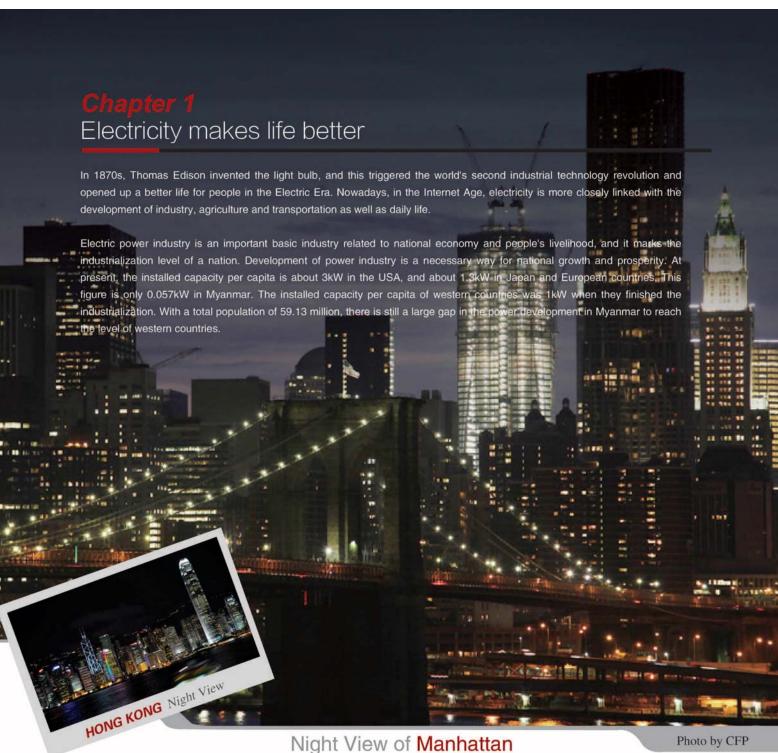


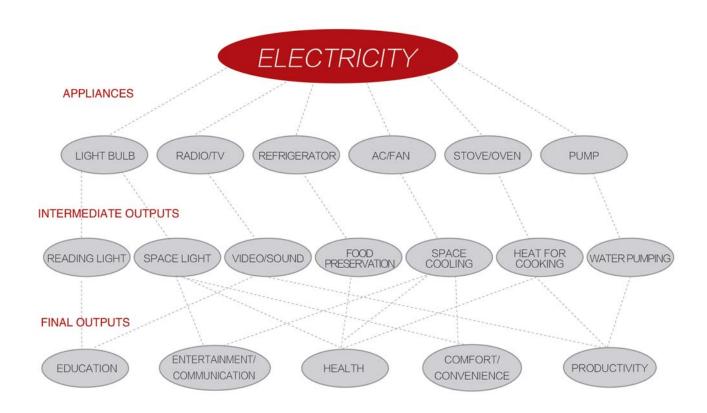
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Electricity makes city life more beautiful

Benefits of Electricity





Electricity makes farming easier



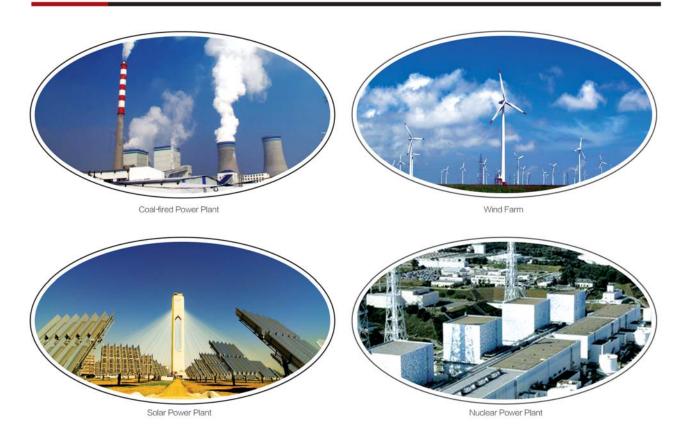
Electricity makes transportation more convenient



