumption and utilisation on the petroleum sector but it remains insufficient to bring a coherent directive for management. The chapter ends with a section on energy strategy in China with a focus on acquiring foreign resources as China's main predicament remains on energy dependency and stability of supply. It is forerunner to the next chapter which will further study the trends of oil strategy (the development of the industry, national oil biddings, methods and collaborations) that have evolved since the past two ands a half decades.

Chapter 3

Securing Oil Resources Since 1979

Introduction

China's strategy for securing oil followed two different trajectories. The first can be traced to a period when China was self reliant in its oil resources and sought foreign technological assistance which required it to allow foreign companies bid its offshore drilling rights. The second trajectory was followed when its domestic resources were insufficient to meet the growing demands of the economy and therefore forced China to import oil from other nations.

In this chapter, an attempt is made to analyse China's strategies to secure its oil resources from within the country as well as from foreign sources. The first part of the chapter focuses on the development and the expansion of the oil industry and the oil biddings to foreign companies as a sub part to the developments. The second section of the chapter discusses the strategies and methods that the country adopted in the past three decades to secure its oil resources. The third section of the chapter deals with the strategic measures for foreign collaboration and foreign exploration. Since 1993 it has wooed countries like Kazakhstan and African countries by investing in their infrastructural development, used bellicose measures to safeguard their oilfields in disputed territories against the Philippines and Viet Nam, and provided technological assistance and expert personnel in oil and gas exploration to the Latin American countries.

Its pursuit for energy security has been vigorous especially after 1993, when it began importing petroleum from abroad. The year marked a watershed in China's economic development as its petroleum resources became insufficient to meet the domestic demands as the gap continued to widen it drove China to import oil from abroad and thus became vulnerable to oil shocks in the international market. China's overall efforts to secure oil resources continue in a context where the United States as a dominant hegemon striving to achieve monopoly of petroleum resources on a global scale and also the presence of other similar rising economies in the region like India have created a complex interdependent game for seeking their own interests.

I. Growth of the Oil Industry since late 1970s

China's oil industry at the end of 1979 had recorded 26 oilfields with a total annual output of over 100 million tons of crude oil as compared to the statistics of 1949 when China had

8 drilling rigs, 50 oil wells and produced 80,000 tons of oil a year ("New Oil Wells in South China Sea" *Peking Review* 1979: 3-4 and Fang Po Hsi 1978: 20 – 22). According to government statistics the energy ranking of China since 1949 to 1979 increased from ranking 10th to 3rd in coal output, from 25th to 7th in electricity production and 29th to 8th in petroleum production on a global comparative scale ("Fuel and Power Industries" *Peking Review* 1979: 27).

The Taching (Daqing) oilfield discovery gave China a boost to its industry. In May 1977, a national conference on the theme 'Learning from Taching' was conducted where Hua Guofeng called for the development of ten more oilfields of the Taching type by the end of the century. As the Chinese goals have always been on long term prospects, so was the objective of achieving ten or more oilfields of the Daqing type by the end of the century.[12] In 1983, China was estimated to have 30,000 million-60,000 million tons of oil resources (Wang and Jian 1983: 13). Between 1981 and 1983 China had 1.06 billion tons of verified deposits of which 570 million tons were discovered in 1983 alone. In 1984 the output of crude oil was 114.61 million tons (Yan Shi 1984: 17- 18 and China Energy Database Table 2A 1.1)[13]. It had adopted world level oil processing techniques and could manufacture 730 varieties of petrochemicals, of which 90 met international standards ("Petrochemicals to Meet Need" *Beijing Review* 1984: 7). The first six months of 1985 experienced an increase in petrochemical exports by 22 percent in comparison to 1984. As oil and oil-based products were the exports of the China Chemical Industry Imports and Exports Corporation it took further steps to locate new sources of petrochemicals for exports and as the outcome was less than expected they also dealt in bartering and agent-client system with the domestic refineries and producers. In the first half of the year it also sponsored a sales exhibition for China's petrochemical products in Japan ("Petrochemical Exports Increase", *Beijing Review* 1985: 30-31). As the export volume of petroleum products for 1985 was 6.59 million tons it had increased by 8 percent from the previous year. The evaluation of the petroleum industry in the Sixth Five-Year Plan (1981-1985) declared the presence of oil and gas in two thirds of its provinces, where 180 oilfields were operating. Daqing, Shengli, Zhongyuan and Huabei were among the biggest. Daqing's annual output had been at an average of over 50 million tons and Shengli oilfield production was 27 million tons. The end of the Sixth Five-Year Plan witnessed the discovery of 30 large oil and gas reserves amounting to 3.1 billion tons. By the end of 1985, the total production has touched 125 million tons (Zhong He 1986: 20-

[12] This had been a repeated feature in its energy policy and most of the articles in the Chinese papers and magazine during the late 1970s and early 1980s have reiterated this.

[13] Its capacity ranked seventh as compared to twenty seventh in the early 1950s.

21). According to Felix Chang, foreign ventures were denied any onshore exploration until 1986. In the first round of onshore bidding sixty-eight companies had participated and thirty-seven onshore production contracts were signed till 2001. The total value was over US$ 1 billion (Chang 2001: 220). The total crude oil production in 1986 was 130.69 million tons.

An evaluation of the investments in the energy sector from 1980 onwards till 1987 gives us interesting insights into the growth of oil industry in China. In 1987, the total investment into the energy sector was 30.9 billion yuan, an increase of 170 percent from the 1980 status. 5 billion yuan was earmarked for the extraction and processing of petroleum and natural gas during this period which accounted for 51.5 percent. The output of crude oil was 100 million tons in 1978 and remained constant for the next six years. However, in 1984, with the introduction of the responsibility system and high investments, crude oil production steadily rose by 8.1 percent over the 1983 level. By 1987, the total output was 134 million tons of crude oil which was an increase of 2.6 percent over the previous year and 26.4 percent increase vis-à-vis the 1980 level of production. As a result, crude oil export experienced a rapid growth. During this period China exported 152 million tons of crude oil, 18.7 percent of its total crude oil output for the same period. In 1985, the export of crude oil was 36.65 million tons of crude oil and oil products. In 1986, China exported 34.61 million tons of crude oil and oil products. The 1987 figure was 32.17 million tons and the proportion of oil consumption vis-à-vis the total energy consumption fell from 29.9 percent in 1980 to 15 percent in 1987. This was due to the higher consumption of coal that rose from 72.1 percent to 77.6 percent in the same period as more efficient use of coal was introduced. The national income earned from each ton of standard coal consumed rose from 619 yuan in 1980 to 845 yuan in 1987 an increase of 36.5 percent. The energy input for production worth 10,000 yuan fell from 16.16 tons of standard coal 11.90 tons. The decrease was recorded at 26.3 percent saving a total of 200 million tons of coal during the period. ("Development of Energy Resource" *Beijing Review* 1988: 26 – 27).

By 1988 the petroleum sector, comprised of 40 large petrochemical works and numerous medium sized and small enterprises, and employed over a million people. The annual sales in the year reached 40 billion yuan. The total production of crude oil in 1988 stood at 137.05 million tons a year making China the fifth largest oil producer in the world ("Daqing Spirit Inspiring", *Beijing Review* 1989: 5) [14]. The geological reserves and recoverable resources

[14] This figure mentioned in one source of Beijing Review stated the crude oil output as 110 million tons which does not tally with another one mentioned in the earlier issue where total crude oil production for 1987 was 137 million tons. hence reference from China Energy Database is taken as 137.05 million tons.

verified in 1988 totalled 540 million tons and 400 million tons respectively. The amount increased in 1989 as 11 more major discoveries of the verified oil in new areas attracted global attention. The 1988 crude oil production reached 137.05 million tons.

In 1989, China's oil output totalled 137.65 million tons (including 900,000 tons of offshore oil) and ranked fifth in the world. China's crude oil production from January to August 1990 was 91.42 million tons accounting for an increase of 1.51 percent from the previous year. The steep rise in the production was due to the discoveries and exploitation of Daqing, Shengli, Dagang, Liaohe and Huabei oilfields. According to statistics, although there was increase of crude oil output, the growth rate declined from the Seventh Five-Year Plan. Crude oil output for 1985 totalled 124.89 million tons, 130.67 million tons in 1986, 134.13 million tons in 1987, 137.03 million tons in 1988 and 137.65 million tons in 1989. In 1988, China's crude oil output went up by only 2.9 million tons while the workload was equal to building a 20 million ton capacity oilfield. By 1990, the crude oil production reached 138.31 million tons. Increase in oil production capacity was not appropriately balanced with the work put in and this prompted the Chinese companies for further exploration as the ones already in use were depleting. According to sources, China's oil deposit totalled 61.4 to 78.7 billion tons.

In the Eighth Five Year Plan (1991-1995), China planned to open its continental oil reserves for joint foreign exploration in the provinces of Jiangsu, Zhejiang, Anhui, Fujian, Hunan, Jiangxi, Yunnan, Guizhou, Guangdong, Hainan, and Guanxi Zhuang Autonomous Region. In 1991, China made considerable progress in foreign cooperation in exploring continental oil and eventually signing 3 agreements with foreign oil companies and consortiums for loans and two contracts for risk exploration ("Expansion of Foreign Co-operation for Oil" *Beijing Review* 1992: 30).[15] In 1992, China's oil output was 142 million tons, an increase of 2.2 million tons or 1.6% over the 1991 production. However, the increase in the figure for the first time failed to meet the economic demands as the GNP growth rate was 12.8%. The main cause for the insufficiency was the increase in the number of vehicles, amounting for 1 million units for 1992 (SWB: FE/W0280 a/7). In 1993, China produced 143.8 million tons of oil which was an increase for its onshore and its offshore oilfields (SWB FEW/0315 WG/9). In the same year the processed volume of crude oil jumped by 50.7 percent over the 1983 figure and ethylene production increased threefold while other products quadrupled. By 1993, the product mix of oil and petrochemicals rose from

[15] In 1982, before the East China Sea was opened up to foreign investors, China signed agreements with 42 companies and 13 countries to explore this region and the foreign investment totalled to US$ 3.13 billion. By 1991, 67 oilfields or 30 percent of those confirmed were found or proved to have oil and gas deposits.

70 million tons in 800 varieties of products to 100 million tons in 1,500 varieties by 1993. The primary processing capacity of crude oil reached 10 million annually accounting for 86.9 percent of national total; the secondary processing capacity of oil amounted to 6 million tons; and the volume of refined crude oil hit 112.9 million tons, or 88.2 percent of the national total. China's processing volume for crude oil accounted for only 3.7 percent of the worldwide total for the year 1993. In 1994, China's annual oil output was 146.08 million tons at fifth place in the world and in the same year China discovered 700 million tons of oil reserves. Important discoveries were also made including the potential oil bearing strata in the Yaha Oilfields in the Tarim Basin and others in the Junggar Basin were expected to yield an overall output of 100 million tons each (Shuang Zhou 1998: 9). In 1995, the total output was 150.04 million tons (China Energy Database Table 2A 1.1.) In 1996, China's crude oil output exceeded 157.43 million tons. The total output of oil being 140 million tons still was a shortage to fuel the economy. East China's production accounted for four-fifths of the country's total production ("Petrochemical Corporation Increases Earnings", *Beijing Review*: 1998: 35). In 1997, the China Petrochemical Corporation's major production of crude oil amounted to 124.3 million tons an increase of 5 percent from the 1996 level (Marine Oil Industry Grows Fast in China, *Beijing Review* 1994: 23). By 1997, the forecast for China's annual crude oil output was expected to be as much as 160.74 million tons including that of crude oil production of the China Petrochemical Production.

