



北京 2022 年 冬 奥 会 官 方 合 作 伙 伴
Official Partner of the Olympic Winter Games Beijing 2022

ANNUAL REPORT ON ENVIRONMENTAL PROTECTION 2020

China Three Gorges Corporation

About the Report

Time Frame

From January 1 to December 31, 2020. Part of the content may exceed the aforementioned time frame.

Scope

This report covers work on environmental protection related to the main business of CTG, excluding environmental protection in projects which the Corporation has a minority stake in for the time being.

Interpretation of Environmental Protection

Environmental protection, as described in this report, includes management of the environmental impacts arising from the Corporation's operations, as well as work related to aspects such as soil and water conservation, ecological restoration and energy conservation.

Terms

In this report, the terms "the Group", "the Corporation" and "CTG" all refer to China Three Gorges Corporation.

Context of the Publication

The Corporation's *Annual Report on Environmental Protection* has been published for 16 consecutive years since 2006. Its electronic versions can be downloaded from the official website of CTG.

Data in the Report

The data referenced in this report is CTG's final statistical data for 2020.

Normative References

This report mainly uses the following standards as reference:

- *Environmental Protection Law of the People's Republic of China* (as amended on April 24, 2014)
- *Guidelines for Drafting on Corporate Environmental Reports* (HJ 617-2011), a national environmental protection standard of the People's Republic of China
- *Disclosure Mechanism for the Assessment of the Environmental Impact of Construction Projects*, issued by the Ministry of Ecology and Environment of the People's Republic of China
- GB/T 36000-2015, *Guidance on Social Responsibility*, a national standard of the People's Republic of China
- Sustainability Reporting Standards issued by the Global Reporting Initiative (GRI)
- *Hydropower Sustainability Assessment Protocol*, issued by the International Hydropower Association (IHA)

Language Versions

This report is available in Chinese and English, and published in both print and electronic formats. The electronic version can be downloaded from CTG's website at <http://www.ctg.com.cn/>. If a print copy is needed, please email wang_pengyuan@ctg.com.cn or call 86-010-57081675.

Read More

More content is available on CTG's website at <http://www.ctg.com.cn/>. Other relevant information on environmental protection can be found in the following documents:

- Bulletins on the Ecological and Environmental Monitoring Results of the Three Gorges Project
- CTG Annual Reports
- CTG Sustainability Reports
- Social Responsibility Reports of China Yangtze Power Co., Ltd.
- Social Responsibility Reports of Hubei Energy Group Co., Ltd.

Goals for Improvement

- To gradually standardize report compilation in accordance with the *Guidelines for Drafting on Corporate Environmental Reports* (HJ 617-2011), a national environmental protection standard of the People's Republic of China.
- To further improve environmental management, deal with issues on environmental responsibilities in a more comprehensive and profound manner, and enhance the disclosure transparency of environmental information according to the requirements of GB/T 36000-2015 *Guidance on Social Responsibility*.
- To develop an environmental performance disclosure system with Chinese features for hydropower enterprises based on the *Hydropower Sustainability Assessment Protocol* compiled by IHA, national conditions in China, and findings of studies on China's hydropower sustainability assessment guidelines.



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Message from Top Management



Lei Mingshan

Board Chairman



Han Jun

Director of the Board and President

2020 was an extraordinary year in the history of the People's Republic of China. Mounting downward economic pressures, profound changes in the international landscape, and the rampant spread of COVID-19 brought a stream of impacts on people's health and well-being, working and living conditions, poverty alleviation efforts, and ecological and environmental conservation. Against the backdrop of these unprecedented challenges, China Three Gorges Corporation (CTG) hit the "fast-forward" button on well-coordinated environmental conservation in the Yangtze River Basin. We have remained committed to our original aspiration and mission when facing challenges of pandemic containment and the protection and restoration of the Yangtze River.

In 2020, we did our utmost to implement our two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand, with a focus on our strategic goal of becoming a world-class multinational clean-energy group with strong innovation capacity and global competitiveness. Throughout the process of investing in, developing and operating clean-energy projects, we continued to prioritize the protection of natural environment and pursue green development. We continued to consolidate our foundations in environmental management and pursue innovation in environmental protection technology. New progress was made in ecological and environmental conservation.

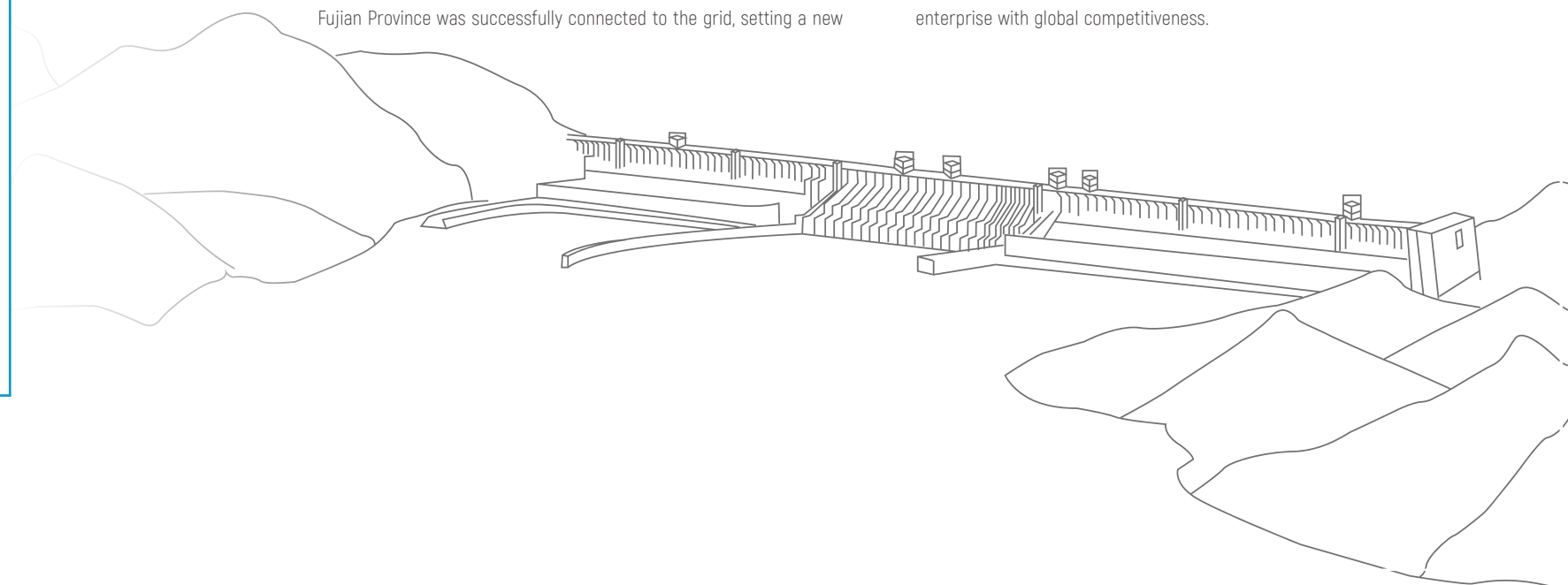
Over the past year, well-coordinated environmental conservation in the Yangtze River Basin was the overriding priority in all our work. To this end, with the joint efforts of all our staff, we fully leveraged our role as an industry leader to promote the green transformation of economic and social development in the 11 provincial-level administrative divisions along the Yangtze River Economic Belt. Facing the adverse impacts of COVID-19 and the severe floods caused by heavy rains in the Yangtze River Basin, we remained committed to science-based water governance approaches and a systematic concept of making a blueprint for the future, so as to strengthen collaborative effectiveness of the Five Platforms and further expand joint implementation. We worked hard to build a three-tier rolling project pipeline comprising projects to be commissioned, projects under construction, and potential future projects. We continued exploring new models and new mechanisms, and strived to provide leadership to bring about progress in well-coordinated environmental conservation in the Yangtze River Basin. We worked hard to improve the ecological environment of the Yangtze River and the ecological functions of its water bodies, to make this Mother River of China more dynamic to benefit our offspring.

Over the past year, we made remarkable achievements in ecological and environmental conservation. We gave full play to our strengths in hydropower development, and built up the world's largest clean-energy corridor along the main stream of the Yangtze River, with an installed capacity around triple that of the Three Gorges Project. The hydroelectricity, generated uninterruptedly from six cascade hydropower plants along the main stream of the Yangtze River, vigorously promoted green development in the Yangtze River Basin. In addition, we continued to advance the development of wind power, photovoltaic power and other forms of new energy on a large scale, promoted the green transformation of economic and social development, and opened a new chapter in being a leader in the offshore wind power industry and a pacesetter in the photovoltaic power industry. Fuqing Xinghuawan Phase II Offshore Wind Farm in Fujian Province was successfully connected to the grid, setting a new

record in the installed capacity of offshore wind power in China. We continued to work on species protection and ecological restoration. To this end, we implemented comprehensive strategies, such as research on preservation of rare terrestrial germplasm resources and the protection of fish resources in the Yangtze River Basin, to build a Three Gorges Model featuring harmonious coexistence between man and nature. CTG is committed to building ecological barriers to benefit people in the fields of flood control, power generation, navigation, comprehensive utilization of water resources and ecological and environmental conservation. CTG has been committed to the integrated operation of cascade reservoirs, and fully leveraged their comprehensive benefits of flood control and water replenishment, thus providing strong and reliable ecological foundation for COVID-19 containment and the development of the Yangtze River Economic Belt.

Over the past year, we have actively championed the Belt and Road Initiative (BRI) and continued to strive towards a new and improved approach to the overseas growth of China's hydropower industry. On top of that, we stepped up energy cooperation with BRI partner countries and regions, steadily sped up the Going Global strategy of green industries, green equipment, green technologies and green energy standards and expanded the coverage of our clean energy and sustainable development infrastructure over 90 countries and regions.

2021 is a year of great importance to China. It marks the centenary of the founding of the Communist Party of China, and a new journey to build China into a modern socialist country in all respects. Meanwhile, it is also a year of historic events for CTG, such as the commissioning of the first batch of generating units in the Baihetan Hydropower Plant and the commissioning of all generating units in the Wudongde Hydropower Plant. Entering a new stage of development, we will strive to implement our two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand, and speed up our transformation into a world-class enterprise with global competitiveness.



About Us



Based in Beijing, China Three Gorges Corporation (abbreviated as "CTG", referred to as "the Group" or "We") is a solely state-owned enterprise. Founded on September 27, 1993, it was formerly known as China Three Gorges Project Corporation, renamed "China Three Gorges Corporation" on September 27, 2009, and then restructured on December 28, 2017.

With over 20 years' steady growth, CTG has developed into the largest hydropower development enterprise in the world and the biggest clean energy provider in China. As of the end of 2020, the main business of CTG had extended to engineering construction and consulting, power generation and operation, cascade dispatch and comprehensive management, new energy development and operation management, international energy investment and contracting, capital operation and financial service, assets management and base service, ecological protection investment and operation and so on.

CTG has earnestly carried out the missions bestowed by the state to play a leading role in well-coordinated environmental conservation in the Yangtze River Basin. The Group has actively developed its business in ecological protection and established relevant entities, reinforcing its support both in technology and investment. It has carried out pilot projects in pilot cities with urban sewage treatment as the starting point. As of the end of 2020, CTG's efforts for the well-coordinated environmental conservation in the Yangtze River Basin had been rolled out across the board. Building upon pilot trials in four cities and deeper cooperation with 12 cities along the Yangtze River, it has achieved a new, geographically comprehensive stage in well-coordinated environmental conservation that covers all 11 provincial-level administrative divisions in the Yangtze River Economic Belt.

- CTG takes full responsibility for the construction and operation of the Three Gorges Project
- According to the mandate given by the state, CTG is also responsible for the construction and operation of the four world-class mega cascade hydropower plants, i.e. Xiluodu, Xiangjiaba, Wudongde and Baihetan, in the lower reaches of the Jinsha River.
- The Wudongde Hydropower Plant has been put into operation. Baihetan Hydropower Plant will come online during China's 14th Five-Year Plan (2021-2025), after which CTG will own five of the 12 largest hydropower plants in the world by installed capacity.
- Over two-thirds of the world's hydroelectric generating units with an installed capacity over 700 MW are run by CTG.
- CTG actively advances new-energy operations, such as wind power and solar power, and is committed to becoming a leader in offshore wind power.

- CTG follows the national Belt and Road Initiative, accelerates the implementation of the "Going Global" strategy, and strives towards a new and improved approach to the overseas growth of China's hydropower industry. Overseas business operations have become an important growth engine for CTG's sustainable development.
- Well-coordinated environmental conservation in the Yangtze River Basin is a top priority for CTG. To this end, we have fully leveraged our role as an industry leader to promote the green transformation of economic and social development in the 11 provincial-level administrative divisions in the Yangtze River Economic Belt.

