

Jake Berliner
China Cross Cultural Leadership Program
October 11, 2006
China – India comparison

Fueling Giants: Energy and Environmental Security in the 21st Century

As China and India continue down their path to development at breakneck growth speeds, they are increasingly coming up against energy shortages. With their energy demands going nowhere but up, China and India have increasingly been working to improve their energy security and diversify their energy mix. This strategic desire is understandable, as the alternative - continuing down a path toward further environmental degradation by continuing to burn some of the dirtiest coal on the planet and having insufficient energy to maintain economic growth, as exemplified by common power outages - is wholly unacceptable.

Asia's Giant Coal Conundrum

The energy supply of both India and China consists highly of fossil fuels. In 2001, 80.2 percent of China's electricity came from fossil fuel sources¹, while 81.7 percent of India's did². While this high reliance on fossil fuels is wholly common, the issues associated with it are unique. Unlike Europe, and, to a lesser degree the United States, the energy supply of India and China is greatly reliant on the use of coal. "Coal alone provides two thirds of China's energy and half of India's."³ This coal results in roughly

¹ "The CIA World Factbook." China. 19 Sept. 2006. Central Intelligence Agency. 4 Oct. 2006 <<https://www.cia.gov/cia/publications/factbook/>>.

² "The CIA World Factbook." India. 19 Sept. 2006. Central Intelligence Agency. 4 Oct. 2006 <<https://www.cia.gov/cia/publications/factbook/>>.

³ Flavin, Christopher and Gary Gardner. "China, India, and the New World Order." State of the World 2006 New York: W. W. Norton & Company. 2006. p. 8.

half of the greenhouse gases emitted on the planet coming from these two developing economies.⁴

Furthermore, unlike the coal found in the western United States, the coal in China and India is of a very impure variety or of low energy value. Additionally, China's coal use is notoriously inefficient.⁵ An examination of Carbon Emissions per Unit of GDP, when adjusted for Purchasing Power Parity, is telling. While the United States emits 147 tons of Carbon per million dollars of GDP, China emits 158 tons. This number exemplifies a need for reform in the way China goes about producing energy. India's number of 99 tons per million dollars of GDP is more inline with those of Europe (94) and Japan (95).⁶

Both China and India, especially in regards to coal, have tremendous looming infrastructure requirements to curtail coal use. Common practice in parts of both India and China is to burn dirty coal briquettes in the home for heating and cooking. This leads to the local emission of dangerous pollutants. Furthermore, the expansion of the use of coal for power generation is problematic both for its environmental costs, and, unlike oil and other advanced liquid fuels, coal is not flexible, both in transport and use, and is therefore a questionable source of power generation for an advanced economy.⁷

The problem, however, is not where China and India's current energy use is, but rather where it is headed. From 1990 to 2004, the United States increased its carbon emissions by 19 percent, and Japan did so by 23 percent. China increased its emissions

⁴ Clad, James. "Convergent Chinese and Indian Perspectives on the Global Order." [The India-China Relationship](#). New York: Columbia UP, 2004. 267-293.

⁵ Ibid.

⁶ Flavin and Gardner, 2006.

⁷ Ibid.

by 67 percent, India by 88 percent.⁸ This tremendous increase is not unexpected for developing countries, but the large scale of India and China is unprecedented. Should India and China continue growing at current rates (or China slow down and India speed up, as is widely expected), these leaps in emissions will become frightening. The current responsibility that the United States bears for global warming will pale in comparison to the damage that these two giants will be able to do.

Despite the high use of coal for electricity production and abundant reserves (China is the number one coal producer, and India has the fourth largest coal reserves in the world)⁹, China and India are both unable to produce adequate supply at peak demand. The summers of 2004 and 2005 in China saw rolling blackouts throughout the cities, and peak demand in India exceeded supply by 12 percent in 2004.

In both countries, shortages are the tip of a larger grid and regulatory iceberg. Grids in both India and China are highly inefficient, and proper distribution of energy capacity is not yet playing its proper role. 44 percent of Indian households are still not grid connected. In addition to inefficient household coal use, businesses take energy matters in their own hands using inefficient diesel generators and other power plants, further pressuring oil supplies.

While both countries are in the process of reforming these issues, inexpensive power in India is taken as a right by the citizens, and has resulted in electrical subsidies for agriculture that penalize industry. The need for reform in the regulatory sector of both countries could not be greater. China, however, has begun moving on the correct path, one advantage of its totalitarian regime. Currently, the Chinese government, under the

⁸ Ibid.

⁹ The CIA World Factbook.

direction of Premier Wen Jiabao, is drafting a comprehensive energy law that covers all regulatory issues.¹⁰ While a finished law is not anticipated for two years, an adequate energy regulatory framework will aid China in its overall economic development.

