ANNUAL REPORT ON ENVIRONMENTAL PROTECTION

2017

China Three Gorges Corporation

About the Report

Duration of Reference

From January 1 to December 31, 2017. The report may include content outside of this period.

Scope of Content

This report includes all the environmental protection-related work involved in the main business of CTG, excluding the environmental protection of its share-participating projects.

Definition of Environmental Protection

Environmental protection in our report includes not only the management of the environmental impacts caused by the business operation of CTG, but also the soil and water conservation, ecological restoration, energy conservation and emission reduction.

Terms of Reference

In this report, “the Company”, “the Corporation” and “CTG” all refer to China Three Gorges Corporation.

Publication of Report

CTG annual report on environmental protection has been published for thirteen consecutive years since 2006. The electronic versions can be downloaded from the official website of CTG.

Data in Report

All the data used in this report are CTG’s final statistical data from 2017.

The Standards Referred to

- *Environmental Protection Law of the People’s Republic of China* (Revised on April 24, 2014)
- *Guidelines for Drafting on Corporate Environmental Report* (HJ 617-2011), National Environmental Protection Standards of People’s Republic of China
- *Plan for Information Disclosure Mechanism of Construction Project Environmental Impact Assessment*, Ministry of Environmental Protection of the People’s Republic of China
- *GB/T 36000-2015 Guidelines for Social Responsibility*, National Standard of People’s Republic of China
- *Sustainability Reporting Guidelines (G4)*, the Global Reporting Initiative (GRI)
- *Hydropower Sustainability Assessment Protocol*, International Hydropower Association (IHA)

Languages Available

The annual reports on environmental protection of CTG are available in both Chinese and English editions, and are published in print version and online electronic version. The electronic version can be downloaded from the website of CTG (http://www.ctg.com.cn) . For printed hardcopies, please email mi_chuang@ctg.com.cn or call 86-10-57081673.

Further Reading

For more information, please visit the website of CTG (http://www.ctg.com.cn). Other related information concerning environmental protection can be found in the following documents:

Ecological and Environmental Monitoring Bulletin of the Three Gorges Project

Annual Report of China Three Gorges Corporation

Social Responsibility Report of China Three Gorges Corporation

Social Responsibility Report of China Yangtze Power Co., Ltd.

Social Responsibility Report of Hubei Energy Group Co., Ltd.

Upcoming Goals

- To gradually standardize the report compilation in accordance with *Guidelines for Drafting on Corporate Environmental Report* (HJ 617-2011), which is the National Environmental Protection Standards of People’s Republic of China.
- To further improve environmental management, achieve more comprehensive and in-depth management of environmental responsibility, and enhance transparent disclosure of environmental information according to *GB/T 36000-2015 Guidelines for Social Responsibility*.
- To introduce the *Hydropower Sustainability Assessment Protocol* compiled by IHA and take into consideration the actual situations in China in order to draw support from the studies of China’s hydropower sustainability assessment guidelines to form an environmental practice disclosure system for hydropower development enterprises with Chinese characteristics.

Contents

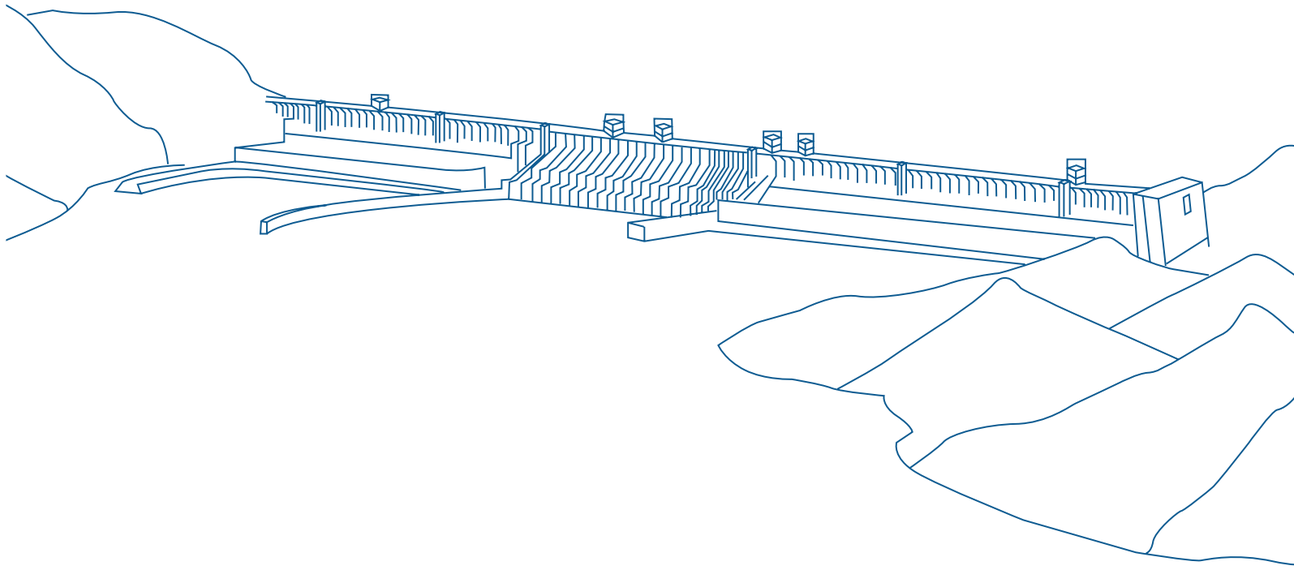
Message from Top Management

Lu Chun
Board Chairman

Wang Lin
President

In the Report to the 19th CPC National Congress in 2017, harmonious coexistence of man and nature and the construction of a "Beautiful China" were defined as one of the basic policies and strategies for continuous development of socialism with Chinese characteristics and one of the goals of the overall construction of socialism in the new era. The Report also proposed a guideline of "promoting well-coordinated environmental conservation and avoiding excessive development" for pushing ahead the development of the Yangtze River Economic Belt and environmental protection efforts in this region. CTG, as a key SOE with its roots in Yangtze River and Three Gorges Project underpinning its development, shares the commitment of Communist Party of China to serve the people and the future and destiny of China. Bearing in mind its social responsibility, CTG takes the initiative to undertake the new mission of protecting the Yangtze River hand in hand with other stakeholders. On the other hand, a major transformation is happening with CTG - a shift of focus from "Constructing the Three Gorges Project and Developing the Yangtze River" to "Managing the Three Gorges Project and Protecting the Yangtze River" as well as "Restoring Yangtze River to its natural beauty".

During the past year, CTG thoroughly studied and implemented the Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. Following its philosophy of "building a hydropower station, facilitating local economy, improving local environment, and benefiting resettled residents", and focusing on its strategic goal of constructing a world-class transnational clean energy group with strong innovation capabilities and global competitiveness, CTG carried out environment programs covering all operations, the whole river basin and throughout business processes. New records have been set in the operation and management of cascade hydropower stations in the Yangtze River basin. The comprehensive benefits of the Three Gorges Project in flood control, shipping, power generation as well as ecological and environmental protection have been brought into full play; Xiluodu and Xiangjiaba cascade hydropower stations have been in safe and efficient operation; the main electromechanical equipment of Wudongde Hydropower Station enter the stage of designing and manufacturing, and Baihetan Hydropower Station was successfully approved by the State, signifying a new stage for CTG where two 10-gigawatt-level giant hydropower stations under construction in parallel with each other. Joint reservoir operation for cascade hydropower stations in the basin was actively carried out to improve utilization of water resources and to bring such functions as flood control and water replenishment into effective play, greatly promoting the development of the Yangtze River Economic Belt.



During the year, CTG promoted large-scale cluster development of new energies such as wind power, photovoltaic energy and pumped-storage hydropower, etc., pushed ahead with innovation-driven development of new energies, and took the development and operation of offshore wind power in China to a new epoch featuring gigawatt scale projects. CTG proactively served the "Belt and Road" initiative by joining hands with leading Chinese enterprises engaged in hydropower to form a national force for global competition, led Chinese hydropower enterprises overseas with their equipment, technology and standards to create an upgraded version of "Going Global" for the Chinese hydropower industry, and facilitated the sustainable development of global clean energy industry.

During the year, CTG actively implemented the philosophy of green development, -launched efforts to protect the Yangtze River together with other stakeholders, mobilized internal and external resources to form specialized entities for protection of the Yangtze River, and accelerated progress in shaping a virtuous cycle where CTG's operation works better with local government and community in a coordinated matter so that sustainability and win-win outcomes can be delivered. We continuously strengthened ecological and environmental protection, conducted joint ecological operations with a cascade of reservoirs in the Yangtze River basin, and set a record in facilitated spawning of the four domestic Chinese carps; we reached agreements on environmental protection with local governments beginning with urban sewage treatment, actively explored new approaches to ecological restoration, pushed ahead with water pollution prevention and treatment, aquatic ecological restoration, and water resources protection to protect the Mother River of the Chinese nation with our actions. In 2018, guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, adhering to the core values of "devotion, responsibility, innovation and harmony" and following the philosophy of "ecology first and green development", CTG will plunge into work with a sense of responsibility and urgency in mind, seizing every minute, to effect the implementation of the measures for the protection of the Yangtze River, build quality green projects, explore new modes for the restoration of ecological environments that can be copied and popularized, promote the sustainable development of clean energies at home and abroad, assist the construction of a "Beautiful China", and make greater contribution to the harmonious coexistence of man and nature.

Panorama of the Three Gorges Project

About Us

China Three Gorges Project Corporation was formally established on September 27, 1993, renamed as “China Three Gorges Corporation” on September 27, 2009, and was restructured on December 28, 2017 (hereinafter referred as “CTG” or “the Group”).

CTG is strategically positioned to actively serve the development of the Yangtze River Economic Belt and the “Belt and Road” Initiative, play a backbone role in integration of the Yangtze River Economic Belt and the well-coordinated environmental conservation in the Yangtze River Basin; provide guarantee for promoting regional sustainable development; take the lead in promoting the upgrade and innovation of the clean energy industry; and continue deepening the reform of the enterprise so as to speed up the process of developing CTG into a world-class transnational clean energy group with strong innovation capabilities and global competitiveness. After more than 20 years of sustained and rapid development, CTG has become the largest hydropower development enterprise in the world and the largest clean energy group in China. As of the end of 2017, CTG’s main business covers the construction and management of hydropower projects, power generation, international investment and contracting, the development of wind and solar power, amongst other renewable energies, the comprehensive development and utilization of water resources, and relevant professional technical consulting services. As of the end of 2017, CTG owns 315 wholly-owned and holding subsidiaries and 2 holding listed companies, with business operation in 31 provinces, municipalities and autonomous regions in China and covering 47 countries and regions around the world.

As of the end of 2017, CTG has a consolidated installed capacity of 70,017 MW, and a total installed capacity covering completed, under-construction, and equity projects of 124 GW (of which renewables accounted for 96%), and its consolidated hydropower capacity accounts for 16% of that in China. As of the end of 2017, the assets of CTG amounted to more than 700 billion yuan, delivering excellent operating results.

CTG is responsible for the construction and operation of the Three Gorges Project. With 20 years of hard work, the preliminary design and construction tasks of the Three Gorges Project was completed on schedule in 2009, and the ship lift was put into trial operation in September 2016. Authorized by the State, CTG is also responsible for the development, construction and operation of four world-class mega-sized cascade hydropower stations in the lower reaches of the Jinsha River (upper reaches of Yangtze River), i.e., Xiluodu, Xiangjiaba, Wudongde and Baihetan. By the end of the 13th Five-Year Plan, Wudongde and Baihetan Power Stations will be completed and put into operation successively. Then CTG will own five of the top 10 hydropower stations in terms of installed capacity and over 2/3 hydro-generators with a capacity over 700 MW in the world.

CTG actively develops new energy business such as wind power and solar energy, and strives to build new energy business as its second business pillar and become a leader in offshore wind power. Closely following the “Belt and Road” initiative, CTG accelerates its progress of “Going Global” and strives to upgrade the industry and compete in the international market. So far, overseas business has become an important growth point for the sustainable development of CTG.

In the process of hydropower development and construction, CTG thoroughly implements the spirits of 19th CPC National Congress,and the five development concepts of innovation, coordination, green development, opening-up and sharing, earnestly practices the principle of “building a hydropower station to facilitate local economy, improve the environment and benefit resettled residents”, and play a major role in establishing well-coordinated environmental conservation in the Yangtze River Basin to actively fulfill the social responsibilities of a central enterprise. While giving full play to the ecological benefits such as flood control and disaster relief, water conservation as well as energy conservation and emission reduction of the cascade complexes in the Yangtze River Basin, CTG makes efforts to coordinate the hydropower development and the ecological, social and economic benefits through engineering measures, technical means and scientific operation. Additionally, CTG is also actively involved in targeted poverty alleviation, fixed-point poverty alleviation, partner support, cooperation between enterprises and local comminities, providing assistance to Xinjiang and Tibet, among other social activities for public good, and continuously promotes the coordination of the hydropower development, stability & prosperity of resettled residents, ecological environmental protection and local economic & social development, making efforts to benefit more people with the achievements of reform and development.

890 million RMB
Environmental Protection Investment in 2017

237.59 TWh
Total Clean Energy Generation in China

73.416 million tons
Equivalent of Standard Coal Use Reduction

188.46 million tons
Equivalent of CO_2 Emission Reduced

96%
Renewables' Share Among CTG Total Installed Capacity

16%
Hydro Capacity's Share Among Hydropower Market in China

100%
Implementation Rate of Evaluation of Environment Impacts of New Projects

1.08 billion
Quantity of Oosperms of the Four Domestic Chinese Carps Hatched as a Result of the First Joint Ecological Operation at Cascade Reservoirs in the Yangtze River Basin

By the end of 2017
over **5** million
Chinese sturgeons had been released into the Yangtze River on a cumulative basis
accounting for over **2/3**
of total sturgeons released throughout the country

Flood discharge from the Xiluodu Dam

Leading Green Development for Ecological Progress

2017

Ecological protection comes with lasting benefit. The Report to the 19th CPC National Congress in 2017 advocates that we should firmly establish a socialist outlook on ecological protection, facilitate the formation of a new dynamism for modernization with man and nature co-exist harmoniously, contribute our efforts to the protection of ecological environments. President Xi Jinping emphasized that “Developing clean energy is an overarching task for improving the energy structure, ensuring energy security and promoting ecological progress.” Clean energy development is an important part of green development. CTG has been committed to becoming a world-class transnational clean energy group, implementing and leading green development and has formed a philosophy of environmental protection covering “all business operations, the whole river basins and throughout management process” to realize transformation from the protection of environments for the development and operation of hydropower in the basin to the management and control of environments for a comprehensive clean energy group.

CTG, as a key SOE with its roots in Yangtze River and Three Gorges Project underpinning its development, shares the commitment of Communist Party of China to serve the people and the future and destiny of China and has a stake in the green development of the Yangtze River. The Report also proposed “Promoting well-coordinated environmental conservation and avoiding excessive development” as an guideline for pushing ahead with the development of the Yangtze River Economic Belt. CTG is actively integrating itself into and implementing the new mission of protecting the Yangtze River hand in hand with other stakeholders, committed to becoming a world-class clean energy group in harmony with ecological environments and playing a leading role in delivering the comprehensive benefits of the Yangtze River basin.

Providing
Clean Energy for Society

Implementing
Green Development Initiative for Ecology

Providing Clean Energy for Society

China Three Gorges Corporation (CTG) keeps firm to hydropower development as the main business, and expands its business in new fields in wind and solar power and international business. CTG expands its industrial chain further to two ends, i.e., water resources development & protection and power distribution & sales, making efforts to protect the fresh water resources in China; expands the new energy business, with the aim of becoming a leading player in offshore wind power and creating a model for green development of the whole business; and follows closely the Belt & Road initiative, driving China's competitive hydropower production capacity to "Go Global" and establishing CTG presence in selected international clean energy markets.