2020 in Numbers

Joint protection of the Yangtze River

By the end of 2020

CTG had invested RMB **137.5** billion in the well-coordinated environmental conservation in the Yangtze River Basin

512 sewage treatment plants, with a total capacity of **3.58** million m³/day, had been built

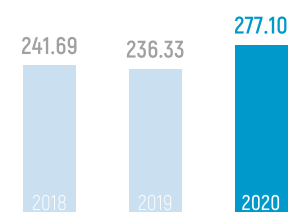
Over **17,000** km of stormwater and sewerage piping had been designed

covering an urban area of about **18,000** km²

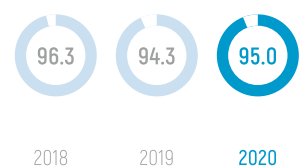
and over **20** million residents



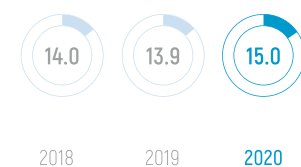
Total amount of clean electricity generated by CTG (TWh)



Proportion of renewables in CTG's total installed capacity (%)



CTG's share in China's total installed hydropower capacity (%)



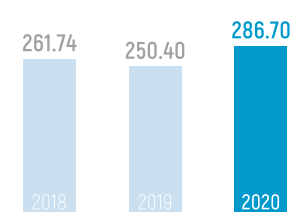
Equivalent savings in standard coal (tons)



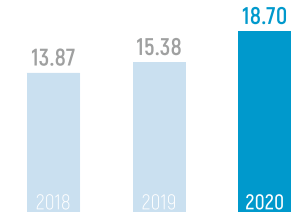
Equivalent reduction in CO₂ emissions (tons)



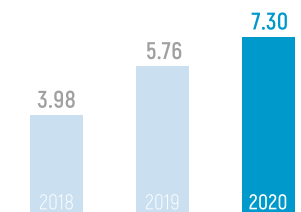
Total hydropower generated by CTG (TWh)



Total wind power generated by CTG (TWh)



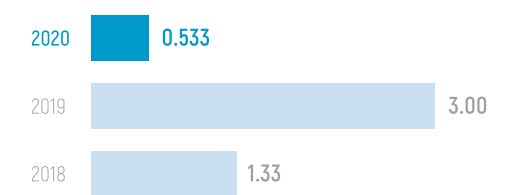
Total solar power generated by CTG (TWh)



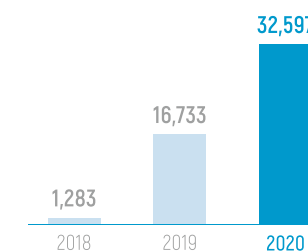
Number of Chinese sturgeons released into the Yangtze River



Total number of eggs spawned by the four major breeds of Chinese carp during experimental ecological regulation in the Yidu section (billion)



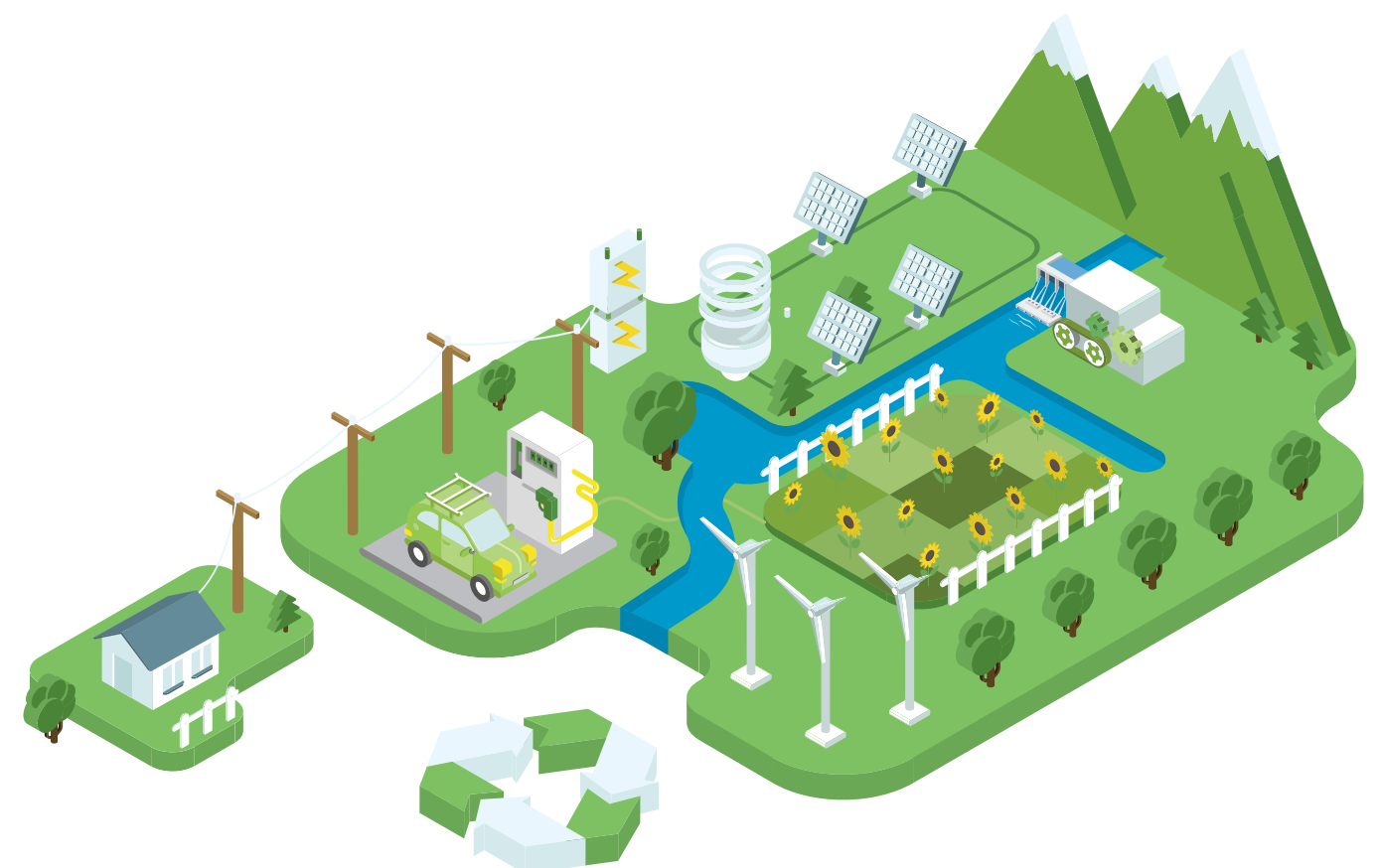
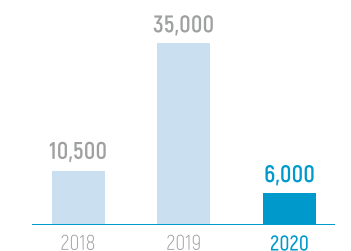
Total investment in environmental protection (including water and soil conservation) (RMB million)



Implementation rate of environmental impact assessments for new projects (%)



Issued green bonds (RMB million)



Feature

Achievements in Well-coordinated Environmental Conservation in the Yangtze River Basin

CTG has taken the initiative to serve major national programs and is fully engaged in the green development of local regions. Facing the adverse impacts by COVID-19 and the severe floods caused by heavy rains in the Yangtze River Basin, we took a science-based approach towards flood control and further expanded the scope of coordinated efforts. We worked to build a three-tier rolling project pipeline comprising projects to be commissioned, projects under construction, and potential future projects. We continued exploring new models and new mechanisms, and strived to provide leadership to make achievements in the well-coordinated environmental conservation.



Making continuous efforts in leadership

We have proactively participated in the well-coordinated environmental conservation of the Yangtze River and firmly adhered to the two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand. In accordance with our Science-based Water Governance Program, we have made steady progress and are fully engaged in the green development of local regions and the building of ecological barriers.

By the end of 2020



CTG had invested RMB

137.5 billion

for well-coordinated environmental conservation in the Yangtze River Basin



109

cooperation agreements had been signed with local governments along the Yangtze River

2017



December 13, 2017

CTG attended a conference organized by the Office of the Leading Group for Promoting the Development of the Yangtze River Economic Belt.

2018



May 29, 2018

An site conference on CTG's pilot work in urban sewage treatment in the Yangtze River Economic Belt was held in Jiujiang, Jiangxi Province, by the Office of the Leading Group for Promoting the Development of the Yangtze River Economic Belt. This meeting marks the "first move" by CTG in urban sewage treatment.



December 28, 2018

Yangtze Ecology and Environment Co., Ltd. was founded.



November 27, 2019

The Office of the Leading Group for Promoting the Development of the Yangtze River Economic Belt held a special meeting in Beijing, where the achievements by CTG in well-coordinated environmental conservation in the Yangtze River Basin in 2019 were applauded.



September 25, 2020

The third site meeting of the Office of the Leading Group for Promoting the Development of the Yangtze River Economic Belt was held in Zhenjiang, Jiangsu Province. During the meeting, the achievements made in different phases were inspected. It was made clear that the benefits of CTG's participation in well-coordinated environmental conservation in the Yangtze River Basin were emerging.

2019



June 5, 2019

The second site meeting of the Office of the Leading Group for Promoting the Development of the Yangtze River Economic Belt was held in Wuhu, Anhui Province. This meeting officially rolled out the "Three Gorges Model" for urban sewage treatment in the Yangtze River Economic Belt.

2020



August 25, 2020

CTG launched an initiative to establish the Developer Alliance of Yangtze River Delta Eco-Green Integration Development Demonstration Zone.



September 18, 2020

CTG has invested over RMB 100 billion in well-coordinated environmental conservation in the Yangtze River Basin.

Working together to continuously improve well-coordinated environmental conservation in the Yangtze River Basin

CTG is committed to the philosophy of joint contribution and shared growth. The Corporation is dedicated to establishing multi-party partnerships that can reassure governments, win industry recognition, and achieve public satisfaction. CTG has coordinated the resources and strengths of industry alliance members, continued to step up cooperation with relevant enterprises, universities, and research institutes, and pursued collaboration on key issues and bottlenecks in environmental governance.

The on-going efforts made by implementors, with Yangtze Ecology and Environment Co., Ltd. at the core, have achieved a transition from pilot trials in four cities and deeper cooperation with 12 cities along the Yangtze River to a new, geographically comprehensive stage in well-coordinated environmental conservation that covers all 11 provincial-level administrative divisions in the Yangtze River Economic Belt. The synergistic effect of the five platforms has been further manifested.



By the end of 2020

The number of provinces, cities, districts and counties signing cooperation agreements with CTG on well-coordinated environmental conservation in the Yangtze River Basin had increased to 102.

102



Financing Platform
Yangtze River Green Development Investment Fund

- Researching and optimizing plans for the establishment of funds, seeking of financing, and working with China Securities Index Co., Ltd. (CSI) to publish an index for environmental conservation of the Yangtze River.
- Utilizing capital markets to serve national strategies.



R&D Platform
Yangtze River Ecological Environment Engineering Research Center

- As one of the main entities engaging in preparatory work for the establishment of a national engineering research center for water environment protection and water ecology restoration of the Yangtze River Economic Belt, it focuses on the "4 + 1 Program" for well-coordinated environmental conservation in the Yangtze River Basin and pursues the development and commercialization of innovative ecological and environmental conservation technologies.

Implementation Platform
Yangtze Ecology and Environment Co., Ltd.

- Number of members has increased to 102.



Joint Development Platform
Yangtze River Protection Industry Alliance

- Disbursement of RMB 2.2 billion to support forward-looking programs such as preparation of water environment comprehensive management plans and development of demonstrative projects.



Support Platform
Special Fund for Ecological Protection of the Yangtze River

Formulating and publishing the thematic index of the Yangtze River protection together with CSI

CTG, through collaboration with CSI, has formulated the CSI Yangtze River Protection Theme Index by selecting 100 listed companies (from the Shanghai, Hongkong and Shenzhen stock exchanges) that are dedicated to and have benefited from ecological conservation in the Yangtze River Basin, as well as representatives of green development in the Yangtze River Economic Belt. The formulation and issuance of this index provides a thematic index for capital markets to focus on the national strategies for the Yangtze River Economic Belt, and also constitutes a major move by capital markets to serve major national strategies.

Promoting the "Three Gorges Model" through innovation

CTG is committed to science-based systematic water governance and has continued to refine the "Three Gorges Model" to generate overall and complete progress in water management. Meanwhile, CTG continues to explore innovation in the formation of innovative standards and specifications. The Corporation has formulated sound standards to address problems in the industry uncovered during the implementation of integrated systems of sewerage pipeline networks and wastewater treatment plants.

"Capital Plus" rolls out along the Yangtze River

The "Capital Plus" model for well-coordinated environmental conservation in the Yangtze River Basin is a new model and mechanism devised by CTG for protecting the Yangtze River. The approach of exploration is to speed up investment scale, partially foster core industrial chain capacities and build industry consensus on well-coordinated environmental conservation in the Yangtze River Basin.



