CHINA S ENERGY PROBLEM

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China is an energy poor nation on a per-capita basis, despite the abundance of energy resources. The most significant energy resources problem is not extraction or development, but distribution. Almost without exception, energy resources are in wrong places, far from consumption centers and hard to reach where they needed.[1]

Growing demand and inefficiency are the main cause of China s Energy shortage. Accelerating development of power-intensive machinery, auto, steel and manufacturing sectors, the growing pace of urbanization and low energy efficiency are the main causes of China s extensive energy shortage, which may worsen before 2020.

An industrial report of a State Information Center with the National Bureau of Statistics forecasts China will face more severe power shortage this year than it did in 2004. A total of 24 provincial areas imposed power brownouts in the past few months. A leading official with the Energy Bureau of the State Development and Reform Commission said China s output of primary energy was equal to 1.603 billion tons of standard coal last year, up 11 percent over the previous year .[2]

But demand outpaced supply as shortage of Coal power, and oil were reported in many areas of China, whose economy grew by 9.1 percent last year and over 7 per cent in the two years before 2004.[3]

Growing Demand

The year 2004 saw many coal fired power plants in China sound the alarm bell of running out of coal, and 22 provincial areas imposed brownouts due to power shortage. China produced 170 million tons of crude oil in 2004 and imported about 100 million tons of crude and refined oil.[4]

China is now in the middle stage of industrialization phase characterized by faster development of energy-extensive machinery, auto, iron and steel sectors. Urban residential consumption of energy also rose dramatically due to the country s fast pace of urbanization and improved standard of living.[5]

Statistics from the Ministry of Construction show that from 1978 to 2003, the level of urbanization in China increased from 18% to 40%. A growing number of the urban residents have more spacious houses, more electronic consumer goods and vehicles, which push up the per-capita consumption of energy. The per-capita energy consumption for urban residents is 250 % more than that of their rural counterparts. With increased automobile use by the urban population, oil demand is likely to grow somewhat faster than overall energy demand, so China s oil imports could easily reach 300 million tons in 2020.[6]

Meanwhile, overseas investors are relocating their processing and manufacturing sectors, especially the manufacturing sector characterized by high energy consumption such as iron and steel, electrolytic aluminum, and cement production etc. has been another contributing factor of the power shortage in China. Excessive investment has been made in these heavy energy consumer sectors in the last 5 years.[7]

Energy Inefficiency

Low energy efficiency remains a problem for China as its comprehensive energy efficiency stands at 33 %, ten percent lower than that of developed countries and China s energy consumption for per-unit output value is twice as much as that of developed countries. A survey conducted by China s power sector shows its coal-fired power plants and power transmission companies would save an equivalent of 120 million tons of standard coal if their energy efficiency was raised to the advanced level of developed countries.[8] Wan Guangtao, China s Minister of Construction has said that energy consumption of buildings in China is double or triple that of developed countries of comparable climate .

Many experts estimate that if new buildings and existing buildings in China all confirm to advance energy conservation standards by 2020, their energy consumption would drop by an equivalent of 335 million tons of standard coal per year. That s about one fifth of China s annual energy consumption.[9]

China s energy problems did not emerge overnight. The country is rich in coal, so after 1949 revolution China overwhelmingly relied on coal for power generation 94% in 1953. The discovery of major oil reserve in Daqing, in north eastern China, in the late 1950s brought much needed diversity, further helped smaller offshore oil finds in the 1970s. Coal s share of China s primary energy consumption had dropped to 72% in 1975. However, following aggressive oil exports that followed the Chinese communist party s open door economic policy launched in 1978, the country s coal dependence had risen to 75% in 1990.[10] Pollution caused by coal extraction and consumption was so serious and acid rain so rampant, that in 1998 China accounted for seven of the world s ten most polluted cities.[11] The need to reduce coal dependence was not in doubt, but the problem was lack of an

affordable and clean alternative.[12]

Hydro power has been a major focus of alternative energy development due to China s abundance of rivers. Three Gorges Hydro power projects of 18.2 gigawatt has been started a decade ago but is not due to be completed until 2010. Another hydro project twice the size of the three Gorges project is on the drawing board, but will probably take even longer to complete.[13]

Hydra-electricity accounted for 21% of China s electricity generation in 1990, but that ratio slipped to 18% in 2001 and that ratio will not change dramatically in short period of time.

