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SIT Independent Study Project

China Environmental Study

"Recently released figures showing crude oil imports soaring by nearly 40% in the first five months of the year as China needs more oil to fuel its explosive economic growth..." says one article from the BBC. According to the internationally renowned news agency "...stockpile coal has plunged to lowest levels in 20 years..." China is not alone in its battle with depleting natural resources. The entire international community has placed alternative energy research as a primary objective. Though the economic powerhouse has enjoyed an over 9% GDP growth rate for a better part of the last decade, environmental experts wonder at what cost China continues to grow. As the country continues to prosper, nationwide energy consumption rises. In the last decade China has emerged as a significant importer of oil, surpassing Japan as the second greatest oil importer behind the United States. According to the Foreign Policy Association China produces 3.6 million barrels of crude oil per day. As the international community's supply of crude oil continues to deplete at alarming rates, many countries may find themselves at the mercy of the eleven OPEC (Organization of Petroleum Exporting Countries) nations. The Baker Institute estimates that without increases in alternative forms of energy, by 2020 China along with other South-East Asian countries will be heavily dependent on Russia for energy imports. These kind

of projections place enormous pressure on the Central Government to find varying means of supporting its growth. Whether through wind, solar, wave, nuclear or hydroelectric power, China is experimenting with alternative energy forms to find which form is most efficient. One form, hydroelectric power, has proved to be a very promising option for the future. Yet a very heated debate has developed surrounding China's use of hydroelectricity. By examining this debate from different angles while trying to understand how China might solve its national energy concerns, I will use past and present data to expose the real issue facing this rising global power.

Can China's Growth Be Sustainable Without Change?

Extensive research has been conducted on China's growing "energy crises". With a population of over 1.3 billion the topic of sustainable development becomes an important issue. Much is known about China's historical dependence on coal as a primary source of energy. Yet as China's position on the world stage continues to elevate, the global community is beginning to look to the "Red Giant" to lead Asia toward more environmentally conscious energy sources. China stands as a model for the Asia Pacific region of the world; therefore, other developing nations look to China for advice, supplies and various other forms of support. With the 2008 Olympics approaching and preparations underway for China to present to the entire world that all is well within its borders, many issues will be "swept under the rug". China will use every resource at its disposal to prevent a "loss of face" within the

international community. International environmental agencies recognize the potential dangers to the environment China's growth presents. The issue of sustainable development is of transnational concern; therefore a proper approach to a solution requires transnational attention. Sustainable development can be loosely defined as those aspirations a country possesses to modernize and the means employed to achieve modernization. Let's briefly review China's history as it pertains to environmental challenges. Water pollution, air pollution, deforestation, farmland losses, and the generation of greenhouse gases have all been challenges for China's growth. Through various historical campaigns aimed at advancing China's position within the global society, Chinese leaders had ushered their country through the Great Leap Forward (1958-60), Cultural Revolution (1966-76), and Harnessing Water (1978-present). These campaigns have indirectly damaged China's vast and beautiful landscape while scarring its citizens for life. As a result of such national campaigns China has lost some of its best forests and arable land. The water availability in Northern China, with roughly 500 million people, is less than a third the national average of India, a country with far less people. About fifty million Chinese don't have a reliable drinking supply and this is even true in the nation's capital. Because of past exploitation of oil and gas reserves, China will have to burn even more coal in the coming years. More than three-quarters of China's coal is burned without any preparation, and roughly one-half of fuels are outdated which increases inefficiency. As a result,

China's carbon and sulfur emissions far surpass health standards established by the World Health Organization (WHO). China is already the second largest producer of greenhouse gases worldwide, and expected to be the leader by 2020. As history proves, Chinese leaders will go to extreme lengths to push their country's growth. This continued growth may come at enormous costs to the international community. For example, if China were economically developed and the Chinese per capita consumption of petroleum and minerals and per capita carbon dioxide emissions were equal to that of Americans, this would more than triple the two countries' combined carbon dioxide emissions. To continue with this example, if China were to economically develop to the level of the United States, it would be extremely difficult for the country to support the needs of its population. Therefore, both China and the entire world alike could not withstand China becoming fully developed. This brings us back to the question of sustainable growth. We now understand that the world is not ready for a fully developed China, so what must be done to ensure that the lives of Chinese citizens can continue to prosper without upsetting the current global balance? A major step in the right direction would be for Chinese leaders to place environmental concerns at an equal level with economic concerns. In a Utopian society we could just request that people consume less, therefore relieving some of the current degradation on the environment. Growing by consuming less is not *usually* how people understand prosperity, therefore a plan of re-focusing resources