100%
China's first large hydropower station with 100% domestically produced power units

Largest
The largest floating photovoltaic power station in the world is completed

13.1 TWh
The new energy power generation in China reaches 13.1 TWh, with a year-on-year growth rate of 30.1%

Four cascade hydropower stations in the mainstream of the Yangtze River play the role of saving energy and reducing emission

The total power output of the four cascade hydropower stations on the mainstream of the Yangtze River reached 210.893 TWh in 2017. Hydropower is a renewable and clean energy source with great effects in saving energy and reducing emission, thus playing an active role in optimizing the energy structure in China, promoting the development of the national economy and building the Yangtze River Economic Belt.

Note 1: According to the Annual Development Report on China's Power Industry 2017, the net coal consumption of coal-fired power stations in China in 2016 was 312 g/kWh (standard coal), and the emissions of CO_2, SO_2 and NO_x from each unit of coal-fired power generation are 8.22g/kWh, 0.39g/kWh and 0.36 g/kWh respectively. So producing 100,000 MWh of clean hydropower means 31,200 tons of standard coal will be saved, which is equivalent to reducing 82200 tons of CO_2, 39 tons of SO_2, and 36 tons of NO_x.

Note 2: According to the recommended data of the Development Research Center of the State Council (DRC), 1 hectare of broad-leaved forest absorbs about 365 tons CO_2 per year.

Offshore wind, from Fujian to the rest of the country

Following the development principle of "one industry base in Fujian, covering both ends of the value chain and expanding nationwide", CTG has completed its blueprint of offshore wind power market in the "13th Five-Year Plan" along the some 18,000km coastline starting from Zhuanghe, Dalian of Liaoning in the north to Yangjiang of Guangdong province in the south.

In 2017, CTG completed the construction of the 202 MW offshore wind power project in Xiangshui, and the secured domestic offshore wind power resources totaled 13,190 MW, of which 230 MW were constructed and put into operation, 1,440 MW is under construction or approved for construction, and 11,520 MW are subject to preliminary work in the pipeline. In the next two years, the first 1,000-MW class offshore wind cluster in China will be constructed.

Pilot wind farm in Xinghua Bay

Further reading: Compared with onshore wind power, China abounds in offshore wind resources and offshore wind farms occupy no farmland. Being close to power load centers and high in power generation availability hours makes it well suitable for large-scale development. According to the planning for wind power development in the national 13th Five-Year Plan, by 2020, the offshore wind power construction in China will reach 10,000 MW, with the ambition of a cumulative grid-connected capacity of 5,000 MW.

The world's largest floating photovoltaic project successfully connected to the grid for power generation in Huainan, Anhui

By utilizing abundant solar energy resources in Huainan, CTG builds a floating photovoltaic project on the idle water surface of the coal-mining subsidence area in Huainan area of Anhui Province with a total investment of about 1 billion yuan. This floating photovoltaic project, with a total installed capacity of 150 MW, was successfully connected to the grid in December 2017. Upon completion, its annual power generation will be about 150 GWh, which is equivalent to planting about 530 hectares of broad-leaved forest and saving about 53,000 tons of standard coal annually, or reducing about 199,500 tons of CO_2 emissions and 54,000 m^3 of logging, and can meet the electric power demand of about 94,000 urban and rural households. Through the construction of the photovoltaic base combined with ecological management.

CTG actively explores the new mode to combine solar farm operation with fishery via which the subsidence area is changed into a green energy base. With this, a foundation for the promotion and application of floating photovoltaic power generation in China is laid, and farmers' income is increased.

Further reading: Different from traditional photovoltaic power plants, in floating photovoltaic power plants, the photovoltaic power generation components are installed on floaters on water surface, so that no land is occupied and less water is evaporated. Photovoltaic modules and cables are cooled by water, which significantly improves power generation efficiency.

Implementing Green Development Initiative for Ecology

Four Measures Set in Motion for the Protection of Yangtze River

It is the unshirkable duty and mission for CTG to play a key role in the Well-coordinated Environmental Conservation in the Yangtze River Basin. CTG has initiated the protection efforts in the Yangtze River Basin, and seeks to promote the construction of the Yangtze River Economic Belt with environmental protection as a priority to ensure green development.

CTG attends the meeting of the National Leading Team for Promoting Development of Yangtze River Economic Belt

01

CTG establishes the Leading Team for Well-coordinated Environmental Conservation in the Yangtze River Basin, actively engage in dialogues with the National Development and Reform Commission and other relevant ministries and commissions, and attends the office meetings of the Leading Team for Promoting Development of Yangtze River Economic Belt, thus steadily pushing forward progress on all fronts.

02

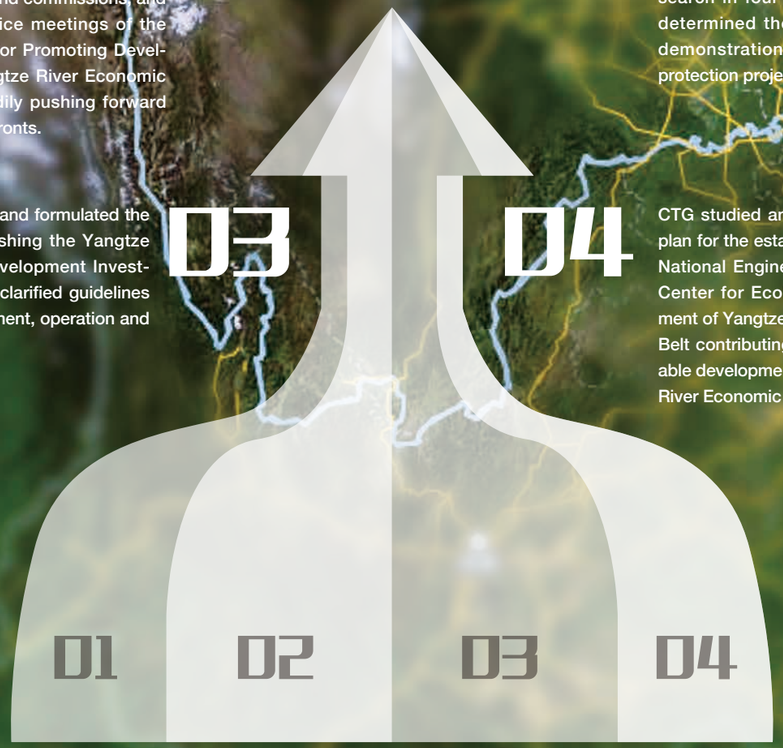
CTG has established the preparatory team of China Yangtze River Ecological & Environmental Protection Group Co., Ltd., developed the establishment plan, completed the joint research in four provinces, and determined the first batch of demonstration environmental protection projects.

03

CTG developed and formulated the plan for establishing the Yangtze River Green Development Investment Fund and clarified guidelines for its establishment, operation and management.

04

CTG studied and proposed the plan for the establishment of the National Engineering Research Center for Ecological Environment of Yangtze River Economic Belt contributing to the sustainable development of the Yangtze River Economic Belt.



CTG in Dialogue with Yichang Government on Yangtze River Protection

The 1st Meeting of CTG's Leading Team Environmental Conservation in the Yangtze River Basin

CTG and Power Construction Corporation of China signed a strategic cooperation framework agreement on environmental conservation in the Yangtze River Basin

Innovation- in Support of Ecological Protection

CTG strictly implements the measures for improving ecological environment and mitigating impact, carries out fish habitat protection in river basins, systematically conducts ecological protection research work, creates a model of river basin ecological protection, and has long been committed to the protection of rare and endemic fish species such as Chinese sturgeons and the conservation of natural resources in the Yangtze River, which promote the ecological protection in the Yangtze River Basin.

The first time to establish the molecular technology of Chinese sturgeon sex identification in the industry

Low-temperature water mitigation method was patented

In 2017, more than 200,000 individuals of rare fish in the Yangtze River were bred and released in Xiangjiaba and Wudongde Hydropower Stations. Among them, more than 28,900 individuals fall into the National Grade I & II Protected Fish Species, setting a new record so far

Chinese Sturgeon Protection and Releasing

In order to protect Chinese sturgeon, an ancient and rare species, the Chinese Sturgeon Research Institute of CTG has carried out a series of protection and research work and gained outstanding results. In 2017, new progress was made in the conservation of species, genomic research and germplasm bank of Chinese sturgeon. The complete artificial propagation of second filial generation of Chinese sturgeon was successful again, effectively supplementing the second filial generation artificial population echelon.

The preliminary assembly of the genome structure of Chinese sturgeon was completed; the BAC library of the Chinese sturgeon genome was successfully established; the genetic management of the artificial Chinese sturgeon population was further enhanced, with the genetic characteristics of the 200 first filial generation individuals from 2006 to 2008 studied, thus supplementing the parental fish genetic lineage; research efforts also focused on conservation techniques of germplasm resources such as sperm and cells.

On April 8, 2017, the 59th Chinese Sturgeon Releasing Event in Three Gorges of Yangtze River was held in Yichang, and 500 Chinese sturgeons with an average weight of 5.5kg were released, of which the releasing specification is the highest in history. To monitor the effect of the Chinese sturgeon releasing and by means of various technologies such as sonar monitoring, Internet and wireless transmission, a monitoring system for the released Chinese sturgeons covering the middle and lower reaches of the Yangtze River (from Yichang to Hekou) is established. This is the most comprehensive real-time monitoring and evaluation system for fish releasing effects with the most extensive coverage in China.

Parent fish echelon rearing workshop of the Chinese Sturgeon Research Institute

Laboratory of the Chinese Sturgeon Research Institute

Ecological Operation for Suitable Hydrological Conditions

CTG conducted ecological operation for the natural reproduction of the four major Chinese domestic carps in the middle reaches of the Yangtze River for the seventh consecutive year. Such operation can create sustained artificial flood peaks in the middle reaches of the Yangtze River to provide hydrological conditions suitable for the natural reproduction of fish, including the four major Chinese domestic carps. And fish reproduction was improved significantly because of it. In 2017, CTG conducted two times of ecological operation for the natural reproduction of the four major Chinese domestic carps – number of eggs monitored in the Yidu section of Yangtze River reached 1.08 billion.

The Xiluodu Reservoir regulates the outflowing water temperature via intaking middle and upper level water by operating the stoplogs gate so as to promote egg spawning and reproduction of fish spawning viscid and demersal eggs (such as Acipenser dabryanus and myxocyprinus asiaticus).

By keeping increasing water discharge to the downstream, Xiluodu reservoir creates a sustained higher water level in river channel downstream to provide suitable hydraulic conditions for fishes spawning drifting eggs to spawn, including four major Chinese domestic carps, and coreius heterodon. In 2016-2017, the Chinese Sturgeon Research Institute applied the environmental DNA technology to monitoring the breeding of the four major Chinese domestic carps, which enabled researchers to locate fish spawning fields more accurately and to better understand of the laws of natural reproduction.

1.08 billion eggs

The breeding scale of the four major Chinese domestic carps in the Yidu section reached 1.08 billion eggs during ecological operation

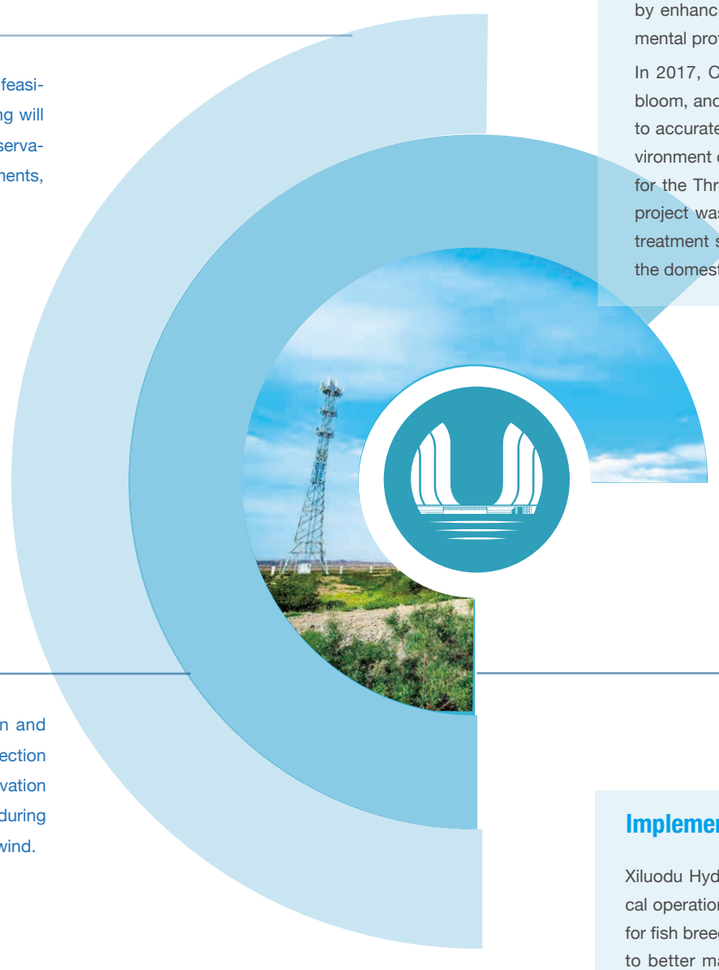
15 folds

The annual average spawning of the natural breeding of the four major Chinese domestic carps has increased by 15 folds in 2015 compared with that of 2010

Collecting eggs of the four major Chinese domestic carps during ecological operation

Green Development throughout Project Lifecycle

CTG strictly implements the measures for improving ecological environment and mitigating impact. Our environmental management covers the whole life cycle of projects from preparation, construction to operation. CTG's commitment to green development guides the operation of, all power stations and every step of our work strike a balance between human and the environment.



During Early Stage of a Project

In the early stage of the project, environmental protection measures in pre-feasibility study will be verified and environmental assessment of basin planning will be carried out, the environmental impact report and the soil and water conservation plan report will be prepared for the approval of administrative departments, and all environmental measures will be strictly implemented.

Assessing Environmental Impact

In the planning period of wind power, photovoltaic and other projects, China Three Gorges New Energy Co., Ltd. strictly abides by the red lines for ecological protection, works towards environmental quality improvement objectives and legal requirements of relevant planning and environmental impact assessment, implements relevant approval procedures for environmental protection as regulated by the State before the construction starts, and prepares the environmental impact assessment report and the soil and water conservation plan report, which will be submitted to administrative departments for approval.

Construction Period

In the construction period, CTG gives priority to resource conservation and ecological environment protection, strictly implements environmental protection measures, enhances the implementation of environment and water conservation programs, and makes every effort to ensure environment is well-protected during the development of all types of power projects, including hydro, solar and wind.

Designing fish ladders and passages to implement measures for improving ecological environment

Environmental protection measures are incorporated in designing of projects when CTG develops the cascade of hydropower stations in the lower reaches of Jinsha River. Key technologies on fish ladders and passages were studied for Wudongde and Baihetan hydropower stations before such facilities were designed. Fish passage port designing report and the whole fish passage plan were completed in 2017.

Enhanced environment monitoring to prevent and control adverse effect of construction activities comprehensively

Construction Site of Xiluodu Hydropower Station

Through monitoring water, air, sound, environment, mainstream water quality, soil and water conservation conditions, etc., CTG controls the sewage, waste gas, noise and solid waste generated during project construction and keeps close check of soil and water conservation projects, thus effectively preventing and control the adverse effects of the project construction activities on the environment. We strictly implement the Three Simultaneities system for environmental protection by enhancing supervision and management, guaranteeing the normal operation of all environmental protection facilities, and minimizing the discharge of pollutants.

In 2017, CTG monitored the water environment quality, sediment conditions, tributary algal bloom, and ecological environment of the management area of the Three Gorges Reservoir so as to accurately assess environmental quality, accumulate monitoring data, carry out ecological operation, and study how environment changes, with the purpose of providing basic information and decision-making basis for environmental protection for the Three Gorges Project. The gravel processing and concrete production system of the Xiluodu Hydropower Station project was constructed, in strict accordance with the requirements of the Three Simultaneities system, with waste water treatment systems. Four domestic sewage treatment plants were constructed in four camps in the construction area, and the domestic sewage treatment rate in the construction area was 98% at minimum.