In 1999, the total production of the crude oil was 160 million tons, which recorded China as the fifth largest producer of oil for 13 consecutive years (SWB FEW/0622 WG/8). It had 20.3 billion tons of oil resources in 1999. By 2010 the production was aimed to reach 300 million tons of oil and the main fields were Songliao Basin in the northeast, around Bohai Sea and in the west and the northwest areas. In 1999, China's crude oil imports surpassed 40 million tons, which accounted for 20 percent of the total crude oil to be processed at home. In the eastern sector, the total output was estimated to reach 120 million tons by 2000. A Changqing Oilfield Company official projected the output of the company at 30 million tons by 2005 ("Oil Reserves" *Beijing Review* 2001: 4). The total crude oil output amounted to 163 million tons in 2000. 2001 production totalled 163.96 million tons. In 2002, the total production of crude oil was 167 million tons and in 2003, 169.61 million tons. China's crude oil production in 2005 was 182 million tons and it has been estimated that China's annual crude oil production is likely to surpass 200 million tons by 2020 and remain at 170 million tons by 2030.

Table 3.1 – Chinese Annual Oil Production (thousands of barrels per day)

Basin or Field	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Onshore										
Anhui	—	—	0.8	0.9	1.0	1.6	1.8	1.6	1.8	1.5
Henan	48.3	43.2	42.9	41.3	38.6	38.0	37.3	37.2	33.0	25.0
Jianghan	14.6	15.2	16.3	17.5	17.1	17.4	16.5	15.1	12.7	11.3
Jiuquan	10.5	10.0	9.1	8.7	8.7	8.7	8.1	8.0	8.1	7.8
Junggar	140.0	146	153.0	159.1	159.1	167.2	175.2	174.2	177.0	182.0
North China Basin										
Dagang	76.0	78.0	81.6	85.6	86.6	87.4	87.6	86.0	85.5	85.0
Huabei	98.6	94.7	92.6	93.4	93.8	94.1	94.3	94.6	94.0	90.0
Jidong	6.8	7.8	8.7	9.3	10.3	11.5	12.3	12.8	11.0	9.0
Liaohe	270.2	267.9	285.9	302.5	312.6	302.9	302.8	290.4	301.1	299.0
Shengli	652.6	650.9	658.4	622.2	604.1	586.3	564.2	564.2	535.0	520.0
Zhongyuan	127.0	121.0	110.7	97.3	82.6	80.6	80.0	80.0	76.0	72.0
Ordos Basin										
Changqing	36.7	43.7	36.2	39.5	44.3	55.4	66.5	80.0	85.0	90.0
Yanchnag	—	—	11.5	12.7	14.8	17.7	21.6	32.5	35.0	34.0
Qaidam	17.2	21.0	21.7	21.7	24.5	28.2	32.3	35.2	38.0	44.0
Sichuan	2.7	2.9	3.1	3.1	3.4	4.3	4.7	4.4	4.3	4.1
Songiiao Basin										
Daqing	1113.0	1113.0	1125.7	1127.8	1127.8	1127.8	1127.9	1114.1	1090.0	1060.0
Jilin	69.0	69.0	67.5	66.5	68.5	74.5	80.6	79.4	67.0	58.0
Subei	17.9	18.1	17.3	18.5	20.4	21.6	23.6	25.2	24.0	23.0
Tarim	12.0	19.0	32.2	39.3	51.0	62.5	84.6	77.0	85.0	90.0
TurpanHami	—	—	23.2	28.5	44.5	58.8	60.4	59.0	65.0	70.0
Others	15.6	15.6	15.6	15.3	14.3	15.0	13.4	18.2	20.0	20.0
Annual Total	**2728.1**	**2737**	**2814**	**2810.7**	**2828**	**2628**	**2895.7**	**2889.1**	**2848.5**	**2795.7**
Offshore										
428W	0.8	0.7	0.7	0.6	0.5	0.4	0.3	0.2	—	—
Boxi	—	—	—	—	—	—	4.2	12.5	11.6	10.2
Bozhong	13.0	11.3	10.2	9.2	6.2	4.5	4.8	6.5	6.5	6.5
Caofedian	—	—	—	—	0.4	5.5	4.7	3.9	3.2	2.4
Chengbei	7.4	7.8	7.2	6.8	6.0	5.8	5.7	5.0	4.2	3.4
Huizhou	24.0	57.0	57.0	58.0	64.0	95.0	94.0	83.0	89.0	82.0
Jinzhou	—	0.3	1.8	1.8	3.2	2.4	2.3	1.8	4.5	16.5
Liuhua	—	—	—	—	—	45.6	43.9	28.0	24.0	19.0
Lufeng	—	—	2.3	16.4	13.4	18.7	15.5	50.7	32.9	18.2
Pinghu	—	—	—	—	—	—	—	2.0	2.0	3.0
Suzhing	—	—	2.2	12.8	20.7	27.2	28.9	40.0	32.0	50.0
Weizhou	3.0	3.0	12.3	23.4	20.1	20.2	23.3	17.3	20.6	35.4
Xijiang	—	—	0.0	1.0	39.0	87.0	105.0	83.0	70.0	62.0
Yacheng	—	—	—	—	—	0.5	1.1	1.3	2.0	2.0
Annual Total	**42.2**	**80.1**	**93.7**	**130.1**	**173.5**	**312.8**	**333.7**	**335.2**	**302.5**	**310.6**

Source: Chang Felix K (2001) "Chinese Energy and Asian Security" *Orbis*, Elsevier Science Limited, p: 218.

Table 3.2 China's Petroleum Consumption (Annual Growth)

Year	Total Petroleum
1990	-1.3%
1991	8.1%
1992	9.7%
1993	10.1%
1994	-0.3%
1995	8.0%
1996	9.9%
1997	10.3%
1998	1.1%
1999	6.5%
2000	7.9%
2001	2.5%

Source: "Table 4A, 1.4 Primary Energy Consumption", Chapter 4. v6, *China Energy Database*, June 2004

The above figure (3.1) gives the details of onshore and offshore production basin-wise. Daqing oilfields in the Songliao Basin recorded as the highest onshore production well for an entire decade followed by Shengli in North China Basin. As the table demonstrates, apart from the two mentioned oilfields the oil production in the other oilfields was comparatively meagre. In the offshore front, there was no large production from any single source. Huizhou and Xijang offshore-well marked the highest production in the 1990s peaking at 95,000 barrels per day in 1996 and 105,000 barrels per day in 1997 respectively as in comparison to Daqing, the highest onshore production, well accounting for 1127.9 million barrels of oil production per day in 1997. As per the growth in production of the petroleum industry, the development was extremely slow in relation to the rate of petroleum consumption (as given in Figure 3.2) due to the rapidly growing economy. The annual contribution from the offshore production to the nation's total petroleum output remained limited. Most of the joint ventures undertaken in the offshore areas with foreign companies did not yield expected results and China was forced to provide more benefits and incentives. Shortly after China began to import oil from abroad in 1993, it leased out its onshore oilfields to foreign joint ventures.

In the domestic sphere China's involvement with foreign companies was done in different phases by opening the offshore areas for drilling operations of South China Sea, the East China Sea and the Bohai Gulf and later by the fourth round of bidding, foreign companies were permitted to hold stakes in the onshore areas also. It granted investment benefits and several subsidies to foreign companies that invested in the domestic reserves.

Some of the important onshore and offshore oil reserves have been discussed below.

Onshore Oilfields

Daqing

The first offshore exploration began in 1960, in Daqing where 40,000 workers were dispatched in what came to be called as the 'Daqing Spirit' (Chang 2001: 213). The composition consisted of thousands of workers, cadres and technicians from oilfields and enterprises in 12 provinces, municipalities and autonomous regions as well as Peoples' Republican Army (PLA) engineering corps (Peking Review 1978: 3). The Daqing fields lies along the coast of the Bohai Gulf and the Shengli Fields near the mouth of the Yellow River. It generated about one third of the total petroleum output in 1978 (Chang Ibid.). On 27th September, 1989, Daqing's celebration of thirty years of national contribution was recorded with a total production of 1 billion tons of crude oil, accounting for more than half of China's total production till 1989. It contributed 77.9 billion yuan (US$ 21 billion) in profits and taxes. 11.8 times of the state's investment in Daqing during the same period. It exported 200 million tons of crude oil, earning US$ 28 billion for the state over the thirty years. It had recorded a total of almost 20,000 wells. Annually it produced 365 million barrels for thirteen consecutive years.

In 1992, Daqing's annual production was 55.56 million tons of crude oil or 40 percent of the national output of crude oil, with more than 166 petrochemical products. Out of the 500 largest enterprises the Daqing Petroleum Administration was recorded as the largest leading it in sales volume (Daqing Sets Up High Tech IDZs, *Beijing Review* 1993: 34).

Wang Tao, the general manager of China National Oil and Natural Gas Corporation affirmed the 1994 crude oil production to be 139.4 million tons and 56 million tons of oil production by Daqing. The Daqing Oilfields were estimated to produce 50 million tons annually.

Daqing oilfield in the Songliao Basin contributed about 60 percent of recoverable resources by 1990s. The earlier 60 percent of extractions had been oil but the later stages from oil bearing formations were with increasing water content. With use of more developed technology, the cumulative production reached to 6.1 million tons of crude oil. Daqing continues to be the highest producer of crude oil production in China.

Shengli

The Shengli Oilfield in the Huanghe River estuary on the Shangdong peninsular also had inland prospects such as an oilfield five kilometres off the Huanghe estuary had reserves of

120 million tons in 3-10 metres deep waters. The Shengli Oilfield planned to construct a man made island for better exploration.

The Oilfield being the second largest maintained an annual output of 30 million tons for nine years and its 1997 production was 28 million and the proven reserves increased by 100 million when better technology was used (Wei Bei 1998: 16).

Tarim

The first oilfield found in the Basin was Yiqikilik Oilfield and two decades later in the 1970's the Kokyar Oil gas was discovered. The Petrophysical Exploration Bureau imported desert transportation and seismic prospecting equipment during the early 1980s, thus enhancing the potential resources in the region. In September 1987, the Lunnan field (which is located about 100 kilometres from Korla) was discovered which again had high production. The biggest discovery was in October 1989 in the Tazong fields, which is 400 kilometres south of Korla (Chang 2001:216). The Tazong No. 1 exploratory well located in the Tarim basin of the Xinjiang Uygur Autonomous Region had a daily output of 576 metres of oil along with 360,000 cubic metres of natural gas when it began drilling to a depth of 3,700 metres on May 1989. Oil layers as thick as 100 metres were found in the Tazong No. 1 oil well. On 31st October, 1989, 576 cubic metres of crude oil output was recovered from Taizong No. 1 oil well Wu Zongying, a spokesperson from the CNPC said that a 117 metre thick oil stratum bearing light crude oil had been discovered. In understanding the basin's structures and oil pool formation it was regarded as the biggest marine sedimentary basin. The deposits were deduced to be continental deposit strata. In the middle of the basin where Tazong No.1 was located an area 8,200 square kilometres of oil bearing geological structure had been discovered. Li Gansheng, chief engineer of the Exploration department of the CNPC said that the seismic data proved the Tarim's oil resources account for one-seventh of the national total. For the annual budget of 1989-1990, China invested about 1.5 billion yuan for large scale development and exploration in the basin ("Tarim Basin, a Promising Oil Resource", *Beijing Review* 1989: 6-7).