Electricity makes life more colorful

Chapter 2

Methods of Power Generation



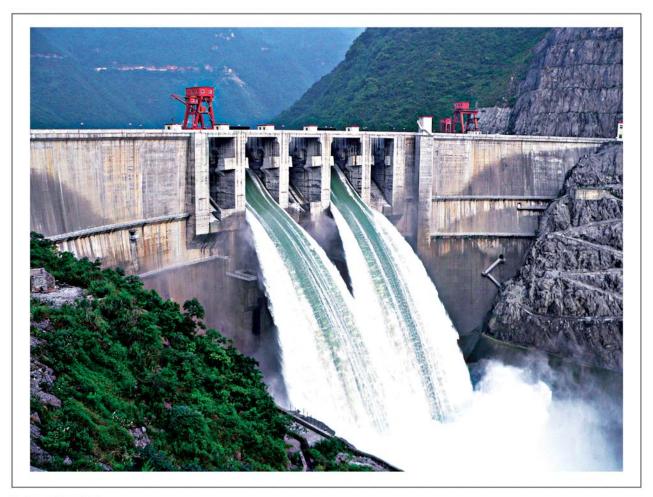
There are coal-fired, hydropower, nuclear, wind, solar, geothermal, tidal, biofuel and other types of power generation. In consideration of severe global warming and shortage of fossil energy, hydropower is one of the cleanest and most economical with multiple social benefits as compared to the other types of power generation.

Although coal-fired power can be implemented quickly, it has a high power cost. In addition, non-renewable primary fossil energy such as coal and oil is consumed, and nitrogen oxides, dust, etc. are emitted, resulting in relatively high environmental pollution.

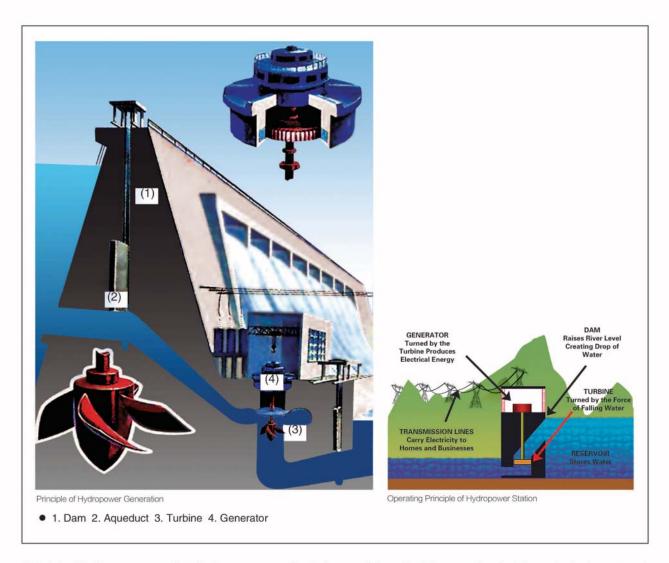
Nuclear power can be developed on a large scale with high efficiency, but it requires huge investment and complicated technology. In addition, the nuclear raw materials are hard to obtain, and the issues of nuclear safety are prominent.

Wind and solar energy is renewable without pollution, but the cost is high, the quality of electricity is low and it is hard to develop on a large scale.

Although hydropower requires huge investment and takes a long construction period, it only uses renewable natural water energy and there is no water loss and pollution. In addition, the cost of power generation is low, and the water can be re-used. So, hydropower has become one of the main methods for power generation.



Hydropower Power Station



Principle of hydropower generation: Hydropower generation is to convert the potential energy of water into mechanical energy and then into electric power. That is, the hydropower station is built on the river and utilizes the drop of water to drive the water turbine which turns the generator to produce electricity. After being used for power generation, water will flow back into the river to be re-used downstream.

Characteristics of hydropower generation

Hydropower does not consume primary fossil energy such as coal and oil, and it has comprehensive benefits such as flood control, irrigation, and fishery. Its main characteristics are as follows:

- (1) No loss of water: Hydropower only makes use of the energy carried by water flow and does not consume water, so the water used for power generation can still be re–used downstream.
- (2) Pollution-free: Hydropower will not cause acid rain, smog, dust and other pollutants. The use of 100 million kWh of hydropower can replace 32,700 tons of standard coal.
- (3) Low cost: The maintenance cost of a hydropower station is only 1/15 that of the coal-fired power plant with equal capacity.



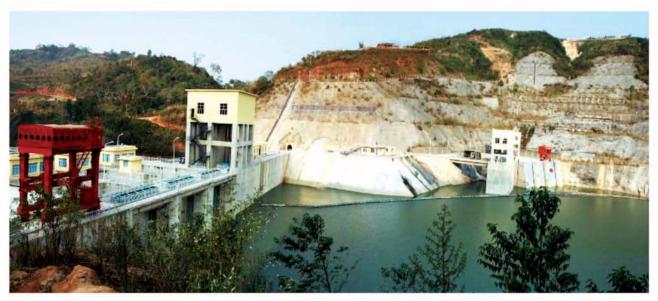
Itaipu Hydropower Station in Brazil and Paraguay, total installed capacity 14000MW, energy output 94.68 billion kWh in 2008, providing 90% of electricity consumed in Paraguay and 19% of that in Brazil