Carrying out ecological protection actively in overseas wind power projects

The Three Gorges Second Wind Farm Pakistan (Pvt) Ltd. and Three Gorges Third Wind Farm Pakistan (Pvt) Ltd follow CTG's sustainable development concept, and attach great importance to pollution prevention and treatment. They implement the whole-process environmental management covering the early stage of project, the construction period and the operation period, and effectively control and treat the wastewater, waste gas, noise and solid waste in the construction period. They also formulate environmental protection standards for wind farms and make efforts to solve prominent problems affecting ecology, so as to effectively protect and improve the ecological environment.

Operation Period

CTG controls and treats all kinds of emissions, implements environmental monitoring during the operation period, ensures the green operation of all projects, and promotes ecological improvement and recovery.

Implementing stratified water intake to promote ecological protection

Xiluodu Hydropower Station continues to carry out ecological operation tests to create hydrological conditions suitable for fish breeding, thus protecting aquatic organisms. In order to better maintain the original aquatic environment of the downstream river channel, a four-layered stoplogs gate is adopted in the water inlet to divide the intake water into five layers. So that the impact of the discharged low-temperature water can be reduced via stratified water intake in the reservoir, thus increasing the temperature of the discharged water and reduce the adverse effects of the low-temperature water on growth and reproduction of fish. Aquatic organisms and aquatic environment are protected, producing enormous ecological and social benefits.

Stratified water intake through stoplogs gate in Xiluodu

Environment Management

2017

In the whole process of investment, construction and operation of clean energy, CTG gives priority to resource conservation and ecological protection, builds a solid foundation for harmonious coexistence of man and nature through green development, and works closely with suppliers to make them pay equal attention to and work together towards ecological progress.

Covering All Business Units

Environmental protection initiative covers all business units of CTG, hydro, wind and solar.

Basin-wide Approach

CTG comprehensively coordinates the overall basin planning of its six cascade hydropower stations on the main stream of the Yangtze River

Whole Process

Environmental protection initiative spans the life cycle of projects, covering the early stage of project, the construction period and the operation period.

Organizational Structure

CTG's organizational structure of environmental management system includes the top management of CTG, the management representatives, the functional departments, direct subordinates and special entities, and environmental management system from subsidiaries, which provide important support for the environmental management system of CTG.

Corporate Level Management and Control

The Department of Environmental Protection in CTG headquarters, is responsible for the centralized management and provides technical support to environmental protection effort across business areas of CTG.

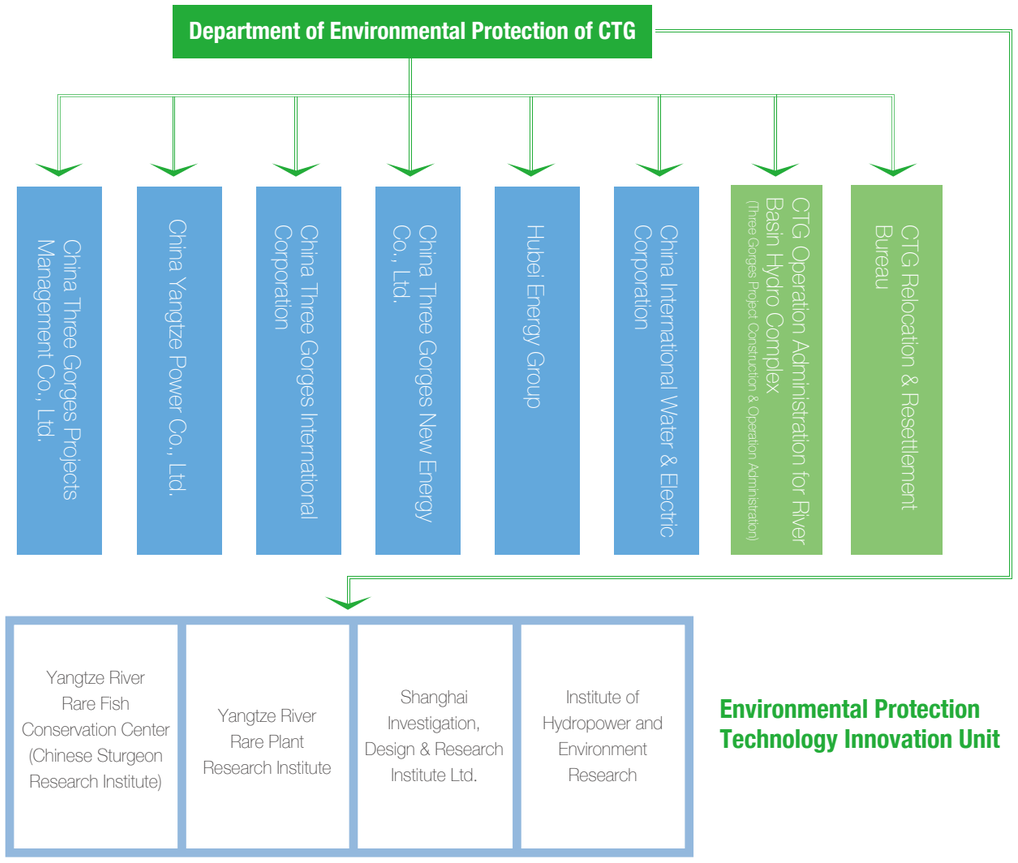
Management of Key Projects

China Three Gorges Projects Management Co., Ltd. and other subsidiaries are responsible for the overall operation of projects, and supervise the whole process of projects by checking the implementation of environmental management system of CTG.

Construction Management of Projects

Environmental protection measures on project construction sites are managed by respective project company with suppliers undertaking part of the work as per their professional area.

Environmental protection management organization system of CTG



Management System

CTG implements a management system that the functional departments for environmental protection manage their environmental protection work as per their business area. In a mode of hierarchical management and control, the headquarters and subsidiaries of CTG supervise the environmental protection in all links of the business activities through the life cycle in their our jurisdiction, thus covering all environmental protection work and managing the whole life cycle of projects.

Environmental Management System

CTG has established a sound environmental management system and passed the ISO 14001 environmental management system certification. We enhance post responsibility management and internal audits in an all-round way, and constantly check the implementation of the management system in actual work and identify defects and problems. In this way, we optimize and improve the management system and work processes, improve work efficiency, manage to minimize the impact of production operations on the environment and pursue zero environmental accidents, to achieve harmonious coexistence between people and the environment.

Environmental Management Regulations

Building upon past success while nurturing innovation, CTG pools in experiences in institutional building, awareness promotion and management of environment regulation and systematically improves its environment management approach. The content of regulations involve environmental management, acceptance management of environmental protection facilities and complex operation in the early stage of project and the construction period, and environmental management, environmental protection research, monitoring and statistics, supervision and management, etc., in the power production period.

In 2017, based on special analysis of and research on the laws and regulations about environmental protection and water conservation in the past five years, CTG revised 9 environmental management systems, formulated two sets of guidelines on foreign equity and stock-holding equity investment, added 10 new business processes, identified 30 risk points and corresponding control measures, and adpoted the new version of ISO 14001 across CTG.

Environmental Management Regulations

Level	Name
Level II	*Environmental Protection Management Regulation of CTG*
Level III	*Hydropower Project Environmental Protection Management Methods of CTG*
Level III	*Environmental Protection Plans and Statistics Management Methods of CTG*
Level III	*Energy Conservation & Emission Reduction Monitoring and Statistics Management Methods of CTG*
Level III	*Environmental Protection Examination Management Methods of CTG*
Level III	*Environment Fund Project Management Methods of CTG*
Below level III	*Environmental Factor Identification and Assessment Management Methods of CTG*
Below level III	*Environmental Compliance Assessment Management Methods of CTG*
Below level III	*Solid Waste Management Methods of CTG*
Below level III	*Resource and Energy Conservation Management Methods of CTG*
Below level III	*Environmental Protection Public Participation Management Methods of CTG (Subject to amendments)*
Guiding Opinions	*Guiding Opinions on Enhancing Environmental Risk Management of Equity Investment of CTG in China*
Guiding Opinions	*Guiding Opinions on Enhancing Environmental Protection Management of Overseas Business of CTG*

Environmental Risk Management

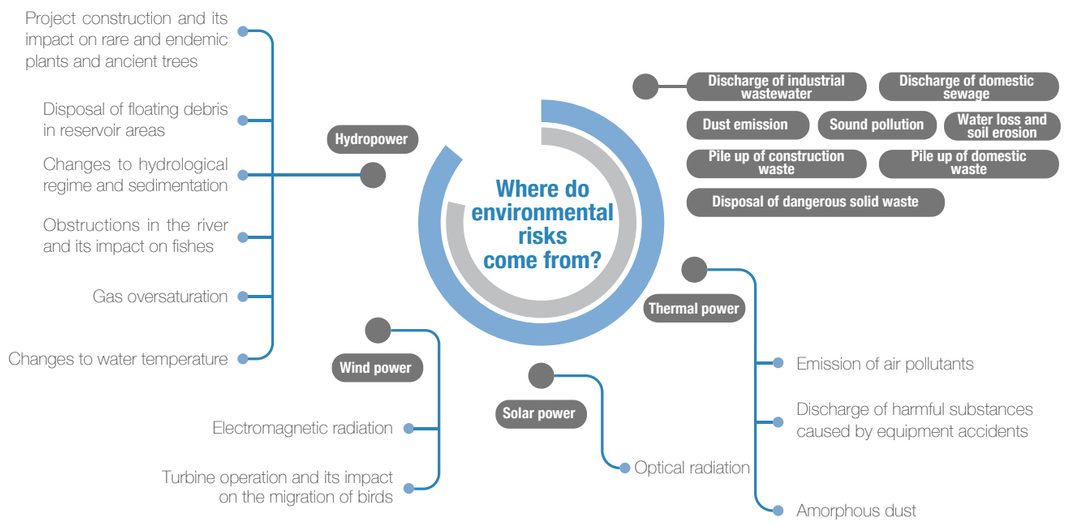
In the planning, design, construction and operation of projects, CTG identifies environmental risk factors in terms of water, atmosphere, acoustic pollution, land and energy resource consumption, and screen out important environmental risk factors based on amount and extent of pollution, implementation of environmental laws and regulations as well as energy resource consumption and conservation degree, etc., so as to develop management strategies for various environmental risks. In 2017, CTG encountered no environmental incidents, with the overall environmental risks under control.

CTG organized the identification of environmental factors and assessment of important environmental factors, during which 1256 environmental factors were identified and 200 important environmental factors assessed, and developed the management plans for the important environmental factors;

CTG organized the screening and control of environmental hazards, during which 160 general environmental hazards were screened out, and all units were urged to actively complete rectification, thus effectively preventing environmental accidents;

CTG completed the Annual Environmental Risk Management Report and Environmental Risk Management Quarterly Reports for 2017;

CTG actively carried out internal control and evaluation of environmental management work.



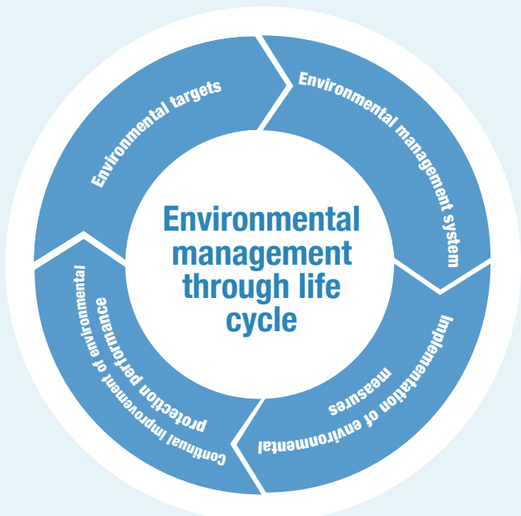
Emergency Management System

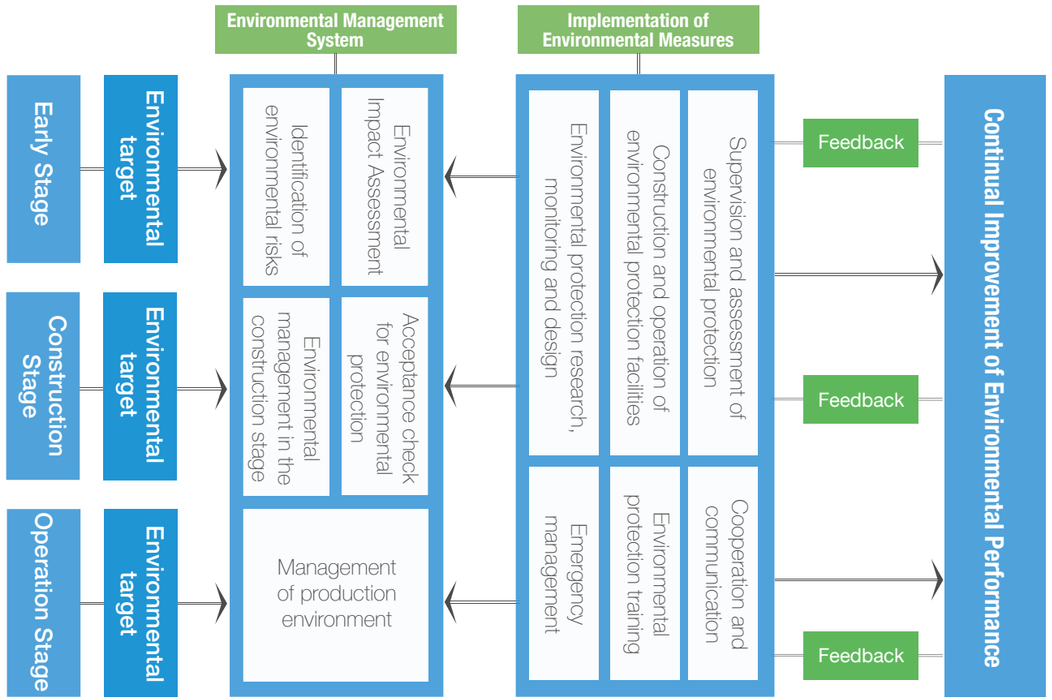
CTG has established a sound emergency management system and improved emergency management organization. Following the principles of region-specific accountability, hierarchic responsibility, classified guidance, comprehensive coordination, and dynamic management, we managed emergency plans, organized training and drills for emergency plans, so as to improve the capacity of handling major environmental risks.

Based on the emergency management system of CTG, each unit prepares its own comprehensive emergency plan, special emergency plan and on-site handling plan, thus forming an emergency plan system that covers every corner and incorporates all stakeholders.

Process Management

CTG implements environmental management through life cycle, including setting environmental goals, establishing and improving the environmental management system, and implementing environmental protection measures, so as to implement closed-loop environmental management while continuously improving environmental performance.





Planning and Programming

CTG headquarters formulates the overall planning and program plans of environmental protection. Taking the progress of the reform research and the project needs into comprehensive consideration, it organizes the medium-term planning and annual plans and carrys out tracking and management of the plans so as to promote the implementation of environmental protection projects.