In 1991, the crude oil production from Tarim was 33,800 tons and rose to 889,000 tons by 1992 and to 2.1 million tons in 1994. In 1992, US$1.2 billion was loaned for further development. Other infrastructure developments were also made such as a 192 kilometre oil pipeline and a 219 kilometre highway in the Taklamakan desert. The success rate for exploratory wells stood at 45.4 percent ("Tarim Basin: New Hope for China's Oil Industry", *Beijing Review* 1995: 10- 13)

The Yaha field which was discovered in 1994 was another major discovery. The crude oil output in 1994 had doubled on an annual basis and five projects were estimated to produce 2.1 million tons. By 1995, it was home to seven oil and gas fields with 167 exploratory wells with an average of 5,232 metres with 76 wells producing a high volume of industrial oil. Some oilfields in the region like the No.4 Oilfield were expected to have reserves of 100 million tons. By March 1997, thirty five wells had been spudded. Although, it was predicted to produce 300 million tons of oil, it was revised and the estimates were downsized to 30 million tons. However, exploration was considered to be expensive which amounted to US$20 million for each exploration well and foreign oil company investment was necessary for further ventures.

Changqing

Another watershed in China's oil industry was the case of Changqing oilfields where companies like Mobil Oil Company and other companies had refuted the presence of oil deposits in Changqing but later oil deposits were estimated to exceed 2.05 billion tons, of which proven oil reserves amounted to 550 million tons. The annual production capacity of crude oil had reached 2.95 million tons and the refining capacity was 0.7 million tons. Estimates projected that by 2000, annual crude oil output would reach 4 million tons ("Chongqing Oil Field Developing", *Beijing Review* 1997:18). Agip and Texaco had begun exploration activities in Block 15/22 in 1991 materialised in 1997 where four oil rigs were installed and wells drilled were expected to produce 104,000 barrels of oil per day. The later records of the oilfields had fallen to 62,000 barrels by late 2000.

Offshore

With a number of factors such as the peaking onshore production, rising oil prices and poor performance of the offshore production during the late 1970s, China was driven to focus on its undersea potentials (Chang 2001: 216). The first exploratory oil and gas well to yield commercial oil and gas was 'Pinghu No. 1' situated 420 kilometres southeast of Shanghai, 4651 metres deep began to yield oil in mid-June 1982 in the East China Sea. It was initiated on 17th November 1982 and completed on 10th April 1983. Experts estimated the prospects of more than 400 oil-bearing structures in the north of South China Sea and the south Yellow Sea. Some which had been drilled so far yielded more than 1,000 tons of crude oil ("Oil Discovered in East China Sea" *Beijing Review* 1983: 7-8). In 1982, the offshore exploration production was less than 100,000 tons of crude oil ("Key Contracts Signed with Foreign Oil Firms", *Beijing Review*

1997: 27). The recorded statistics state that China's petroleum industry had an annual capacity to refine 90 million tons of crude oil and covered for 8 percent of the nation's total revenue which in comparison to past records was commendable but still did nor match up to the standards of the developed nations. Organizational problems were also one of the main reasons for the inefficiency (energy body was divided with different functions) of the petroleum sector where many oil refining, petrochemical and chemical fibre enterprises were operated by petroleum chemical and textile industries.

In 1983, the Deputy Secretary-Generals, Wang Qingyi and Gu Jian of the China Energy Research Society underlined the development of petroleum strategy by the year 2000.[16] The petroleum production till 1983 had remained 100 million tons with substantial resources in the west and the coastal continental shelf of China. More offshore reserves were expected to be found in the South China Sea and the south Yellow Sea and also in the Bohai Sea and the Beibu Gulf region. China utilised about 100 million tons of oil, consuming one third of its total amount. They reinforced the need for "restructuring and technological transformation in refineries and other petrochemical enterprises so as to raise the amount of intensively processed oil products and develop comprehensive utilisation of petrochemical products." China had also developed expertise in the study of unconventional oil and coal based synfuel.

National Oil biddings – Offshore and Onshore

Oil biddings are an integral part of the growth of the oil industry in China. This section encapsulates the authorization of foreign companies to explore the untapped oil reserves within China's territory. By 1983, 14 exploratory wells and 2 oil bearing structures were constructed. It was estimated to produce an average of more than a million tons of crude oil annually. The first offshore contract with China was led by Total in May 1980. The contract covered an area of 11,000 square kilometres for oil exploration and production. The Atlantic Richfield Company of the United States was the second company to join the Chinese offshore exploration. In May, 1983, the first round of bidding for joint exploration of China's offshore oil was announced and the British Petroleum acquired drilling rights over five areas covering 14,000 square kilometres in South China Sea and south Yellow Sea. By December 1983, China had signed 12 contracts with 21 oil companies from eight countries on the joint exploration and

[16] See Chapter 2, section II, first paragraph Energy Strategy in China since 1978, page 39, where the strategic targets for energy development for 2000 is elaborated from Wang Qingyi and Gu Jian (1983) "How Will China Solve Energy Problem", *Peking Review*, Vol. 26, No.35, 29 August 1983, p. 16.

development of China's oil resources in the South China Sea. The cooperation blocs covered an area of 38,500 square kilometres and in total more than forty companies joined China in searching for oil in the Chinese sector of the South China Sea ("Chinese Foreign Oil Co-operation, *Peking Review* 1983: 5-6).

In the second round of offshore oil bidding conducted in May 1985, 23 foreign oil companies participated. From 1981 to 1985, the Chinese and the French drilled four oil wells in the area that proved to be high yielding sites, with two sites that yielded more than 1,000 tons of crude oil per day. The No. 8 well was the third of the six wells that had been planned to be drilled in the trial production period. On September 1985 Qin Wencai, the general manager of the CNOOC in an interview with Beijing Review mentioned the starting of operation of the Sino-Japanese oil venture in the oil wells of Chengbei Oilfield. The Wei 10-3 Oilfield in the Beibu Gulf of the South China Sea was expected to go into production by 1986 (Sino-French Oil Cooperation" *Beijing Review* 1985: 23). By mid 1985, China had signed 23 contracts with 32 oil companies from 12 countries on offshore exploration and production activities. The areas that cover the contracted blocks were the Bohai Sea, South Yellow Sea Basin, the Zhujiang (Pearl) River Mouth Basin of the South China Sea, the Beibu Gulf and the Yingye Sea and over a hundred exploratory and 59 producing wells were drilled and oil and gas were found in the 21 formations in the area. China drilled 34 exploratory wells in two years over an area of 150,000 square kilometres. More than 500 oil bearing structures were discovered in China's continental shelf, but 80 percent of these structures had not been drilled till then. By the end of 1987, 257,000 kilometres of seismological survey had been survey lines were completed, 150 wells drilled and 31 oil and gas bearing structures found.

The third round of offshore oil bidding was conducted on 3rd January 1989. It comprised of seven zones covering a total area of 32,075 square kilometres. The bidding area included shallow seas around 200-500 metres deep. The zones were Dongsha to Shengu in the Zhujiang (Pearl) River estuary basin of the South China Sea and other areas which held promising prospects of oil. The COPC had compiled a geophysical data in 1986-1987 on these areas for foreign companies that were interested in exploring this region. It covered an area of 65,000 square kilometres. A deep oil lake and three exploratory wells were discovered in the Zhujiang Liuhua 11-1 Oilfield in the South China Sea and its discovery was estimated to produce approximately 100 million tons of oil and also boost the third round of bidding for offshore oil. Till then 37 oil contracts and three agreements on geological exploration had been signed with

45 foreign companies in 12 countries and by the end of 1987, 257,000 kilometres of seismological survey lines had been completed, 150 wells drilled and 31 oil and gas bearing structures found.

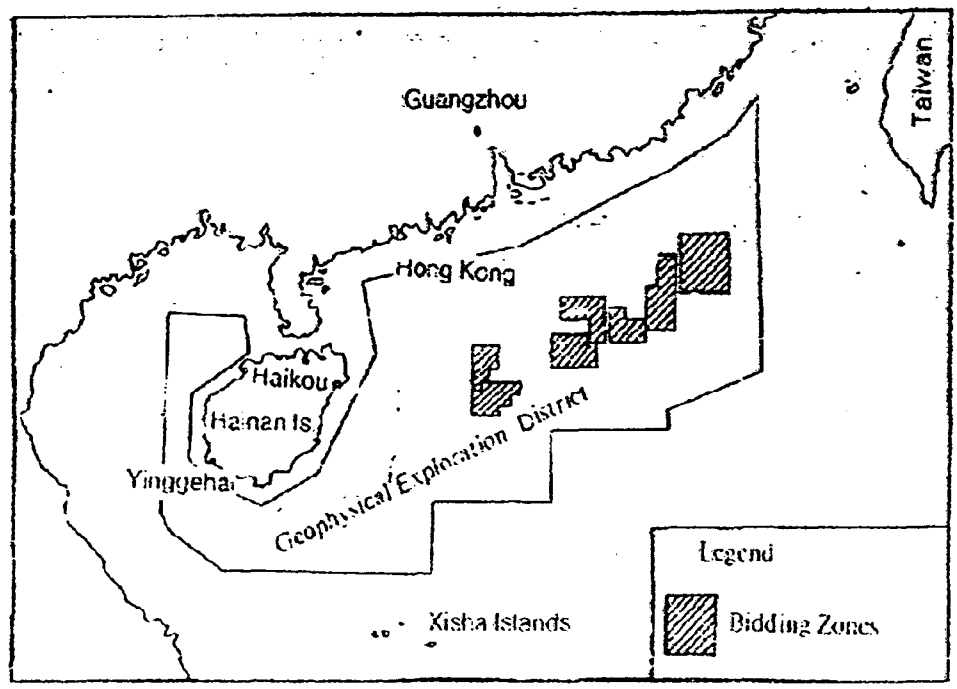
In 1987, three test wells were drilled in the East China Sea continental shelf which showed varied amounts of reserves. A decade back 16 oilfields were drilled which showed similar varied results. 1989 witnessed drilling 30 initial test wells and appraisal wells in the independently managed areas. Special focus was given to Liaozhing sunken area in the northern part of the Bohai Sea. The cooperative areas had aimed to focus more on Huizhou sunken area in the South China Sea. The prospects of the Wei 10-3 Oilfield in the southwest sunken area in the Beibu Bay were high and the CNOOC had planned to tap the reserves in it. Till 1988, nine oilfields were under construction or were soon to start. Six oilfields of these nine were under Sino-foreign contracts. The Bozong 28-1 and 34-2/4 oilfields in the Sino-Japanese area were forecasted to be completed by May and December of 1990 respectively. The former was estimated to produce 360,000 tons while the latter had an estimation of 400,000 tons per year. Three other oilfields in the Sino-US cooperative area in the South China Sea-Huizhou 21-1 and 26-1 and Xijang 24-3 was to be completed by 1990-1992. The annual productions of these two oilfields were estimated to surpass 1 million tons in its peak period. The independently developed oilfields were 11-4 Oilfield in Beinu Bay of the South China Sea and the Suizhong 36-1 Oilfield in the Bohai Sea. The offshore oil production for 1988 was 752,000 tons of crude oil, an increase of 5.6 percent from the previous year. In 1989, the estimated production was estimated to reach 900,000 tons, an increase of 12 percent from the previous year's production. From 1982-1988, China's offshore oil output totalled 2.45 million tons. The joint collaboration of China and Japan in the Chengbei Oilfield in the Bohai Sea and 10-3 Oilfield jointly managed by China and France in Beibu bay were taken over by China and operated independently. The immediate goal of the CNOOC from 1989 to 1992 was to find 1,200 million tons in oil reserves besides gas reserves and to raise the productivity of crude oil to 5 million tons (Han 1989: 27).