Hoover Hydropower Station in the USA, dam height 221m, installed capacity 2080MW, with flood-control, irrigation, water supply to city, and other comprehensive benefits



Three Gorges Hydropower Station in China



600MW Shweli Hydropower Station in Myanmar



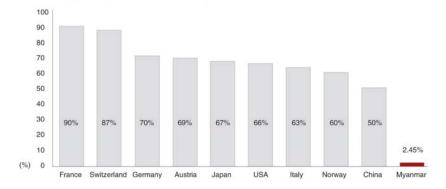
Yeywa Hydropower Station in Myanmar

Chapter 3

Hydropower is a Practical Selection for Industrialization in Myanmar

About 20% of global electric power is hydropower. According to the statistics of 2008, there are 16 countries in the world relying on hydropower to provide more than 90% energy; there are 49 countries relying on hydropower to provide more than 50% energy; there are 57 countries relying on hydropower to provide more than 40% energy. The average hydropower development rate in the developed countries has reached more than 60%, in which France is 90%.

Rate of Hydropower Development

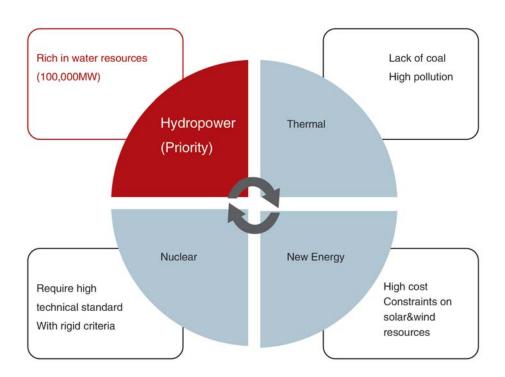


It is necessary to develop hydropower in Myanmar



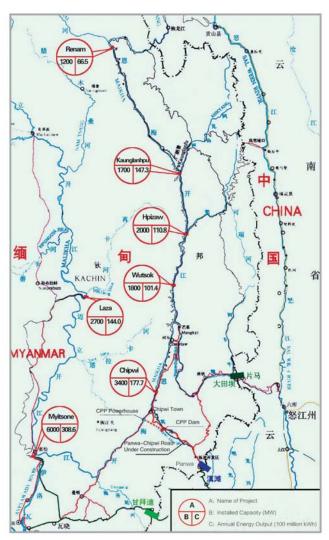
Hydropower is the best choice for Myanmar's energy industry development

With the steady progress of national industrialization, the demand for power is becoming greater and greater in industry, agriculture, transportation, and everyday life. The annual growth rate of power consumption has exceeded 10% and the power supply shortage is rather large. The proved uranium and coal resources in Myanmar are relatively deficient, making it difficult to develop coal–fired and nuclear power on a large scale. The efficiency of wind and solar power generation is relatively low, and they cannot meet the large power demand of the nation for realizing industrialization. However, Myanmar has abundant hydropower resources. The total installed capacity of hydropower reserve in the Ayeyawady River, the Chindwin River and the Thanlwin River is more than 100, 000MW, and the rate of development is only 2.45% at present. Hydropower is a necessary choice for national economic development, environmental conservation and improvement of people's livelihood.



Chapter 4

Joint Development of Hydropower Projects in the Upstream Ayeyawady River Basin by Myanmar and China



General Layout of Hydropower Projects in Upstream Ayeyawady River Basin

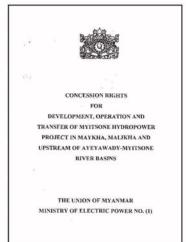
The Hydropower Projects in the Upstream Ayeyawady River Basin are located in Kachin state in northern Myanmar, including 7 cascade projects, i.e., Myitsone, Chipwi, Wutsok, Hpizaw, Kaunglanhpu, Renam, and Laza, and one Construction Power Plant (CPP) planned on Maykha, Malikha and Upstream of the Ayeyawady–Myitsone River Basins. The total installed capacity is about 20,000MW and the annual energy output is about 100 billion kWh.

These Hydropower Projects are the largest in the history of our country and have attracted high attention from the governments of Myanmar and China as well as strong supports from all circles in the society. Strict review and approval procedures of both countries have been performed for the development of the Projects according to law.

The implementation of these Hydropower Projects is significant for increasing the nation's utilization of clean energy, resolving the power bottleneck for economic growth, and promoting industry, agriculture, education, health, and transportation.