Key environmental protection plans and programs in 2017

- Ecological Restoration Planning and Program of Heishui River Basin
- Measures and Program for Wudongde Reservoir Tail Water Environment Protection
- Experimental program for joint ecological operation of Xiluodu, Xiangjiaba and Three Gorges Reservoirs

Some key environmental protection work plans in 2017

Completing internal and external audits of the environmental management system

Promoting completion acceptance of environmental protection and water conservation for Xiluodu and Xiangjiaba Hydropower Stations and Three Gorges Ship lift

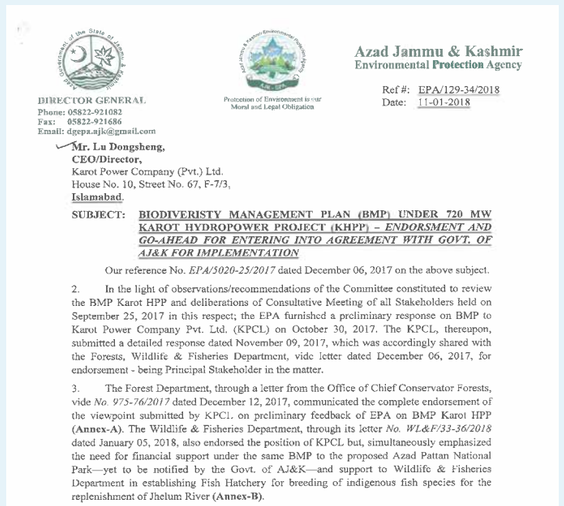
Promoting the implementation of key environmental protection measures for reservoir filling and power generation in Wudongde and Baihetan Hydropower Stations

Promoting the restoration and protection of water ecology in the Yangtze River Basin with emphasis on nature reserves for rare and endemic fish stocks in the upper reaches of the Yangtze River

……

Special planning for environmental protection of the Karot Hydropower Project in Pakistan

The Karot Hydropower Project in Pakistan adopts environmental and social responsibility framework issued by the World Bank and related standards, with about 150 million yuan invested for “tailor-made” special environmental protection plans. Through the preparation of the Biodiversity Management Plan, the biodiversity conservation management and practices were conducted in a planned manner Reviewed by IFC and the local government, the Plan was approved by the IFC and local Environmental Protection Agency of AJ&K.



DIRECTOR GENERAL
Phone: 05822-921082
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Protection of Environment is our Moral and Legal Obligation

Azad Jammu & Kashmir
Environmental Protection Agency

Ref #: EPA/129-34/2018
Date: 11-01-2018

Mr. Lu Dongsheng,
CEO/Director,
Karot Power Company (Pvt.) Ltd.
House No. 10, Street No. 67, F-7/3,
Islamabad.

SUBJECT: **BIODIVERISTY MANAGEMENT PLAN (BMP) UNDER 720 MW KAROT HYDROPOWER PROJECT (KHPP) – *ENDORSMENT AND GO-AHEAD FOR ENTERING INTO AGREEMENT WITH GOVT. OF AJ&K FOR IMPLEMENTATION***

Our reference No. *EPA/5020-25/2017* dated December 06, 2017 on the above subject.

2. In the light of observations/recommendations of the Committee constituted to review the BMP Karot HPP and deliberations of Consultative Meeting of all Stakeholders held on September 25, 2017 in this respect; the EPA furnished a preliminary response on BMP to Karot Power Company Pvt. Ltd. (KPCL) on October 30, 2017. The KPCL, thereupon, submitted a detailed response dated November 09, 2017, which was accordingly shared with the Forests, Wildlife & Fisheries Department, vide letter dated December 06, 2017, for endorsement - being Principal Stakeholder in the matter.

3. The Forest Department, through a letter from the Office of Chief Conservator Forests, vide *No. 975-76/2017* dated December 12, 2017, communicated the complete endorsement of the viewpoint submitted by KPCL on preliminary feedback of EPA on BMP Karot HPP **(Annex-A)**. The Wildlife & Fisheries Department, through its letter *No. WL&F/33-36/2018* dated January 05, 2018, also endorsed the position of KPCL but, simultaneously emphasized the need for financial support under the same BMP to the proposed Azad Pattan National Park—yet to be notified by the Govt. of AJ&K—and support to Wildlife & Fisheries Department in establishing Fish Hatchery for breeding of indigenous fish species for the replenishment of Jhelum River **(Annex-B)**.

Supervision and Inspection

CTG performs its internal supervision and inspection duties on environmental protection work of projects from the levels such as Group, subsidiaries and project departments, checks the ecological environment protection conditions comprehensively, inspects the implementation of the “Three Simultaneities” principle on site, carries out special spot check for environmental protection on the construction sites, reviews the completion of environmental protection inspection and rectification work, carries out annual environmental performance appraisal; actively coordinates with external administrative supervision and inspection, environmental supervision and public opinion supervision, and expands external supervision channels by establishing a public participation platform on CTG’s official website, which receives positive appraisals. In 2017, with the construction of large hydropower stations and operation of complexes as key targets of environmental management, and international business, new energy business, Hubei Energy, investment or shareholding business and the like covered, CTG urged the full implementation of relevant environmental protection and water conservation work, organized environmental inspections, and issued rectification opinions and work suggestions.

Environment Monitoring

CTG conducts environment monitoring work in the business such as hydropower, wind power and solar energy based on the EIA reports and the EIA approval documents. Especially in the hydropower area, through the ecology and environment monitoring systems including the Ecological and Environmental Protection Monitoring System of Yangtze Three Gorges Project, the ecological environment monitoring system in the downstream of the mainstream of Jinsha River, the national nature reserves for rare and endemic fish in the upper reaches of the Yangtze River and related aquatic ecosystem monitoring systems, CTG covers the watersheds and affected areas of all its major domestic water conservancy projects in China, conducting long-term monitoring and assessment of the environmental conditions of each project construction area and watershed, the area of the ecological environment of the river basin impacted by operation of hydropower stations, and the effects of environmental protection measures, and updating data in real time for information management.

In 2017, CTG monitored the algal bloom in reservoir areas and tributaries, the main stream and tributary water environment of the reservoir area, the natural population resources of Chinese sturgeon, etc., with all monitored data shown in normal status.

Ecological and Environmental Protection Monitoring System of Three Gorges Project. With the focus on the construction and future operation of the Three Gorges Project, a complete representative ecological and environmental monitoring network for the Three Gorges Project is used to track and monitor the ecological environment problems that may be caused by the Three Gorges Project for timely warning and forecast.

Ecological environment monitoring system in lower reaches of Jinsha river main stream. Based on the ecological environment changes of the river basin and the actual conditions of development and construction, the ecological environment of the lower reaches of the Jinsha River is monitored in an orderly manner, including water quality, aquatic ecology, terrestrial ecology, water temperature of the Panzhihua-Yichang section of the Yangtze River, supersaturated gas in the river and etc.

Aquatic ecology monitoring system for national nature reserves for rare and endemic fish and related waters in the upper reaches of the Yangtze River. CTG monitors fish resources and typical habitats of the river sections such as Panzhihua-Qiaojia and Yongshan-Shuifu; early fish resources in the river sections of Jiangjin and Yibin; and the water quality, plankton, fish heavy metal residues and pollution accidents within the protected areas in breeding season of fish.

Soil and water conservation monitoring

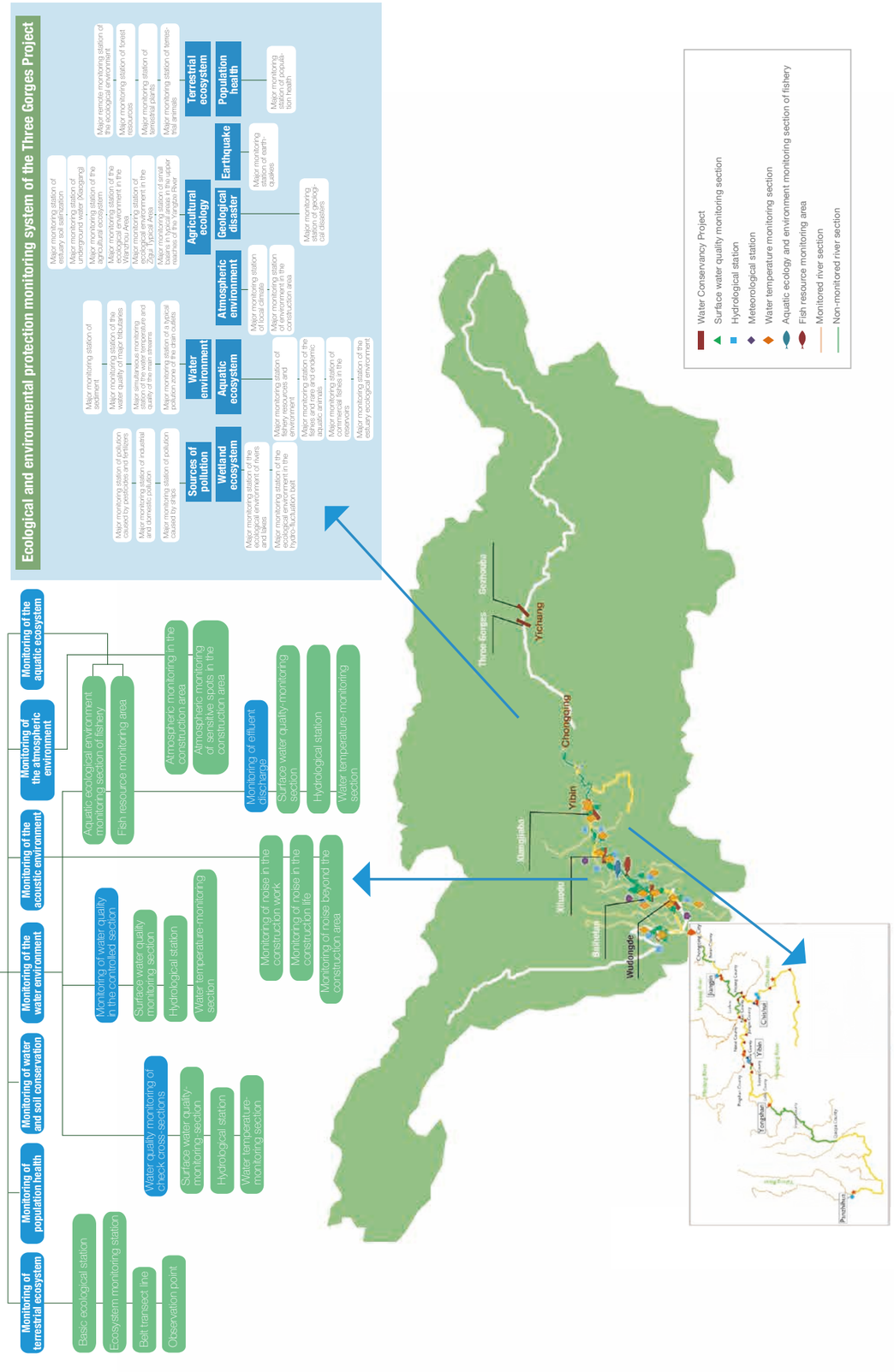
Water temperature monitoring

Water quality monitoring

Basin water and rain condition monitoring

Terrestrial ecology monitoring

Fish tracking and monitoring



Water Environment Quality Situation

The main stream water quality in the Three Gorges Reservoir Area

In 2017, the water quality of the mainstream and tributaries in the Three Gorges Reservoir Area was Good, and the proportion of Class II-III water quality sections in the main stream was 100% (99% in 2016), and 98% in tributaries (95% in 2016), so the overall water quality of the main stream and tributaries was better than that in the previous year.

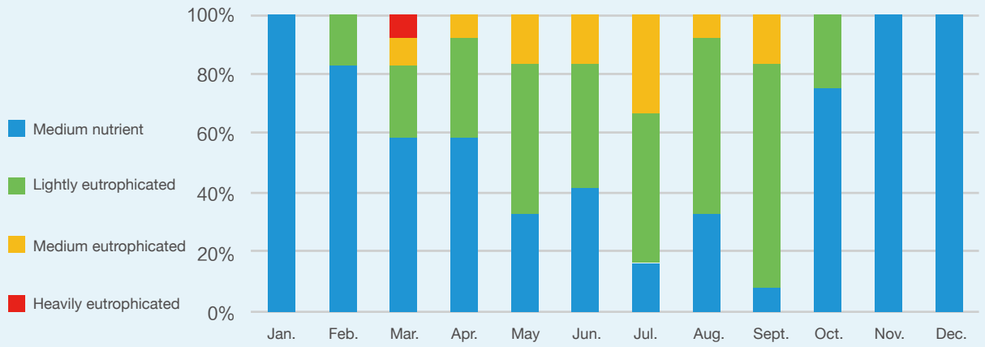
100%
the proportion of Class II-III water quality sections in the main stream

98%
the proportion of Class II-III water quality sections in the tributaries

Water environment quality conditions of key tributaries in the Three Gorges Reservoir Area

In 2017, CTG monitored the water environment of key tributaries within the reservoir area, and conducted monthly inspections on the water environment of the key tributaries within the reservoir area, understanding the nutritional status of key tributaries in different reservoir operation stages such as impoundment and drawdown. The monitoring results showed that the proportion of eutrophication in the 12 key tributaries within the reservoir area is 41%, higher than that in the same period of the previous year (31%). In terms of space, the nutrient level of Zhuxi River, Meixi River, Yuanshui River and Xiaojiang River was relatively high; and in terms of time, all the tributaries were of medium nutrient level in January, November and December, and in other months were in a state of eutrophication in different proportions, wherein they were mainly of medium nutrient level in February to April and October, and mainly in the state of eutrophication from May to September. The proportion of tributaries in the state of eutrophication was the highest in September, which was 92%.

Distribution of trophic status of 12 monitored tributaries within the Three Gorges Reservoir Area in 2017



Gas supersaturation status in lower reaches of Jinsha River

In 2017, a 54-day gas supersaturation monitoring was carried out in the lower reaches of the Jinsha River at the three stages, i.e., before the flood season, during the flood season and after the flood season. The monitoring results show that the spatial and temporal distribution of dissolved oxygen saturation in the basin is not significantly different from that in previous years. The dissolved oxygen saturation of the nearest sections in the downstream of Xiluodu Hydropower Project and Xiangjiaba Hydropower Project is generally below 110%, and can be reduced to non-saturated status in the Jiang'an section; and TDG is maintained at about 100% without obvious change trend.

Aquatic Ecological Status

Rare and endemic fish

In 2017, 17 species (1541 individuals) of endemic fish in the upper reaches of the Yangtze River were detected in the monitored area of the lower reaches of the Jinsha River; endemic fish was monitored in 15 of the 16 monitored river sections in the upper reaches of the Yangtze River, with the Longchuan River estuary as the only exception. In the river sections where the endemic fish species were detected, there were 8 in Jiaopingdu section, which was the highest, followed by the Yalong River estuary section (7 species), then Heishui River estuary section (5 species), and the last one in Suijiang County (only one species).


Procypris rabaudi


Coreius guichenoti


Leptobotia elongata


Leiocassis longirostris

Important commercial fishes

In 2017, a total of 80 species of fish were detected in the lower reaches of the Jinsha River. The main catches in the whole river section mainly included silurus meridionalis, coreius guichenoti, hemiculter tchangi, spinibarbus sinensis, carp, liobagrus marginatus, leiocassis longirostris, schizothorax prenanti, pelteobaggrus nitidus and rhinogobio ventralis.

Water temperature conditions

In 2017, an experimental stratified water intake through stoplog gates was implemented at Xiluodu Hydropower Station, which was intended to mitigate the impacts of water temperature, and water temperature was tracked and monitored. The monitoring results show that after stratified water intake through stoplog gates was implemented in Xiluodu Hydropower Station, the water temperature was increased to some extext compared with the conditions when the stoplog gates were not in use, and the operation of the stoplog gates could increase the water temperature near their top to some extent. So the stratified water intake scheme through stoplog gates has made certain improvement in the temperature of the discharged water of Xiluodu.