Rural Sewage Treatment and Beautiful Countryside Program in Liuhe District, Nanjing, Jiangsu Province.

"Capital Plus National Water Affairs Platform" Model

CTG has partnered with leading enterprises specializing in sewage treatment in the fields of capital and business operations, including complementarity in strength as well as coordinated development in the areas of capital, platform and business. In 2020, CTG formed an equity bond with Beijing Enterprises Water Group Limited (BEWG). Both parties jointly executed 5 projects in total, rapidly increasing the sewage treatment capacity of CTG by absorbing and integrating the stock assets of BEWG.



Phase III MBR Membrane Cisterna of Zhujiqiao Sewage Treatment Plant in Wuhu, Anhui Province



Signing Ceremony for Capital Increase and Equity Expansion of Sichuan Environmental Protection Industry Group Co., Ltd.

"Capital Plus Local Water Affairs Platform" mode

CTG carried out equity cooperation with local platforms through putting idle resources into use, encouraging local platforms to give full play to the effect of capital. CTG put in place water governance programs, made plans for key projects and achieved reform in water regulation enterprises and high-quality development, thus improving local water environments. In 2020, CTG worked with Sichuan Environmental Protection Industry Group Co. Ltd. and other local water investment and operation platforms to establish over 10 cooperation platforms in seven cities across China.

"Capital Plus Technology-based Enterprises" Model

CTG has established equity cooperation with outstanding technology-based companies in the field of environmental protection in China. We have drawn upon their strengths to bring advanced treatment technology, equipment and management philosophies into the joint protection of the Yangtze River, thus forming a virtuous cycle of business expansion and technology development. In 2020, CTG invested in ten enterprises with high-quality expertise in new pipelines, smart water governance, pipeline repair, sludge disposal, and sewage treatment.



Upper reaches

Aerial View of Guangyang Island



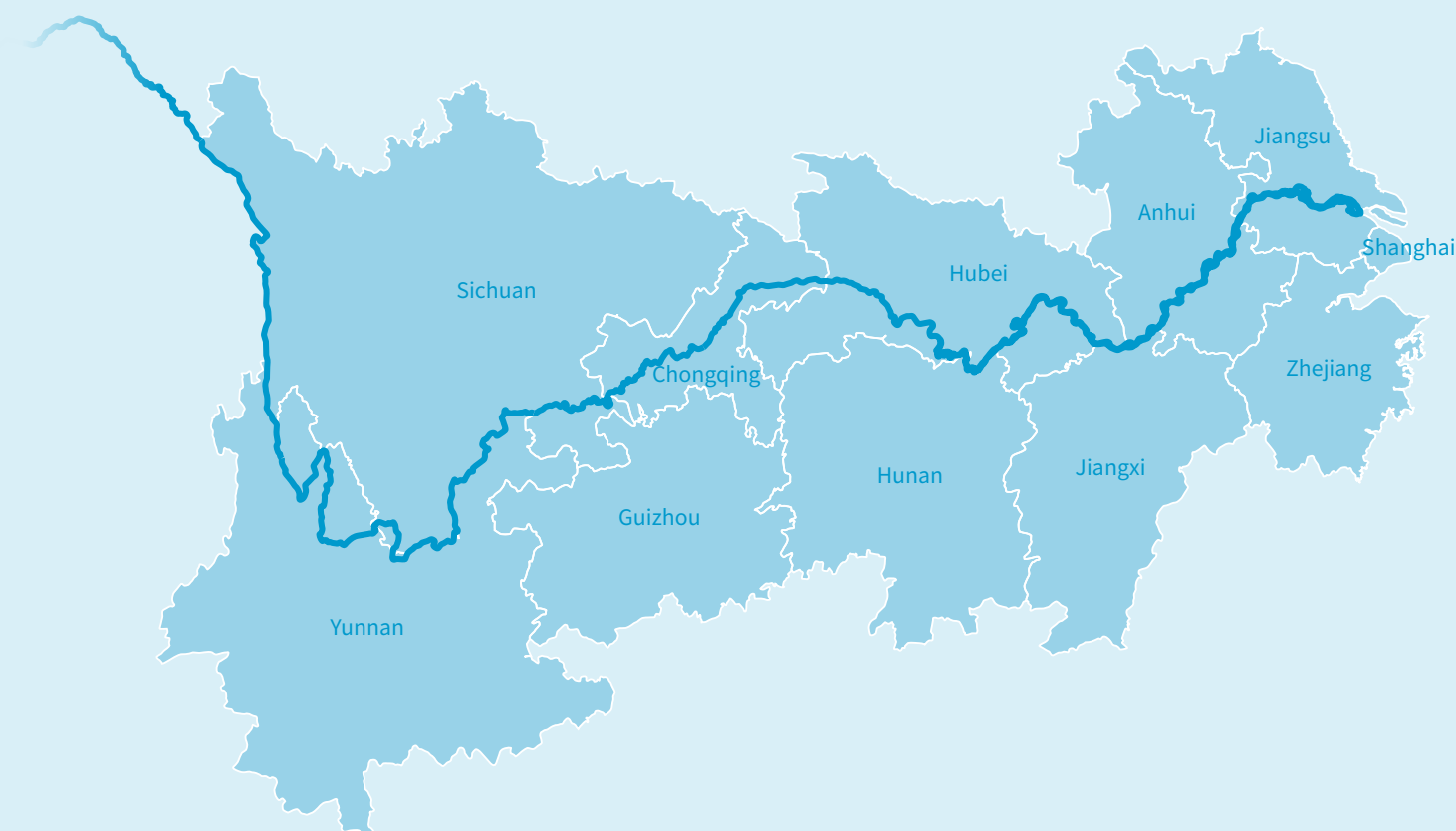
Hubei

Aerial view of the Wuhan Optics Valley Corridor (Phase II)



Anhui

Completion of the first batch of photovoltaic modules for the Distributed Photovoltaic Project of the Wuhu Zhujiqiao Sewage Treatment Plant



Hunan

Dredging in the Wangjia River in downtown Yueyang City



Jiangxi

Shilihe River Landscape Restoration Project in Jiujiang, Jiangxi Province



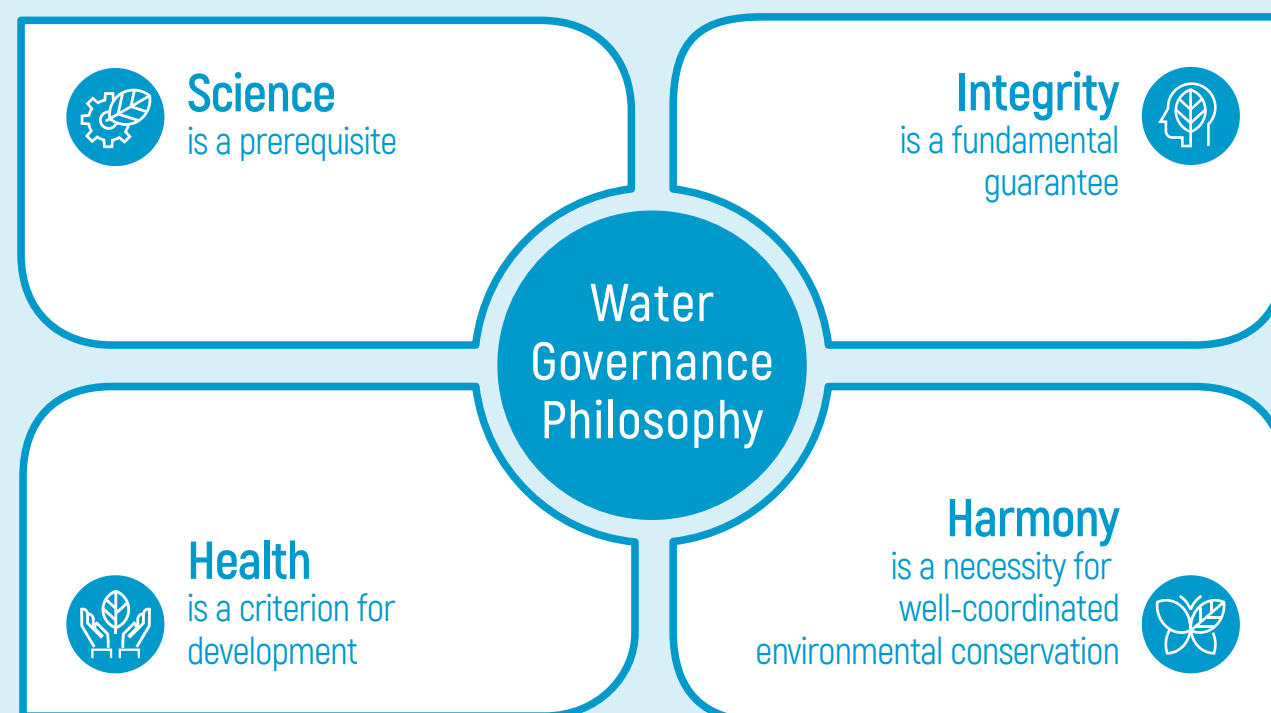
Jiangsu, Zhejiang and Shanghai

The Beautiful Yuandang Lake in Wujiang District, Suzhou



Making targeted efforts to consolidate implementation and execution for visible outcomes

CTG has made targeted efforts in key programs, upheld its water governance philosophy of "science-based, integrity, healthy and harmonious", and made progress in well-coordinated environmental conservation in the Yangtze River Basin.



Wuhu, Anhui

- Upgrading and renovation scale of sewage treatment plants reached 350,000 tons per day
- Sewage pipelines in central urban areas reached 993 km. Approximately 1,000 km of old pipelines were upgraded
- COD concentration increases were observed at 32 water quality monitoring stations in 51 key sections within the water quality monitoring range of Zhujiaqiao Sewage Treatment Plant
- Significant increases in COD concentration were observed in inflows to Gaoan Sewage Treatment Plant, up to 184 mg/liter



Yichang, Hubei

- 10.4 km of stormwater and sewage diversion piping in central urban areas were upgraded. Ecological afforestation totaled 30,000 m²
- Zigui County saw an increase of 10,000 tons per day in sewage treatment capacity
- Xingshan County completed upgrading and renovation of six sewage treatment plants, with an increase of 8,000 tons per day in sewage treatment capacity and about 58 km in new pipelines



Yueyang, Hunan

- 57.7 km of new trunk pipelines were built
- 30 km of piping was dredged
- 245 hectares of land were upgraded for rainwater and sewage diversion
- 86,000 m³ of storage pools are under construction
- Over 1.05 million m³ of sludge in Dongfeng Lake and Wangjiahe River were dredged, and 52.5 hectares of wetland were constructed
- Sewage collection rate of typical residential areas increased from less than 10% to more than 95%
- COD concentration on rainy days increased to 200 mg/liter



Jiujiang, Jiangxi

- An increase of 145,000 tons per day in sewage treatment capacity
- Around 320 km of pipelines were constructed, renovated or transformed
- 56 communities were renovated, with sewage collection rates increasing from 60% to 90%
- COD concentration of water released in sunny days increased to 279 mg/liter
- Basai Hydro-complex played a key role in flood control, effectively safeguarding the lives and property of 600,000 people



Environmental Management

As the largest hydropower developer in the world and the largest clean energy provider in China, CTG has remained committed to incorporating the philosophy of prioritizing the natural environment and green development throughout the process of clean-energy investments, development and operations. On top of that, in accordance with the two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand, CTG has consolidated its foundations in environmental management, strengthened its capacity for research and innovation in environmental protection, and accelerated its efforts to become a world-class multinational clean-energy group with strong innovation capabilities and global competitiveness.