must take effect. This plan requires a strong and efficient energy source, like hydroelectricity, therefore allowing China to use its coal, oil, and natural gas supplies in moderation. With a strong energy source China will be able to continue its growth and help its people improve their living standards.

Why Hydroelectricity?

When water or steam are used to generate the production of electricity, hydroelectricity is created. The hydroelectricity is produced from generators driven by water turbines that convert energy in falling fast-flowing water to mechanical energy. Water at a higher elevation flows downward through large pipes or tunnels (penstocks). The falling water rotates the turbines, which drive the generators, which convert the turbines mechanical energy into electricity. The process may seem rather simple in description, but actually is very technical in practice and requires factors, sometimes countries, working together. The fact that numerous developed and developing countries alike recognize the advantages of hydroelectricity over other forms attracts China to its use. Norway, Sweden, Canada, and Switzerland all rely heavily on hydroelectricity because they have industrialized areas close to regions with heavy rainfall. China, like those countries mentioned, also has these regions prone to heavy rainfall; but China also has millions of people living in these regions in need of stable electricity. Many of these people are also searching for answers to problems with flooding and irrigation. Hydroelectric stations, when properly designed and constructed, can alleviate these and other

problems in regions with heavy rainfall. Another benefit found in hydroelectric dam construction is the construction process itself. As one government official describes it, "The process consists of designing, researching, planning, employing the best company for construction and finally building the dam." Numerous people are employed and local economies boosted from dam projects. In a time when China and the world searches for sustainable energy sources, hydroelectricity meets those needs along with providing other benefits.

How Hydroelectricity Works

- Dam is built to trap water, usually in a valley where there is a lake or river.
- Water is allowed to flow through tunnels in the dam, which turns large turbines thus driving dam generators.
- Dams are usually much thicker at the bottom than the top. This is because the pressure of the water increases with depth.
- The Sun evaporates water from the sea and surrounding lakes and rivers. Then clouds form and the evaporated water is returned in the mountain rain, therefore keeping the dam constantly supplied with water.
- Gravitational potential energy is stored in the water above the dam. Because of height of water, it will arrive at turbines at high pressure, which means a great deal of energy extraction. Water then flows down river.

Hydroelectric Highlights

- Expensive to build dam, but then virtually free to maintain.

- No waste or pollution.
- Much more reliable source of electricity than: wind, solar, nuclear or wave.
- Water can be stored above the dam for later use.
- Hydropower stations can increase to full capacity very quickly.
- Electricity is constantly being produced.
- Hydropower is a renewable form of energy.

Three Gorges “Sanmenxia” Project

When one thinks of hydroelectricity in China the infamous Three Gorges Dam Project is usually the first thought to mind. The Three Gorges Project began as a vision by one of China's well-known leaders, Sun-Yat-Sen. China was a country plagued with turmoil and suffering and then Sun-Yat-Sen brought his three principles of revolution (nationalism, democracy, and equalization) to China and set the stage for modernization. It is safe to say that Sun-Yat-Sen could not fathom the complications and concerns that accompany a project of this magnitude. In the years leading to the Great Leap Forward, Mao Zedong reintroduced the project as a part of his ambitious plan to make China a world superpower. Yet with the many downfalls that came with Mao's reign, the project eventually lost much of its national “thunder”. Again in the 1980's the determination of project supporters revived it and convinced Deng Xiaoping to view the project as one of China's primary objectives. Deng's leadership was characterized as China's modernizing period. Deng promoted the “harnessing water” campaign, which was left over from Mao, and he