Energy Liquidity

If China and India want to become major players on the global economic and (therefore) political stage, advanced economic development hinges on both countries moving away from coal. Primarily, this interest has played itself out in the use of oil and natural gas. Oil, especially, is creating an interesting dynamic, both in Asia and globally. When viewed in the light of American control of global oil, the rise of China and India is all the more interesting.

While their use of modern liquid fuels per capita is just one tenth that of Japan's,¹¹ India, and especially China, are playing an increasingly significant role in global oil use. It was as recently as 1994 that China became a net importer of oil¹², but today it is the world's second largest oil importer, at 3.2 million barrels per day. This steady increase in Chinese oil is problematic, but the degree of the problem is dependent on which geologist one believes. This paper will in no way attempt to address the concern of peak oil, but if the combined oil use of India and China was to reach that of Japan, they alone would be using 100 million barrels of oil per day. In contrast, total global oil consumption was 85 million barrels per day in 2005.¹³ Regardless of whether or not the earth can support this demand in the long run, the immediate need for oil has piqued energy security concerns in the near term.

¹⁰ Shi Jiangtao. "Drafting of comprehensive energy law accelerated." South China Morning Post June 15, 2006.

¹¹ Flavin and Gardner, 2006.

¹² Clad, 2004.

¹³ Flavin and Gardner, 2006.

Oil concerns have lead the Chinese and Indian governments to work to convert their State Owned oil enterprises into leaner corporations that can compete with the Royal Dutch Shells and ExxonMobils of the world. The China National Petroleum Corporation (CNPC), the China National Petrochemical Corporation (Sinopec), and China National Offshore Oil Corporation are all taking part in an enhanced drive for energy security, both at home and abroad. Chinese efforts and successes are more prevalent, especially on the international stage, and therefore more worthy of discussion. However, India's efforts, and limited successes will ultimately be converted in successes, providing an interested comparison and venue for potential competition with China.

Both China and India have started domestically, as Sinopec, CNPC, and the Indian Oil Corporation have spent a great deal of money to monopolize domestic retail gasoline networks.¹⁴ The impending entry of foreign corporations due to World Trade Organization accords has lead both countries to consider sectors in which foreign investment is not in their security interests; energy being on of them.

China has a number of options when determining how best to gain energy security from overseas. It can view the issue as a mercantilist one or as a capitalist one. The mercantilist goes about establishing agreements and infrastructure throughout the world including refineries, pipelines, ports, and ultimately military bases in foreign countries. While it certainly has viewed the issue in this way, it is also limiting its capital intensive investments, instead focusing on arrangements with foreign governments and companies, in a more capitalist view. Additionally, like India, China "seeks instead to optimize short-term market opportunities for overall lower-cost deliveries in the long term."¹⁵ That is to

¹⁴ Clad, 2004.

¹⁵ Clad, 2004. p.272.

say, China has of late begun viewing oil as more of a global commodity, and understands that over-investing in oil related infrastructure does not help manage the price of the good, but still has an almost irrational obsession with guaranteeing its availability for Chinese companies.

China has embarked on a great number of projects and agreements to secure its oil future, sometimes paying one tenth more than the United States or other countries to secure that future. In the past five years, China has spent \$15 billion in the past five years on over 100 oil fields and companies. This is only part of a hybrid strategy, as fully securing all its energy supplies is practically impossible. According to McKinsey consultants, “if China manages to keep domestic production from its aging fields at the current level, it will need to buy 3 per cent of the world’s proven petroleum assets – more than the combined reserves of BP plc, Chevron Corp, Exxon Mobil, Corp, Royal Dutch Shell plc, and Total SA – to meet projected demands until 2025.”¹⁶ Additionally, China has other burgeoning demands, namely refining capacity, for which it needs to build “a world class refinery every year for the next 15 years.”¹⁷ Such refineries cost \$2 billion each.

China’s investments, successful and otherwise, have ranged broadly, from its own back yard in South East Asia and the South China Sea, to the Middle East, to Africa, and, most infamously, CNOOC’s attempted acquisition of the American firm Unocal in 2005. China has also toyed with the idea of pipelines from Kazakhstan, Sakhalin, and East Siberia, while India has considered Iran (IPI), Bangladesh, and Turkmenistan (TAPI). In

¹⁶ Mukherjee, Andy. “Oil is Like Milk and China Has No Need to Buy Cows.” New Straits Times (Malaysia) 29 July 2006.

¹⁷ Ibid.

virtually every case, political or cost issues have derailed the projects or at least put them on the back burner¹⁸.

China has also dealt with areas that are problematic. Oil deals with Indonesia have lead to riots on the street over rising oil prices¹⁹ and the infamous support of the Sudanese government in the Darfur conflict in order to continue to receive its oil has lead the western world feeling shaky regarding China's intentions and values. Similarly, ties with Iran and Venezuela have created fears of an anti-United States energy alliance, while the Unocal deal scares the same critics into believing in a Chinese global conquest of energy.