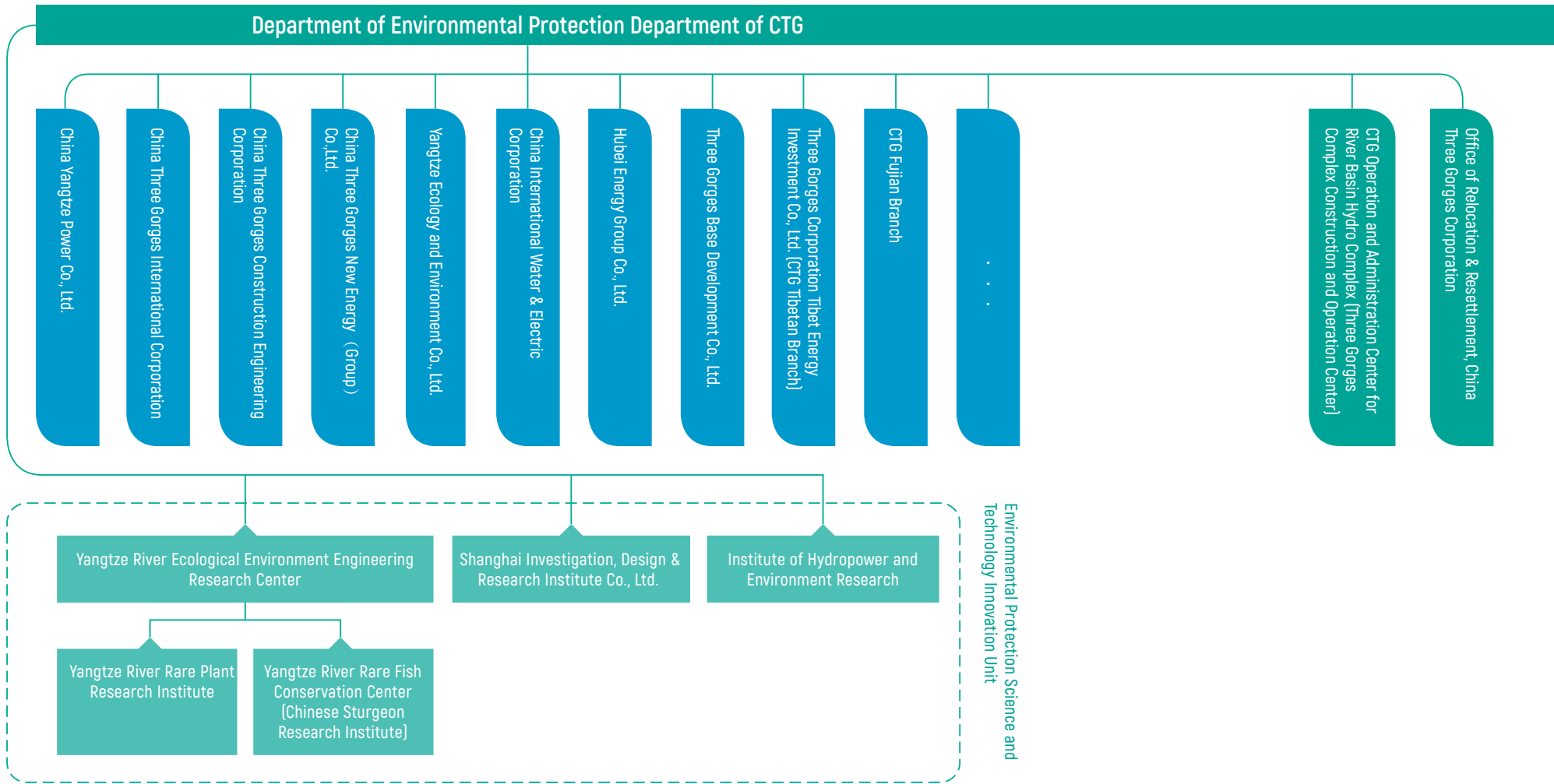
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Organizational Structure

CTG has established a sound environmental management system, in which the environmental protection programs are managed by corresponding functional departments with separate responsibilities. In accordance with hierarchical management principles, CTG and its subordinate units carry out their respective duties to achieve environmental management that encompasses all business operations and processes in the entire Yangtze Basin.

Organization system of CTG's environmental protection management



Management System

CTG has continued to improve its environmental management system, which is interdependent with the quality, environmental, and occupational health and safety management system, environmental management mechanism, comprehensive risk management system, internal control system and environmental emergency management system, to manage environmental protection throughout its business activities.

Environmental management system

CTG has established a sound environmental management system that strengthens internal audits and on-the-job responsibilities. CTG has constantly improved and refined its management system and working process through uninterrupted inspections and timely rectification to realize dynamic improvement in environmental protection. In 2020, CTG passed internal and external audits of its environmental management system between 2019 and 2020, and was awarded the GB/T 24001-2016/ISO 14001-2015 Environmental Management System certification.



Environmental management system

The environmental protection management system of CTG covers environmental management in the early stages and construction period of projects, management of the acceptance of environmental protection facilities, environmental protection management in the operation of Three Gorges hydro-complex and power generation, environmental protection research, monitoring and data collection, and management oversight. In 2020, CTG, in accordance with revised plans and the realities of management system and business procedures, edited and revised the following: 1 Level-II system [Ecological Protection Management System of China Three Gorges Corporation], 2 Level-III systems and 4 systems below Level-III.

Environmental risk management

CTG carried out identification and analysis of environmental risk factors on a regular basis from multiple perspectives, including electricity generation through hydropower, wind power, solar power, and thermal power facilities, as well as energy resource management and pollutant discharge management. CTG singled out key environmental risk factors and formulated risk management strategies in accordance with the enforcement of environmental protection laws and regulations, pollutant volumes and impacts, as well as energy resource consumption and conservation. In 2020, no major environmental pollution incidents have occurred within CTG, and environmental risks are under control.

Emergency management system

CTG has improved its emergency management system and organized departments to carry out emergency response training and drills to enhance its capacity for handling major environmental emergencies. Based on CTG's emergency management system, each entity has established its own comprehensive contingency plans, special contingency plans and on-site response plans, forming a comprehensive emergency response system with a well-balanced and coordinated structure that reaches every corner of CTG's business.



Process Management

CTG has established a closed-loop environmental management process through project life cycles, covering aspects such as establishment of environmental goals, creation of sound environmental management systems, implementation of environmental protection measures and continuous progress in environmental performance, in order to achieve sustained improvements in environmental management.

Programming and planning

CTG closely follows national strategies and the policies and plans of local governments. The Corporation comprehensively considers the progress in studying its reform plans and strategies during the 14th Five-Year Plan and the environmental protection efforts in its projects. In addition, CTG has formulated plans related to ecological and environmental conservation over the 14th Five-Year Plan, carried out dynamic follow-up and management of environmental protection plans (including the special plan for well-coordinated environmental conservation in the Yangtze River Basin), and advanced the implementation of and oversight over ecological and environmental conservation efforts. Over RMB 30 billion was invested to achieve well-coordinated environmental conservation in the Yangtze River Basin in 2020.

Supervision and inspection

CTG focuses on the construction and operation of large-scale hydropower plants, and coordinates its international business operations, new-energy business operations, and investment or equity business operations. The Corporation has fully implemented self-inspection of internal oversight over environmental protection, and strengthened special inspection of environmental protection of key programs, to ensure immediate rectification of problems in environmental policy. CTG has launched oversight over ecological technology and fully strengthened regulation of the implementation of environmental protection measures in its programs to ensure that environmental protection measures and facilities generate positive results. We have expanded the external supervision channels and subject ourselves to oversight and inspections by environmental protection authorities at various levels. In addition, on its official website, CTG has set up a platform for public feedback regarding environmental protection, placing our work under public scrutiny.

Scientific and Technological Innovation

CTG uses innovation as a driving force to deepen environmental protection efforts and improves its management capacity, cherishes the leading role of the CTG Standard, steps up the development of platforms for independent scientific and technological innovation, and has established the Yangtze River Ecological Environment Engineering Research Center. CTG continues to improve the innovation capabilities of environmental research institutes such as the Yangtze River Rare Fish Conservation Center and the Yangtze River Rare Plant Research Institute. The Corporation has scaled up scientific input and intensified research efforts, by which a number of fruitful scientific and technological achievements have been generated.



Exploration to restore fish spawning grounds and protection of rare and endemic fish habitats

In 2020, China Three Gorges Construction Engineering Corporation, based on basic principles of ecology and habitat demands of targeted fish spawning grounds, took a problem-oriented approach to establish a Framework for Evaluating Habitat Suitability of Fish Spawning Grounds. This approach was a trailblazer in introducing the concept of suitability management and practice of fish habitat restoration based on early human guidance and late natural restoration. This practice fully leverages the role of the Wudongde Reservoir in protecting the habitats of rare and endemic fish in the upper reaches of the Yangtze River.

Key Research Programs of Environmental Protection in 2020

- Joint study on ecological conservation and restoration of the Yangtze River
- Restoration of fish resources in Xiangjiaba Reservoir and protection of rare species in the Yangtze River
- Key program supported by joint funds for water science research in the Yangtze River

Studying on comprehensive emulation and evaluation of urban water system

In 2020, the Yangtze Ecology and Environment Co., Ltd. carried out a study on comprehensive emulation and evaluation of urban water systems, including mountains, cities, rivers, lakes and the Yangtze River. It comprehensively considered the characteristics of water flow and pollutant generation among mountains, cities, lakes in and outside cities and the Yangtze River, as well as the cyclical process between water flow and pollutants among mountains, cities, rivers, lakes and the Yangtze River. It integrated urban hydrology, pipelines, water ecology of water environments such as rivers and lakes, transfer and transformation of urban pollutants, as well as the integrated dispatching system of urban sewage treatment plant, and formed a comprehensive emulation and evaluation system (urban emulator) for the urban water system including mountains, cities, rivers, lakes and the Yangtze River, as well as a multi-process comprehensive emulation and evaluation of urban water cycles and water environments involving many factors.

Cooperation and Exchange

CTG proactively shares with its peers the achievements made in environmental protection and advanced environmental protection concepts, strengthens communication and cooperation with governments at all levels, research institutes, environmental protection organizations and relevant enterprises, and works together with partners to enhance environmental protection capabilities and raise awareness of environmental protection.

Attending High-level Forums

Attending the BRI Clean Energy Development Forum



Attending the International Forum on Tackling Climate and Environmental Crisis



The Third Site Meeting of the Joint Protection of the Yangtze River was Held in Zhenjiang, Jiangsu Province



Attending the 2020 Global Energy Interconnection (Asia) Conference and Delivering a Theme Speech on Boosting Asian Green Development via Clean Energy Connectivity

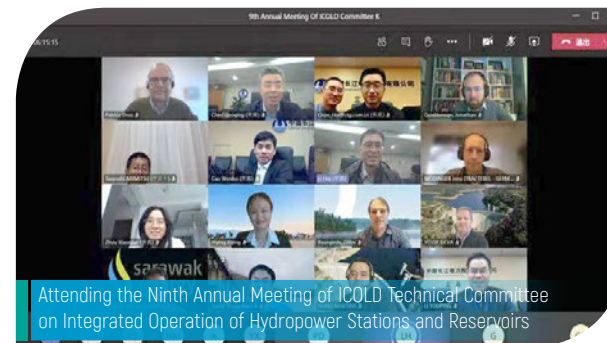


Cooperation with International Organizations

Attending the Joint Meeting of ICOLD Technical Committee



Attending the Ninth Annual Meeting of ICOLD Technical Committee on Integrated Operation of Hydropower Stations and Reservoirs



Cooperation in the Joint Protection of the Yangtze River

Meeting between Yangtze Ecology and Environment Co., Ltd. and Royal Danish Embassy in China



Signing Ceremony of Framework Agreement between Yangtze Ecology and Environment Co., Ltd. and Grundfos (China)



Attending International Forum on Tackling Climate and Environmental Crisis



Attending International Forum on Tackling Climate and Environmental Crisis to share CTG's experience in environmental protection

Climate crisis is closely related to the energy sector. On September 22, 2020, CTG attended the International Forum on Tackling Climate and Environmental Crisis organized by the Global Energy Interconnection Development and Cooperation Organization, focusing on clean energy development, low-carbon energy transformation, and cross-regional energy network development. Meanwhile, we shared environmental protection concept and practices with the UN, relevant international organizations, research institutes, enterprises and financial institutes' leaders, to play our part in achieving global consensus, pooling global efforts, and promoting energy transformation.

Signing Ceremony of the Official Partners of the Olympic and Paralympic Winter Games Beijing 2022



Working with Beijing Organising Committee for the 2022 Olympic and Paralympic Winter Games to convey green development concepts to the world

In December 2020, CTG attended the Signing Ceremony of the Official Partners of the Olympic and Paralympic Winter Games Beijing 2022. CTG will fully fulfill its responsibilities and duties in cooperation, work to make the culture of clean energy and ecological conservation more colorful, and convey to the world China's determination and concept of holding a green Olympic Games for green development.

Green Energy

CTG is adept at utilizing the forces of nature to actively promote low-carbon development. We have vigorously developed hydropower, wind power, solar power and other forms of clean energy, continuously increased new-energy utilization rates and explored innovations in clean energy utilization, to boost low-carbon and green economic and social development.

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Development of Clean Hydropower

CTG, through fully leveraging its strength in hydropower development, has sped up the building of the world's largest clean energy corridor along the main tributary of the Yangtze River. The installed capacity of the six large-scale hydropower plants under construction or in operation along the main tributary of the Yangtze River is almost equal to triple that of Three Gorges Dam. The stream of electricity generated from them makes an important contribution to promoting ecological conservation in China and the green development of the Yangtze River Economic Belt.