demanded national support for dam construction. Mao and Deng didn't share Sun's ignorance on the potential problems that come with a project of enormous proportions. During Sun's period, China was desperately in need of a solution to frequent natural disasters, floods being a major problem. Before 1949, only twenty-three large-and medium-scale dams and reservoirs existed in all of China. Mao and Deng were very aware of the disastrous effects a large-and medium-scale dam can have on society. Bringing China up to speed with the West was more important than concerns of safety in dam construction and maintenance. As a result, China's "harnessing water" campaign like other national campaigns led to a focus on quantity and not quality. By 1990, roughly eighty-three thousand dams had been built in China. Over three-hundred and fifty large-scale dams, almost two-thousand five-hundred medium-scale dams, and over eighty-thousand small-scale dams had been constructed within China. This means in about forty years all of China's major rivers had been dammed. Due to the quantitative focus of the campaign, dams were poorly designed, constructed, and maintained. Numerous engineers responsible for the dams were not adequately trained or qualified to tackle their assigned tasks. During the 1980's almost three-thousand dams had collapsed, including two large-scale dams (Shimantan and Banqiao). Over one-hundred medium-scale and numerous small-scale dams had also collapsed. Due to many of the shortfalls in China's dam construction past, numerous activists groups have come out in protest of

future projects, particularly Three Gorges. The debate has focused on the possibility of economic development versus the possibility of environmental degradation. One person has been propelled to the forefront of those against the Three Gorges Project; Dai Qing has authored two books criticizing against the catastrophic dam. She has been ousted from Chinese society because of her views. In her book entitled The River Dragon Has Come, Dai Qing explains how this project has potential consequences beyond proportion. She views the project as a “symbol of uncontrolled development”, which she defines as a conscious disregard for controlling one’s actions. Dai Qing charges the government with consciously understanding the drastic effects Three Gorges presents and yet they continue to promote the project. She references that during a 1991 conference on dam collapses in Vienna where participating countries exchanged information, China’s representative told the other attendees the country had “no collapses to report”. Dai Qing views this as a clear example of China’s leaderships’ willingness to hide the ugly truth in order to “save face”. She argues that with this type of leadership, it is difficult to project what dangers lay ahead for China. Though she has numerous criticisms of the Three Gorges Project, Dai Qing also recognizes the potential benefits of the project. The Three Gorges dam will be the largest ever to be built in the world, which adds to China’s international acclaim. The two-kilometer-long, 185-meter-high dam will create a reservoir as long as Lake Superior. The dam has brought companies who are giants in dam building

from all over the world to bid on its contracts including: Caterpillar, General Electric, ABB, Siemens AG, Mitsubishi, and Toshiba. With these big names comes international attention, which China constantly seeks. Despite the global fame that comes with this enormous dam project and the millions that will be supplied with electricity, Dai Qing feels the costs overshadow the benefits. In her book, she discusses some of the environmental and social problems that will accompany the project. “It will flood thirty-thousand hectares of prime agricultural land in a country where land is the most valuable resource; it will cause the forcible resettlement of upward 1.9 million people; it will forever destroy countless cultural antiquities and historical sites; and it will further threaten many endangered species, some already facing extinction.” From the passion felt from reading her book, it is not difficult to determine that Dai Qing truly loves and cares for her country and her people. In 1997, a freelance journalist and columnist asked Dai Qing, in her book, “Do you really believe that popular resistance could possibly stop the project at this point?” Dai Qing answered by saying, “Right now I think we have two years to stop it altogether, or at least to change the design. In terms of foreign companies, who have invested, they could still profit just as much by helping to build smaller dams on the tributaries, which would create the same amount of energy at less cost and, most importantly, those 1.9 million desolate people would not have to be forcibly resettled.”