These fears, however, are intensified and mitigated in the same ironic fate: China's energy policy is increasingly directed toward the Middle East, The Unites States' energy stronghold. China began its attempts to acquire oil from the Middle East in the 1990s. This decision was made to establish relationships with Oman and Yemen, countries that possessed the proper type of oil: light, sweet crude, so that Chinese refineries could easily process it. While Chinese relations with other second tier Middle Eastern countries including Egypt, Kuwait, and the UAE increased in the 1990s, China's role in the Gulf drastically increased in 1997 and then again in 2002.²⁰

In 1997, the China North Industries Corporation (NORINCO), signed a 22-year production-sharing agreement to develop Iraq's second largest oil field when the UN lifted sanctions and ended oil for food. NORINCO is also a large arms company, an item that did not fail to attract attention. Around the same time, the Chinese worked to make agreements with Iran and Saudi Arabia. In 2002, Hu Jintao became general secretary of

¹⁸ Clad, 2004.

¹⁹ Flavin and Gardner, 2006.

²⁰ Leverett, Flynt Lawrence "Managing China-U.S. Energy Competition in the Middle East" The Washington Quarterly - Volume 29, Number 1, Winter 2005-06, pp. 187-201 [The MIT Press](#)

the Chinese Communist Party and adopted the “going out” for oil policy, as it is known today. It attempted to create exclusive relationships with many of the second tier Gulf States and intensified its efforts with the Iranians and Saudis. In 2004, Iran’s oil minister said that China would eventually displace Japan as its leading market for oil exports. Additionally, a questionable transfer of technology from Saudi Arabia occurred in 2002, at which time the Saudis became the PRC’s leading supplier of oil.²¹

The relationships held with the three largest players in the Gulf are obviously of concern to the United States. Certainly the concern about Iraq has dissipated now that it is occupied by the US, but China’s oil first mentality, both with Iran and in the Sudan, has proven unsettling. In the end, though, cooperation is possible in the region, and the United States still does get to feel secure that its alliance with the Kingdom of Saudi Arabia is strong.

India’s record on oil acquisition is miniscule compared to that of China. Not short of attempts, the star of Indian energy security enhancement is the Oil and Natural Gas Corporation. Responsible for 82 percent of domestic oil output, ONGC is looking overseas more energetically than ever before. ONGC recently signed an acquisition deal in Cuba, but is consistently losing out on bids to the Chinese, namely in Angola and Ecuador and on PetroKazakhstan. Additionally, it seemed to be confused on a bid for OAO Rosneft and bought into a quarter of the Greater Nile Oil Project in the Sudan at over \$300 million more than China bought its 40 percent stake.²² After winning a Chinese bid in Nigeria, ONGC dropped it after it was determined to be less than cost worthy. In a positive note for India, in January of 2006, Beijing and Delhi signed a deal

²¹ Ibid.

²² Mukherjee, Andy. “Timidity hinders India’s quest for oil.” The Straits Times. July 19, 2006.

to act in cooperation in searches for energy. ONGC, following the trends of Sinopec and CNPC is also publicly listed. However, this public listing has hindered its decision making abilities and crimps its ability to compete in the global market. While India's record is lackluster, it is certainly making progress and will continue to grow in its ability to obtain oil resources.²³

Gas Guzzlers

China and India have also attempted to substitute their high use of coal with natural gas. While natural gas plays a much smaller role than many other sources in their energy mixes than even nuclear, natural gas has become a high priority for both due to its flexibility. Both countries have begun negotiations to receive LNG exports from the Middle East, Southeast Asia, Australia, and potentially Russia. Both India and China, despite efforts in the Middle East, would still prefer to limit their reliance on OPEC. While most pipeline plans do not have much hope, the few that do are gas related. They include an Indian deal with Indonesia and piped gas from Iran or Turkmenistan, through Pakistan, as well as importation of gas from Bangladesh, a dubious proposal given domestic Bangladeshi politics.²⁴

The Indian and Chinese desire for oil and gas does provide a stimulus for cooperation. Both countries have a vested interest in keeping the areas of the world from which oil and gas flow relatively safe, and, despite predictions of oil conflict, instability in oil rich regions is not in the best interests of China, India, or the United States. Because of their "common predicament," there is hope for China-India cooperation on energy issues, especially since they have been forced to abandon their hopes of self reliant

²³ Merchant, Khozem. "On a mission to find enough energy to feed a guzzling economy The Oil and Natural Gas Corporation is struggling to improve a dismal record." The Financial Times January 26, 2006.