As of the end of 2020,
consolidated installed capacity of
hydropower generating units

in China

56,700 MW

outside China

9,030 MW

Total hydropower installed capacity
accounted for 15% of the whole nation



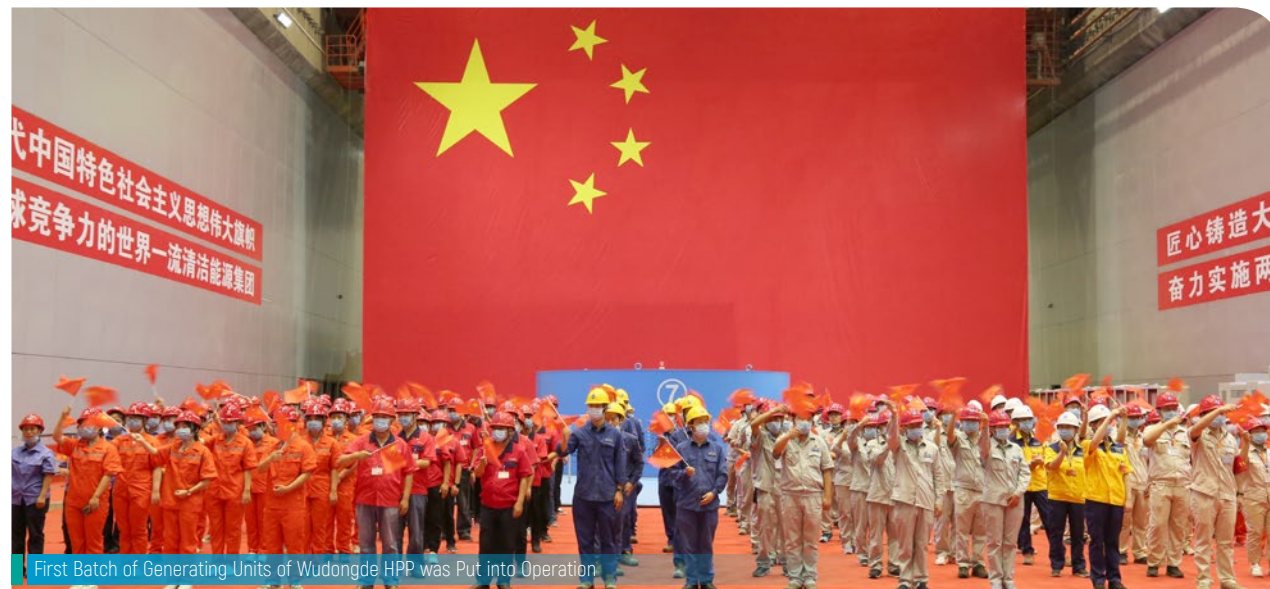
In 2020,
total hydropower generation

in China

252.8 TWh

outside China

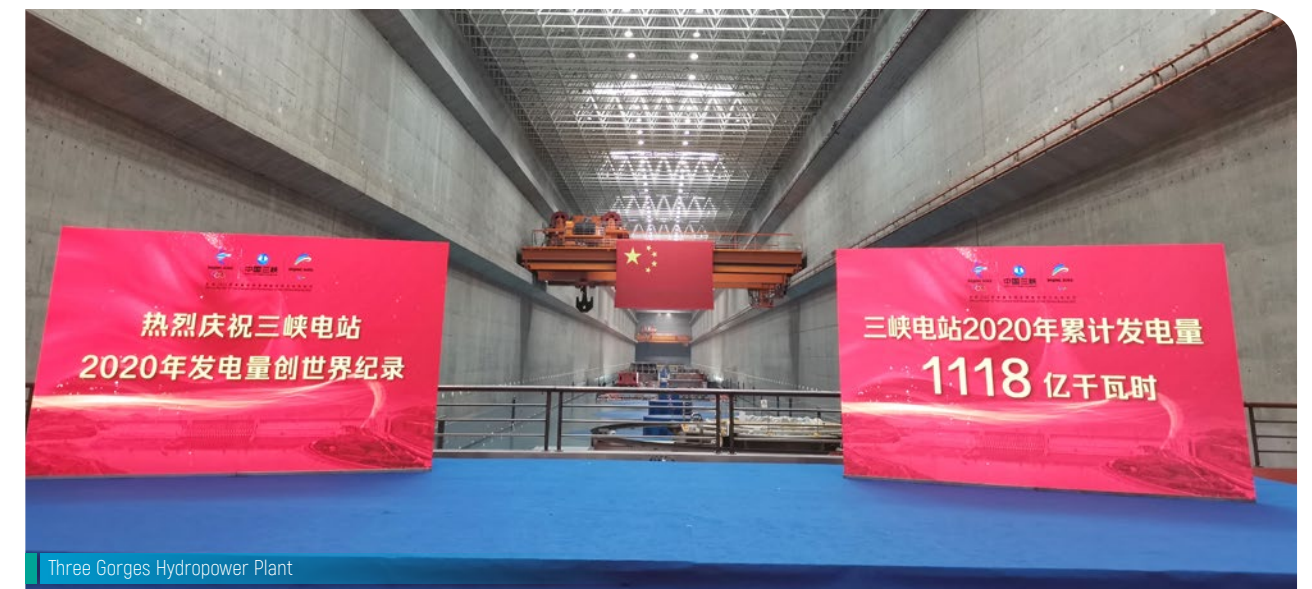
33.9 TWh



First Batch of Generating Units of Wudongde HPP was Put into Operation

The first group of generating units of the Wudongde Hydropower Plant was put into service to build a new benchmark for green development of hydropower

Wudongde HPP is located in the Jinsha River basin at the provincial border of Yunan and Sichuan, and also a key link of the strategy of "West-East Power Transmission Project". In June 2020, the first batch of generating units of Wudongde HPP was put into operation after the acceptance of environmental protection during impoundment as well as water and soil conservation facilities. This is another important milestone in hydropower development at the downstream of the Jinsha River, and also a new benchmark of green development made by CTG.



Three Gorges Hydropower Plant

A world record of annual power generation by the Three Gorges Project - the pillar of a great nation

As of the end of 2020, the clean electricity generated in the Three Gorges Hydropower Plant in 2020 totaled 111.802 TWh, setting a record in annual power generation by a single hydropower plant. Compared to coal-fired power generation, this translates to fossil fuel savings of 34.39 million tons of standard coal equivalent, reduction of 94.02 million tons of CO₂ emissions, 22,400 tons of SO₂ emissions, and 21,200 tons of nitric oxide emissions. It contributes to building an energy system that is clean, low-carbon, safe and efficient, as well as progressive achievement of China's goals for peak carbon emissions and carbon neutrality.

Development of New Energy

CTG is among the first batch of enterprises with the fastest growth and highest quality setting foot in new energy. With steady and rapid development, the installed capacity of CTG has exceeded 17,000 MW, and its business operations have expanded into every part of mainland China. These have helped CTG successfully enter into the world-leading European offshore wind power market as well as master new-energy development, in particular core capabilities in offshore wind power development and operations, fostering its competitive strengths in the whole industry chain and its global development.

By the end of 2020, Total installed capacity had reached 17,240 MW

Consolidated wind power installed capacity

Consolidated PV installed capacity

in China

9,660 MW

outside China

440 MW

in China

7,130 MW

outside China

18 MW

In 2020

Wind power generation

in China

17.1 TWh

outside China

1.6 TWh

in China

7.3 TWh

outside China

0.03 TWh

International Business of Clean Energy

CTG has actively followed the Belt and Road Initiative and stepped up energy cooperation with BRI partner countries and regions. The Corporation has steadily expanded its plans for the Going Global of green industries, green equipment, green technologies and green energy standards.

Overseas power generation
in 2020

35.52 TWh

As of the end of 2020
our business operations had extended into

47 countries and regions across the world

By the end of 2020

CTG's new-energy business operations
had covered every part of Chinese
mainland

Cumulative power generation of

110 TWh

Equivalent to

6 years' electricity consumption by

10 million
households with three members



Fujian Offshore Wind Power Program

The largest offshore wind farm in the Asian-Pacific region was put into operation

On July 12, 2020, Fujian Fuqing Xinghuawan Phase II Offshore Wind Farm of CTG was put into operation. This is the first 10 MW offshore wind power generating unit in China, and also the largest unit capacity offshore wind power generating unit independently developed by CTG in the Asia-Pacific region and the second largest in the world, setting a record for Chinese offshore wind power generating units. The commissioning of this unit is conducive to reducing the sea area occupied by offshore wind farms, increasing sea utilization rate and promoting high-quality development of offshore wind power. It has made new and greater contributions to further promoting high-quality development of new energy.

Green Financing

Since 2016, CTG has proactively supported the real economy through green bonds. One of the first central SOEs to issue green bonds in domestic and international capital markets, CTG has explored new approaches to guide green financial services by Chinese enterprises, and issued the first green Euro-denominated climate bond by a Chinese corporation in 2017 and the first and largest green exchangeable corporate bond (RMB 20 billion) in China. Today, CTG is a non-permanent member of the Green Bond Standard Committee of the National Association of Financial Market Institutional Investors.

In 2020, CYPC, a subordinate of CTG, successfully issued global depository receipts (GDRs) through the London Stock Exchange, the first GDR with a Green Economy Mark issued by the exchange. This fully shows the high recognition given by international investors to the high-quality sustainable development of China's clean energy industry.

By the end of 2020

16

green bonds had been issued in
interbank markets, stock markets and
overseas bond markets

About RMB

70 billion

of green and low-cost funds had been
raised for clean energy projects such
as the Wudongde Hydropower Plant,
Baihetan Hydropower Plant and Wenda
Wind Power Farm

Clean and Low-Carbon

While building a clean, low-carbon, safe and efficient energy system, CTG has proactively responded to new trends and new requirements of global climate change, promoted low-carbon production and reduced pollutant emissions to contribute towards climate change mitigation.

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Tackling Climate Change

CTG is committed to alleviating the adverse impact of an abnormal climate and continuous improvement of the energy mix. The Corporation has vigorously developed hydropower, wind power, solar energy and other forms of clean energy. CTG fully leverages comprehensive benefits of cascade hydro-complexes, such as flood control, water replenishment and ecological benefits, and proactively carries out carbon emissions reduction management as well as carbon market development and trading. On top of that, CTG has developed CCR products and worked to reduce the volume and intensity of carbon emissions, striving to respond to the climate crisis via the sustainable development of energy.

By the end of 2020

53

CCER products had been developed

Total installed capacity had reached
2,639.94 MW

Estimated equivalence to annual reduction of CO₂ emissions by

4

million tons



Benefits of Clean Energy in Emissions Reductions

In 2020,
Clean electricity generation
by CTG in China:

277.1 TWh

Equivalent to

Fossil fuel savings of
84.9 million tons
of standard coal equivalent

Reducing carbon dioxide
emissions by
232 million tons

Reducing SO₂ emissions by
51,800 tons

Reducing nitrogen oxide
emissions by
54,000 tons

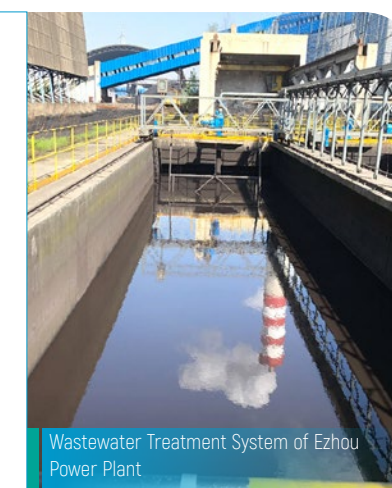
Note: Based on the Annual Report on Development of China Power Industry 2020 published by China Electricity Council, fossil fuel consumption in terms of standard coal equivalent by thermal power plants with capacity of 6,000 kW and above in 2019 was 306.4 g/kWh. CO₂, SO₂ and nitric oxide emissions per unit of thermal power generation were 838 g/kWh, 0.187 g/kWh and 0.195 g/kWh respectively. Therefore, generation of 0.1 TWh clean energy is equivalent to savings of around 30,640 tons of standard coal, or equivalent to reducing CO₂ emissions by about 83,800 tons, SO₂ emissions by about 18.7 tons and nitric oxide emissions by 19.5 tons.

Water Discharge Management

CTG strictly implements the "Three Simultaneities" environmental protection system. The Corporation has continued to improve domestic and industrial wastewater treatment facilities, develop innovative wastewater treatment technologies and strengthen the recycling of wastewater to reduce wastewater discharge as much as possible.

Wastewater recycling in Ezhou Power Plant

To improve the wastewater treatment processes and technologies in Ezhou Power Plant and achieve wastewater recycling, Hubei Energy Group Co., Ltd. has established a zero-wastewater discharge system under the Multi-Purpose Tiered Water Recycling Framework. In this framework, industrial water and equipment cooling water are used to provide make-up water for cooling towers; concentrated wastewater from cooling towers is used to provide make-up water for gas desulfurization systems and flushing water for spraying systems in coal yards; industrial wastewater is used to provide make-up water for gas desulfurization systems. This framework achieves the complete recycling of gas desulfurization wastewater in Phase I and Phase II of the Ezhou Power Plant. Desulfurization wastewater in Phase III of the Ezhou Power Plant is disposed through flue gas evaporation after being treated.



Wastewater Treatment System of Ezhou Power Plant

Reducing Atmospheric Pollution

CTG strictly implements measures for preventing atmospheric pollution. The Corporation has installed sprinkler systems for day-to-day road de-dusting, and further controlled and reduced soot, flue gas and other air pollutants through enhanced project management as well as upgraded in equipment and technology.