Nu River “Salween” Project

Perhaps the only other hydroelectric project with equal and growing international recognition would be the Nu River Project. The Nu River cascades over three-thousand kilometers from glaciers in the upper reaches of Tibet down to its delta at the Andaman Sea in Burma. It is known as the Salween River in Burma and Thailand. The Salween is the second largest river in Southeast Asia and one of China's last undimmed rivers. The area contains over six-thousand different plant species and is believed to support over twenty-five percent of the world's and fifty-percent of China's animal species. An estimated three-hundred thousand people live in the area along the river, all with diverse cultures. It is one of three rivers comprising a UNESCO World Heritage Site, therefore international players are watching closely to ensure its success from beginning to end. The North China Power Company plans to build the thirteen-station project along the Nu River in one of the most precipitous territories on earth. Experts intend on the project taking more than a decade to build and estimates are saying the Nu river project will generate more power than the massive Three Gorges Project. The dam stands to bring numerous forms of employment to rural China while helping local economies and supplying electricity. For these reasons, I found the Nu river project to be especially interesting in comparison with other dam projects researched. I had the opportunity to speak with two local government officials in Kunming about the Nu River Project as well as hydroelectricity in general. I asked one official working in development why he thought

hydroelectricity is the right form of energy for Yunnan. “There are a lot of ways to produce electricity. We can use coal-fire, wind, or nuclear, but in Yunnan Province hydroelectricity is the best form. Yunnan is famous for its water availability and use. If we use other forms to make electricity, we will have to pay more.” In speaking with him I discovered that he was very familiar with the topic and specifically the Nu River project. I asked him about the potential costs and benefits to local people around the project. “We have improved our techniques in dam building very much; as a result the lifespan of dams has been lengthened. Except for a war, typhoons, or some other natural disaster, dams can last forever.” I was curious to learn his views on the preparations for natural disasters such as typhoons. In my research, I found that historical records compiled by local governments along China’s South-eastern coast during the past one-thousand years suggest that there’s a fifty-year cycle in the annual number of typhoons to strike the area. According to the China Meteorological Administration, “typhoon landings in China have a trend to increase and intensify in recent years.” With knowledge of weather patterns at his disposal, I was sure he had been presented with similar information of potential dangers in the area. He responded by saying, “It’s not a problem with new and advanced technology. I was stunned at his confidence in China’s technology. He projects a project of this size to take in the area of a decade to build. He recognized the dangers to historical relics and wildlife but still made clear the importance of the dam’s construction. “We

can remove some of them (historical relics) and reinstall them in nearby sites; but for those that can't be removed, we have no choice but to destroy them.

“ When I spoke with the other Kunming official I discovered that he viewed the issue purely from an economic perspective. He told me that the local government received benefits from the electric companies in the area and in return the companies are given a greater amount of independence. “The problems with moving people is the responsibility of the company, those matters should be settled by them. “The government collects the initially costs of project construction then, according to law, the government goes on to collect roughly forty-percent of the company's earnings. He explained how water electricity is viewed as a cleaner and inexpensive means of supplying electricity and, like the other official; he talked about Yunnan's abundant water supply. “It's a good way to get electricity.” Coal is still widely used in Yunnan especially in the dryer months (January-April) because of its speed. I inquired about the use of local employment in dam construction. “Though we employ some local labor, in an effort to insure safety in the process the workers must be trained for several months and we *only* employ professionals for technical positions.” I followed-up with a question about the safety process and potential work-related injuries. “Our safety methods are good, for example, helmets and safety clothing are required and there is usually a committee to check on the dam. Sometimes people are injured or die, but those problems belong to the companies who are doing the construction, not to the

government. The government reviews the company's history and quality before giving contracts and the companies are required to report any accidents to the government." Having the local government perspective was a unique factor in researching the Nu River project, but I also wanted to know more about the cross-border conflicts arising with the project. I found a petition to the Prime Minister of Thailand from the individuals and organizations of Burma and Thailand discussing this very topic. The petition highlighted local concerns about the environmental and social impacts from planned projects along the Salween River. According to the petition, "The decision-making process for planning and implementation has been kept secret. No public participation among dam-affected communities has been consulted. The project stands to adversely impact local ecosystems, including pristine teak and other hardwood forests, rare and endemic plants and fish, as well as increase seismic risk." The authors of the petition not only fear the direct impacts posed by the dam, but also warn of the indirect ones. For example, the disruption of the livelihoods of people along the river could lead to increases in logging, adding to China's growing problem with deforestation, and wildlife hunting around the reservoir. The Chinese government is not legally bound to seek the views of the two countries since it has not signed any agreement on how to share waters of the Nu River. Furthermore, the people of Burma and Thailand look to Chinese negligence within its own borders as an example of what will come. Though China is not obligated to

seek approval, the country is obligated to conduct environmental impact assessments internally and along the rivers downstream path through neighbouring countries. It will be interesting to see how this conflict develops over the next decade, and I will surely continue to follow the Nu River projects construction.