²⁴ Clad, 2004.

energy strategies. Furthermore, aiding each other in overcoming technological issues, especially related to environmental degradation, is a winning situation for both countries, and military cooperation to secure transportation is also possible.²⁵

Further issues can result from the transport of oil and gas over the sea. The United States Navy's main duty in this day in age is to patrol sea lanes. Both China and India rely on this control to receive all their good, including oil and gas. However, many Chinese believe that in the next two decades, they will be able to match American military spending to protect their own oil.²⁶ While such a claim is probably untrue, it illustrates very real concerns both in the US regarding the rise of China, and in China regarding the ability to direct their own future.

Because 80 percent of China's oil travels through the straits of Malacca²⁷, the desire to secure their own SLOCs is understandable. The United States, China, and India must be careful in unduly escalating conflicts regarding maritime issues and energy transport and should see the issue as an area of cooperation.

Greening the Mix

The efforts of India and China to improve their energy futures have not just been limited to oil and gas. Both countries have been aggressive in their desires to ramp up their alternative energy use, both in the forms of nuclear and large hydropower, as well as in wind, solar, and biomass. Additionally, while both countries possess environmental NGO's, China has very few, and requires much assistance from outside groups. India, as a democracy, has a better record on the environment, and certainly has more NGOs.

²⁵ Clad, 2004.

²⁶ Smil, V. 2006. "Japan and China: The next fifty years." Japan Focus Summer 2006.

²⁷ Mukherjee, Andy. "Oil is Like Milk and China Has No Need to Buy Cows." New Straits Times (Malaysia) 29 July 2006.

The implementation of China's renewable energy law draws on experiences from successful renewable energy environments such as Germany and California. It will seek to stimulate an entire domestic industry based on growing solar, biomass, and wind technologies. Additionally, as evidenced by migrant worker housing outside of Shanghai, China has already made abundant progress on solar hot water, owning three quarters of global capacity.²⁸ That said, China has much environmental degradation to make up for, and has seemingly only worked to improve their RE capacity due to a shortage of supply. Additionally demand side management in China is taking off, but only thanks to the work of mostly American NGOs and partnerships with local and regional governments. As of yet, energy efficiency credits are not part of the national renewable energy law.²⁹

India has also taken as progressive tact on development, pledging itself to a new form of development that does not follow the evils of the west.³⁰ Already home to the fourth largest wind industry in the world with noted companies like Suzlon, Indian President A.P.J. Abdul Kalam announced a goal of increasing renewable energy from five to 20 or 25 percent. Additionally, it is common in India to use solar cells to power village homes and workshops.³¹

Other, slightly less green solutions are afoot in both India and China. In the first half of 2006, the United States agreed to help India with civilian nuclear power. Additionally, China is in the process of commissioning or building more than 30 nuclear power plants.³² Such a push toward nuclear, while somewhat unpopular in the west, is

²⁸ Flavin and Gardner, 2006.

²⁹ Finamore, Barbara. Personal Interview. July 31, 2006. Skype to Taipei, Taiwan from Hong Kong.

³⁰ Narain, Sunita. "Forward." State of the World 2006 New York: W. W. Norton & Company. 2006.

³¹ Flavin and Gardner, 2006.

³² Miura, Junichi. "China seeks nuclear-powered energy security." The Daily Yomiuri May 8, 2006.

similarly timed with efforts in the United States to encourage the development of nuclear energy domestically. Such a push is a prime example of an easy area of cooperation, at least for the United States and India, if not also China.

Finally, China, with the world's largest hydropower potential³³, has been infamous for harnessing it. The resource will certainly play a large potential in China's sustainable future. The Three Gorges Dam is an example, according to many, of how not to go about harnessing hydropower, but other, smaller scale hydropower projects are occurring in China as well. India, too, has ample hydropower resources, but rough weather conditions make them somewhat difficult to harness. That said, India still gets roughly 15 percent of its electricity from hydropower³⁴, and it is an important source for India's future.

Cooperation or Conflict?

Energy, perhaps more than any other issue, can be a point around which cooperation or conflict between states is born. As India's rise toward China continues, and as they both approach America, the stakes will become higher to make sure that energy becomes an issue through which similar interests are expressed. Fundamentally, a secure global market is in the interests of all three states, and a peaceful Middle East and Central Asia are stepping stones to that issue. That said, all three states, at first under American leadership, will need to increase their reliance on alternative energy sources and learn to avoid political problems that could cause shocks to the oil market. Geopolitical resource shortages will have to be handled in concert, as energy related conflict possesses a devastating potential. Eventually, the world will transition away from a fossil

³³ CIA World Factbook. "China."

³⁴ CIA World Factbook. "India."

fuel economy, it just happens to be an unfortunate coincidence that, just as energy issues are rising, so are two energy guzzlers. The rise of China and India, and the station of the United States are dependent on a peaceful and energy abundant 21st century.