Ultra-low emissions modifications to generating units in Phase I of the Ezhou Power Plant

Ultra-low emissions overhaul of generating units in Phase I of the Ezhou Power Plant

In 2020, the existing environmental facilities of generating units in Phase I of the Ezhou Power Plant were upgraded. Through denitration modifications (addition of one catalyst layer) + flocculant added before soot collector + overall electrostatic precipitator modifications + induced draft fan modifications + denitration modifications (double-tower, double-cycle), was used to reduce emission concentrations of atmospheric pollutants and SO₂.

In 2020

100%

Flue gas desulfurization and denitrification units comprised 100% of coal-fired units

96.24%

Units with ultra-low emission limits accounted for 96.24% of coal-fired units



Soot Prevention Net around the Project

Soot control of 2×150 MW Combined Heat and Power Generation Project of Hubei Energy Group Co., Ltd.

Positive pressure pneumatic conveying systems were used in the soot control systems of the 2×150-MW Combined Heat and Power Generation Project of Hubei Energy Group. Compressed air was used to divert coal ash to storage areas to realize its comprehensive utilization. Hydraulic flushing was used in the coal transfer system. De-sooting devices and sprinkler systems were provided at each point of transfer. Fully enclosed dry coal sheds and coal yard sprinkler systems were used to prevent soot from polluting the environment.

Noise Pollution Control

CTG has strengthened thorough noise control through a number of measures, such as installation of noise barriers, rational arrangement of construction schedules, and installation of No Horn and Speed Limit signs. These measures control the sources and transmission of noise from systems, construction and traffic in construction sites to minimize the acoustic impact on the surrounding environment.

Noise pollution control by Changlongshan Hydropower Plant

Based on the progress of construction works and changes in construction sites, the Changlongshan Hydropower Plant project set up noise barriers and fully-enclosed concrete mixing systems in environmentally sensitive areas. No Horn and Speed Limit signs were placed at the junctures of roads leading to residential communities. Vibration damping equipment was provided for sand and stone processing systems, and construction schedules were arranged rationally. In order to minimize noise levels, acoustic screens and sound absorbing curtains were set up in traffic tunnels leading to the plant, as well as during the blasting of drainage tunnels.

Noise Barriers at a Plant for Processing Steel Pipes for the Changlongshan Hydropower Plant



Noise Barriers at the Baihetan Hydropower Plant

Noise Monitoring at a Site Producing Precast Box Girders for the Isimba Hydropower Plant in Uganda



Ear Plug Dispenser on the Generator Floor of the Nam Lik 1-2 Hydropower Plant in Laos

Cleaning of Floating Debris

CTG is dedicated to cleaning floating debris in cascade reservoirs and areas near dams. The Corporation has explored smart and systematic approaches to clearing floating debris with respect to difficulties caused by different geological landforms. CTG has further boosted the efficiency of clearing floating debris from the upstream face of the dam while ensuring clean water supply and safe power plant operations.



Debris Clearing Robot

The first cleaning robot for power plants in China

Gezhouba Hydropower Plant is a run-of-river power plant. Each year, there is a huge amount of floating debris in the river. However, conventional machinery is not a match for large-size floating debris, and has a low clearing efficiency and hidden safety hazards. In 2020, CTG developed an automated smart robot that can be used to clear various forms of floating debris. This robot comes with automated activation, positioning, dredging, (temporary) storage and loading functions, significantly enhancing the efficiency of clearing floating debris.

In 2020

CTG cleared

374,000 m³ of floating debris

Over

10,000 boats were used to clear floating debris

Over

40,000 people worked to clear floating debris

Around

2,850 tons of floating debris were dredged up with 918 boats in the Xiangjiaba Reservoir

Around

400 tons of floating debris were dredged up with 89 boats in Xiluodu Reservoir

100% of floating debris were sorted and rendered harmless treatment



Clearing Floating Debris in the Upstream Face of the Dam



Clearing Floating Debris in the Upstream Face of the Dam

Resource Conservation and Recycling

CTG is committed to resource conservation and recycling. CTG has continued to reduce its consumption of energy and materials through lean management and innovative energy conservation technologies, and has promoted the recycling of resources and conservation of energy resources to the greatest possible extent.

Cutting Energy Consumption
Optimizing Resource Utilization

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Cutting Energy Consumption

CTG has worked to improve energy efficiency. The Corporation has strengthened energy conservation assessments for its production and construction projects, and prioritized energy-saving processes and technological measures to ensure a steady decrease in fossil fuel consumption for thermal power generation in terms of standard coal equivalent. CTG has vigorously promoted energy-saving lighting and new-energy vehicles, fully tapped the potential of resources in production through technological and managerial innovation, and explored best practices in recycling of resources and waste.



Distributed Photovoltaic Power Generation Project at the Zhujiqiao Sewage Treatment Plant of Yangtze Ecology and Environment Co., Ltd.

Building distributed photovoltaic power generation project for sewage treatment plant to save energy

Yangtze Ecology and Environment Co. Ltd. has built distributed photovoltaic power generation facilities in sewage treatment plants in Wuhu, Anhui. Through a power generation model of "self-sufficiency and diverting surplus to the grid", the project fully utilized idle space above the ponds and roofs of sewage treatment plants to generate high-quality and cost-efficient electricity. On September 30, 2020, the Phase I components of the Zhujiqiao Photovoltaic Power Project were fully connected to the power grid. It is estimated that the photovoltaic power project can reduce electricity bills for the sewage treatment plant by RMB 1,865,000 each year, equivalent to reducing the cost of wastewater treatment by RMB 0.00772/ton and 3.5% of the cost of electricity for sewage treatment.

CTG Brazil achieves 100% carbon neutrality

CTG Brazil has long integrated sustainable development into its development philosophy. In addition to providing clean energy, the company has implemented green environmental protection philosophies, boosting reductions in carbon emissions. In 2019, CTG Brazil's offices and majority-equity power plants emitted a total of 1,691.79 tons of CO₂. Through cooperation with EDP Brazil, an offset of 1,691.79 tons of CO₂ was achieved via the Jari Amapá REDD+ Project. In terms of direct carbon emissions, 100% carbon neutrality has been achieved.

100%
carbon neutrality has been
achieved

Optimizing Resource Utilization

CTG is dedicated to exploring paths for mutually beneficial outcomes in environmental and economic efficiency. CTG continues to promote resource recycling to reduce waste of resources such as electricity and hydropower, and achieve progress in development and conservation.



Impoundment at Gezhouba Hydropower Plant

Water conservation and increased power generation of cascade hydropower plants along the main streams of the Yangtze River

CTG has proactively conducted joint scheduling of reservoir clusters in the main streams of the Yangtze River. The Corporation has achieved water conservation and increased power generation of power plants through climate analysis in the upper reaches of the river basin, optimization of water levels in reservoirs and optimized scheduling during mid-sized and small floods. In 2020, an increase in power generation of 2,396.06 GWh by water conservation was achieved by the Xiluodu and Xiangjiaba cascade hydropower plants, with the water energy utilization rate increased by 2.68%. An increase in power generation of 6,950.94 GWh by water conservation was achieved for the Three Gorges and Gezhouba cascade hydropower plants, with the water energy utilization rate increasing by 5.94%. Remarkable progress has been achieved in resource conservation and recycling.

Efficient utilization of topsoil at Baihetan Hydropower Plant

The Baihetan Hydropower Plant has strictly complied with requirements for the reporting of changes in water and soil conservation plans and the relevant requirements subsequently set forth by regulators. We have protected the topsoil at the Baihetan Hydropower Plant, carried out timely stripping and storage of the topsoil, and strengthened its utilization. In 2020, about 200,000 m³ of topsoil were collected, providing the reserve of topsoil for restoring the local ecological environment.



The Dazhaigou Topsoil Stockyard at the Baihetan Hydropower Plant

Ecological Protection

CTG adheres to the systematic advancement of ecological conservation. The Corporation has sped up its efforts to build an ecological system that respects nature and promotes green development, and has pursued technological innovations in order to strengthen species protection and ecological restoration in the Yangtze River Basin and promote harmony between man and nature.

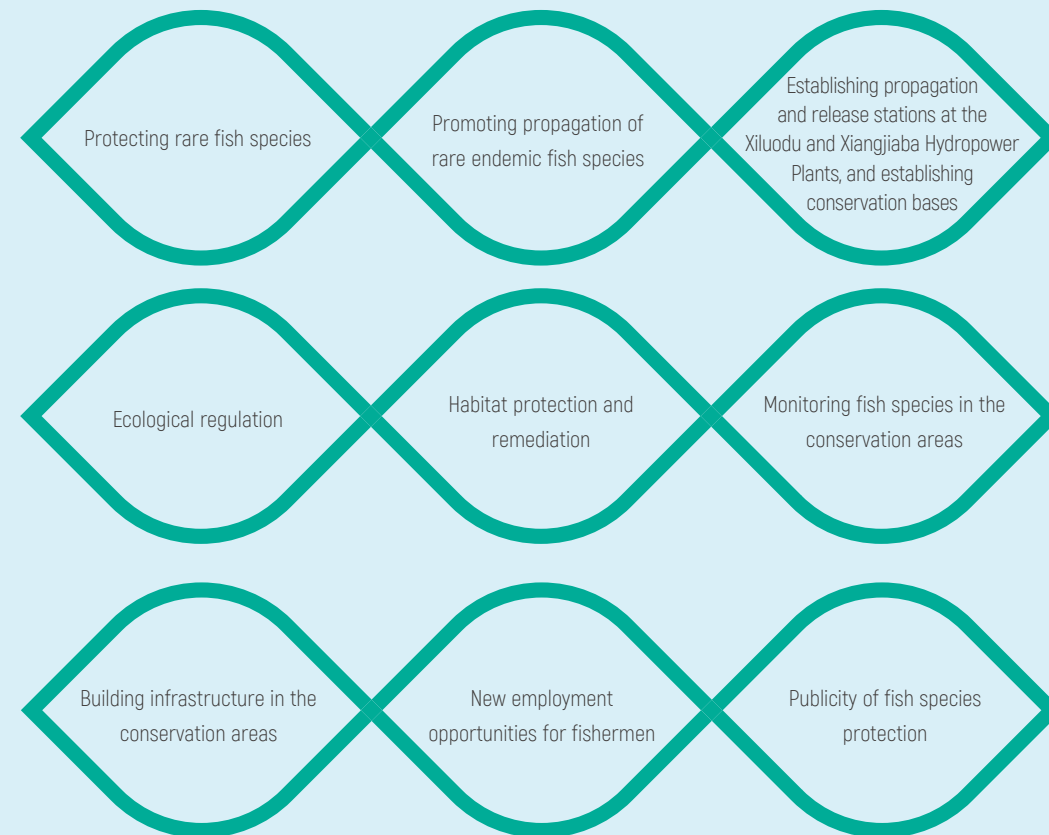
Biodiversity Protection	46
Species Protection	48
Ecological Restoration	50



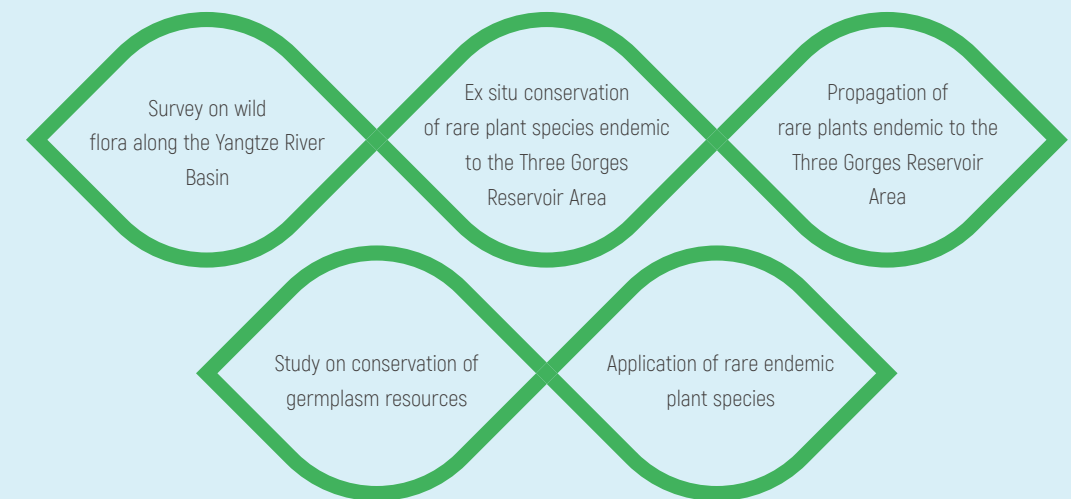
Biodiversity Protection

Biodiversity bears on people's wellbeing and as an important foundation for our continuous existence and development. CTG has long been committed to the implementation of comprehensive strategies, including researches on preservation of rare terrestrial germplasm resources and the protection of fish resources in the Yangtze River Basin, and has worked to expand and heighten the conservation of land and aquatic biodiversity in Yangtze River Basin, so as to build a Three Gorges Model featuring harmonious coexistence between man and nature.