1541 Individuals
A total of 17 species of endemic fish species were monitored in the upper reaches of the Yangtze River.

80 Species
80 species of fish were monitored in the lower reaches of the Jinsha River.

Main catches in the whole river section:

Silurus meridionalis

Coreius guichenoti

Hemiculter tchangi

Spinibarbus sinensis

Liobagrus marginatus

Leiocassis longirostris

Schizothorax prenanti

Pelteobaggrus nitidus

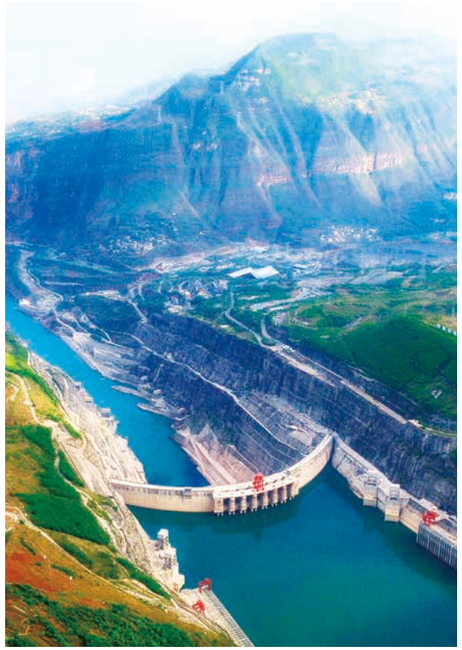
Rhinogobio ventralis

Air Quality Conditions

A real-time air monitoring system for monitoring $PM_{2.5}$, SO_2, NO_2, CO, O_3 has been established in the Three Gorges Complex management area.. Statistics show that the number of Good days in 2017 is 336, with a Good rate of 96%.

Technological Innovation

In CTG,scientific and technical innovation runs through the ecological environmental protection work which covers all businesses segments. Theoretical and technical researches on various major basic and application environmental issues are conducted at different stages of various business lines such as planning, design, construction and operation. Representative achievements about greenhouse gases of reservoirs and ecological fisheries in reservoirs are made and a long-term mechanism has been established, CTG makes medium- and long-term scientific research plans as well as special plans for research and protection of fish, plant etc.



Environmental Protection Research

In 2017, CTG continued to promote environmental protection researches, including research on the effects of gas supersaturation on fish in Jinsha River, background investigation of aquatic life in Heishui River, research and demonstration of key technologies for reconstruction and function optimization of the Three Gorges Reservoir ecosystem etc., with a number of research findings been achieved.

Exclusive scientific research institutions

Basing on the Yangtze River Rare Fish Conservation Center, CTG builds a platform for aquatic ecological scientific and technical innovation to further improve the aquatic ecological research capabilities, and develop the core technical capabilities for protecting species represented by Chinese sturgeons and other rare and endemic fish in the upper reaches of the Yangtze River. CTG develops the research capabilities of terrestrial plants with the platform basing on the Yangtze River Rare Plant Research Institute. Meanwhile, basing on Shanghai Investigation, Design & Research Institute, CTG gains capability of forming integrated solution for environmental protection, giving play to the professional advantages in environmental planning and design as well as water environment, which provides comprehensive technical support for environmental protection work, and enhances the capability of integrated innovation.

Open & collaborative R&D team

CTG gives full play to the scientific research platforms such as the Institute of Hydropower and Environment Research (co-initiated with the Appraisal Center for Environment and Engineering of the Ministry of Environmental Protection, Beijing Normal University and China Renewable Energy Engineering Institute) and the National Engineering Research Center of Efficient Utilization of Water Resources and Engineering Safety (co-established with Hohai University). In addition, CTG has extensive cooperation in scientific research with universities and research institutions such as Tsinghua University, Wuhan University, Chinese Academy of Sciences and Chinese Academy of Fishery Sciences.

Special fund support

CTG has established special funds for science and technology such as the Three Gorges Environmental Fund to fund the implementation of environmental protection projects.

A method for mitigating low-temperature water impact was patented

The low-temperature water discharged from reservoirs in spring and summer has adverse effects on downstream agricultural irrigation and aquatic ecosystems. To mitigate the low-temperature water impact is a major environmental protection measure of hydropower development projects. China Three Gorges Projects Management Co., Ltd., subsidiary of CTG, actively carries out relevant R&D and innovations and study at the measures to mitigate the said impact basing on the project's actual needs. A method of building a diversion tunnel bypassing the main body of the dam to direct the water of suitable temperature in the upstream so as to mitigate the impact of low-temperature water on the downstream ecology of the dam. This research has obtained an invention patent (No. 2702955) granted by the National Intellectual Property Administration of the PRC.

Background reading: Construction of hydropower project, especially a large project with high dam and big reservoir, will inevitably change the hydrological regimes of a river. The original energy exchange between the water and the atmosphere changes, and the water temperature in the reservoir is no longer evenly distributed, resulting in the stratification phenomenon. In the actual operation of hydropower projects, the temperature of the discharged water is usually higher than that of the natural river channel in winter, and lower in spring and summer.


发 明 专 利 证 书

Patent certificate for
"Method for mitigating low-temperature water impact"

Selected Environmental Protection Projects of CTG in 2017

Serial No.	Project Name
1	Evaluation on the effect of breeding and releasing of rare and endemic fishes in the upper reaches of the Yangtze River
2	Research on the influence of water temperature in the Xiluodu-Xiangjiaba reservoir area and protected area in Yangtze River lower reaches
3	Research on the water quality change in the watercourse of the protected area and its impact on fish
4	Research on biology, population dynamics and genetic diversity change of 21 species of endemic fish, including Procypris rabaudi, in the upper reaches of the Yangtze River (Phase-II)
5	Research on the ecological basic flow indicator system and red-line restrained zoning in water conservancy and hydropower projects
6	Monitoring, analysis and research on the greenhouse gas source and sink in the Three Gorges Reservoir
7	Post-project evaluation on the environmental impact of Gezhouba Water Conservancy Complex Project
8	The Cooperative Agreement I on the 1st Batch of Projects for Restoring Fishery Resources of Xiangjiaba Reservoir and Protecting Rare and Endemic Species of the Yangtze River
9	The Cooperative Agreement II on the 1st Batch of Projects for Restoring Fishery Resources of Xiangjiaba Reservoir and Protecting Rare and Endemic Species of the Yangtze River
10	The Cooperative Agreement III on the 1st Batch of Projects for Restoring Fishery Resources of Xiangjiaba Reservoir and Protecting Rare and Endemic Species of the Yangtze River

Publicity and Training

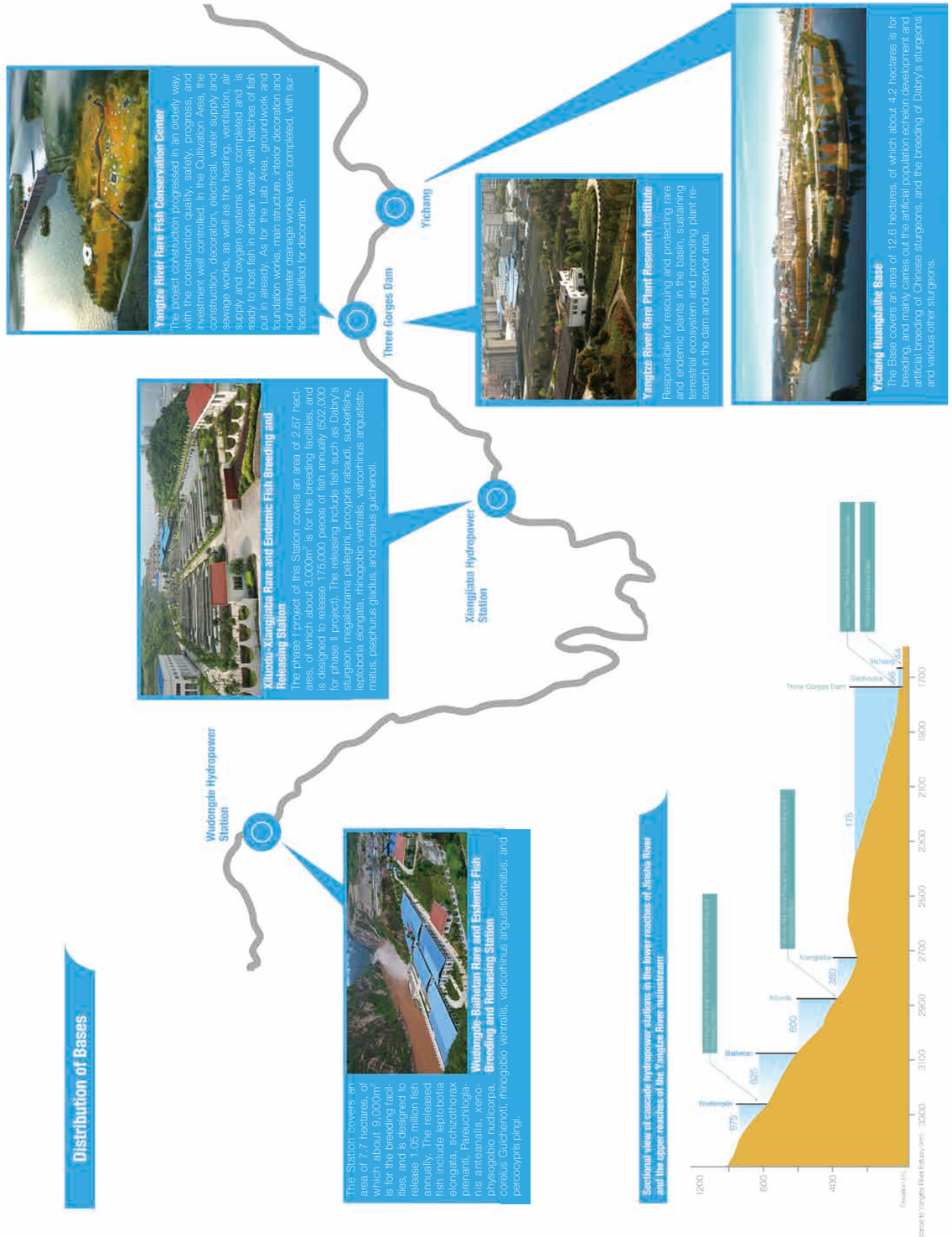
In order to improve the overall level of environmental management, CTG promotes the environmental protection capacity building of CTG and its subsidiaries, actively participates in and holds environmental protection training activities in various forms, and cultivates employees' environmental awareness and capabilities.

Environment Day Publicity Activities of Changlongshan Company

Changlongshan Pumped-storage Power Station Project is located in the birthplace of "Lucid waters and lush mountains are invaluable assets", an important idea of President Xi Jinping. In June 2017, Changlongshan Pumped-storage Power Station Company, together with Soil and Water Conservation Supervision and Management Station of Anji County, launched the Environment Day Publicity Week with the theme of "Lucid waters and lush mountains are invaluable assets", and listed "Soil and Water Conservation" as the main content of the event, with the purpose of strengthening the environmental protection and water conservation awareness of the participants and promoting the implementation of the main body responsibility, so as to provide spiritual power and cultural support for the realization of green projects, thus setting out on a construction path meeting the environmental protection and water conservation culture of the Changlongshan Power Station, i.e., "Protect lucid waters and lush mountains to create invaluable assets".

Construction of Bases

CTG places importance on the development of equipment and facilities for environmental protection research, enhances the capability of research, development and innovation, and provides platforms for exhibiting fruits of environmental protection actions and publicizing scientific and environmental knowledge. CTG has established the Wudongde-Baihetan Rare and Endemic Fish Breeding and Releasing Station, the Xiluodu-Xiangjiaba Rare and Endemic Fish Breeding and Releasing Station, the Yichang Huangbaihe Base, etc. in the vicinity of Wudongde Hydropower Station and Xiangjiaba Hydropower Station and Yichang, and constructs the Yangtze River Rare Fish Conservation Center around the site of the Three Gorges Dam.



Cooperation and Exchange

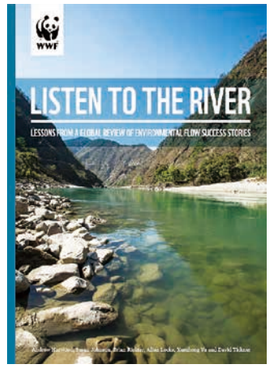
CTG actively shares information on fruits of environmental protection work and advanced concepts and ideas with its peers, enhances communication with environmental organizations and the public, and improves environmental protection capabilities through active exchanges and cooperation. In 2017, CTG actively exchanged and cooperated with the United Nations Development Programme (UNDP), the International Energy Agency (IEA), the International Hydropower Association (IHA), the International Commission on Large Dams (ICOLD), the Nature Conservancy (TNC), World Wide Fund for Nature (WWF) and other international organizations, actively participating in promoting the sustainable development of the global clean energy.

■ Wang Lin, President of CTG, attended the opening ceremony of the 2017 World Hydropower Congress and delivered a speech.

■ Lin Chuxue, CTG Executive Vice President and Deputy Secretary of the CPC Leadership Group attended the presentation of the Nature Conservancy's report titled *Power of Rivers*: A Business Case, and delivered a speech.

■ Sha Xianhua, Executive Vice President of CTG, communicated with representatives of the UNDP.

■ CTG participated in influential international conferences such as HydroVision, International Association for Hydro-Environment Engineering and Research (IAHR), ICOLD conferences, AfriRock and Global Large Hydropower Station Operation Seminar, and submitted 56 abstracts. Ten authors were invited to attend the conferences to give speeches and share experience in water resources management, coping with climate change and environmental protection, making contribution to promoting the progress of environmental protection technologies in the industry.



■ TGP ecological operation case was included into "Listen to River", the achievement report of the WWF, as one of the eight best cases in the world, and released at the World River Forum held in Brisbane, Australia.

■ Holding a seminar on "Cascade Reservoir Management Model", Topic 14 of IEA Hydro.

■ CTG participated in the 8th International Symposium on Sturgeon and gave a speech.

Environmental Protection Campaign

2017

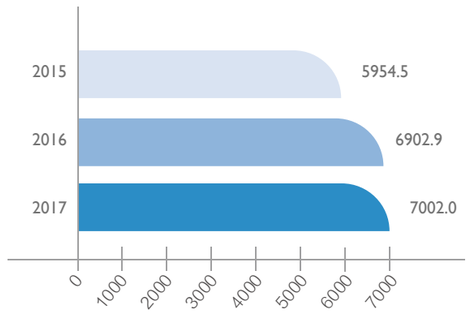
CTG has made intensive efforts in practicing the development concepts of 'Innovation, Coordination, Green development, Openness and Sharing', CTG vigorously develops clean energy such as hydropower, wind power and photovoltaics, and strive to play a leading role in the development of offshore wind power. While providing clean energy for the society, CTG vigorously carrys out energy-saving in thermal power, ecological restoration, prevention and control of pollution, trying to make contribution to create harmony the ecological environment.

Responding to Climate Change

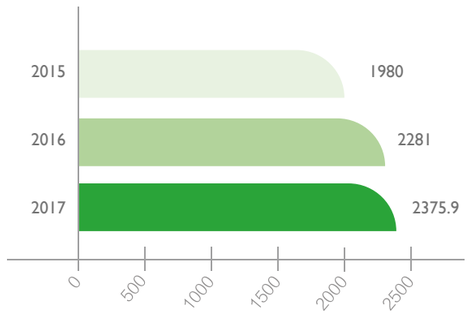
With the goal of “Building a world-class clean energy group” and a global thinking, CTG develops clean energy such as hydropower, wind power and solar energy scientifically, gives full play to the comprehensive benefits of water conservancy projects such as flood control and water replenishment, and makes outstanding contributions to responding to and mitigating climate change.

Developing Clean Energy

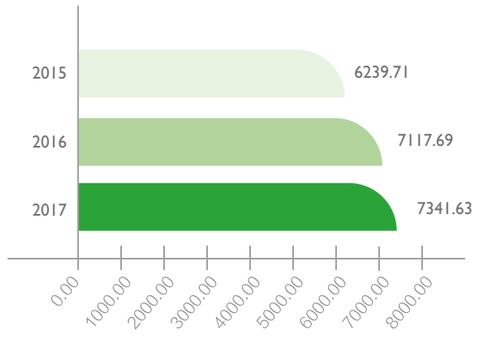
Clean energy development plays an important role in achieving national objectives such as accelerating the construction of ecological civilization, reducing greenhouse gas emission and responding to climate change. Taking hydropower development as its first business, CTG actively makes layouts in other renewable energy business with offshore wind power business as the strategic core, and explores the practice of replacing fossil energy with clean energy, thus making contribution to implementing the UN 2030 sustainable development goal and realize the goal that non- fossil energy consumption accounts for 15% and 20% of the primary energy consumption in 2020 and 2030 respectively in China. In 2017, hydropower accounted for 82.37% of the consolidated installed capacity of CTG in China, while wind power accounted for 8.84%, PV 4.52%.