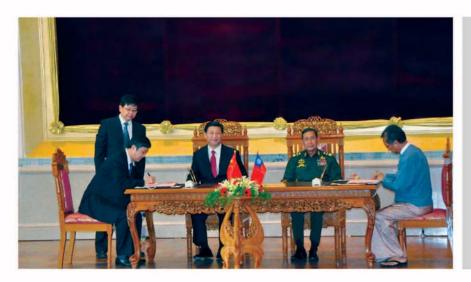
On 28 May 2010, the government issued the Investment Permit for Myitsone Hydropower Project. On 11 June 2010, the government issued the Certificate of Incorporation to Upstream Ayeyawady Confluence Basin Hydropower Company Limited. On 23 September 2010, the government granted the Concession Rights for Myitsone Hydropower Project.



Rendering of Myitsone Hydropower Project



On 27 March 2009, the Framework Agreement on Joint Development of Myanmar Hydropower Resources was signed in Nay Pyl Taw in the presence of Secretary-1 of the SPDC General Thiha Thura Tin Aung Myint Oo, and Mr. Li Changchun, Member of the Standing Committee of the Political Bureau of the CPC Central Committe, and the Projects were listed in the development plan for hydropower cooperation between both countries.



On 20 December 2009, the Joint Venture Agreement for Myitsone Hydropower Project was signed in Nay Pyi Taw in the presence of Vice Chairman of the SPDC Vice Senior General Maung Aye, and Mr. Xi Jinping, Vice President of China.



On 3 June 2010, the Joint Venture Agreements for Chipwi and Laza Hydropower Projects were signed in Nay Pyi Taw in the presence of Prime Minister U Thein Sein and Chinese Premier Mr. Wen Jiabao.

Enormous economic benefits: According to the BOT/JV Agreements, the Projects will be developed with foreign investment and technology, with a total cost of over 20 billion USD. After the completion of construction and operation for 50 years, the Projects will be transferred to the government free of charge. During the 50-year concession period, our country can receive economic benefit in the amount of about 54 billion USD. After the concession period, the nation can further obtain direct revenue of about 160 billion USD.



Nanmawkha Bridge



Renderings of Roads under Construction

Sufficient power supply: After all the Projects are completed, the nation can enjoy 10 billion kWh of free power every year. About 90 billion kWh of surplus power can be exported for foreign exchange earning, and the shortage in residential and industrial power supply in northern Myanmar will be ended forever.

Improving hydropower construction and management: Through the project construction, our country will achieve overall improvement in technology and management of hydropower construction and operation. At present, the training of Myanmar technical personnel for hydropower construction, management and operation has been started by the Chinese side.

Boosting economic development: The materials and equipment for the Projects amount to almost 20 million tons in total, mainly including cement, steel, oil, fly ash and explosive materials. With the improvement of production capability in our country, these materials will be gradually supplied from local sources.

Improving infrastructure construction: 750 kilometers of roads, 7 major cross-river bridges and well-developed hydrology and earthquake monitoring networks will be built in the Basins. They will improve the transportation conditions in northern Myanmar and provide a scientific basis for industrial and agricultural development, flood control, earthquake and disaster relief.

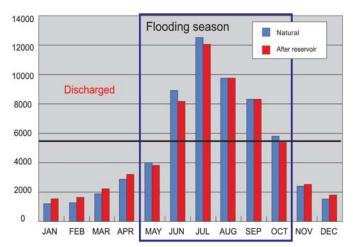






Rendering of Chipwi Bridge under construction

Improving flood control: After the Projects are completed, the flood control standard in Myitkyina will be improved from once in 5 years to once in 20 years. Meanwhile, the discharge of the Ayeyawady River in dry season will increase by 16% and the downstream water level will be raised by 1.5 feet, which helps irrigation and prevents intrusion of sea water. The discharge in wet season will decrease by 3.5%, playing a remarkable regulation role.



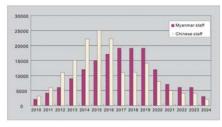
Change of flow rate before and after dam construction on the Ayeyawady River



Seismic station network distribution in the Upstream Ayeyawady River Basin



Myanmar hydropower technicians receiving professional training in China



Demand for Myanmar Workforce for the Project Construction



Enkhaga Hydrological Station and Meteorological site

Chapter 5

Scientific and Serious Environmental and Social Impact Assessment

Scientific and serious environmental and social impact assessment has been conducted for the Hydropower Projects in the Upstream Ayeyawady River Basin, in accordance with China's standards and with reference to the guidelines of the World Bank and the Asian Development Bank.