In the third round of offshore bidding, the Japan-China Oil Development Company started work on the BZ-28-1 oilfield located in the centre of the Bohai Sea. The annual output was predicted to reach 400,000 tons. The BZ-34-2/4 oilfields were also expected to undergo production at the capacity of 400,000-500,000 tons. Six other oilfields located at various places of the mouth of the Zhujan (Pearl) River, in the north east of the South China Sea, north of the Bohai Sea and west of the South China Sea were also being exploited. Although most of these

oilfields were small or medium sized, reserves like the Liuhua 11-1 oilfield and the Suizhong 36-1 oilfield had more than 100 million tons each. Zhou Shan, the general manager of the CNOOC liaison department, said that the oil exploration around China's coastal seas during the last few years resulted in the construction of 200 oil wells. The past explorations in the Dongsha-Shenhu Zone showed sedimentary deposits which is an indication of oil prospects. At the third round of offshore bidding, China has made some provisions for foreign companies promoting further exploration. These preferential measures were:

1. "After preliminary exploration has been completed, overseas companies can choose to continue cooperation or stop their contract, thus reducing investment risks.
2. All oilfields with an annual output of less than 1 million tons will be exempted from oilfield use fees.
3. The cost of hiring Chinese workers and the number of the integrated administrative committee will be reduced" ("Prospects for Offshore Oil" *Beijing Review* 1989: 29- 30).

Figure 3.3. Exploration Zones for the Third Round Bidding for Offshore Oil Exploitation



Source: "Prospects for Offshore Oil", *Beijing Review*,32, February 6-12, 1989, p.29.

The bidding area was divided into seven zones which covered an area of 32,075 square kilometres. The major part of the bidding area was covered by shallow seas around 200-500 metres deep as shown in figure 3.1.

By the end of 1988, the corporation had signed contracts worth US$ 2.4 billion from abroad. Till 1989, 45 contracts including 3 agreements were signed by the overseas companies. Out of these, 20 of contracts had expired, 25 were implemented. The activities included oil exploitation, test well drilling, physical and chemical prospecting (Han Ibid). BP of Britain did not fare well with its exploration deals in the first and the second round of the bidding but it signed two more deals on drilling initial test wells in the Bohai Sea. Some contracts of other companies expired but renewed it in the third round of bidding. The 2 billion investments of foreign companies was an increase of 16 percent more than the previous year's investment.

The Beijing Petrochemical Corporation ranked the first in petroleum production (China's Top Ten Energy Enterprises *Beijing Review* 1993: 26). In the fourth round of bids for Chinese offshore oil the first batch of contracts was signed in October, 1993 by Texaco of the United States, Maersk Company of Denmark and Agip Company of Italy. Texaco won the first bid for exploration in the East China Sea. 30 oil firms placed bids and 13 contracts were to be signed in the year. The initial bidding covered the area of East China Sea 33/05, 33/19 and 33/13 blocks located 160 to 200 kilometres east of Wenzhou City in Zhejiang Province. The area covered was 8,100 square kilometres with an average depth of 100 metres. The agreement of the fourth round of bidding stated that risks were to be borne independently by the company for a set period of seven years. The total investment for the first three years was estimated to reach US$ 100 million. The ACT Group formed by Texaco, Agip and Chevron were involved in two joint explorations at the mouth of the Pearl River in South China Sea. It produced more than 2.5 million tons of crude oil annually. Chevron signed another batch of contracts with the CNOOC for East China Sea oil exploration. The 33/08 contracted block spread over an area of 150 kilometres offshore, with an average depth of 80 metres ("Contracts for Oil Bids Signed" *Beijing Review* 1993: 45 – 46).

In December 1993, the first inland joint venture oil exploration was conducted when three companies signed a contract in the No. 3 block of the Tarim Basin in northwest China. The China National Petroleum and Natural Gas Corporation (CNPNGC), ESSO China Company Limited headquartered in the United States and the Japan-Indonesia Petroleum Company Limited of Japan signed the contract to explore the block covering an area of 14,475.4 square kilometres located in the south eastern part of the Tarim Basin. The foreign firms were to bear total costs and risks during the eight year contract ("Joint Exploration of Tarim Basin Oil" *Beijing Review* 1994: 27).

The onshore bidding opened only in 1995. It was held from 9th June and 31st October in 1995. The region that was given for bidding was the Tarim and the Junggar Basin in the Xingjiang Autonomous Region. The area covered was 112,739 square kilometres with 12 tracts; Mingfeng, Yutian, Luopu, Hotan and Sanju areas in the south section, the Axqi, Wushi, Shajingzi areas in the northwest areas of the Tarim Basin, Mosuowandong and Dongdaohaizi areas of the east-central section, the Dongwan and Qingshuihezi areas in the south of the Junggar Basin. Eight oil and gas fields were found in the interiors of the basin. The 23 oil and gas structures discovered had an estimated production of 5 million tons per year ("Third Round Bidding for Onshore Oil" *Beijing Review* 1995: 25). During this round of continental bidding, prospecting and exploration had already started by 1995; the Zadong area was the first region for continental contract. The second round of bidding was finalised and evaluation and negotiations were in progress. The two rounds attracted around US$ 100 million of foreign capital. Risk exploration bids were also being contemplated. In the same year China had attempted to conduct limited prospecting and joint venture development of oil resources in other countries also. It had begun providing oil production technology and labour service and contracting oil projects abroad.

Since the first round of offshore licensing opened for foreign joint ventures and till October 1998 five rounds had been completed. The "China National Overseas Oil Corporation (CNOOC) which administered the development offshore blocks generally licensed acreage through bilateral negotiations, granting an average of six licenses per year during the 1990s". The contracts that were signed allowed acquisition of an interest in exploration fields if enough oil or natural gas were discovered to make development viable(Chang 2001: 216-217). The contracts given out included both for petroleum and gas exploration.[17] Eighty-six companies bid in the first onshore licensing round and since 1986, thirty-seven onshore production sharing contracts worth over $ 1 billion had been conducted (Chang Ibid).

In the Eighth Five-Year Plan (1991-1995), China planned to open its continental oil reserves for joint foreign exploration. These were the 11 provinces of Jiangsu, Zhejiang, Anhui, Fujian, Hunan, Jiangxi, Yunnan, Guizhou, Guangdong, Hainan, and Guanxi Zhuang

[17] The most successful explorations in the early years were the projects at Yacheng, situated ninety kilometres from Hainan Island. The exploration led to gas discoveries in the region by ARCO in 1982 and subsequently in 1994, pipelines were constructed to transport gas to Hainan, Black Point Power Station in Hong Kong and later also to a power station in Shenzhen that is jointly built by Exxon and China Power and Light (shareholders of Castle Peak Power Company, the company which owns Black Point Power Station). Further developments in the South China Sea by CNOOC and ARCO have been made to make Ledong gas fields viable and also Wencheng area is under study.

Autonomous Region. In 1991, China made progress in foreign cooperation in continental oil by signing three agreements with foreign oil companies and consortiums for loans and two contracts for risk exploration ("Expansion of Foreign Co – operation for Oil", *Beijing Review,* 1992, p. 30)

II. Methods adopted by the Chinese for Securing Oil Resources

The government of the PRC endeavoured to secure oil resources by adopting several measures that have over the years enhanced the energy security and this ensures its economic development. The following section focuses on the steps taken to protect and amass reserves by building pipelines, implementing energy conservation policies, improve of the quality of oil produced by adopting foreign technology and collaborating with companies to share technical know-how.

Pipelines

Though China's first oil pipeline construction started in October 1975, it began to function on July 1978. It extended from the province of Shandong's Linyi to Jiangsu's Nanjing oil harbour and then branched into two lines from Hubei province which ran more than a thousand kilometres crossing Shandong, Anhui and Jiangsu provinces. Hundreds of production wells had been set up and an 850 kilometres of pipeline had been laid. It was recorded to hold about 4 million tons at the maximum in each square kilometre ("A New Oil Pipeline" *Peking Review* 1978: 41).

By the end of 1989, 15,500 kilometres of oil and gas pipelines were laid which linked northeast, north and east of China. The annual flow of oil from these pipelines accounted for more than 90 percent of the nation's total crude oil. Other infrastructure such as construction of highways, power transmission lines, water facilities, flood and tidal control facilities which facilitate oil exploration were also developed (Li Ping 1990: 16 – 19). In 1997, pipelines were laid from the northwest to the developed coastal regions of the east. It began in Korla in Tarim Basin, Xingjiang Uygur Province passing from Shanshan Base of Turpan-Hami Oilfield and the Dunhuang Base of the Qinghai Oilfield and then to Lanzhou City. The pipeline then branched out to Luoyang City of Henan Province and to south of Pengzhou Refinery of Sichuan Province which was still under construction. The pipeline stretched for 4200 kilometres costing 20 billion yuan. The first phase of the construction, a 402 kilometres pipeline stretched from Korla to Shanshan was completed by May 1997. The Tarim region of Junggar, Turpan, and Hami in the Qinghai Qaidam Oilfield with reserves of 30 billion tons was planned to be connected to the

main pipeline accounting for a third of the national onshore oil resources (Pipelines from West to East: *Beijing Review* 1997: 28). Other areas where pipeline project networks linked the nation was in Kunming in the Yunnan Province with one of China's largest oil refining bases at Maoming in the Guangdong Province. It stretched for 2000 kilometres and had a capacity of transporting 10 million tons meandering through Guangdong, Guangxi, Guizhou and Yunnan joining 23 oil pumping stations and oil depots (Oil Pipeline Project" *Beijing Review* 2001: 6). This included expert forums, government officials training programs, surveys and investigations. On August 2004, as part of the "go west policy" to develop its western region China established a 4200 kilometre pipeline from Shanghai to the Tarim Basin. This was to be linked with Kazakhstan and later to Turkmenistan and Iran (Bhadrakumar 2005).

Efficiency

At the onset of opening up to the world, China's status of energy efficiency was very low where a spokesperson of the State Economic Commission "said that poor energy management had resulted in a low utilization rate of only 28 percent which was [is] about half that in the developed countries." Added to the low efficiency was the "lack of advanced technology, [and] energy development had fallen behind the needs of industrial growth and exports" ("China's Energy Policy", *Peking Review* 1980: 22: 5).

The measures taken to make oil exploration more efficient were initiated during the 1990s after the government realised the insufficiency of the domestic production to fuel the rising demand (Chang Ibid: 213). According to Chen Yongwu, an State Administration of Petroleum and Chemical Industries (SAPCI) official, with a constant economic growth China's oil demand was likely to approach 300 million tons in 10 years. With better efficient methods and management systems China will be able to be sufficient with an increase of its current 66 percent of its oil refining capacity. Demand was expected to reach 101 million tons by the end of 2000. Its refining capacity was 260 million tons, ranking fourth in the world. With the ban on oil products import and the encouragement of domestic refineries to refine imported crude, it was expected to help make the refineries make more profits ("China to Import More Crude Oil" *Beijing Review* 2000: 29).