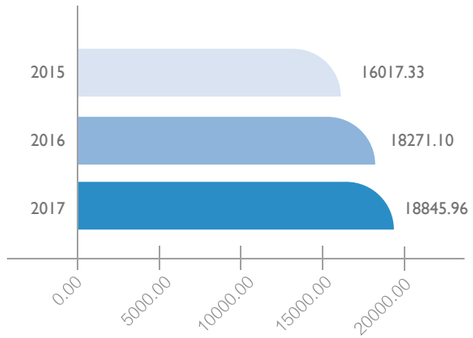
Installed capacity (10 MW)



Domestic clean energy generation (100,000 MWh)



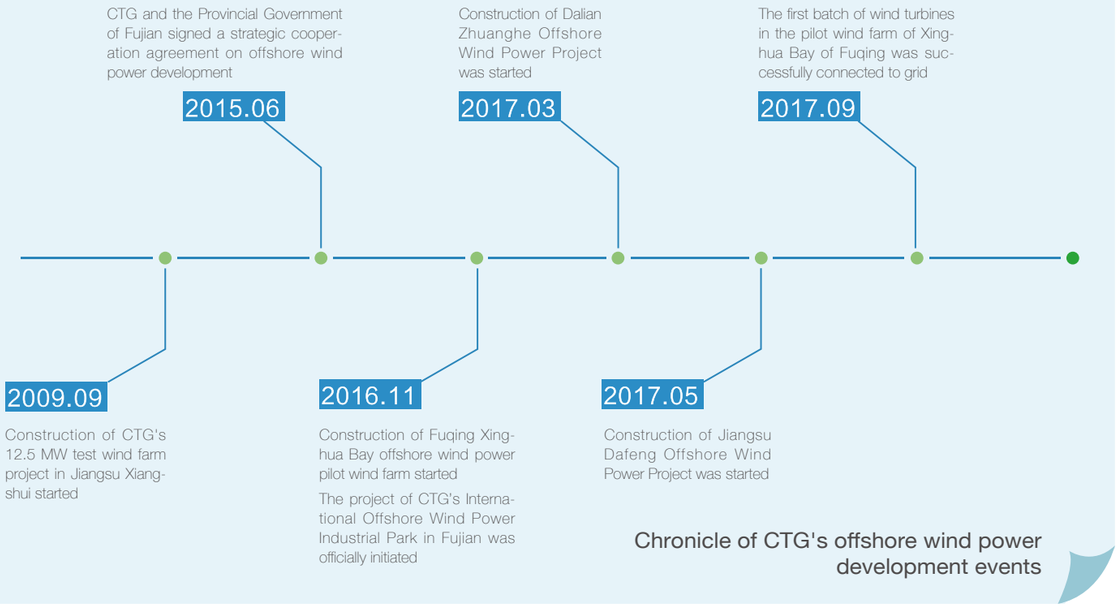
Equivalent to saving standard coal (10,000 tons)



Equivalent CO_2 Reduction (10,000 tons)

Making layout of offshore wind power to optimize utilization of clean energy

Through resource integration, layout optimization and model innovation, CTG improves its layout of offshore wind power and successfully complete the first commercially operated offshore wind power project in China - Jiangsu Xiangshui Offshore Wind Power Project (202 MW), which created many “firsts” both at home and abroad. In 2017, the construction of CTG's Dalian Zhuanghe Offshore Wind Power Project and Jiangsu Dafeng Offshore Wind Power Project started, and the first batch of units in the Fuqing Xinghua Bay Pilot Wind Farm were successfully connected to the grid, which indicated that the large-scale development of offshore wind power gradually got on track.



Chronicle of CTG's offshore wind power development events

Establishing green development credit in international market

CTG successfully issued 7-year green bonds valued 650 million euros in June 2017. This was the first time that CTG issued green bonds in overseas markets and was the biggest green euro bond issuance among Asian companies. The funds raised by the bonds are mainly used for the WindMW offshore wind power project in Germany and the ENEOP onshore wind power project in Portugal. The installed capacity of the WindMW project is 288 MW, with the estimated on-grid energy of 1.35 billion kWh in 2017, which can reduce 1.25 million tons of CO_2 emission. The installed capacity of the ENEOP project is 422 MW, with the estimated on-grid energy of 980 million kWh, which can reduce 960,000 tons of CO_2 emission. Both projects have passed the independent international green bond certification and comply with the principles of international green bonds.

Adhering to the strategic direction of clean renewable energy, CTG has been fully recognized by international investors, and won the trust and praise of investors in global markets such as China, Europe, America and Asia-Pacific, thus establishing its unique high-rated credit of green development in the international market.

CTG successfully completed pricing of green bonds in Edinburgh

Further reading: Green bond is a financing tool developing rapidly in the green finance sector in recent years. With the characteristics of clear use of funds, high credit rating, guaranteed principal income and broad investment subjects, it is mainly used to raise fund to support green industry projects. Green projects mainly refer to environment-friendly or environment-restoring projects that contribute to improving climate, air, water, soil, ecology and energy consumption.

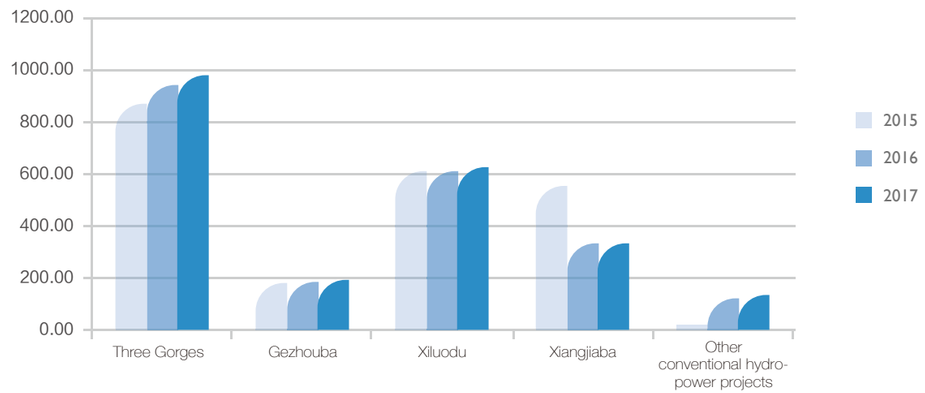
Clean Energy Development in China

Gansu Dazhaitan Photovoltaic Power Station

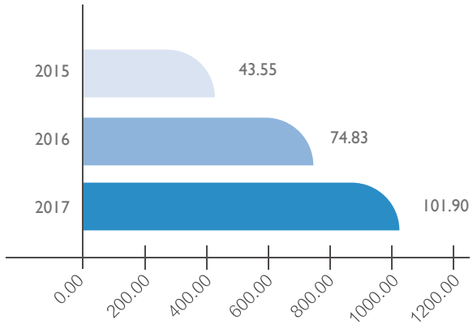
Changing desert to oasis with photovoltaics and sea-buckthorn

Constructed by China Three Gorges New Energy Co., Ltd, Gansu Dazhaitan Photovoltaic Power Station actively implements the "Photovoltaic Industry Driving Ecological Construction" project, combining the ecological restoration with the development of characteristic industries by planting sea-buckthorn in the photovoltaic power station to realize dual purpose of same land, thus guaranteeing both power generation and desertification control. This "photovoltaics + sea-buckthorn" mode can transform the rich sunshine in West China into clean energy while make use of the land efficiently, thus making contribution to local tax collection and employment while reducing the cost of governance and promoting ecological improvement. It opens up a new way to explore and innovate desertification control in China for the win-win situation of photovoltaic power generation and restoration of vegetation to improve the ecology, and plays a good role of demonstration.

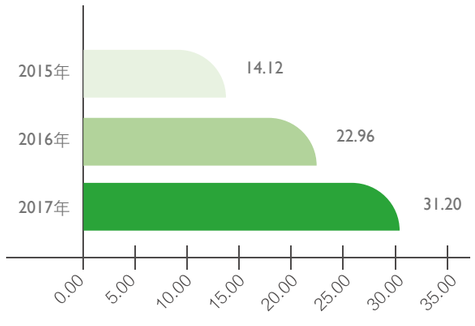
Serial No.	Project name	Type	Production scale (10 MW)	Location
1	Anhui Shucheng Wind Power	Onshore wind power	1.05	Anhui
2	Shaanxi Suide Wind Power (Phase I)	Onshore wind power	4	Shaanxi
3	Sichuan Mianning Wind Power	Onshore wind power	7	Sichuan
4	Tianrong-Shandong Zhanhua Wind Power (cooperative project)	Onshore wind power	4.8	Shandong
5	Tianrong-Shandong Zhucheng Wind Power (cooperative project)	Onshore wind power	4.8	Shandong
6	Taibai-Qinghai Xitieshan Wind Power (cooperative project)	Onshore wind power	4.95	Qinghai
7	Anhui Lianghuai Front Runner	Photovoltaics	7.32	Anhui
8	Shandong Yiyuan Photovoltaics	Photovoltaics	2	Shandong
9	Shanxi Pingding Photovoltaics	Photovoltaics	5.7	Shanxi
10	Hebei Quyang 4-1 Photovoltaics	Photovoltaics	3	Hebei
11	Hebei Kangbao Distributed Photovoltaics	Photovoltaics	0.9	Hebei
12	Gansu Dunhuang Photovoltaics	Photovoltaics	3	Gansu
13	Jilin Shuangliao Fuxian Phase IV	Photovoltaics	3	Jilin
14	Sinoma-Shandong Weifang Distributed Photovoltaics (cooperative project)	Photovoltaics	1.9	Shandong
15	Guolian-Shandong Laoling Distributed Photovoltaics (cooperative project)	Photovoltaics	1.775	Shandong
16	Sineng-Shanxi Xiyang Distributed Photovoltaics (cooperative project)	Photovoltaics	3	Shanxi
17	SUNGROW-Chongqing Zhongxian Agriculture-Photovoltaics Complement (cooperative project)	Photovoltaics	7.87	Chongqing
18	SUNGROW-Gansu Dunhuang Photovoltaics (cooperative project)	Photovoltaics	1.1	Gansu
19	Hong Solar - Erenhot Photovoltaics (cooperative project)	Photovoltaics	3	Neimenggu
20	Fuqing Xinghua Bay Phase I	Offshore wind power	2	Fujian
21	Hubei Suixian Yanzihe/Guangshui Wudian Photovoltaics	Photovoltaics	8	Hubei
22	Lichuan Anjiaba Wind Farm Project	Onshore wind power	0.88	Hubei
23	Hubei Tongcheng Huanglong Mountain Wind Farm	Onshore wind power	1	Hubei
	Total		82.045	



Domestic hydropower production in the past 3 years (100,000 MWh)



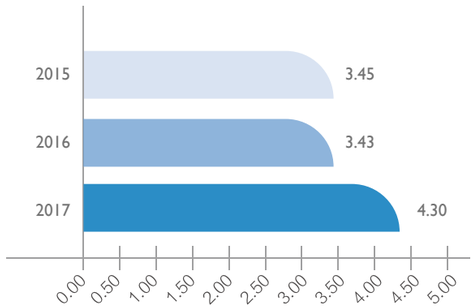
Domestic wind power production in the past 3 years (100,000 MWh)



Domestic solar energy production in the past 3 years (100,000 MWh)

Clean Energy Development in the World

Following the "Belt & Road" initiative, CTG, fully exerting its own advantages, enhances cooperation with the upstream and downstream of the industrial chain and drives China's competitive hydropower production capacity to "Go Global", thus driving international clean energy development, and is committed to global green and low carbon development. Focusing on the "Belt and Road Initiative" and making layouts in key markets such as the surrounding areas, Europe, South America and Africa, CTG's overseas business has covered 47 countries and regions, with the total overseas installed capacity over 15,000 MW and overseas assets over 110 billion yuan.



Domestic pumped-storage power production in the past 3 years (100,000 MWh)

A glance of the site of the Souapiti Water Control Project in Guinea

Saving Energy Resources

CTG adheres to lean production, fully utilizes water, wind and solar energy resources, improves lean management and precise scheduling, and makes efforts in improving resource utilization rate. In 2017, CTG actively participated in the domestic carbon trading, registering 112 emission reduction projects and completed the development of 55 CCER projects, and obtained an emission reduction income of RMB 3,904,700.

Power Production and Increased Power Generation through Optimized Utilization of River Flow at Cascade Hydropower Stations in Yangtze River Basin

Power Station	Power Production (100,000 MWh)	Increased Power Generation through Optimized Utilization of River Flow (100,000 MWh)
Three Gorges Hydropower Station	976.05	53.63
Gezhouba Hydropower Station	190.52	12.83
Xiluodu Hydropower Station	613.91	15.97
Xiangjiaba Hydropower Station	328.45	13.90

Adapting to Climate Change

CTG actively responds to extreme weather conditions such as flood and disaster, vigorously develops clean energy, gives full play to the benefits of cascade complexes such as flood control, water replenishment and ecological protection, guarantees regional security and water for production and domestic use, and improves the capability of river basins to adapt to climate change. In the flood season in 2017, 12.87 billion cubic meters floods were retained on an accumulative basis by the cascaded hydropower complexes in Yangtze River Basin. The Three Gorges Reservoir has achieved the trial impoundment target of 175m for 8 consecutive years, and provided 23.29 billion cubic meters of water for downstream during the dry season.

Smooth water at the top of steep gorges

Ecological Protection and Restoration

To implement the strategic plan of "Speeding up Reform of the System for Developing an Ecological Civilization, and Building a Beautiful China", CTG actively responds to the ecological civilization construction policy of the State, attaches importance to enhancing ecological protection, protects rare animals and plants, and helps to form a new modern development pattern of harmonious development between human and nature, thus realizing harmony between human and nature.

Habitat Conservation

CTG adheres to green development, and gives top priority to ecological protection. We actively explore new roads for ecological protection and restoration, and conducts habitat conservation activities for a long time, forming a natural ecological protection pattern with the national nature reserve for rare and endemic fish in the upper reaches of the Yangtze River as the main body and the rear water section and tributary habitats as important supplements and featuring overall planning and systematic protection, so as to protect the living environment of animals and plants.

Carry out water ecological protection in the Yangtze River Basin together with the Ministry of Agriculture and Rural Affairs

CTG has reached an agreement with the Yangtze River Basin Fishery Supervision and Management Office of the Ministry of Agriculture and Rural Affairs about the strategic cooperation on ecological protection of the Yangtze River Basin, and signed the Agreement on Restoring Fishery Resources in the Xiangjiaba Reservoir Area and Protecting Rare and Endemic Species of the Yangtze River, carrying out basin water ecological restoration and protection with the focus on the rare and endemic fish stocks in the upper reaches of the Yangtze River. The main content of the Agreement include the breeding and releasing of aquatic living resources in the upper reaches of the Yangtze River, the restoration and reconstruction of habitats for rare and endemic fish in the upper reaches of the Yangtze River, the impact of cascade reservoirs on aquatic organisms, and the protection of rare and endemic aquatic species.