Natural gas is another alternative. Its production grew in the 1960s and 1970s after the discovery of a major gas field in Sichuan province in China s remote West. But the sector s growth has lagged due to the cost of delivering it to the population centers in the east. Still, construction of a 4200 kms pipeline began in 2002 to bring natural gas from Xinjiang in the west to Shanghai in the east. Another 4000 kms pipeline is being built to bring offshore gas from Hainan Island to the Southern and Eastern coasts. Construction could take 15 to 17 years, so natural gas contribution to China s overall energy consumption (2% at present) will not significantly increase for some time.[14]

In 2001, China embarked on two infrastructure projects, necessary to start importing liquefied natural gas. Beijing has contracts to obtain liquid natural gas from Australia and Indonesia but its facilities would not be ready until 2010 and 2011 respectively.[15]

China is the world s largest consumer of coal, burning one in every three tons of coal used worldwide in 1995. Coal accounts for nearly 80 % of primary commercial energy use and 75% of residential use. Strong growth in energy demand over the next 25

years, combined with a dearth of affordable alternatives, means that China will continue to burn coal on a massive scale for the foreseeable future.[16]

Scramble far Oil

In the absence of immediate alternatives to coal, oil is of critical importance for China. Her dependence on oil imports is on the rise. Between 1990 and 2000 oil s share of China s primary energy mix increased from 17% to 21%.

Production in Daqing, which supplies half of China s oil needs is declining, while other fields, including those off-shore and in the remote West, where extraction is difficult, are not coming along adequately.

China became a net oil importer in 1993. Recently it overtook Japan to become the second biggest oil importer in the world, just after the US. Its dependence on oil imports is expected to rise to 50% by 2010.[17]

Moreover, nearly 60% of China s oil imports come from the Middle East and have to be shipped through the Malacca Strait, a strategically vulnerable bottleneck that China, unlike the US, doest not have the military capability to defend. This vulnerability explains why Beijing has been working overtime to diversify its sources of oil imports, with priority given to Russian and Central Asian sources.

Beijing knows that Washington s bid to control the Middle East is also aimed at controlling the critical oil supplies to its economic competitor China.[18] Oil multinational companies of Europe and America are also unwilling to share it with China which makes things worse for China.

BG, a British group, agreed to sell its 17% share in a Kazakhstan oil Joint venture, to two Chinese state oil companies. But in May 2003, ENI of Italy, EXXON of the US, Total of France and Anglo-Dutch shell collectively exercised their rights as existing shareholders to buy that stake in order to block out China.[19]

China has been obtaining oil from Russia via train but this is expensive and only allows limited supply. Similarly its bid to build a pipeline to access east Siberian oil has been frustrated. Beijing has been competing with Japan to obtain Moscow s blessings for two alternative pipeline proposals. China s proposed route is 2400 kms and will cost $2.5 billion. Ending at Daqing city, it will serve the Chinese market only. Japan s proposal is 3900 kms. long route and will cost two to three times the cost of the Chinese route, but it is backed by $7.2 billion worth of Japanese finance. The pipeline is to end in the port city of NakhodKa, on Russia s Far-East coast and theoretically can serve markets other than Japan. Japan has won the deal though it proposes to build an even longer pipeline to accommodate a branch to Daqing (city of China).[20]

Conclusion

At an average annual growth rate of almost 8%, total energy consumption in China will triple over the next 25 years. But even a major shift towards alternative sources of energy will not significantly reduce coal dependence. Even if China were to develop every viable hydroelectric power site, hydropower would supply just 8% of primary energy demand in 2020. An even if China were to install ten new 600 megawatt nuclear power plants a year, it would contribute only 6%. Although certain renewable energy sources, especially wind power, are particularly promising in China, even major development would meet only a tiny fraction of energy needs. Not only these alternatives *are* inadequate in the face of energy demand, they are also costly.

Even after taking into account the social costs of coal fired power generation, and ignoring the substantial environmental concerns about massive nuclear and hydroelectric development, China s abundant coal reserves ensure that most alternatives are simply more expensive per unit of power produced. In fact, the only sizeable and affordable alternatives to coal over the medium term are oil and natural gas, primarily from imported sources.[21]

China consumes about 150 million tons of oil a year and its production capacity is estimated to be about 200 million tons a year in 2020. With increased automobile use, oil demand is likely to grow somewhat faster than overall energy demand, so oil import could easily reach 300 million tons a year in 2020. Although the cost of these imports at current prices ($42 billion) will be less than 5% of China s expected export earnings of $700 billion.

References

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