Manwan “Lancan” Project

We have looked at two of China’s very popular large-scale hydropower projects; now let’s examine one of China’s lesser-known large-scale projects. As one of the key existing hydroelectric power stations in China, the Manwan project was started in 1986. It took eight years, in total, to build and another two years to begin supplying energy. The Lancan River flows from the upper reaches of the Tanggula Mountain in the Qinghai Province of the Qingzhang Plateau. Stretching across Tibet before entering into the West of the Yunnan Province, the river is re-named the Meigong River when it goes abroad. The Manwan power station is located in the middle of the Lancan River, at the cross of Duanyun County and the Xiandong County. It extends a distance of 4500 kilometers with a disparity between its highest and lowest points of 5000 meters and a flooding area of 174000 square kilometers. The station has a capacity of over 150 million kilowatts divided into two sections. The first section has a capacity of nearly 125 million kilowatts, while the second, smaller of the two, has a capacity of about 25 million kilowatts. Expert projections say the Manwan power station can produce up to 62 billion

kilowatts per year. Manwan has an average flux of 123 cubic meters and the normal water level stored in the reservoir is 994 cubic meters. An infield area of roughly 415 square kilometers was submerged by flooding, and an estimated three-thousand five-hundred and thirteen people were forcibly relocated. At an estimated 33.9 billion Yuan, the national dam project completion costs were the most expensive in the Yunnan Province. Estimates place Manwan as the largest existing hydroelectric power station in the Yunnan Province. With an enormous amount of resources already invested in the Manwan power station, China's leadership has decided to renovate it. Employing the services of the Swiss firm ABB and others, the Chinese government is making strides to improve the safety and efficiency of the Manwan power station. With such improvements being made to the dam, one would think the local Manwan community would reap benefits from construction. After speaking with a few residents of the county, I discovered the opposite to be true. Of those individuals relocated during the original dam's construction about eighty families remain in close proximity to the dam itself. On my way to the power station I came across an elderly woman tilling a small patch of land by the side of the road. I was compelled to stop and speak with her. She told me she was a sixty-year old farmer from the Tiankan village. "With a family of six to look after", she explained, "the government only gave my family seventeen-thousand two-hundred Yuan to move". She told me her family was forced to move twice and that the money received was

not enough to cover the multiple moves. “We spent about eight-thousand to rebuild our home the first time, then because of the coasting we moved again, but received no assistance from the government. She expressed to us the difficulties she faces with her husband seriously ill and her eldest son away working in a steel tube producing factory. “I must sell the few vegetables I can grow to make a living for my family”. When I asked about the changes in the county related to the dam construction, she told me many of the current residents are not of those relocated. Rather, many people came from nearby counties in search of work. With an influx of people coming in search of dam employment, I wondered if there was precedence given to the local residents. She told me there was no precedence given, “The government paid no attention to that, all they cared about was those people with which they had relationships”. Experts were brought in from outside to work in the technical positions. After speaking with her, as I looked around, I noticed a crowd of people had formed along the side of the road. They all had curious looks on their faces and as I scanned the crowd one woman’s expression stood out. I could tell from her expression she had information and wanted to speak with us. We introduced ourselves she immediately invited us to join her at her son’s home to talk. Her son’s home was located on the side of a nearby hill and when he saw us coming, he welcomed us with open arms. He was a forty-five former dam worker and the former head of the Kantian village. His immediate family consisted of four members: his wife, son, daughter, and