Panoramic View of Xiangjiaba Hydropower Station

Carrying out planning and design for ecological restoration of Heishui River

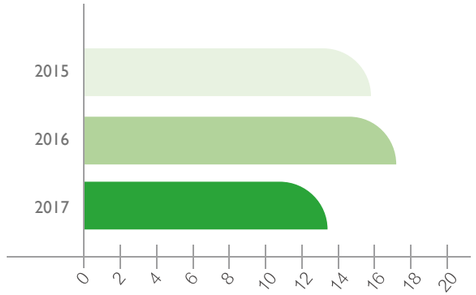
In 2017, with focus on the restoration of the Heishui River habitat and with comprehensive assessment of the ecological integrity of this river, CTG formulated the strategies, actions and scenarios of protection, proposed protection plans and corresponding action plans, and carried out systematic design work. The work is conducted in an orderly manner, in order to give play to the role of its lotic ecosystem in the protection of endemic fish in the upper reaches of the Yangtze River, so as to provide a suitable aquatic ecology for fish in the Baihetan reservoir area which likes slow-flowing and still-water habitat but needs stimulation of flowing water for spawning.

Ecological restoration area of Heishui River

Breeding and releasing activities in the Paranapanema River Basin

Species Protection

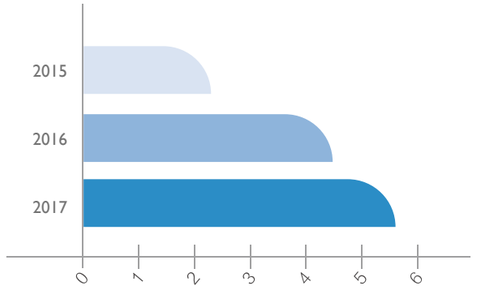
Combining the protection of natural resources in the basin with their rational development and utilization, CTG implements biodiversity conservation measures, systematically carrying out ecological protection measures such as releasing and research of the Chinese sturgeons, breeding and releasing of fish, bird activity monitoring and rare plant cultivation, and implements ecological compensation mechanism to conserve aquatic living resources and restore the biodiversity in river basins. In addition to the Yangtze River Basin, CTG also pays close attention to the conservation of species diversity in the regions where it operated.



Releasing area: Rare and Endemic Fish Breeding and Releasing Stations of Xiluodu and Xiangjiaba Hydropower Stations in Jinsha River

Released species: parental fish of procypris rabaudi, megalobrama pellegrini, suckerfish, spinibarbus sinensis, etc.

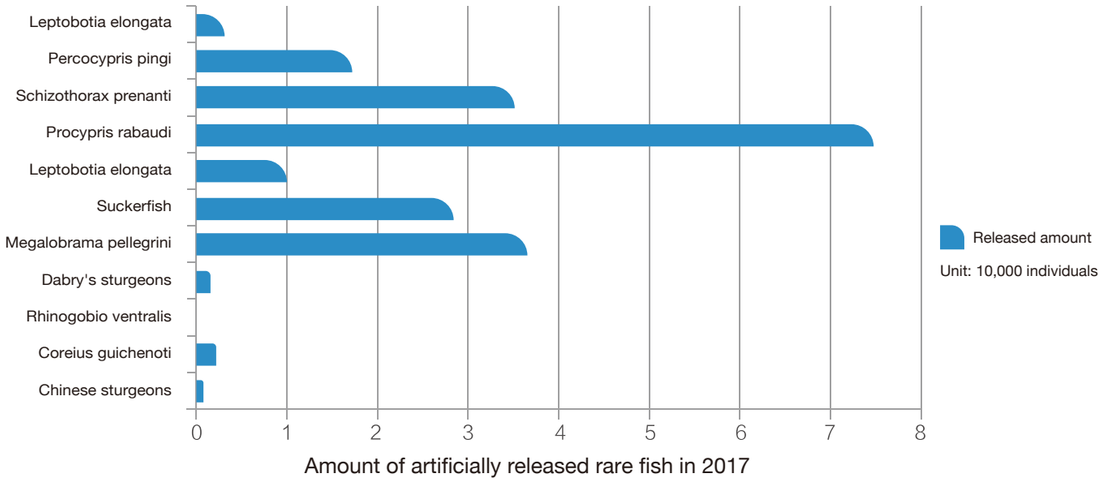
Unit: 10,000 individuals



Releasing area: Rare and Endemic Fish Breeding and Releasing Stations of Baihetan and Wudongde Hydropower Stations in Jinsha River

Released species: fries of leptobotia elongata, schizothorax prenanti, percocypris pingi, etc.

Unit: 10,000 individuals



Amount of artificially released rare fish in 2017

Xiangshui Company organized breeding and releasing activities for the restoration of marine ecosystems

On the basis of long-term breeding and releasing activities in inland rivers, CTG expanded the breeding and releasing activities to the marine area in 2017, making efforts in enhancing marine environmental protection and promoting its restoration. On the National "Fish Releasing Day" (June 6th) in 2017, Xiangshui Company, together with the local government, Marine Fisheries Research Institute, Bureau of Ocean and Fisheries and other stakeholders, organized the breeding and Releasing Event of Three Gorges Xiangshui Offshore Wind Farm in the coastal waters of Xiangshui, releasing fries of prawns, cynoglossus semilaevis, rhopilema esculentum and others contained in oxygenated, cooled and sealed plastic bags into the sea. A total of 700,000 cynoglossus semilaevis fries, 17 million penaeus chinensis, 90 million rhopilema esculentum and 460,000 sepia esculenta were released.

Xiangshui Company organized the breeding and releasing activities

Protecting the rare and endemic species of the Three Gorges

Through careful research and meticulous maintenance, CTG has created an environment suitable for endangered species and built a "Rare Plant Garden" and a fish conservation center. The Yangtze River Rare Plant Research Institute of CTG continues to carry out the protection and research of rare and precious plants in the Three Gorges area. Since 2007, it has continued to investigate the wild plant resources in the Yangtze River Basin, carried out the introduction and protection of rare and endemic plants in the Three Gorges and breeding of the rare and endemic plants in the Three Gorges such as myricaria laxiflora and davidia involucrata, implement the ecological protection projects of the Yangtze River Basin cooperatively or independently, and applied the rare and endemic plants in the Three Gorges to the ecological restoration projects, thus achieving the purpose of ecological protection. In 2017, the Yangtze River Rare Fish Conservation Center, a new fish protection base, was completed.

Taxus chinensis

01 Conducting field investigation to obtain specific information of plants

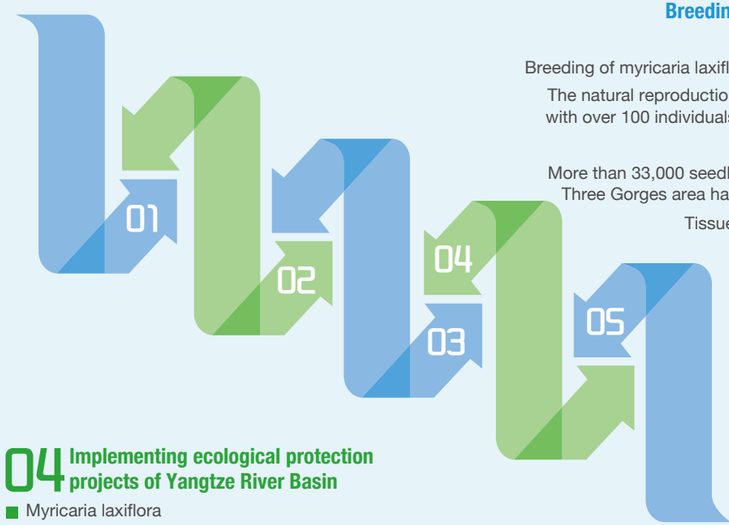
- Investigating species, habitat characteristics, distribution range, growth status, threatened conditions and the like of plants
- Obtaining information on plant taxonomy, floristic, phytoecology, plant resources, etc.

02 Introduction and protection of rare and endemic plants in the Three Gorges area

- By 2017, the Yangtze River Rare Plant Research Institute has introduced 436 species of rare plants (more than 18,000 individuals)
- Files have been created for all endemic and rare plants

03 Breeding of rare and endemic plants in the Three Gorges area

- Breeding of myricaria laxiflora endemic in the Three Gorges area
- The natural reproduction of the myricaria laxiflora succeeded, with over 100 individuals reproduced with traditional methods
- Traditional reproduction of rare plants
- More than 33,000 seedlings of rare and endemic plants in the Three Gorges area have been bred with traditional methods
- Tissue culture research of rare and endemic plants in the Three Gorges area



04 Implementing ecological protection projects of Yangtze River Basin

- Myricaria laxiflora
- Adiantum reniforme
- Plantago fengdouensis
- Buxus ichangensis, Chuanminshen violaceum and other endemic plants in Three Gorges area
- Emmenopterys henryi (Grade II National Protected Plant)

05 Application and slash restoration of rare and endemic plants in the Three Gorges area

- CTG has put more than 10,000 seedlings of acer wilsonii, taxus chinensis, davidia involucrata and others into use for project such as the Gezhouba sand-blocking dam, the 84 platforms on the right bank and the ecological restoration of Jigongling Mount.

Soil and Water Conservation

The report on the 19th National Congress of CPC pointed out that it is necessary to establish and implement the concept of "Lucid waters and lush mountains are invaluable assets", treating the ecological environment like our life. CTG deeply implements President Xi Jinping's important thought "Lucid waters and lush mountains are invaluable assets", and spares no effort to prevent soil and water loss and protect soil and water conservation, enhances the environmental management of disturbed land in the power station construction area, and improve the regional ecological environment recovery capability. Suitable species are selected for vegetation in the construction area of the Xiangjiaba Hydropower Station to prevent the invasion of alien species. In 2017, the remediation rate of disturbed land in the Xiluodu Hydropower Station construction area reached 97.60%, while that of Xiangjiaba Hydropower Station was 97.82%.

Terrestrial ecological protection measures for Wudongde Hydropower Station - Greening Project

In May 2017, the second phase of the greening project of Wudongde Hydropower Station construction area started, which mainly included road greening, greening of viewing platform, slope greening of the processing plant, etc. By the end of 2017, 3,220m^3 planting soil has been backfilled, 1,450 m^2 slope treatment finished, 1,350 trees such as ficus microcarpa, oleander, delonix regia, Maochun, ficus virens and bougainvillea speetabilis planted, and 668m^2 hedgerow built. The greening area in the curing period within the construction area has reached 433,100m^2.

Landscaping of Wudongde Viewing Platform

Landscaping of Wudongde Campsite

Soil and water conservation in overseas project construction

The Sampales Power Station in Greece was built on the flank of the hillside, in which the drainage system constructed by the construction company is prone to cause landslide during the rainy season. CTG European Company complete the rectification in terms of the slope reinforcement, concrete drainage ditch, concrete retention wall construction and road leveling for the purpose of soil and water conservation. This rectification met the design requirements and has been accepted by CTG and third-party institutions.

Prevention and Control of Pollution

Adhering to green development, CTG strictly controls the discharge of pollutants throughout the construction and operation of projects. We effectively prevent and control the adverse impacts of construction on the environment, and build a foundation for harmony between human and nature through green development.

Domestic sewage treatment System of the Isimba Hydropower Station Project in Uganda

Waste Water and Sewage Treatment

CTG strictly implements the Three Simultaneities environmental protection system to treat production waste water and domestic sewage in a proper way. We construct and improve treatment facilities inspects and supervises the operation of domestic sewage treatment stations. We also innovate environmental protection technologies, with which treated domestic sewage will be preferentially reused for green conservation and watering in the camp after treatment, thus promoting the recycling of water resources.

Prevention and Control of Air Pollution

CTG integrates the concept of green development into production, management and operation. We strictly implement emission reduction measures for air pollutants generated by blasting and transportation during the development of hydropower and dust in the development of thermal power, thus preventing and controlling air pollution effectively.

Blasting Period

- In the dam operation area, measures such as spraying with water cannons and watering curtain are taken to reduce the slag and the dust generated by slag tapping and turning operations.
- Water bags are put in the blasting area, which will be blasted simultaneously with the earth-rock to form water mist so as to prevent the blasting dust.

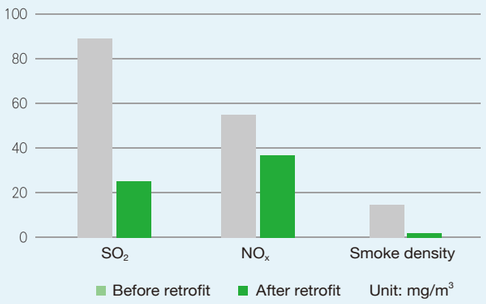
After Blasting

- Sprinkle water on the muck piles in the digging and loading process, and adopt wet operation for drilling to reduce the dust hazard

Adopting near-zero emission technology to effectively prevent air pollution

Ezhou Power Generation Co., Ltd of Hubei Energy Group (hereinafter referred to as “Ezhou Power Plant”), a large thermal power generation enterprise under CTG, actively implements pollution control, energy conservation and consumption reduction measures in order to build a late-model coal-fired power enterprise featuring green production, resource recycling, high efficiency and advanced technologies. The third phase of this project adopts the world’s most advanced near-zero emission technology , with the “low-nitrogen combustion + SCR flue gas denitrification” process used for controlling nitrogen oxides, and “three-chamber five-field electrostatic precipitation + wet electric precipitation process” for the flue gas dust removing devices. The environmental protection level meets and even exceeds the domestic maximum emission standard, with “near-zero emission” of flue gas realized.

In 2017, Ezhou Power Plant implemented the ultra-low flue gas emission retrofit project, with two units retrofitted and put into operation in August and December respectively.



Flue gas denitration device for Phase III of the project

Road water-sprinkling dustfall of the Souapiti project in Guinea

Slag truck washing and rinsing system of Haizigou waste slag yard in Baihetan Hydropower Station

Prevention and Control of Noise Pollution

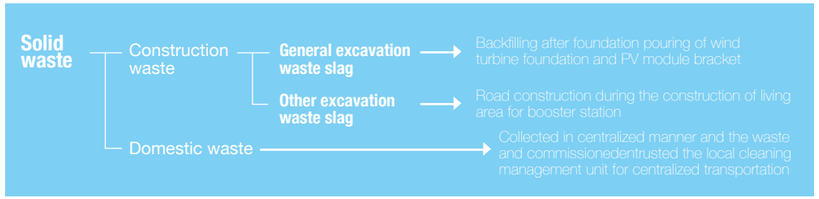
CTG earnestly carries out the sound environment protection work in the project construction area and strictly implements the requirements of *Environmental Quality Standard for Noise* and *Emission Standard of Environment Noise for Boundary of Construction Site*, and manages the system noise, construction noise and traffic noise in the construction area, making efforts to creating a harmonious environment for the surrounding residents and habitats.

Noise detection for the Saint Elena project in Ecuador

Solid Waste Treatment

During the construction and operation of the hydropower stations, CTG establishes solid waste treatment standards covering the entire process, and builds waste treatment systems for collection, transportation and landfill of construction and domestic wastes. We also enhance standardized management to reduce the adverse impacts of construction, living and production on the environment. In 2017, the harmless treatment rate of domestic waste in the Three Gorges Dam area was 100%.

Construction Period



Operation Stage

Solid waste treatment for wind farms and solar power stations

Clearing waste oil for the AMT Freeway Project in Senegal

CTG actively cleans floating dregs in the reservoir areas. The floating dregs in the main stream in the Three Gorges Reservoir area are cleaned by the local governments entrusted by CTG. The upstream floating dregs in the Three Gorges, Xiangjiaba and Xiluodu Hydropower Stations are cleaned both with machines and manually in a timely manner and treated harmlessly, thus protecting the upstream water quality and ensuring smooth navigation. In 2017, about 47,000m^3 of upstream floating dregs was collected in the Three Gorges area, with a total of 7,350 person-times participating in the cleaning work.

Dry season

- January-May: cleaning is the main work

Flood season and impoundment period

- It is the flood season from June to August, and there are not many floating dregs, which are cleaned both with machines and manually.
- It is the Autumn flood season in September, and there are many floating dregs, which are cleaned mainly with machines.

Dry season

- After mid-October, manual cleaning with small power barges is the mainly used cleaning method.