Authoritative environmental and social impact assessment organizations

Top international institutes, including Biodiversity and Nature Conservation Association (BANCA) from Myanmar, CISPDR from China, CAS South China Botanical Garden, CAS South China Institute for Endangered Species, Institute of Hydroecology under the Chinese Ministry of Water Resources, have been engaged to carry out the environmental and social impact assessment of the Projects. Right now, the special study of the environmental and social impact of the project development on the downstream areas is still under way, and BANCA is carrying out further in–depth social impact assessment.

Serious environmental and social impact assessment

For implementation of the Projects, equal importance has been attached to resource development and environmental protection, and strict investigation, analysis and approval procedures are followed to accomplish scientific environmental conservation. So far, the cost of environmental conservation has reached over 30 million USD, including more than 5 million USD for EIA and ecological conservation study.

Systematic field investigation

More than 100 experts from Myanmar and China conducted in-depth field investigations of the River Basin where the Projects are located from January to July 2009. During the investigations, more than 8000 plant specimens, about 2000 animal and bird specimens, more than 1000 fish and aquatic organism specimens were collected, and 18 water quality sections, 17 atmospheric environmental monitoring sites and 7 acoustic environment monitoring sites were monitored.

Wide public participation survey

The survey covered governmental officials, directly or indirectly affected persons, intellectuals, ecologists, representatives of people from different religions and ethnic groups, etc., with 340 questionnaires completed. It showed that most people were in the opinion that the project implementation would not produce remarkable adverse effect on the local environment.

Thorough survey of desires of PAPs

From March to May 2010, BANCA independently organized and conducted in-depth field social impact assessment including survey of the desires of the PAPs in the whole River Basin and baseline investigation of physical indicators before the resettlement physical indicator investigation of the Projects was started, which covered every single household of the PAPs.

EIA Field Investigation



Site Sampling and Monitoring by Experts









Experts Conducting In-depth Field Social Impact Assessment Investigation at Villages









Conclusions of Environmental Impact Assessment

- (1) The primary vegetations in the basin are extremely small in proportion. In particular, the vegetations in the river valleys where it is convenient for loggings to flow downstream are largely secondary in nature. The total submerged land area of the seven projects is only 1.4% of the total basin area. The impact of reservoir inundation on the vegetation cover is relatively small in general.
- (2) The protected species like Spinulose Tree Fern, Arethusa and Aquilaria Malaccensis etc. are sparsely distributed in the reservoir area. However, they are widely distributed in the other regions out of the submerged line of the reservoir. The project construction and reservoir inundation will not have impact on the biodiversity of terrestrial plants.
- (3) About 195 species of fish are distributed in the river sections and only two species of fish, Anguilla Nebulosa and Anguilla Bengalensis, belong to long distance migratory types. In addition, they do not usually live in the river section above Myitkyina. No adverse impacts will be caused by the Projects on the rare and endangered fishes. After the reservoirs are formed, the hydrological conditions downstream will be more favorable for the survival of the Ayeyawady dolphins.
- (4) The project development will have a minor impact on terrestrial animals and birds, with some apparent positive impacts on some species.
- (5) The assessment institutions performed public participation surveys on local people and ecologists, which covered people with different careers, ethnic groups, faiths and educational backgrounds. According to the surveys, it is found that: 80.4% of interviewees were in the opinion that the hydropower development could bring more job opportunities and higher incomes to local people, 62.8% of the interviewees were in the opinion that the hydropower implementation could significantly promote development of local economy, 13.8% of the interviewees, who were all from Tang Hpe village of Myitkyina, did not support the Projects and their major concerns were as follows: whether the property losses will be properly handled and compensated, whether there will be land to farm, whether infrastructure of new resettlement site will be better than before, and whether the quality of living will be lowered. At present, all the villagers from Tang Hpe have moved to the new resettlement village voluntarily.
- (6) The spoils, domestic sewage, garbage and excavations arising during the construction period may have some environmental impacts locally, but the adverse impacts can be mitigated after practical environmental protection measures are implemented.
- (7) After Myitsone Dam is completed, the confluence will be moved upward and a new confluence will be formed. The new natural landscape combined with the human landscape and supported by the improved infrastructure, will boost the growth of tourism sector in the basin.
- (8) During the project construction and operation periods, there are no environmental limitations, and the Projects are feasible environmentally.

On 11 January 2011, the EIA Report of the Hydropower Projects in the Upstream Ayeyawady River Basin was approved by MOEP (1) after more than two years of field investigations and studies.