himself. He told me his twenty-year old son was mentally disabled and his sixteen-year old daughter was away studying in Yun County. He and his wife support themselves by farming a small plot of land in front of their home and selling the crops. I asked him about his income, he said, "My current payment is six-hundred Yuan per month, but my daughter's schooling cost three-hundred per month". I could hardly believe this man could support his family on such a small amount per month. When I thought about it, his family of four was living on less than two-dollars a day. He belonged to the group of local residents relocated by the dam's construction, but he also was a dam worker at that time. "According to the policy then", he said, "The government paid us two-thousand Yuan per person, adding to the seven-thousand Yuan for the cost of a house. But when we had to rebuild our house because of relocation, we had little money left over". He looked to still be in very good working condition; therefore I wondered why he no longer worked for the power station. "When I worked for the dam in 1994, I fell down from a height of about seventy-meters due to a work-related accident. I was disabled and then fired; now my brain and waist are not so strong. So even if I were still working, no matter how hard I labored, I could be easily replaced by younger and healthier people. It became very difficult to sit there and listen to the immense hardships that his family had to endure. Finally, I asked him if, aside from the electrical gains, he felt the Manwan power station benefited him directly. "No, everyone who lived here before the dam construction was farmers. Then they

built the power station and destroyed the farmland. Before we had enough to eat, the gains of one year of farming could support a family for the next two years. We lived simple, but we lived well by selling our gains. Now, many people don't know how they will continue to survive". Over the next few days I traveled throughout Manwan asking various residents their feelings about the power station. Now that the power station is under renovation, I wondered what things had changed. Residents told me when the renovation began; dam workers were given temporary housing as they waited for new housing and an increase in their wages. But soon after, the government and the company decided the building of new housing for workers conflicted with the project. Although the local residents and the company have been in conflict in the past, residents fear government action because they believe the government will side with the power company. Residents believe the head of the power station to be the son of a high-ranking government official, therefore any resistance to injustices will be met with government force. I asked people if they thought the government cared more for county development or for their well-being. The responses were all very similar. People don't believe it to be a question of caring, but a question of power and rights. With fast economic growth in a particular county, local officials stand to be promoted by the central authority; therefore growth is the primary objective at the local level. Many residents admitted that problems faced by their community were not entirely the fault of government policy. Some residents agreed that their

resistance to policy made life harder, but still think resistance was justified. In light of the income disparities throughout the county, the local government has reduced taxes. There is no tax for renting houses and since the income of many residents is between ten and twenty-Yuan per month, average rent is about sixty-Yuan monthly. A former local government secretary in Manwan suggested that other taxes for those people who were relocated due to the power station be reduced. Soon after he was “asked” to undertake another job and leave the county, those taxes were never reduced. I came across one man who appeared to be a current employee of the power station and I asked him about natural disasters in the area. “A big flood with rocks and sand came in 1993, I was a major then, and I reported it to the government. They immediately arranged simple housing for those affected; I think the government really cares about the safety of us. He also mentioned that he received money from the government for his report. I found it interesting how difficult it was to find this kind of support for the power station outside of those employed. I asked local farmers how they felt the environment had been effected by the dam’s construction. They thought the weather had changed after the power station was built, but they were unsure if this was directly related. They were sure, however, that the crops historically grown in the county can be grown everywhere but in the area of the dam. As I interviewed more residents, it became clearer these people lacked empowerment. I spoke with another resident about relocation, he said,” We moved whenever

the government asks us to, I still remember the first time; they told us that we must go in seven days. Because time was so limited, we had to move into the nearest possible housing. As a result of their impatience and unreasonable demands many people, including my daughter, suffered from injuries”. With so many people with family roots in farming and few other skills, I wondered how the local educational system was combating this problem. Apparently there *used* to be an elementary school in another county but the road was too long and rough for children to safely arrive. Also, many farming families could only afford both financially and socially, to have children away at school for a few years, and then they were required to return home and help with the farm. Things have changed some, now there is a better school closer to Manwan and education policy has improved. Education costs have been reduced and even canceled in some cases. There are counties all over China suffering from similar hardships as Manwan, they have limited resources and they lack the luxury of tourism. Though one tourist destination named Xizhanyuan is located about three miles beyond the county, the local economy reaps very little benefits because most tourists are workers from the power station. With a fair understanding of local opinions of Manwan’s history, I wanted to know what people thought about their futures. “I hope we can move into better housing near good farmland”, one respondent said, “I hope the government could harmonize the relationship between the company and local residents. I hope they can help improve the lives of people relocated and create easy jobs