Oil Pricing Policies

Subsidies were encouraged such as the exemption of taxes on the oilfield mining areas if an oilfield produced less than a million tons of crude oil a year ("Bright Prospects for Offshore Oil" *Beijing Review* 1985: 29-30). The tax regulation was imposed from 1st April 1988. The number of contracting companies had increased to 45 since 1985 (when onshore exploration

in Southern China opened). In 1995, royalty fee was introduced. The oil royalties were brought down according to different regions. This was primarily to encourage more foreign investment. The original provision had stated that the developers had to pay a 6.4 percent of production as royalties to the state. However, the amendment provided royalty exemption for an oilfield where annual production was below 1 million if they were located in Qinghai, Tibet and Xingjiang and the shallow water range regions. In other regions royalties were cut to 6 percent. A maximum royalty of 12.5 percent was imposed in the frontier oilfield where annual production was more than 4 million. In comparison, the new royalty system was lower than in many countries ("Oil Royalties Cut to Favour Exploration" *Beijing Review* 1995: 6).

As the domestic oil prices were much lower than the international oil prices on 1st and 5th June 1998, China implemented a new oil price for the country since then. According to the new oil price policy, the new crude oil price was to be set on a monthly basis in line with the Federation of Business of oil in the international market plus tariff raised by the State Development and Planning Commission (SDPC). The retail price of the refined oil was to be set by the CONGC and the China Petrochemical Group Company inside a 5 percent floating range on the basis of international price and the medium retail price of each administrative region ("Oil Prices to Dovetail International Prices" *Beijing Review* 1998: 25).

Although the pricing mechanism was adopted in 1998 it was continuously brought higher China adjusted the price of domestic refined oil five times in November 1999 and February, May, June and July in 2000. From July 2000 onwards, the oil prices were to be adjusted once a month in accordance with the changes in the world market. The periodic price regulation was to ensure regular supply of oil and prevent hoarding. The CNPC and the Sinopec had full autonomy to decide their retail prices based on government set prices with a floating margin of 5 percent ("Oil Prices to be Adjusted Every Month", *Beijing Review: 28*).

Despite the hike in the oil price, due to low technology China continued to face losses in refining. On 14th July 2000, the domestic prices of oil were raised once more, this time to the international market prices. CNPC and the Sinopec through negotiations settled the prices in a two part process – the base crude oil and the premium price. The SDPC determined the base price according to the average price of crude oil to the international market while the premium was negotiated between the seller and the buyer. While the SDPC set a median retail price based on duty paid and reasonable distribution expenses on the domestic prices, the CNPC and the Sinopec determined the specific retail price within 5 percent range of the median price. China

offered many incentives to foreign investors encouraging them to expand their operations in the country. Among the many benefits and concessions to the foreign companies, the General Taxation Bureau of the Ministry of Finance issued a document stating that "if a foreign oil company failed to profit from an operation and revokes the contract but continues to maintain an office and other contracts in China, the expenses incurred on the failed operation can be used to directly offset the amount of taxable income from other profitable operations" ("New Measures to Cover Loss for Foreign Companies" *Beijing Review* 1998: 38).

Other provisions for relaxation of taxes for foreign companies was that if it terminated its sole contract, but signed a few others before the date of termination, the expenses of the failed operation would be carried over to offset the income gained which helped to reduce the income tax payable. The oil price hike was also driven by preparation for China's entry into the WTO to gradually eliminate or reduce tariffs on crude oil and refined oil, open the domestic market for refined oil, wholesale and retail and permit overseas multinational to participate in the operation of domestic oil market. This trend required China to bring its oil prices in line with the international market so that domestic and foreign enterprises could compete on an equal footing. However, the dovetailing of the domestic refined oil price and international market price did not affect the domestic consumers as taxes such as consumption tax, value added tax and petroleum reserve tax and environment tax were not imposed in the selling price of refined oil ("Chinese Oil Prices to Float with World Prices", *Beijing Review* 2000: 20).

Technology

The Chinese government, in a bid to improve the status of energy efficiency and consumption, allocated 2,040 million yuan in 1980, the largest sum so far. A major part of this amount was meant for adopting better technology. While energy increased by 2.8 percent over 1978's statistics, the industrial output was 8.5 percent. The energy used in 1979 was at the rate of 30 percent of efficiency only in overall terms. This was due to the lack of efficient technology. A policy of fixed energy quota distribution to the energy consuming enterprises was adopted and obsolete machinery was done away with ("Energy Conservation" *Peking Review* 1980: 5-6). In 1979 and 1980, about 1400 boilers were renovated and improved which saved 5 million tons of petroleum. The conservation share of motor vehicles (truck transport) in Shanghai and Tianjin was estimated to save 8,966 and 2,400 tons of petroleum respectively. While industries like Anshan Iron and Steel Company, the largest steel company then, saved 34,000 tons of various kinds of refined oil in 1980 ("Economising on Petrol" *Peking Review* 1981: 6). By early 1980s as

China had just opened its economy, it felt the need for foreign assistance to develop its offshore resources as it lacked equipment and technical skills for drilling in moderately deep waters.

China's cooperation and technical exchanges with the foreign countries gave a boost to the petroleum industry. The old oilfields were readjusted for better drilling techniques, developed mechanised methods and more efficient underground methods of operation were adopted. Its seismic exploration technology which was lagging decades behind that of the developed nations had then reached to the 1970s level (Yan Shi 1984: 19-20). By the beginning of the 1990s China's oil industry was well equipped with a total labour force of 1.35 million workers with high production capacity industrial system, geological exploration, development and construction of oilfields, pipelines, manufacturing machines and scientific research design and education. Research done on the oil exploration methods matched with the standards of the developed countries. China had full range of exploratory and developed technologies, including geological testing, drilling, exploration, oil recovery, gas extraction, construction of oil fields, storage and transportation and environmental protection. China's oil industry had acquired five major technologies: "1) to interpret and process data for earthquakes 2) technology for mining sandstone oilfields and fault block oilfields 3) drilling oil wells with high pressure injection; directional and deep well drilling methods; 4) technology for extracting thick oil, highly solidified oil and low infiltrated oil and gas reserves and 5) technology for oil well exploration, oil testing, ground construction, the transport of oil and gas" (Li Ping 1990: 16-19). All these technologies facilitate exploration and development for various kinds of complicated fault block oil and other reserves and the deep calcareous rock and gas oil.

China's oil machine technology developed over the years. 90 percent of drilling rigs which were used in many oil fields were made in China. 75 percent of the special equipment used for exploration and development of land reserve was also indigenously manufactured. The technology currently used is of standard equal to the developed countries (Li Ping 1990: 16-17)).

In 2000, China adopted the polymer-driven technology, on which injecting one ton of polymer into the oil wells helped to extract 167 tons of crude oil. Its onshore oilfields extracted an additional 10 million tons of crude oil. The use of this technology prompted for the establishment of a polymer plant in Daqing which had a production capacity of more than 50,000 tons. "Most of China's oilfields belong to the complex continental deposits as far reserve layers are concerned, where the crude oil is thick and oil wells have large water content." ("Offshore Oil and Gas Stepped Up" *Beijing Review* 2000: 32).

Conservation

In 1981, the State Council allocated 3,000 million yuan for energy conservation. The goal of conserving energy was aimed to be equivalent to 24 million tons of standard coal (*"Stress on Energy Conservation"* Peking Review 1980 4-5). Xia Zhen (1981: 15) wrote "The development of all industry, of course, depends on adequate energy supplies. Our principle is pay equal attention to exploitation and practising economy. Energy is still one of the weak links which needs to be strengthened as quickly as possible. At present, emphasis is laid on practicing economy to reduce the heavy waste in energy consumption."

An Energy blueprint was drafted by the Ministry of Energy Resources which was titled, "An Outline for the Development of China's Energy Industry, 1989 – 2000". It aimed at energy conservation of all energy sources. During the same year the proven reserve for crude oil was estimated to be 12.5 billion tons. The plan was completed in June 1989 and was to be endorsed for a strategic distribution of China's energy resources ("Energy Blueprint Worked Out" *Beijing Review:* 1989: 6).

III. Strategic Measures for Foreign Collaboration

The CNOOC issued five strategic measures to further develop its oil industry in collaboration with foreign companies.

- Sticking to and developing foreign cooperation. Practice has proven that foreign cooperation is an efficient measure and one of the best ways to develop China's offshore oil industry and this policy will be adhered to.
- Continuously developing China's independently managed prospecting and exploitation. Since 1984 China has won encouraging results in its independently managed prospecting. With the growth in financial and material strength, the scale of independently managed prospecting will increase day by day.
- Building a natural gas production base in the western part of the South China Sea. China's coastal areas, particularly Guangdong and Hainan Island have a serious shortage of energy resources (as compared to their industrial development). The development of the YA 13-1 gasfield is of great significance in boosting the economy in these areas. Survey shows that gasfields found in South China Sea have rich natural gas reserves. The development of the Ya-13-1 gasfield is viewed as important by the Chinese government and has attracted the attention

of many foreign oil businesses. CNOOC will do more to build a large gas base in the sea in a planned way by further expanding prospecting and inviting more foreign capital.

- Opening the East China Sea to the outside world. The East China Sea basin is the largest deposited basin on China's continental shelf. It has attracted keen attention of Chinese and foreign geologists. Test wells drilled in this area have shown good prospects for oil and gas exploitation, and many foreign firms have expressed the desire of working in cooperation with China in the area. CNOOC will actively create conditions for early cooperation with foreign oil firms.
- Building oil refining and petrochemical industries. With the beginning of the development of a group of oil and gas fields, the CNOOC will aim to raise economic efficiency as a whole by putting more efforts into developing oil refining and petrochemical industries. In these new branches, the corporation will adopt the same policy of foreign co-operation as in oil prospecting and exploitation" (Han Baochen 1989: 29).

Development of oil production capacity was to shift its focus from the Eastern reserves, where proven reserves and production facilities, to the Western oil fields, in Xinjiang. The government formulated the following policy:

- "Continue to develop oilfields in the east and expand their production- Further efforts will be made to ascertain the oil and gas reserves in the old Shengli, Liaohe, Zhongyuan, Dagang and Huabei oilfields and at the same time, expand the exploration of oil and gas on the beach and shallow sea areas of Bohai Bay, focussing on the Chengdao formation.
- Vigorous efforts will be made to speed up the prospecting and development of oil and gas in the west, particularly in the Tarim Basin, so as to build large and extra-large oilfields in the area.
- Equal emphasis on oil and gas development- A major effort to explore and develop natural gas will be made and new gas fields will be exploited so as to balance the production of natural gas and oil; and
- Continue to attract foreign capital to accelerate the exploration and development of China's offshore oil and natural gas. Efforts will be made to increase China's offshore crude oil production capacity to 5 million tons and its natural gas capacity to 1.2 billion cubic metres by 1992" (Han: Ibid).

In 1990, Wang Tao, the general manager of the China National Petroleum and Natural Gas Corporation stated that China would extend its cooperation in six new areas. Firstly,

funding from foreign loans mainly from Japan and repayment could be done with oil resources. Secondly, opening up of land oil exploration in 11 provinces and autonomous regions to joint venture projects; an area of 1.8 square kilometre and 167 basins were initiated where firms from the United States and New Zealand undertook projects in Hunan's Dongting Lake Basin while other foreign companies signed an agreement with China to explore and carry out research in four basins. Thirdly, the development of existing oilfields by using advanced technology and equipment and managerial expertise which also included foreign invitation to raise their recovery ratio so as to increase production. Fourthly, using imported ground engineering technology and domestic engineering to design, construct, produce and manage oil production facilities and pipelines. Fifthly, the foreign engineering and technological services used for the domestic oilfields were proposed to be exchanged for labour; and sixthly, the involvement of more foreign expertise to work in China ("New Oil Projects for Foreign Co-operation *Beijing Review* 1990: 27).