Chapter 6

Upstream Ayeyawady Confluence Basin Hydropower Co., Ltd. a Responsible Large Enterprise in Myanmar

Upstream Ayeyawady Confluence Basin Hydropower Co., Ltd.(ACHC) carries on the corporate spirit of "providing green energy to serve the general public", and implements the hydropower development philosophy of "constructing a hydropower station to promote the local economy, improve the environment, and bring benefits to the public". It also proactively fulfills its social responsibilities, endeavors to build first-class international hydropower projects, and serves the social and economic development of our country.

Project partners

In February 2010, Ministry of Electric Power No.1 (MOEP(1)), CPI Yunnan International Power Investment Co., Ltd (CPIYN), and Asia World Company Limited (AWC) jointly established ACHC in Nay Pyi Taw. MOEP(1) owns 15% free share, CPIYN 80%, and AWC 5% by cash contribution. In June of the same year, the Trade Council of Myanmar approved the registration of ACHC.

Since 1988, MOEP(1), which is in charge of power investment, construction and operation, has greatly promoted the development of national power industry and built 23 new hydropower, thermal and gas stations to achieve a rapid national installed capacity growth from 529 MW to 3366 MW. In 2001, a 30-year power strategy plan was launched. At present, 129 power stations are under way, with a total installed capacity of 45303.5 MW.

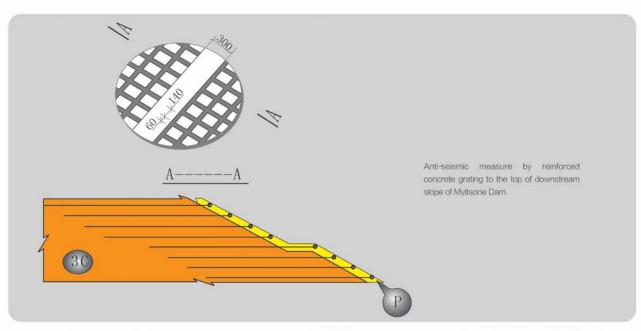
China Power Investment Corporation (CPI) is one of the five largest power generation groups in China, and its main businesses cover hydropower, thermal power, nuclear power, wind power, coal, aluminum industry, railway and port. By the end of 2010, the total assets of CPI have reached RMB 440.3 billion and it has achieved the coal production capacity of 72.75 million tons, 2.08 million tons of electrolytic aluminum, and 70720 MW of installed power capacity. Among that, the installed capacity of hydropower is about 20000 MW, in which the hydropower installed capacity in the middle and upper Yellow River Basin alone exceeds 10000 MW. CPI has rich experience in the field of river basin hydropower development.

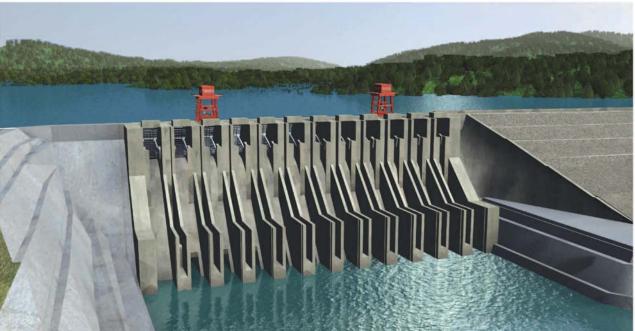
AWC is one of the biggest business groups in Myanmar, and its main businesses include minerals, energy, telecommunications and many other sectors. It actively takes part in the infrastructure construction such as airports, docks and roads as well as national public welfare undertakings.

Science, responsibility and safety

Well-known hydropower design and research institutes have been engaged through international bidding, and made responsible for project planning, survey and design. Besides, top organizations from Switzerland, Japan and other countries were also hired to conduct scheme study and special consultation to ensure absolute safety and reliability of the engineering plans of the Projects.

Since 2005, professional experts have been organized to inspect and survey the River Basin for seven times. All the damsites determined at present are the best in terms of environmental impact, construction conditions, comprehensive benefits, etc.





Myitsone Dam (139.5m high, CFRD dam)

Concrete Faced Rockfill Dam (CFRD) or concrete gravity dam is selected as they are technically proven, safe, reliable and widely used all over the world.

On 12 May 2008, a massive earthquake measured at magnitude–8 with a seismic intensity of 10 struck China's Wenchuan County. However, no dam failure occurred in the thousands of hydropower stations within the quake area. The Zipingpu, Shapai, Bikou and Baozhusi dams in the epicenter, which are concrete dams or CFRDs more than one hundred meters high, all stood the test of this earthquake that exceeded their designed seismic intensity of 8.

On 11 March 2011, a magnitude–9 earthquake hit Miyagi Prefecture in Japan, which caused the serious Fukushima nuclear leak accident. However, according to the statistics of Japan Commission on Large Dams, over two hundred large and medium dams within the quake area all stood this earthquake.