Main work of cleaning floating dregs

Prevention and control of upstream floating dregs pollution

In 2017, a total of over 1,600 times of boat-cleanup, including 4 mechanized cleanup boats, were dispatched with more than 7,300 person-times to clean the upstream floating dregs timely and effectively, with a total of 47,000m^3 floating dregs cleaned. The upstream floating dregs is treated in a harmless manner, as all the floated objects were sent to Huaxin Cement Zigui Co., Ltd. for cement kiln co-processing. There has been no long-term accumulation of upstream floating dregs, and the floating dregs have made no adverse effects on the operation of the powerhouses, ship locks, ship lift and the water quality. The cleaning and treatment of floating dregs effectively protect the regional ecology and keep the river surface and banks tidy and clean, thus guaranteeing the safe operation of the Three Gorges Dam.

Cleanup boats in the Three Gorges Reservoir

Cement kiln co-processing for utilizing floating dregs as resources

The floating dregs mainly includes various agricultural, domestic and industrial wastes such as trees, straws and plastics. With pretreatment such as drying, the energy contained in the floating objectives can make a positive contribution to the cement clinker calcination process. CTG has cooperated with Huaxin Cement Co., Ltd since 2010 for co-processing of upstream floating dregs in the Three Gorges area with the new dry-process rotary cement kilns in the Huaxin Cemnet Zigui Factory. The collected upstream floating dregs from the Three Gorges Dam are transported to the dock of the Huaxin Cement Zigui Factory by transport vessels, unloaded on land to be crushed and dried, and then transported to the cement kilns for high-temperature incineration.

Unloading → Crushing → Drying → Storage → Measuring → Transporting → Feeding into kiln

Through cement kiln co-processing, the upstream floating dregs in the Three Gorges area can be treated as resources in a reducing and harmless manner. By the end of 2017, the floating dregs treated by cement kiln have been over 510,000m^3, replacing more than 10,000 tons of standard coal, thus realizing safe, environmental and efficient treatment of upstream floating dregs.

Feeding port for treatment of floating dregs

Environmental Protection Performance

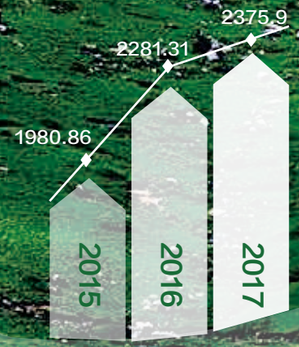
2017

Following the central idea of “Green Development, Key Breakthroughs, Systems Improvement, and Standard Management”, CTG has given full play to the spirit of unity and cooperation and implemented the concept of green development. CTG achieving results in multiple sectors through comprehensive and systematic environmental protection actions.

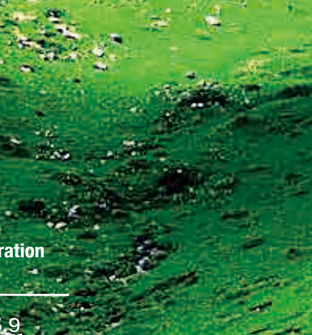
Overall Performance

Total investment in environmental protection (in 100 million yuan)

Domestic clean energy generation (100,000 MWh)

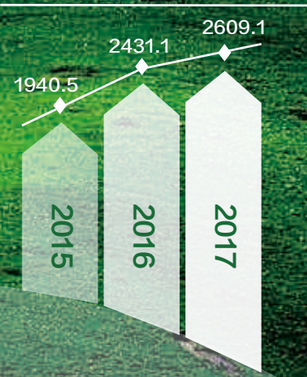


Equivalent to saving standard coal (10,000 tons)



Equivalent to reducing CO_2 emission (10,000 tons)

Global Hydropower Production (100,000 MWh)



Global Wind Power Production (100,000 MWh)

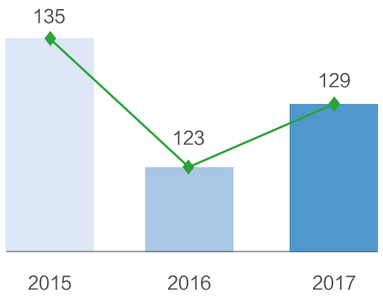
Global Solar and PV Power Production (100,000 MWh)

Performance by Category

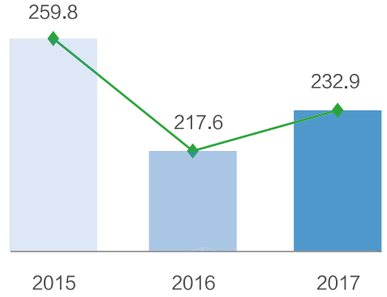
Benefits of Emission Reduction

Benefits of Flood Control

Total impound floodwater
(100 million cubic meters)

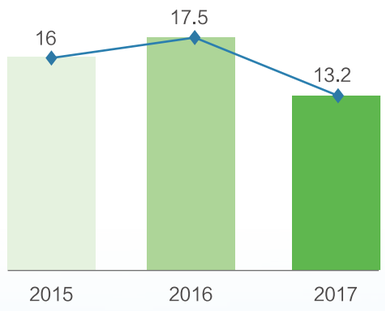


Water provided for the middle and lower reaches of Yangtze River during the dry season
(100 million cubic meters)

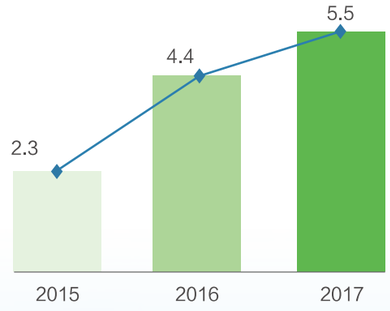


Artificial Fish Breeding and Releasing

Rare and Endemic Fish Released by Xiluodu-Xiangjiaba Breeding and Releasing Station
(10,000 individuals)



Rare and Endemic Fish Released by Baihetan-Wudongde Breeding and Releasing Station
(10,000 individuals)



Soil and Water Conservation

Six indicators of Xiluodu Hydropower Station and Xiangjiaba Hydropower Station have met the goal of water and soil conservation in the impoundment stage.

	Disturbed land remediation rate of construction area and external traffic area	Total control degree of soil erosion	Soil loss control ratio	Slag blocking rate	Forestry and grass vegetation restoration rate	Percentage of forestry and grass coverage
Xiluodu Hydropower Station	97.6%	94.4%	0.87	96.3%	96.1%	21.2%
Xiangjiaba Hydropower Station	97.8%	96.2%	0.92	98.8%	98.2%	30.8%

Prevention and Control of Pollution

The compliance rate of Xiluodu Hydropower Station and Xiangjiaba Hydropower Station is 100%.

Xiluodu Hydropower Station	Xiangjiaba Hydropower Station
114,400 tons domestic sewage treated	**277,700** tons production waste water treated
1,636,950 m^2 road area with dust removing, cleaning and maintenance in total	**16,969** tons construction slag treated
	1690 tons domestic wastes treateda
	2.5 tons hazardous wastes storage

Outlook for 2018

In 2018, guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, CTG will continue implementing in-depth the spirit of the Report to the 19th CPC National Congress in 2017, actively practice a new development philosophy, further improve the environment management system and mechanism, organize and carry out environmental risk evaluation in-depth, strengthen environmental risk management and control, earnestly coordinate with law enforcement and inspection on environmental protection, and continue monitoring and analysis of environmental conditions. At the same time, we will carry out diversified training activities on environmental protection, cultivate our staff with the sense of environmental protection and related capabilities, actively exchange and learn experience in environmental protection from home and abroad, build fine-quality green projects, promote the harmonious coexistence of man and nature, and realize the harmonious unity among economic, social and environmental benefits.

In 2018, CTG will firmly undertake the new missions entrusted by the Central Government, fully function as a backbone in promoting the development of the Yangtze River Economic Belt with “Promoting well-coordinated environmental conservation and avoiding excessive development” as an orientation, actively explore new approaches to environmental protection and restoration, fully carry out water pollution prevention and treatment, aquatic ecological restoration, and water resources protection. CTG will steadily proceed with the final acceptance tests for the environmental and hydrological protection works of Xiluodu and Xiangjiaba hydropower stations. Giving priority to the implementation of key environmental protection measures at the Wudongde and Baihetan hydropower stations. CTG will carry out aquatic ecological restoration and protection of the Yangtze River Basin, with the natural reserve for rare and endemic fish in the upper reaches of the Yangtze River as a focal point. In addition, CTG will deepen major special studies on ecological environments and contribute efforts to the construction of the Yangtze River Economic Belt into a model for ecological civilization.

In 2018, CTG will further improve the comprehensive benefits of the cascade complexes in the basin. With the needs for flood control, shipping, power generation and ecological protection in the upper and lower reaches, on the left and right banks and in the mainstream and tributary areas of the Yangtze River. CTG will carry out in-depth joint operation of cascade reservoirs along the mainstream of the Yangtze River and in the Qingjiang River Basin, strengthen the achievements in the utilization and joint operation of medium and small-scale floods as resources to maximize comprehensive benefits. By fully employing market measures, CTG proceed with the establishment of a new mechanism for operation and coordination of reservoirs in the basin to contribute more clean energy for the victory of defence of the blue sky.

In 2018, CTG will accelerate the construction of the “Wind & Solar Three Gorges”, fully proceed with the development of offshore wind power, onshore wind power and photovoltaic power, accelerate the construction of an offshore wind power operation and maintenance system, strengthen the acquisition of resources, actively expand into new industry forms, continue optimizing our business layout, and push ahead with the development of new energies in terms of scale, management, technology, standards, talent and branding to promote the sustainable development of clean energies at home and abroad.

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Indexes for Corporate Environmental Report (HJ 617-2011)

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	Enterprise Overview			
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2.2	Total assets, sales revenue and employees	√		About Us
2.3	Industry, main products or services		√	About Us
2.4	Operation philosophy and culture		√	P4-P5
2.5	Management framework and related policies		√	P23-P26
2.6	Employee evaluation of the company		√	
2.7	Major changes in corporate scale or structure	√		About Us
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2.8	Report's limitation	√		About the Report
2.9	Report time frame	√		About the Report
2.10	Measures and commitments to ensure and improve the accuracy and reliability of the Corporate Environmental Report	√		About the Report
2.11	Third-party verification		√	
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Third-party Comments

China Three Gorges Corporation has released Annual Report on Environmental Protection for 2017 recently, which is the 13th consecutive one. This report comprehensively demonstrates the highlights and performance of CTG in environmental protection in 2017 with rich content and clear logic in novel forms. Inheriting the essence of the previous environmental annual reports, this report makes great improvements in structure and content, showing the remarkable achievements of CTG in accelerating the process of building a world-class clean energy group and in the field of environmental protection.

Respond to the key focuses of stakeholders. With full and complete content, the report focusing on spotlights of social concerns and laying emphasis on substantive issues, responds positively to environmental issues such as development of clean energy, adaptation to climate change, conservation of species diversity, soil and water conservation and ecological restoration with clear data and rich cases, thus improving the transparency of the company and reflecting the important role played by CTG in promoting the construction of ecological civilization in China.

Highlight the environmental protection concept of "the Whole Business, Whole Basin and Whole Process". Featuring clear structure and distinctive characteristics of the enterprise and industry, the report, with the newly added theme of "Leading Green Development for Building Ecological Civilization", highlights environmental protection concepts of "the Whole Business, Whole Basin and Whole Process" formed by CTG in practicing and leading green development. The main part of the report systematically demonstrates CTG's management, practice and performance through three chapters, i.e., Environmental Management, Environmental Protection Actions and Environmental Protection Performance with clear and easy-to-read structure, showing the transition of CTG from the environmental protection in development and operation of river basin hydropower development to the environmental management and control of an integrated clean energy group.

Bring good reading experience to readers. The report, featuring a simple and clear style with flexible and novel design, presents the highlights of CTG in performing its responsibilities with a large amount of data, logic diagrams and photos. Its content is rich and interesting, easy to read, and close to the readers, showing the sincere attitude of CTG to communicate with stakeholders and enhancing the sense of participation of stakeholders.

Zhai Qi

Deputy Secretary-General of China Business Council for Sustainable Development

Annual Report on Environmental Protection 2017 of CTG is an excellent report in professional standard. With detailed content and a reasonable structure, the report comprehensively reflects CTG's management initiatives and key practices in the field of environmental protection in 2017. CTG actively participates in the construction of ecological civilization in China, implements the concept of green development in an in-depth manner, and makes impressive contribution to the implementation of the environmental conservation of the Yangtze River and the national ecological civilization construction strategy.

Participate in the national strategy of co-construct the ecological civilization. As a clean energy group, CTG deeply explores hydropower development as the main business, actively promotes the extension of the industrial chain to the development of water resources, makes efforts in protecting the fresh water resources in China, and expands new energy businesses such as offshore wind power and photovoltaics, thus creating a model of green development of whole business. Integrated into implementing the strategy of the environmental conservation of the Yangtze River, CTG actively play the main force role and leading role of an key enterprise, promoting the construction of the Yangtze River economic belt as well as the comprehensive protection and continuous improvement of the ecological environment in the middle and lower reaches of the Yangtze River.

Continue to deepen and improve environmental management capabilities. CTG carries out environmental management system that cover the whole business, whole basin and whole process. It, deepening environmental protection concepts and improving environmental management capabilities. In the chapter "Environmental Management", the Through-Life-Cycle concept, effective policies and measures and comprehensive execution ability of CTG in environmental management are systematically presented from six aspects, i.e., organizational structure, management system, whole-process management, environmental monitoring, R&D and capability building as well as exchanges and cooperation, reflecting the systemic, comprehensive and advanced environmental management of CTG.

Implement green development through the whole life cycle. In addition to providing clean energy to the society, CTG is committed to realizing harmony between energy production and ecological environment by continuing to carry out fish habitat protection and ecological protection research in river basins. CTG strictly implementing measures for mitigating environmental impact and improving ecological environment. In the chapter "Environmental Protection Actions", the actions and performance of CTG in responding to climate change, ecological protection and restoration and improving prevention and control of environmental pollution are systematically presented, reflecting the efforts and fruits of CTG in promoting the coordinated and sustainable development of production, living and ecology in the Yangtze River Basin.

There is a long way to go for ecological environmental protection. I expect that CTG will continue to play a leading role in the future green development of China and continuously innovate the way for enterprises to participate in environmental management.

Lu Chunxia

Associate Researcher, Institute of Geographic Sciences and Natural Resources Research, CAS

Reader Feedback

In order to improve the environmental protection work of CTG and enhance the Corporation's ability to implement social responsibility, we particularly hope to know your comments and suggestions. Please spare the time to give us your valuable opinions on our work and report.

1. How would you evaluate the Annual Report on Environmental Protection of CTG in general?

○ Great ○ Good ○ Average

2. How well do you think CTG has been doing in proactively serving government and customers?

○ Great ○ Good ○ Average ○ Bad ○ I don't know

3. How well do you think CTG has been doing in protecting the environment and promoting sustainable development?

○ Great ○ Good ○ Average ○ Bad ○ I don't know

4. How well do you think CTG has been doing in communicating with stakeholders?

○ Great ○ Good ○ Average ○ Bad ○ I don't know

5. Do you think that the Report is able to reflect the major environmental influences CTG has had?

○ Yes ○ Maybe ○ No

6. What do you think of the clarity, accuracy and completeness of the data and indices disclosed by the Report?

○ Very High ○ High ○ Average ○ Low ○ Very Low

7. Does the layout of the Report help your reading?

○ Great ○ Average ○ Bad

8. You are welcome to give your opinions and suggestions about environmental protection work of CTG and the Report here:

Note: Please tick ("√") the corresponding circles ("○") and mail this page to the following address:Department of Environmental Protection, CTG, No. 1, Yuyuantan South Rd.Haidian District, Beijing, China Zip: 100038

For online opinions, please send them to mi_chuang@ctg.com.cn, or you can leave your valuable opinions on the official website of CTG at http://www.ctg.com.cn/hjnbdc/index.php .

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