Protection of Rare Fish Species



Protection of rare terrestrial flora



Species Protection

CTG has strengthened scientific and technological researches related to species protection as well as their applications. CTG has launched long-term projects for the growth of fish populations, development of breeding technologies, and the propagation and release of rare and endemic fish species in the Yangtze River. In addition, CTG has strengthened the protection and propagation of rare plants, and explored new approaches to duly contributing to the conservation of species resources in the Yangtze River Basin.



A Chinese sturgeon released through a slide

Record number of second-generation Chinese sturgeons released into the Yangtze River

In 2020, the Chinese Sturgeon Research Institute of CTG released 63 batches of Chinese sturgeons. As a result, 10,000 second-generation Chinese sturgeons were released into the Yangtze River. This marks the largest quantity of Chinese sturgeons released into the Yangtze River since the first such initiative in 2009. The Chinese sturgeons released in 2020 involves five age brackets of Chinese sturgeons from 2009 to 2019, including 10 males born in 2009. This move is of great importance in promoting age diversity among wild Chinese sturgeon populations, improving their genetic diversity and adjusting the gender ratio imbalance of Chinese sturgeons in the wild.

63 batches of Chinese sturgeons have been released

130,000 coreius guichenoti released in a large-scale for the first time

On September 23, 2020, as part of a program organized by CTG, research institutes released 130,000 coreius guichenoti into a national reserve for rare endemic fish species in Jiangjin, Chongqing, which lies in the upper reaches of the Yangtze River. This move will be conducive in supplementing natural populations. With the implementation of policies for habitat restoration, comprehensive water environment governance, and long-term fishing bans, it will promote the growth and reproduction of the species in the wild and turn it into yet another landmark species in the restoration of the aquatic ecology of the Yangtze River.



Fingerlings of Coreius Guichenoti to be Released



Propagation and Release at the Wudongde Reservoir in 2020

First propagation and release event at the Panzhihua River Section at the tail of the Wudongde Reservoir

On the morning of September 1, 2020, CTG conducted the first release of fishes in the Panzhihua River Section at the tail of the Wudongde Reservoir. In total, 280,000 Schizothorax prenati and 50,000 Percocypris pingi, rare endemic fish species, were released into the Jinsha River. This is the 6th release in the Wudongde Reservoir since 2015 and also the largest such event. The release constitutes a concrete action for protecting rare and endemic fish species.



Fruits of Taxus Chinensis – A Tier 1 Plant under State Protection

Breeding of endemic and rare plants reaches record high

Researchers at the Yangtze River Rare Plant Research Institute of CTG have used different methods to treat the seeds and branches of rare plants. As a result, breakthroughs were made in the propagation of over 100 plants, including Davidia involucreta, Taxus chinensis and Adiantum reniforme. As of the end of 2020, over 180,000 endemic and rare plants were propagated through tissue culture, cuttage and seeding. These plants have grown well and some have borne fruit, vigorously increasing their population numbers.

Over **180,000** plants have been propagated

Propagation and release of fish species endemic to Heishui River in the upper reaches of the Yangtze River

CTG released fishes endemic to the upper reaches of the Yangtze River at the Heishui River. From 2019 to 2021, CTG conducted 3 release events, releasing a total of 40,500 fishes, including Schizothorax wangchiachii, Leptobotia elongata, Schizothorax Prenati and Coreius guichenoti. Tracking and monitoring show that the released fishes have adapted to the natural environment of the Heishui River. This has increased fish resources and further raised local awareness of fish conservation.



Yangtze Sturgeon of the Second Generation to be Released

Making breakthrough in the number of Yangtze sturgeon of the second generation released at Xiangjiaba Reservoir

On October 24, 2020, CTG released 257,000 fishes of rare species endemic to the upper reaches of the Yangtze River into the Jinsha River near Xiangjiaba Hydropower Plant. This move marks the 26th release of fingerlings of rare and endemic fish species at the Xiangjiaba Reservoir since the first release of such fishes in 2008. Six fish species, namely the Yangtze sturgeon, Coreius guichenoti, Myxocyprinus asiaticus, Leptobotia elongata, Megalobrama pellegrini and Procypris rabaudi, were released, along with 40,000 second-generation Chinese sturgeons, making this the largest ever event of its type in China. This heralds that technologies for the breeding Chinese sturgeons are close to maturity, while also further replenishing wild fish resources and promoting the restoration and growth of wild fish populations.

Ecological Restoration

CTG has all long pursued the philosophy of prioritizing the natural ecosystem and green development. CTG regards ecological restoration and environmental protection as top priorities, promotes ecological remediation across the board, strictly implements measures for habitat improvement and impact alleviation, and explores new approaches for eco-environmental improvement and restoration, so as to build a harmonious, prosperous and sustainable home for all.



Artificial Fish Nests in the Wudongde Reservoir Area

Building artificial fish nests to promote ecological and environmental conservation and restoration at the lower reaches of the Jinsha River

China Three Gorges Construction Engineering Corporation has established artificial fish nests of various types in multiple river sections in the Wudongde Reservoir Area, synchronously carried out multiple scientific experiments and achieved an increase of 3.5 million in eggs of *Cyprinus Carpio*, carp, *Clarias batrachus* and *Pseudorasbora parva*. These efforts have promoted restoration and conservation of habitats and ecological resources for fishes laying viscid eggs, and provided technical support for the conservation of aquatic life in the lower reaches of the Jinsha River.

Building an ecological corridor in reservoir areas to create an ecological protection landscape

Adhering to the principle of ecological conservation and green development, China Three Gorges Construction Engineering Corporation (CTGCEC) has built a demonstrative drawdown zone for ecological restoration in the Wudongde Reservoir Area. Based on habitat characteristics and plant ecological habits, CTGCEC carried out preliminary restoration pilots, and selected multiple dominant species tolerant to drought and flood. A three-dimensional restoration model and a slope stabilization engineering system were created to dynamically monitor the factors affecting habitats in the drawdown zone. On top of that, CTGCEC built a basic database for drawdown zones in reservoirs, which filled voids in the technology for restoration of drawdown zones in hot arid river valley reservoirs, laying a solid foundation for creating beautiful reservoir banks and green ecosystems.



Gongjiaping Reservoir of Hubei Energy Group Co., Ltd.

Putting an end to soil erosion and improving the ecological environment

Hubei Energy Group Co. Ltd. has implemented soil conservation measures in all its projects to ensure comprehensive management of all disturbed topsoil at project sites. Soil erosion remediation measures have been made in 98% of such areas, while vegetation has been restored in 99%. Through these efforts, soil erosion during project development has been vigorously reduced, protecting local water and soil resources.



Green Programs at Baihetan Hydropower Plant

Developing new technology in ecological restoration

In 2020, Baihetan Hydropower Plant explored new technologies for ecological restoration in hot arid valley reservoirs through its Study on Technology Application to Soil Treatment, Plant Selection and Slope Ecological Restoration and the Development on IT Monitoring System for Water and Soil Conservation of Baihetan Hydropower Plant. Through these efforts, the plant explored new, efficient and low-cost ecological restoration technologies to fully advance green programs by tackling problems in the region such as high temperature, low humidity, low levels of rainfall, severe soil erosion, fragile ecology, little vegetation and poor soil quality.



Ecological Improvement in Qingshui Stream and Fenghuang Stream in Shapingba District, Chongqing

"Clean River and Green Banks" Ecological Improvement Project along the Qingshui Stream and the Fenghuang Stream, Chongqing

In 2020, CTG launched a "Clean River and Green Banks" Ecological Improvement PPP project along the Qingshui Stream and the Fenghuang Stream in Shapingba District, Chongqing. In accordance with the principles of customized policies for each river and integrated water pollution treatment, water ecosystem restoration and water resources protection, CTG followed its approach of a plant-pipeline-river-lake-shore integrated wastewater treatment system in the whole basin. Through the construction of new sewage treatment plants, upgrading of existing sewage treatment plants, building of new stormwater and sewage pipelines, development of sponge cities in the Yangtze River Basin, and establishment of intelligent systems to manage water quality and volume, the Corporation has effectively supported urban flood control, prevented soil erosion and improved the living environment, creating a picturesque and harmonious landscape.

Popularization of Environmental Protection Concepts

We have transformed the concept of ecological conservation into a motto for our staff and a call for public action. We have conducted training on environmental protection and outreach campaigns to raise awareness of environmental protection and build environmental protection capabilities. Meanwhile, we have proactively shared our philosophy and practices in ecological and environmental protection and low-carbon development to raise public awareness of environmental protection.

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Environmental Protection Training

CTG has extensively carried out various training programs on environmental protection to improve the overall level of environmental management and raise the staff's awareness and capabilities of participating in ecological conservation and environmental protection.



Environmental protection training program held by CYPIC



Training program on solid waste disposal held by Hubei Energy Group Co., Ltd.



Training program on solid waste disposal held by the San Gaban Project in Peru



Training program on environmental protection held by the AMT Expressway Project in Senegal

Training on well-coordinated environmental conservation in the Yangtze River Basin



Technical training program on sludge dewatering held by Yangtze Ecology and Environment Co., Ltd.



Training on environmental protection held by the Wuhu Project

Low-carbon Lifestyles

CTG has responded to China's goal of achieving carbon neutrality by 2060 with tangible actions. To this end, CTG has organized various publicity and outreach activities, actively advocated low-carbon lifestyles and created a positive atmosphere for extensive public involvement in low-carbon initiatives.



Brisk walking campaign organized by the Nam Lik 1-2 Hydropower Plant in Laos



Environmental protection outreach event by China Three Gorges Renewables (Group) Co., Ltd.

Public Benefits of Environmental Protection

CTG is dedicated to raising awareness of environmental protection and has continued to carry out environmental protection activities and organized public donation drives to spread eco-environmental conservation concepts throughout China. In 2020, commissioned by the Yangtze River Basin Fisheries Administration under the Ministry of Agriculture and Rural Affairs, CTG and China Media Group worked together to film the public welfare documentary "Life-the Yangtze River". The documentary features the natural ecosystems in the Yangtze River and aims to raise public awareness of environmental protection.



An Open Day for the Heishui River propagation and release event



A campaign to clean the Wuchang Beach by Yangtze Ecology and Environment Co., Ltd.



Tree and Grass Planting at Nam Lik 2 Hydropower Plant in Laos by China International Water & Electric Corp.



Fish release by Nam Lik 1-2 Hydropower Plant in Laos initiated by China International Water & Electric Corp.



Fun Run for environmental protection organized by Yueyang Regional Company of Yangtze Ecology and Environment Co., Ltd.



Tree planting at Nam Lik 1-2 Hydropower Plant in Laos by China International Water & Electric Corp.

Environmental Protection Performance

Focusing on our primary mission of "green development, key breakthroughs, sound system and standardized management", we have created a solid synergy in implementing green development principles to achieve environmental protection in multiple aspects through systematic action.

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Ecological Protection Performance 59

凉山州人民全力参与乌东德工程建设



Environmental Monitoring Performance

Water environment monitoring

Water quality and environmental conditions in the Three Gorges Reservoir Area

From January to December 2020, the water quality of the main streams and branches of the Three Gorges Reservoir Area was graded as Good. Water quality in all monitored sections was Level II or Level III.

There are 12 branches of the Yangtze River in the Three Gorges Reservoir Area, namely the Xiangxi River, the Tongzhuang River, the Yuanshui River, the Qinggan River, the Shennong Stream, the Daning River, the Caotang River, the Meixi River, the Tangxi River, the Modao Stream, the Xiaojiang River and the Zhuxi River. Monthly inspections on the water environment in these rivers showed that, from January to December 2020, (inspections were not held in February and March due to the COVID-19 outbreak), the water bodies of these branches were dominantly (65%) in the mesotrophic state.

Water quality and environmental conditions in the Jinsha River Reservoir Area

In 2020, among the 23 monitored sections along the main streams of the Jinsha River Reservoir Area, 95.7% had water quality of Level I to Level III, with a decrease compared with that of the past year. Among the 16 monitored sections in the branches of the Jinsha River, 93.8% had water quality of Level I to Level III, with a decrease compared with that of the past year.

Monitoring of aquatic ecosystems

Rare and endemic fish species

In 2020, 11 fishes of 2 rare fish species endemic to the upper reaches of the Yangtze River and 1,822 fishes of 25 fish species endemic to the upper reaches of the Yangtze River were found in the lower reaches of the Jinsha River. Designated species from the upper reaches of the Yangtze River were detected in 19 of the 20 river sections under monitoring, with the sole exception being the Fotan Village river section. The river section at the estuary of the Yalung River was where most endemic fish species were found (ten in total). Nine endemic fish species were found in the Yibin river section and the Jiaoping river section. Eight were found in the Dongchuan and Luzhou river sections, seven were found at Jiangjin river section, and two were found in the Suijiang and Shuifu river sections respectively.