In early 1995, the China Oil and Natural Gas Corporation (CONGC) and the US based Exxon Corporation decided to jointly explore oil resources in the Daqing region in Heilongjiang Province and the Qaidam basin in the Qinghai Province. Daqing's Songliao Basin Northwest Deep Oil Contract covered 29,900 square kilometres in the north and west region. Under the terms of the contract, Exxon was to bear all the responsibility for production and risks related to exploration and investment. The Chinese and foreign partners were to involve in the production efforts and thereby share the profit according to their proportionate investment ("Sino-US Joint Oil Exploration", *Beijing Review* 1995: 26). By 1995, China's policies towards growth and development had transformed by substantial measures and there had been considerable development in foreign cooperation ranging from seeking foreign partners to attracting foreign direct investment. The prices of oil and gas were also revised to almost international market rates. Financing trends had also diversified from regional joint investments to shareholding system and public financing and issuance of shares by Chinese companies on foreign stock exchanges. Plans were adopted to expand exploration on land and in sea also. In 1995, the recorded statistics state that there were 25 oil and gas production bases and more than 293 oilfields were developed totalling 12.3 billion tons of oil reserves and 4.034 billion tons of workable reserves with a total production capacity of 143.21 million tons of oil (Wu Naitao 1994: 7-9).

In the 14th Congress of the CCP the China Petrochemical Corporation planned to accelerate its production by two phases. Firstly, by the year 2000, the annual processing capacity target was 200 million tons, with ethylene production to reach at 5 million tons and secondly, by 2010, the annual processing capacity of crude oil was ranged between 300-350 million tons and ethylene production was to touch 8-10 million tons. It aimed to reach the level of the developed countries. Following Deng Xiaoping's theory of building socialism with Chinese characteristics the development strategy was to be guided by the eight word principle; *large, advanced, series, extension, group management, international management, stock management and diversified management.*[18]

The Ninth Five-Year Plan draft ensured the energy bottlenecks should be removed and also jointly work with international organisations in maintaining a sustainable environment. The Chinese government in the same year published the China Agenda 21 which was in accordance with international norms and regulations on saving the environment and controlling pollution (Ibid).

According to Wang, the following areas were given priority:

- Continuance of implementing the strategic principle of stabilising the east and developing the west". The oil reserves in China stood at 33.5 billion tons, accounting for 54 percent of the country's continental oil resources. Since the past four decades, east China's oilfields contribution had been enormous increasing to 100 million tons target had been exemplary. For the next three years the target stood at 124 million tons.
- Endeavour to conduct omni-directional opening of the oil industry. Firstly, the attraction of foreign capital, improve international cooperation in operational areas, expand areas of opening at the right time, and to effectively use foreign capital and technology and advanced management expertise. Secondly, to achieve world standards and actively participate in risk prospecting and joint development abroad and acquiring oil resources from abroad. Thirdly, China aims to develop its oil exports and imports in and achieve best economic returns in the process ("Continental Oil Industry to Open Wider, *Beijing Review* 1995: 12-15).

On October 1997, the 15th World Petroleum Conference (WPC) and the 1997 International Petroleum Natural Gas and Petrochemical Exhibition were held. Over 3000 delegates from more than 80 countries participated in the WPC and more than 300 firms

[18] For elaboration of the adopted strategy to meet the specified goals see Chapter 2, page 14 section on Energy Strategy in China.

participated in the latter. US based Exxon Corporation took the lead in donating US$ 400,000 to the conference's organising committee. Texaco B.V. and the Atlantic Richfield Company also provided huge sums of donation. Added to this CNONGC had several tie ups with foreign companies to develop oil and gas fields in the Xingjiang province.

Table 3.4 China's Predicted Energy Production Capacity

	2000	2010
Coal (100 million tons)	13.5	18
Oil (100 million tons)	1.65	2
Natural Gas (100 m. cubic metres)	200	250 – 300
Hydropower (100 m kwh)	2200 – 2300	4000
Nuclear Power (100 m kwh)	150	600

Source: "Predicted Gap in China's Energy Supply" *Beijing Review*, 26 Jan-1 Feb 1998, p.29.

In the Misalieyi Block, the CNPC and a consortium of four Japanese companies signed a production sharing contract. This marked the first onshore licensing to foreign joint venture companies (Chang 2001: 222). The CNOOC in 1997 had signed 126 contracts with 67 foreign oil companies from 18 countries and the total foreign investment amounted to US$ 5.38 billion.

In 1998, Qin Anmin, the general manager of the China Petroleum Engineering Construction Enterprise (CPECPG) stated that China's international oil prospecting and exploring were focussed more on Russia and Central Asia. The China Petroleum and Natural Gas Group Company and its subsidiary CPECPG acquired shares and operational contracts to work in oilfields in Peru, Canada, Thailand and Kuwait. Oil and gas contracts were signed with Russia and Sudan. The CPECPG since 1994 maintained its ranking as one of the world's top 225 contractors ("Transnational Oil Operation Explored", *Beijing Review* 1998: 29).

In the international oil industry circuit Chinese companies participated like the Great Wall Well Drilling Company and the Geophysical Exploration Bureau under the CNPC in 14th International Petroleum Conference and Latest Achievements Exhibition in Cairo. The focus of oil exploration was in deep sea waters of the Mediterranean, the area north of the Nile delta and the northern Sinai Peninsular. On 2nd April 1998, the first of its kind between China and Egypt, the Great Wall Well Drilling Company signed an agreement with an Egyptian company to provide the latter with leasing services of drilling machinery and related equipments ("Chinese

Companies Enter Egyptian Oil Market", *Beijing Review* 1998: 30). The Block 3 oilfield in the Tarim basin which was licensed to a consortium led by Exxon did not prove fruitful and therefore had to be done away with (Chang 2001:221).

Although China had already begun its quest for foreign oil much earlier it was spreading its international oil cooperation with other oil rich countries. On 31st October, 1999, the then President Jiang Zemin met the Algerian President Abdelaziz Boutefika in Algiers and also visited Saudi Arabian King Fahd Ibn Abdul-Aziz where energy cooperation was the main focus of negotiations. They stressed on a stable oil market and also increase oil trade between the countries ("Cooperation with Algeria and Saudi Arabia Stressed", *Beijing Review* 1999:6). In 1999, China's imports of petroleum was 20 percent of the total domestic consumption ("Oil Prices to be Adjusted Every Month" *Beijing Review* 2000: 34). China imported more than 38 million tons of crude oil in 1999 and the major importing areas were the Middle East and Southeast Asia.

In 2000, the overseas operation of CNPC produced 13.5 million tons of crude oil. Out of the total 5.05 was controlled directly by the group. Further to the production, the CNPC had 460 million tons which was still being extracted. In the past five years CNPC signed seven overseas contracts, a refinery building contract and a pipeline contract with an investment of 10 billion yuan in seven countries. The strategy adopted focussed explorations in three regions, the Middle East and North Africa, Central Asia and Russia and South America. Other overseas exports included civil engineering, technological services and equipment. More than 150 construction brigades were sent to Sudan, Peru and other countries. By 2005, the overseas output of oil was aimed to be more than 15 million tons, an equivalent to the production of a domestic super oilfield saving China about US$ 33 billion ("China Extracts 13.5 Million Tons of Crude Oil Abroad", *Beijing Review* 2001: 31).

China spent US$ 43 billion on importing oil in 2004 and US$50 billion in 2005 and thereby has felt the need to improve its domestic production despite geological difficulties such as deserts, loess plateaus and deep water offshore exploration ("Stable Long-Term Oil Supply Predicted" Ibid).

In July 2000 it established 20 subsidiaries in foreign countries in the next five years. It extracted 700 million tons of crude oil accounting for one fifth of the total production. Shengli signed more than 50 contracts worth US$200 with overseas oilfields and were involved in

technical assistance in Peru and Iraq, Iran, Cuba and Indonesia ("Major Oilfields Exploring the International Market" *Beijing Review* 2000: 28).

An oil group, led by Total of France was the first to sign a contract with China in May 1980. The contract covered 11,000 square kilometres.

In 2005 China produced 182 million tons of crude oil while its dependency on overseas oil and oil products reached 42.9 percent. As figure 3.4 shows China's energy production is predicted to reach 200 million tons by 2010. ("Stable Long-Term Oil Supply Predicted" *China Daily*: 1).

Summary

The chapter delineated the growth of the oil industry in China since 1998. One of the major findings is that after gaining much experience China was ready to open its onshore wells for foreign companies. The development of oil industry was faced with several bottlenecks such as wastage and the uses of inefficient technology. The division of the functions, with pricing set by a different body and the exploratory projects handled by another organisation prevented a clear functioning of the petroleum industry. Despite these challenges, initiatives for better measures have been adopted. Construction of oil pipelines across the country linking the western region with the developed eastern region has now developed into a network providing oil despite geographical constraints. Efficient management techniques and coordination between various bodies and indigenous companies have been stressed upon for further cooperation. The domestic oil pricing system has been revised periodically to close the gap with international prices. The government has been steady with pricing but at a very slow pace, primarily for the other areas like technology and conservation to balance the prices. Foreign collaboration is growing at a slow pace. This is largely because it is relatively a recent phenomenon, in addition, China has undertaken foreign ventures in several countries; to reduce its vulnerability to oil shocks from a particular region, its regional oil supplying countries have political bearings like China's overarching shadow in the Shanghai Cooperation Organisation countries. China's ventures have also been in countries where US companies have not invested in. Its foreign biddings have been won aggressively offering huge incentives and bidding price in comparison to other companies. China's strategy, especially in the foreign front has created a point of debate on whether it aspires to capture the oil markets and divert the supplies from other parts of the world to East Asia.

Conclusion

Since 1978 China has been faced with the challenge of evolving an effective energy strategy to fuel its economic growth. Moreover China is the largest developing country and it continues to face problem of poverty. In addition the cities are the cities are increasingly being urbanized and the standard of living has improved putting enormous pressure on energy resources. Meeting these challenges necessitates China to maintain a high economic growth which has resulted in becoming the second largest energy consumer in the world and its primary energy consumption accounts for 13.6 per cent of the world's total.

The economic growth over the past two and a half decades has put enormous pressure on Chinese leadership to formulate credible energy strategy as China has been evolving into a robust industrial economy. The debate on the importance of securing its energy resources is large and looming as China is still grappling with an effective policy in managing its primary energy (non-renewable energy). It is also disputed that issues like education, healthcare and social security have dominated over the energy policy agenda. In addition, the future trends of petroleum policy may change with the use of other alternatives such as electricity, nuclear energy and other sustainable resources. In addressing these concerns a number of initiatives have been taken to formulate a concrete agenda for managing oil resources which includes conservation, technology and pricing. Emphasis has also been placed on conservation, an indication that China will forward its oil consumption as vigorously as before but in a more efficient and effective manner. Technological development, another important area of concern, is intertwined with the conservation policies. There has been rapid development of technology relating to energy over the years and efficiency levels have considerably improved. The pricing reforms have been introduced since the 1980s but due to social implications it has been done cautiously and may take a longer time to meet the stipulated goals of increase price levels to international standards. The government aims to manage its energy resources with minimum effects on the common Chinese citizen.