like cleaning and so on. At the same time, I hope local people can stop doing damage to the company. Then the company would want to hire more of us. If I worked for the company, I think I would work harder than others. I think the government should not always take the side of the company and ignore our concerns. I hope the government can begin to listen to the voices of local people. If we can all learn to treat each other better, I think the future will be better for everyone". The more I talked with people I noticed they became more comfortable speaking, so I asked another man what he thought about my questions. "I feel it is good when people like you come to hear our concerns. When media people come, they can speak for us common people. But they shouldn't exaggerate our condition; just speak the truth, that's enough. We are still alive; we just wish that the advantages from the government could be more efficient. As far as our future, I think we can grow latex or coffee, I feel they are just right for this area. I hope the government can make a way for us to sell our own products, I think this would make local people very happy.

Is Anything Being Done?

Chinese rulers have been building dams for centuries and they have learned a great deal about effective techniques in dam construction from experience. Dams have protected against natural disasters, outside invasion, and assisted with irrigation problems. Therefore, hydroelectricity is not new to China, but the means to gaining hydroelectricity are continually changing. Government

efforts to ensure high quality design and construction of dams and numerous are improving. Over the past decade the Central Government claims it has implemented new policies to combat the country's growing environmental concerns. According to an article by columnist Lin Gu highlighting China's environmental law improvements," When the construction of some 30 big projects were suspended at a mandate from the State Environmental Protection Administration (SEPA) in December 2004, China was taking the most notable move in enforcing environmental laws. Their construction was put to a halt for the projects, most of them hydro- or thermal power plants, failed to have an environmental impact assessment according to law. All would have obvious environmental consequences if no measure is taken to curb their possible hazardous impact, so an advanced assessment on their environmental impact is necessary according to law." SEPA comprised a "blacklist" of projects it is firmly against and the top three on the list were all hydroelectric power plants under China's Three Gorges Project Company. This speaks to the credibility of this organization that it would openly and directly criticize China's largest dam project. Due to this bold move on the part of SEPA, Premier Wen Jiabao openly applauded SEPA's campaign at a State Council conference. But SEPA was not limited to only in-country support; in fact the move was also backed by more than fifty international non-governmental organizations (NGO's). Even with all the support SEPA received for its efforts, it failed to permanently halt construction on any of

China's dam projects. SEPA officials argue that the task is much too large for them to tackle alone. Government environmental action appears well "on paper", but enforcement seems to be lacking. One SEPA official has been quoted as saying, "China's criminal law that includes clear stipulations on crimes of serious environmental accidents took effect in 1997. In the following five years the country recorded at least 50 serious environmental accidents a year based on official estimation, but to date no more than 20 people have been held accountable. This is what happens with the enforcement of criminal law that deals with the most serious cases of environmental accidents in the legal system, and you can imagine what happens to other environmental laws." Only about ten percent of China's environmental laws and regulations are actually enforced.

Conclusion

I find that the most troubling thing with all the projects mentioned in this paper is that dam supporters and dam opponents continue to talk *at* one another and not talk *with* one another. I took a course on conflict resolution at the University of Maryland last summer and I learned that the basic means of finding an answer to a problem is to *listen* to both sides. If neither side is giving serious consideration to the concerns and proposals of the other, no real progress can be made. Furthermore, if each side simply denigrates the opinions of the other, this can make it difficult for a third party (mediator) to gain any understanding of the issue. As a result, problems which otherwise

might be simply solved through dialogue are blown up into national or international debates over who is *more* wrong. The Chinese government must take up its role as the authoritative body and resolve this growing conflict. A system of transparency must be established and local people must be included in the planning processes to relieve concerns. Faulty information and mindless propaganda will never replace the confidence that comes with good governance. The future of China's growth and development is directly related to its environmental policies and alternative energy sources.