Chart of nutrition distribution in 12 tributaries monitored in the Three Gorges reservoir area in 2020

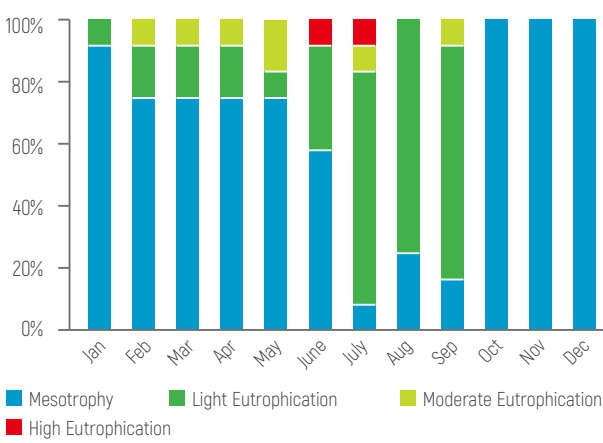
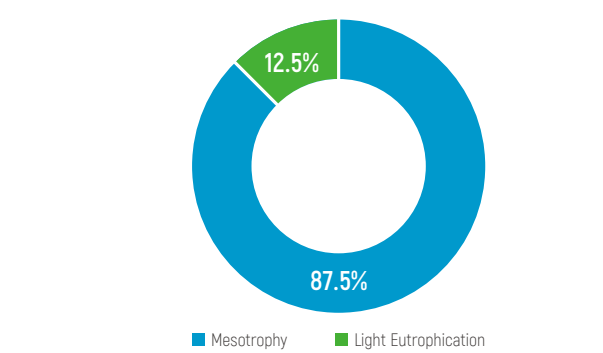


Chart of Annual Assessment of Eutrophy Level in the Tributaries of the Jinsha River Reservoir Area in 2020



Commercially important fish species

In 2020, 105 fish species were found in the lower reaches of the Jinsha River. In addition, 54 fish species were found in the Wudongde Reservoir Area, 53 in the Baihetan Reservoir Area, 30 in the Xiluodu Reservoir Area, 34 in the Xiangjiaba Reservoir Area, and 72 in national reserves. Six invasive fish species were detected.

72 fish species were found in the river sections within national reserves. The Luzhou section accounted for 45 species, comprising the lion's share. 40 were found in the Yibin river section, 36 were found in the river section at the estuary of the Minjiang River, and 30 were found in the Jiangjin river section.

Water temperature

Water temperature is an important indicator of water quality in aquatic ecosystems, and also an important factor driving change in water environment. In 2020, 50 surface water temperature monitoring interfaces and 22 vertical water temperature monitoring interfaces were set up in river sections spreading from Panzihua Hydrometric Station to Datong Hydrometric Station. Water temperature monitoring results show that the period from February to August saw a rise in water temperature, which began to decline in September. Surface water temperature in the main streams of the middle and lower reaches of the Yangtze River were under 10°C in late January, the lowest level over the year. Peak temperatures are nearly 30°C, occurring in mid to late August. Water temperature in national reserves for rare fish species endemic to the upper reaches of the Yangtze River varies from 13.1°C to 26.8°C, with the lowest in early February and highest in mid-August.

Ecological Protection Performance

Water and soil conservation

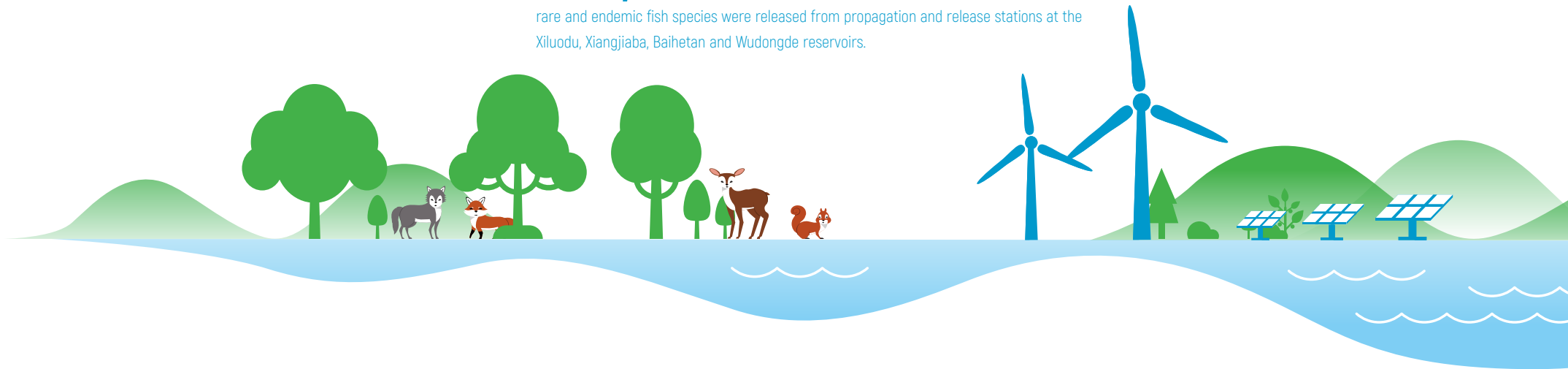
	Soil Erosion Improvement (%)	Soil Erosion Control Ratio (%)	Vegetation Restoration (%)	Vegetation Coverage (%)	Floating Debris Clearance (%)	Topsoil Conservation (%)
Wudongde Hydropower Plant	72.15	1.01	88.26	19.58	97.16	95.21
Baihetan Hydropower Plant	80.60	1.01	62.62	19.83	99.20	88.01

Propagation and release

In the year of 2020,

732,000

rare and endemic fish species were released from propagation and release stations at the Xiluodu, Xiangjiaba, Baihetan and Wudongde reservoirs.



Outlook for 2021

In 2021, great changes unseen in a century will continue to fester, while the clean energy and environmental protection industries will present new features and trends. Nevertheless, we will continue to implement the guiding principles of the 19th CPC National CPC Congress and guiding principles embodied in speeches by Chinese President Xi Jinping for promoting the development of the Yangtze River Economic Belt directed at promoting well-coordinated environmental conservation in the Yangtze River Basin. Moreover, we will prioritize the ecosystem and green development, and strive towards greater progress in our two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand.

We will play an active role in keeping pace with trends in the development of the clean energy and environmental protection industries and take the lead in well-coordinated environmental conservation in the Yangtze River Basin, with the goal of making remarkable achievements in this respect. In addition, we will step up investment in ecological and environmental conservation in the Yangtze River Basin, and establish a number of key projects with distinct ecological benefits that focus on the main streams and tributaries of the Yangtze River as well as key ecological areas. On top of that, we will actively expand market operations to support well-coordinated environmental conservation in the Yangtze River Basin, promote business activities such as the development of clean energy, smart mini-grids and electricity distribution, as well as deepen the integration of environmental protection business operations, and leverage the role of investment in advancing the industrial chain for environmental conservation in the Yangtze River Basin. Further, we will continue to improve the new Three Gorges Water Governance Model and explore the "Urban Comprehensive Green Energy Manager" and "Urban Water Manager" models to contribute more of our expertise to Yangtze River environmental conservation.

We will fully leverage the comprehensive benefits of the world's largest clean energy corridor, and promote green development in the Yangtze River Basin through our long-lasting stream of hydropower. We will unswervingly support China's mission to reach peak carbon emissions and attain carbon neutrality, formulate our timeline for achieving carbon neutrality by 2040 and proactively participate in China's carbon trading market, so as to contribute towards attainment of carbon neutrality in 2060. We will take a holistic approach towards environmental demands along the Yangtze River, such as flood control, navigation, power generation and ecological and environmental protection, explore new approaches for ecological regulation, and enhance the functions of cascade hydropower plants in servicing ecosystems, so as to maximize comprehensive benefits in the Yangtze River Basin. Furthermore, we will continue to promote research on the breeding of rare fish species endemic to the upper reaches of the Yangtze River, such as the Chinese sturgeon, Yangtze sturgeon, *Acipenser dabryanus*, *Coreius guichenoti*, *Schizothorax prenati* and *Percocypris pingi*, as well as the protection of rare flora in the Three Gorges Reservoir Area. We will fully implement measures for ecological and environmental protection during the implementation of programs to promote harmony between human and nature.

We are committed to our strategy of becoming a leader in the offshore wind power industry and a pacesetter in the photovoltaic power industry, and have vigorously devoted resources in new-energy sectors such as wind power and photovoltaic power. We will continue to improve our new-energy strategies, enhance the utilization of wind power and solar power and proactively advance the large-scale promotion of offshore wind power development and the green transformation of economic and social development.



Expert Comments

CTG published its 16th Annual Report on Environmental Protection in 2020. Reading this report left me with a deep impression of CTG's unremitting pursuit in respecting nature, following its laws, protecting nature, exploring a path towards harmony between man and nature, as well as promoting coordination in economic development and ecological protection.

Responding to national strategies and building a new paradigm of development. CTG is committed to achieving its two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand. CTG has long been committed to science-based water governance, and will deepen its efforts towards progress in clean energy development and ecological conservation of the Yangtze River. CTG has also continued to explore new models and new mechanisms, and strived to provide leadership in making green development our best image.

Consolidating environmental management and building a foundation for new development. CTG has implemented environmental management covering all its business operations, the full life cycle of its projects, as well as the entire Yangtze River Basin. The Corporation has continued to improve its environmental management system, which is interdependent with the quality, environmental, and occupational health and safety management system, environmental management mechanism, comprehensive risk management system, internal control system and environmental emergency management system. CTG has continued to promote environmental protection efforts through innovation and enhance its management capacity, and worked with its partners to raise awareness of environmental protection to further strengthen environmental protection capabilities and advance its sustainable development.

Full integration with business operations and exploration of new paths of development. This report focuses on the main business operations of CTG. It uses a clear structure, self-evident big data and detailed cases to demonstrate CTG's path of and achievements in ecological conservation in terms of green energy, low-carbon development, conservation and recycling, environmental protection, publicity of idea and environmental protection performance. This report also shows that CTG has fulfilled its duties in deepening environmental protection through empowerment by technological innovation and digital transformation.

I sincerely hope that CTG will take the initiative to lead the developments of our times, spread its excellent ideas and experience to others while protecting ecological environment proactively, serve as a model of green development, and make steady progress in ecological conservation together with its stakeholders.

Qian Xiaojun

Professor at the School of Economics and Management, Tsinghua University

Associate Dean of Schwarzman College, Tsinghua University

Director of the Research Center for Green Economy and Sustainable Development, Tsinghua University

CTG published its 16th Annual Report on Environmental Protection in 2020. This report showcases CTG's ideas, management, actions and achievements in environmental protection, and highlights its outstanding contributions in well-coordinated environmental conservation in the Yangtze River Basin as well as green, low-carbon development. This report is a high-quality environmental protection report with the following characteristics:

Devotion to shouldering responsibilities in green development. This report is themed upon the "Emerging Benefits of the Joint Protection of the Yangtze River", with a focus on sustained, coordinated, innovative and targeted efforts. It shows CTG's willingness to participate in well-coordinated environmental conservation in the Yangtze River Basin, and its continuation of its two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand. This report also presents the benefits from the efforts of CTG and its partners in exploring new mechanisms for green development and protecting the Yangtze River, and highlights CTG's sense of responsibility and accountability.

Responding to the call of the times and tackling hotspot issues. This report presents the unremitting efforts of CTG in tackling climate change, a common concern of the international community, its endeavors in proactively responding to the goal of attaining peak carbon emissions and carbon neutrality, and its involvement in ecological restoration and environmental protection in the Yangtze River Economic Belt, as well as the development of clean energy and reduction of pollutant emissions. This report also demonstrates CTG's success in both COVID-19 containment and ecological restoration of the Yangtze River.

Detailed contents and remarkable outcomes. This report covers key issues of great concern, such as green energy, low-carbon development, conservation and recycling, as well as ecological protection. The report includes statistical data on its achievements, typical cases and detailed content, helping readers gain a more comprehensive and real understanding of its accomplishments in environmental protection. A truly impressive report!

At the beginning of the 14th Five-Year Plan, I hope that CTG will continue to uphold green development philosophies, focus on its two-pronged strategy where clean energy development and environmental protection of the Yangtze River go hand in hand, consolidate its foundations in environmental management, pursue innovations in environmental protection technology and speed up low-carbon development, so as to inject impetus into the sustainable development of the Yangtze River Economic Belt.

Xue Dayuan

Professor at the College of Life and Environmental Sciences,

Minzu University of China

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2.2	Total assets, sales revenue and employees	✓		
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2.9	Time frame of the report	✓		P1
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Readers’ Feedback

In order to improve CTG’s environmental protection work and enhance the corporation’s ability for and level of green development, your comments and suggestions would be greatly appreciated. Please spare the time to give us your valuable opinions on our work and report. Thank you!

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. How the layout of the Report help your reading?

☐ Greatly ☐ Okay ☐ Badly

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 code: 100038

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



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