A major issue is that China adopted a two-pronged strategy of expanding domestic and international energy resources. This has redefined the energy architecture in Asia and the world. China's efforts to acquire the required amount of oil from foreign sources aim at gaining a foothold in East-Asia. China aspires to obtain more oil than needed to secure reserves for future crisis if it should arise. The vigorous biddings on foreign sources also prove that China's economic growth will continue till it achieves the level of development equal to the developed

countries. China's terms of negotiations with other nations have always reflected a trend of gaining advantageous position over the other party. Its overarching shadow in the Central-Asian countries in the form of the Shanghai Cooperation Organisation (SCO) and its dominant presence in the region has created tensions with most of its neighbours. Its energy strategy in the East and South China Sea caused tensions between China and countries like Japan, the Philippines and Viet Nam. Its influence has been strongly felt in the African and Latin American countries.

China's strategy options for acquiring petroleum resources are circumstantial. In several cases China has bid for oil on near unconditional terms while on the other hand, China's aggression has troubled its neighbours as the country continues to become stronger. Taking geopolitical implications into consideration, China has exercised its options accordingly. China has much to lose and little to gain if it exercises its military options with bigger regional powers like Japan, India and Russia.

Factors like the world petroleum demand, trade and the countries posed several challenges for China. In this international context, China either actively sought partnership to work together and acquire the needed petroleum. Under the complex interdependency model, China has always situated itself in an advantageous position of gaining an upper hand while transacting with the other countries. Their bargaining methods have remained different from the understanding of other scholars.

China's policies in a situation of rising energy demand and changing consumption patterns have addressed some of the challenges. A changing pattern from coal consuming dominated economy to that of gas and renewable sources has emerged over the years. However, as petroleum cannot be completely replaced, its share in the energy pie has experienced minor changes. With the rise in the automobile industry, oil consumption has risen. At the same time oil production has seen some growth. In 2004, China's domestic production amounted to 175 million tons which supported 60 percent of the domestic demands, with the rest being imported. China's thirst for oil continues and its aggressive methods to acquire the remaining amount have created much worry for regions and economies which are also dependent for oil resources. The institutional organisation of the petroleum industry in China had also contributed in addressing the energy demand. With the Ministry of Energy being abolished, two bodies were created. Firstly, the Energy Bureau under the National Development Reform Council (NDRC) and secondly, the Office of the National Energy Leading Group. Each body has been designated

functions where possibilities of a clash of interests have not been ruled out. The NDRC was formerly known as State Planning Commission (SPC) which was founded in 1952. The State Planning Commission was renamed as the State Development Planning Commission (SDPC) in 1998. After merging with the State Council Office for Restructuring the Economic System (SCORES) and part of the State Economic and Trade Commission (SETC) in 2003, the SDPC was restructured into the NDRC. After much adjustment many bodies were created which led to devolution though functions and power overlapped. The three major oil companies CNPC, Sinopec, and the CNOOC have in the past created a bitter struggle for fund allocation and functions. Many of their policies are controlled by government decisions and therefore the companies have lost out on the profits that could have been acquired. Cautious opening up of the offshore exploration zones for foreign ventures was done zone wise and after gaining much experience the onshore exploration was given to bid for joint exploration with foreign companies. China's foreign collaboration has been extensive since 1993 but as it has been only over a decade an a half it still does not have a clear policy or strategy.

The national oil biddings were a benchmark to the oil industry in China as it was the announcement of foreign investment and collaboration. However, the offshore production where the initial oil biddings were implemented only supplemented a small fraction of the nation's total oil production. In the process of tracing the developments chronologically, several trends were identified. These are construction of pipelines, enhancing efficiency, regulating the pricing mechanism for enhancing competition and thereby less wastage and improvement in the technology. As China's foreign collaboration began only about one and a half decades back it still continues to grapple with the problem of charting out new frameworks for action. More study is required in this area as cooperation remains an integral part of international politics. China's acquisition of foreign oilfields has threatened the supply of the North American OECD countries and the non- OECD Asian countries like India and South-East Asia. However, looking at their current requirements and China's ambition to build a strategic reserve for the future China will continue to pursue an aggressive oil strategy.

China's development of the petroleum industry was initiated by the economic reform of 1979 and therefore the policy makers and leaders had little experience in this area. China's growth was mainly induced from foreign direct investments. Therefore, the base structure of the economy; energy which is the main source of the economic growth remained as a weak link.

Development is needed in the area of conservation as state of the art technology is not used everywhere in the country. Environmental pollution in China was brought about by the excessive drive to economic development. The inefficient use of resources and negligence to concerns like pollution and living conditions have culminated into a range of problems. China has become notorious for environmental degradation as it ranks the highest in sulphur dioxide (SO2) production and second highest in carbon dioxide (CO2), next to the United States. As the living standards have improved, the Chinese citizens began to demand for a cleaner environment and pollution controls. It is necessary for China to improve its conservational standards to attain the societal conditions of the developed countries of North America and Europe.

Oil exploration technologies in many regions of China are still lagging behind by several years as compared to the bigger producing oilfields. China's efficiency is still low in comparison to that of Japan and the US. Efficient technology although has been insulated into the petroleum industry it continues to face the problem of distribution in rural and the less developed oil production wells. High technology is an expensive affair and China's requirement for meeting problems of health, education and sanitation are more urgent to address. For efficient fuel production to be implemented uniformly, it is imperative to impose a certain standard of quality. This recent policy has been adopted but without much success as underhanded refineries continue to exist and closing those down would further aggravate the problem of unemployment.

Pricing polices have been adjusted time and again since the beginning of reforms but the nation continues to face the problem of insuffiency. This is because the government bears the burden of the extra price in the international market and sells petroleum at a subsidized rate. The cheap availability of petroleum has led to wastage and the lack of competition has also caused a monopoly of a few companies. Pricing adjustment system ought to be maintained so as to prevent wastage and foreign companies to be absorbed in order to promote competition.

The crux of the matter lies in whether the strategic options that are viable to China are in agreement with the energy strategy of the other nations. The main challenge that China faces is the petroleum strategy of the US which dominates the oil resources across the globe. In this context China must carve a niche in addressing its own energy requirements without causing anu aims for the international system.

Note:

In China, the Energy Conservation Law was approved by the 28th Standing Committee Meeting of the 8th National People's Congress on 1 November 1997. The text of the law was published in the People's Daily on 3 November 1997. The law came into effect on 1 January 1998. The following text is the unofficial English translation of the Law.

Energy Conservation Law of China

Presidential Act of the People's Republic of China No. 90 (1 November 1997)

The Energy Conservation Law of the People's Republic of China which was adopted by the Standing Committee of the National People's Congress at its 28th meeting on 1 November 1997 is hereby promulgated and shall come into force as of 1 January 1998.

Signed by President of the People's Republic of China, Jiang Zemin

Contents

Chapter 1 General Provisions

Article 1 This law has been formulated with a view to facilitating energy savings throughout society, improving efficiency and economic benefits of energy use, protecting the environment, guaranteeing national economic and social development and meeting the needs of peoples livelihood.

Article 2 Energy as mentioned in this law refers to coal, crude oil, natural gas, electricity, coke, coal gas, thermal power, oil products, liquefied petroleum gas, biomass and a variety of the resources which can provide useful energy directly or through processing and conversion.

Article 3 Energy conservation as mentioned in this law refers to reducing loss and waste in various energy stages from energy production to energy consumption, and using energy more efficiently and rationally by strengthening management of energy use and adopting measures which are technologically feasible, economically sound and environmentally and socially affordable.

Article 4 Energy conservation is a long-term strategy for the national economic development. The State Council and the people's governments of the provinces, autonomous regions and

municipalities directly under the central Government shall strengthen work on energy conservation, pursue, as appropriate, restructuring of industries, enterprises, products mix and energy consumption pattern, facilitate upgrading of energy conservation technology, reduce energy consumption of both unit production value and unit product output, improve energy development, processing and conversion, transportation and supply, gradually increase efficiency of energy use and promote an energy conservation-oriented national economic development. The state shall encourage the development and utilization of new and renewable sources of energy.

Article 5 The state shall formulate energy conservation policies and plans and incorporate them into the national economic and social development program with a view to ensuring rational utilization of energy in tune with economic development and environmental protection.

Article 6 The state shall encourage and support research and popularization in the science and technology of energy conservation. The state shall enhance dissemination of information and education on energy conservation so as to popularize scientific knowledge of energy conservation and promote public awareness of energy conservation.

Article 7 Any entity or individual shall have the obligation to save energy and shall have the right to inform against acts of wasting energy.

The people's government at various levels shall grant rewards to entities and individuals who have made remarkable achievements in energy savings or in research and popularization of energy conservation science and technology.

Article 8 The competent energy conservation agency under the State Council shall be in charge of the supervision and management of the energy conservation work of the whole country. The relevant departments under the State Council shall be in charge of the supervision and management of energy conservation work in their respective areas of responsibilities.

The competent energy conservation agencies under the local people's government at the county level and above shall be in charge of the supervision and management of the energy conservation work within their respective administrative area. The relevant departments under the local people's government at the county level and above shall be in charge of the supervision and management of energy conservation work in their respective area of responsibilities.

Chapter 2 Energy Conservation Management

Article 9 The State Council and the local people's Government at all levels shall strengthen their leadership in energy conservation work and, shall plan, coordinate, supervise, examine and promote energy conservation work every year.

Article 10 In accordance with the policy of pursuing both energy conservation and energy development simultaneously while giving first priority to energy conservation, the State Council and the people's governments of the provinces, autonomous regions and municipalities directly under the central Government shall select investment projects of energy conservation and energy development on the basis of technological, economic and environmental comparisons and validations of the projects, and compile energy investment plans.

Article 11 The State Council and the people's governments of the provinces, autonomous regions and municipalities directly under the central Government shall allocate energy conservation funds from both capital construction and technological restructuring investment

funds to support rational energy utilization and development of new and renewable sources of energy.

The people's governments of the cities and counties shall allocate energy conservation funds according to local conditions to support rational energy utilization and development of new and renewable sources of energy.

Article 12 The feasibility study of a fixed asset investment project shall include a specific evaluation of rational energy utilization of the project.

Designs and construction of fixed asset investment projects shall follow standards of rational energy utilization and norms of energy saving designs.

The agency with the authority to examine and approve projects in accordance with the law shall not approve construction of the project which does not meet the standards of rational energy utilization and norms of energy saving designs, and shall not issue certificate of acceptance for such projects after their construction is completed.

Article 13 Construction of new industrial projects exploiting backward technologies characterized by excessive energy consumption and severe waste of energy is prohibited. The agency under the State Council in charge of the management of energy conservation work shall, in consultation with other relevant departments under the State Council, compile a list of industrial projects requiring excessive energy consumption whose construction is prohibited, and formulate specific rules of enforcement.

Article 14 The competent administration under the State Council in charge of standardization shall establish national standards for energy conservation.

The relevant departments under the State Council which are not covered by the national standards shall establish, in accordance with the law, the relevant sectional standards of energy conservation, and file them with the competent administration in charge of standardization under the State Council.

Formulation of the standards for energy conservation shall be aimed at technological advantages, economic soundness and continuous improvement.

Article 15 The competent agency under the State Council in charge of the management of energy conservation work shall, in cooperation with other relevant departments under the State Council, strengthen supervision of the sectors engaged in mass production of widely-used energy-consuming products with a view to urging them to adopt energy saving measures, actively improve product designs and manufacturing technologies and gradually reduce energy consumption per unit product output in the respective sectors.

Article 16 The agency under the people's government at the provincial level and above in charge of the management of energy conservation work shall, in consultation with other relevant departments at the same level, set limit to energy consumption per unit product output for products highly energy-consuming in the manufacturing process.