Strict and high-level anti-seismic design criteria adopted

The designed seismic intensity of Myitsone Hydropower Project is 9. In addition, anti-seismic fortification measures such as reinforced concrete grating to the top of downstream dam slope are also taken. In case of emergency, the reservoir water level can be rapidly lowered through the surface and middle discharge outlets on the spillway dam to ensure safety of the dam and downstream area.

Ensuring flood control safety

The checked flood standard of Myitsone Dam is once in 10000 year. In the design of Myitsone Dam, another 15% has been superimposed on the result of the 10000-year flood frequency analysis as the basis for flood control design.



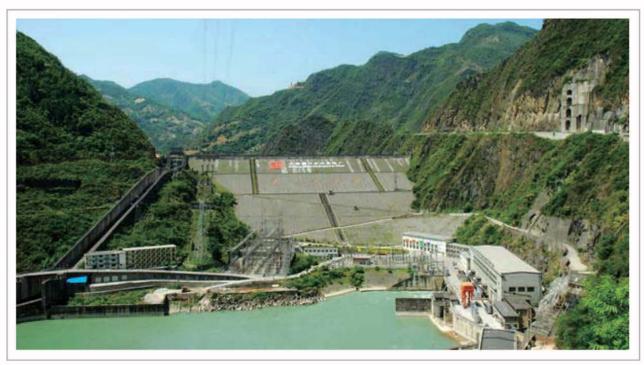
Rendering of Chipwi Dam



Meeting of Technical Advisory Committee for the Projects



Zipingpu CFRD Dam Overviw after Earthquake (156m high)



Bikou Dam (101m high, earth and rock dam)



Baozhusi Dam (132m high, concrete gravity dam)



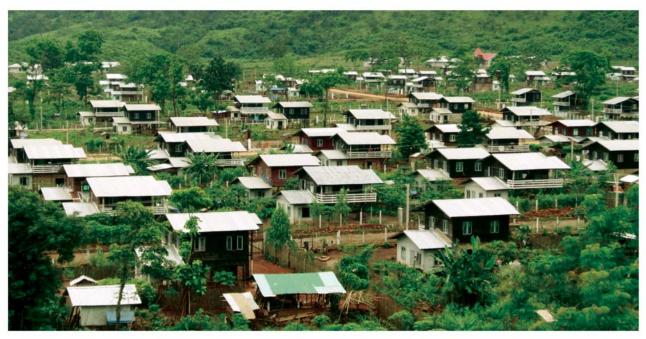
Shapai Dam (130m high, RCC arch dam)

Fulfilling social responsibility

Resettlement work

The River Basin of the Projects features a typical deep river valley terrain. The area to be submerged after the completion of the Projects only accounts for 1.4% of the entire basin area. The number of people to be relocated in the submerged area is less than 20,000.

Based on the resettlement guidelines of the World Bank and the Asian Development Bank and following the principle of "fully respecting the desires of the PAPs and ensuring their living status is not lower than their original level and is improved", ACHC has seriously conducted the resettlement physical indicator investigation and resettlement planning. The new resettlement villages have been built with high standard and the resettlement production program has been implemented to ensure that the PAPs are willing to move, have a stable life and have capacity to develop.



Bird's Eye View of Resettlement Village



Prime Minister U Thein Sein meeting with PAPs at resettlement village in January 2011

At present, the resettlement work for Myitsone dam site area has been substantially finished. The dam site area of Myitsone Project involves 5 villages including 410 households with a total number of 2,146 people, public facilities such as monasteries, churches, schools and hospitals. In order to accomplish the resettlement, ACHC, by considering the desires of the PAPs, has selected two places with convenient transport, good environmental and topographic conditions to build Aungmyintha and Maliyan model villages. Consultations were made with PAPs about the types of buildings and relocation subsidy, and timely adjustments were made to the resettlement planning, design and organization of construction according to the opinions of PAPs.



The resettlement houses are all two-storey brick and timber structures of Kachin style



Original house of PAPs



 $19.68\ \mathrm{km}$ new concrete road built in resettlement village, with free power and water supply to community



PAPs enjoy better life with donated TV





New school with complete facilities.....











New Hospital



New Church



Old Hospital



Medical care in fully-equipped hospital



Old Church



Handover Ceremony for New Church

All the houses of PAPs were improved to two-storey brick and timber structures of Kachin style.

Assistance has been offered to each family for moving all their property to the new resettlement villages. 100,000 kyat subsistence allowance, rice for one year consumption, a 21-inch color TV and domestic supply were issued to each family.