The energy consumption limits per unit product output shall be set in a scientific and rational manner.

Article 17 The State shall institute a phase-out system for backward and excessively energy-consuming products and equipment.

The agency under the State Council in charge of the management of energy conservation work shall, in consultation with other relevant departments under the State Council, identify and publish a list of the excessively by energy-consuming products and equipment to be phased out and eliminated from production. The specific measures of implementation shall be formulated by the agency under the State Council in charge of the management of energy conservation work in consultation with other relevant departments under the State Council.

Article 18 On a voluntary basis, enterprises may, in accordance with the state regulations of product quality authentication, apply for energy-saving quality authentication for energy intensive products with the agency under the State Council in charge of the regulation and supervision of product quality, or with the authentication organizations approved by the departments which are authorized by the agency under the State Council in charge of the regulation and supervision of product quality. After satisfying the qualifications for authentication, the authentication certificate for energy-saving attribute shall be issued, and the label of authentication of energy saving attribute shall be put on the energy intensive products or the packages thereof.

Article 19 The statistical departments of the people's government at the county level and above shall, in cooperation with other relevant departments at the same level, carry out statistical work on energy consumption and energy utilization, and regularly issue bulletins to publish unit product energy consumption data for major energy-intensive products and other relevant information.

Article 20 The state shall strengthen energy conservation management for key energy-using entities. The key energy-using entities are defined as follows:

1) Energy-using entities with the total annual energy consumption exceeding 10,000 tons of coal equivalent; and

2) Energy-using entities which are designated by the relevant departments under the State Council or by the departments under the people's governments of the provinces, autonomous regions and municipalities directly under the central Government in charge of the management of energy conservation, with the total annual energy consumption of over 5,000 tons of coal equivalent and less than 10,000 tons of coal equivalent.

The departments in charge of the management of energy conservation under the people's government at the county level or above shall organize other relevant departments to supervise and examine energy utilization in key energy-using entities, and may entrust the entities that possess testing and measuring technology to carry out tests and measurements of energy savings.

The requirements, measures and management procedures of energy conservation for key energy-using entities shall be formulated by the agency under the State Council in charge of the management of energy conservation in consultation with other relevant departments under the State Council.

Chapter 3 Rational Utilization of Energy

Article 21 Energy-using entities shall, in accordance with the principle of rational utilization of energy, strengthen energy management, and formulate and implement technical measures for energy saving in their respective entity with a view to reducing energy consumption.

Energy-using entities shall conduct education in energy conservation and organize energy conservation training for the relevant personnel.

Personnel who have not received education and training in energy conservation shall not operate energy consuming equipment.

Article 22 Energy-using entities shall strengthen management of energy measurement and establish a sound system of energy consumption statistics and energy utilization analysis.

Article 23 Energy-using entities shall establish a responsibility system for energy conservation and grant rewards to the groups and individuals who have made achievements in energy conservation.

Article 24 Products which are highly energy consuming in the course of production are subject to the officially established energy consumption ceiling per unit product.

Entities which exceed the energy consumption ceiling per unit product, in serious cases, shall be subject to a time-bound rectification. The case of time-bound rectification shall be decided by the departments in charge of the management of energy conservation under the people's government at the county level and above within their competence authorized by the State Council.

Article 25 Entities and individuals engaged in producing and marketing energy-consuming products, must stop producing and marketing the energy-consuming products which have been ordered explicitly by the State to be phased out, and entities and individuals using energy-consuming equipment, must stop using the energy-consuming equipment which have been ordered explicitly by the state to be phased out within the time limit jointly set by the agency under the State Council in charge of the management of energy conservation and other relevant departments under the State Council, and must not transfer such equipment to other people to use.

Article 26 Entities and individuals engaged in producing energy-consuming products shall accurately indicate the energy consumption index in the product manual and on the product label.

Article 27 Entities and individuals engaged in producing energy-consuming products shall not use a counterfeit label of authentication for energy saving attribute and falsely use the label of authentication for energy saving attribute.

Article 28 Key energy-using entities shall regularly submit reports on the status of energy utilization in accordance with the relevant state regulations. The status of energy utilization should cover, inter alia, energy consumption, an analysis of energy use efficiency and benefits of energy savings and energy conservation measures.

Article 29 Key energy-using entities shall set up posts for energy conservation management, appoint energy conservation managers from those at the level of an engineer or above who possess professional knowledge and practical experiences in energy conservation, and file the

appointment with the agency in charge of the management of energy conservation and other relevant departments of the people's governments at the county level and above.

Energy conservation managers are responsible for supervising and examining energy utilization in their entities.

Article 30 Employees of entities and other urban and rural residents who utilize electricity, coal gas, natural gas, coal and other energy produced by entities shall measure and pay for their energy consumption in accordance with state regulations, and shall not utilize the energy without pay or for lump-sum payment.

Article 31 Entities engaged in energy production and the energy business shall supply energy for energy-using entities in accordance with stipulations in the laws and statutes and agreements in the contracts.

Chapter 4 Advancement of Energy Conservation Technology

Article 32 The state shall encourage and support developing advanced energy conservation technologies, determine the key areas and directions in development of advanced energy conservation technologies, establish and improve technical service systems of energy conservation, and develop and regulate the market of energy conservation technologies.

Article 33 The state shall organize and carry out key projects of scientific research and technology development in energy conservation and key demonstration projects in energy conservation, propose projects for popularization of energy conservation, and guide enterprises, institutional entities and individuals to adopt advanced energy conservation processes, technologies, equipment and materials.

The state shall formulate a favourable policy to support energy conservation demonstration projects and energy conservation popularization projects.

Article 34 The state shall encourage introduction of advanced energy conservation technologies and equipment from abroad and prohibit introduction of backward energy use technologies, equipment and materials from abroad.

Article 35 Funds shall be earmarked from scientific research funds allocated by the State Council and the people's governments of the provinces, autonomous regions and municipalities directly under the central Government, and used for research in advanced energy conservation technology.

Article 36 The people's government at the county level and above shall organize the relevant departments, in accordance with the state policy for sectorial development and the state energy conservation technology policy, to promote scientifically specialized production that meet the energy conservation requirements.

Article 37 Building designs and construction shall, in accordance with the relevant laws and administrative regulations, employ energy-saving types of construction structures, materials, facilities and products, improve heat insulation properties and reduce energy consumption for space heating, cooling and lighting.

Article 38 Based on the policy of fitting local conditions, multiple complementation, comprehensive utilization and priority of economic benefits, the people's government at various levels shall strengthen the support, development and utilization of biogas, solar energy, wind, hydropower and geothermal energy.

Article 39 The state shall encourage the following general energy conservation technologies:

1) Co-generation of thermal power and district heating, improving utilization rates of the thermal turbine sets, technologies of thermal energy gradient utilization, co-generation of heat, electricity and cooling and co-supply of heat, electricity and coal gas, and enhanced rates of comprehensive thermal energy utilization;

2) Gradually realization of economic operation for electrical motors, industrial fans and pumping equipment as well as their systems; developing speed adjustable motors for energy savings and electrical and electronic energy-saving technologies for electric power; developing, manufacturing and popularizing high-quality and low-price energy saving instrument and facilities with a view to increasing the efficiency of electric power utilization;

3) Developing and popularizing clean coal technologies in fluidized bed combustion, smokeless combustion, liquefaction and gasification and others; increasing rates of coal energy utilization; and

4) Developing and popularizing other general energy conservation technologies which have demonstrated their maturity and remarkable economic benefits.

Article 40 All sectors shall formulate sectorial energy conservation policies, develop and popularize new energy saving technologies, techniques, equipment and materials limit or phase out dated technologies, techniques, equipment and materials.

Article 41 The agency under the State Council in charge of the management of energy conservation shall, in consultation with the relevant departments under the State Council, formulate the general and sectional specific technical indicators, requirements and measures for energy conservation and modify them in a timely manner in light of the status of both economic development and advancement of energy conservation technology with a view to improving energy utilization efficiency and reducing energy consumption, so as to enable our country to gradually catch up with advanced international standard in terms of energy utilization.

Chapter 5 Legal Liabilities

Article 42 Where new and highly energy consuming industrial projects which are explicitly prohibited by the State regulations for construction have been built in violation of provisions of Article 13 of this Law, the agency in charge of the management of energy conservation under the people's government at the county level and above shall prepare recommendations and submit them to the people's government at the same level for issuing an order to stop the project from coming into operation or utilization of the project within the competence stipulated by the State Council.

Article 43 Where an entity whose products are highly energy consuming in the production process exceeds the limits of unit product energy consumption in violation of provisions of Article 24 of this Law, and if the case is serious, and is subject to rectification within a deadline, but failed to comply or to reach the required level of rectification, the agency in charge of the

management of energy conservation under the people's government at the county level and above shall prepare recommendations and submit them to the people's government at the same level for issuing an order to stop the operation of the entity for rectification or shut it down within the competence stipulated by the State Council.

Article 44 Where there is production and sale, in violation of the provisions of Article 25 of this Law, of the energy-consuming products which are explicitly ordered to be phased out by the state the agency in charge of the management of product quality supervision under the people's government at the county level and above shall order the cessation of the production and sale of such products and confiscate those products and the illegal income, and impose a fine of the amount more than 1 time and less than five times the amount of the illegal income. The administrative bureau of industry and commerce under the people's government at the county level and above may revoke the business license.

Article 45 Where there is utilization of the energy-consuming equipment which are explicitly ordered to be phased out by the state in violation of provisions of Article 25 of this Law, the agency in charge of the management of energy conservation under the people's government at the county level and above shall order the cessation of use and confiscate such equipment; if the case is serious, the agency in charge of the management of energy conservation under the people's government at the county level and above shall prepare recommendations and submit them to the people's government at the same level for issuing an order to stop the business operation for rectification or shut it down within the competence stipulated by the State Council.

Article 46 Where there is transfer of the energy-consuming equipment which is already phased out to others to use in violation of provisions of Article 25 of this Law, the agency in charge of the administration of product quality supervision under the people's government at the county level and above shall confiscate the illegal income from the transfer and impose a fine of the amount more than one time and less than five times the amount of the illegal income.

Article 47 Where there is no indication of the energy consumption index in the product manual and on the product label in violation of provisions of Article 26 of this Law, the agency in charge of the administration of product quality supervision under the people's government at the county level and above shall issue an order for rectification within a deadline and may impose a fine of less than 50,000 yuan (RMB).

Where the indication of the energy consumption index in the product manual and on the product label does not fit the actual energy consumption of the product in violation of provisions of Article 26 of this Law, in addition to the penalties as prescribed in the preceding paragraph, responsibility for any civil liability in accordance with the relevant laws shall be undertaken.

Article 48 Where there is use of counterfeit label of authentication for energy saving attribute or false uses of the label of authentication for energy saving attribute in violation of provisions of Article 27 of this Law, the agency in charge of the administration of product quality supervision under the people's government at the county level and above shall issue an order for a public correction, confiscate the illegal income and impose a fine of the amount more than 1 time and less than 5 times the amount of the illegal income.

Article 49 Where public servants in position of energy conservation management abuse their powers, neglect their duties and bend the law for their own benefits, and if such acts constitute an offense, such public servants shall be subject to investigation for affixing criminal liabilities in

accordance with the law. Where such acts do not constitute an offense, administrative disciplinary action shall be taken against them.

Chapter 6 Supplementary Provisions

Article 50 This law shall come into force as of 1 January 1998.

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