Proper compensations were made for privately owned orchards and economic trees. The total compensation expense for Myitsone dam site reaches 4.1 billion kyat. At present, compensations to the relocated PAPs have substantially been issued.

The public facilities such as churches, monasteries, schools, hospitals, police stations, fire control and administration buildings, post offices and market places with relatively high standards have been built, and the community functions are further improved. The churches, monasteries, schools and hospitals have been furnished with furniture and equipment, and the teaching materials, school uniforms and stationeries were delivered to all the students.

440 acres of land were reclaimed and allocated to the PAPs. In order to restore production as soon as possible, 100,000 kyat land consolidation fee, 30 kg of rice seeds and 50 kg of fertilizers were issued to each household.

19.68 km of new concrete roads was built in the new resettlement villages, and stable water and power supply is provided for the community free of charge. Thus, the conditions of infrastructure were greatly improved.

On 10 April 2011, over 50 people of visiting group of military attachés from various countries, led by Col. Sloan, the American military attaché to Myanmar visited the new resettlement village and spoke highly of the resettlement. The military attachés praised the contributions that ACHC had made to the locals, and suggested that international media be invited to visit the site.





Farming in newly reclaimed land

Our government and ACHC are committed to the long-term assistance and support for the PAPs. At present, assistance and support measures are being prepared. The plan for building cultivation and vegetable farming bases is proposed in the river basin. The local people are attracted to participate in the project construction and to provide logistics services, aiming at creating more and better job opportunities so as to ensure the long-term sustainable development of the PAPs.

In accordance with the MOA for the Projects, a special fund is provided for the project resettlement, mainly covering compensations for houses, fruit and economic trees, farmland reclamation, reconstruction of submerged roads, bridges and public facilities, reservoir clearance, sanitary treatment, etc.



Compensations Paid to PAPs



On 10 April 2011, military attachés from various countries visited the new resettlement village and spoke highly of the

Assistance to improve the local infrastructure

From 2009 to 2011, ACHC renovated the border gate at Panwa, upgraded the clay-bound macadam pavement to concrete pavement for Chipwi town road, Panwa town road and Myitsone-Myitkyina road, and maintained Myitsone-Laza and Myitkyina-Kampaiti roads. Moreover, ACHC has constructed several power transmission lines such as CPP-Chipwi town, CPP-Wa shawng (for Myitkyina) and Myitsone-resettlement village lines, which create good conditions for better access of the local people to electricity generated from the Projects.

Creating more job opportunities

In order to benefit the PAPs in the project construction, ACHC has made all efforts to create conditions for better welfare of the local people. The construction companies have been encouraged to hire the local people in the project construction according to their desires, provide jobs and training for them, and make them fully benefit from the project construction.

Creating conditions for development of the local businesses

ACHC has actively cooperated with the local enterprises through all kinds of channels. Up to now, dozens of cooperative works have been created for them.

Contribution to disaster relief

In the disaster relief for cyclone Nargis in May 2008, earthquake in Shan State in March 2011, etc., ACHC donated cash to the disaster-affected areas for many times. Project workers made their contributions to fire fighting, disaster relief and epidemic prevention.







ACHC Assisting in Fire Fightings in Myitkyina



Original Myitkyina-Myitsone Road



Reconstructed Myitkyina-Myitsone Road



Myanmar staff Working for Projects



Upgraded Chipwi Road



Myanmar Technicians on Site

A Better Tomorrow of the Ayeyawady River

It is our common dream and pursuit to implement the Upstream Ayeyawady River Projects to realize the prosperity of the nation and happiness of the people. With the close attention of governments of Myanmar and China as well as great support of the people in both countries, the project construction is progressing in good order.

In April 2008, 99 MW CPP was officially started, and the first unit will be put into operation within this year.

At the end of 2009, 6000 MW Myistone Project started construction, and the first unit is scheduled to be put into operation in 2017.

At the end of 2010, 3400 MW Chipwi Project began construction, and the first unit is scheduled to be put into operation in 2019.

In the next five years, Laza, Wutsok, Hpizaw, Kaunglanhpu and Renam Projects will be started one after another. By the time, these hydropower projects will stand among the high mountains in northern Myanmar to form an advanced and complete power grid to provide stable, clean and cheap power uninterruptedly. They will play a much greater role in boosting the economic growth and improving the daily life of the people.

The beautiful Ayeyawady River flows day and night and will never stop.

The Ayeyawady River will witness a clearer sky, cleaner water and more beautiful scenery in the future.

The Ayeyawady River will have a brighter and more beautiful tomorrow.

For more information, please visit our website at www.uachc.com