The Best Performing Projects in 2018

2018年度最佳表现贷款项目

ASIAN DEVELOPMENT BANK

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The Fourth Loan Project Award Program

第四届亚行贷款项目评奖活动

In 2012, to better recognize the efforts made by the project executing agencies and implementing agencies in implementation of ADB-financed projects in the People's Republic of China (PRC), the Ministry of Finance, PRC and Asian Development Bank initiated a loan project award program for the PRC projects. The best performing project award, the key award of the program, was launched in 2013. This award is to recognize projects with an effective institutional set up, timely start-up of implementation, smooth disbursement and procurement, strict compliance with loan covenants, and effective delivery of scheduled project outputs.

2012年，为了更好地认可项目执行机构和实施机构在执行和实施亚行在华贷款项目所付出的努力，财政部和亚洲开发银行共同发起了一项亚行在中国贷款项目的评奖活动。2013年，其核心奖项“最佳表现贷款项目”开始第一次评选。该奖项是为了表彰一些项目有着有效的项目管理机构、项目实施启动及时、支出和采购进展顺利、严格遵守贷款协议，并能切实实现项目的预期产出。

To ensure transparency of selection, a self-evaluation approach has been applied. The project management offices (PMOs) are requested to evaluate performance for their own projects following the specific selection criteria and evaluation methodology (see attachments). It is expected that, through the process, the PMOs can identify strengths and weaknesses in project implementation and devise actions to improve project performance.

为了确保评选的公正和透明，评奖活动采取自评方式进行。项目办按照给定评选标准和评价方法（详见附件）对自己的项目绩效进行评估。同事，通过这一过程期望项目办能够认识到其项目执行情况的优缺点，找出提高项目绩效的办法。

Since then, the biannual loan project award has been successfully undertaken four times. In 2019, out of 90 ongoing sovereign lending projects in the PRC, ten projects were selected as the Best Performing Projects in 2018, based on the self-evaluation results submitted by the PMOs which were validated by ADB project teams.

自此，两年一次的亚行贷款项目评奖活动已成功开展四次。2019年，从90个在建主权贷款项目中，基于项目办提交的自评结果和亚行项目团队进行复核和确认后，10个项目被评为“2018年度最佳表现项目”。

The Best Performing Projects in 2018
2018年度最佳表现贷款项目

No. 序号	Loan No. 贷款号	Project Name 项目名称
Agriculture and Nature Resources 农业和自然资源		
1	Loan 2941-PRC	Anhui Chao Lake Environmental Rehabilitation Project 安徽巢湖流域水环境综合治理项目
2	Loan 3336-PRC	Hunan Dongjiang Lake Integrated Environmental Protection and Management Project 湖南东江湖生态环境保护与综合利用项目
3	Loan 3400-PRC	Shandong Groundwater Protection Project 山东地下水漏斗区域综合治理示范项目
Energy 能源		
1	Loan 3308-PRC	Chemical Industry Energy Efficiency and Emission Reduction Project 化工行业节能减排项目
2	Loan 3504-PRC	Air Quality Improvement in the Greater Beijing-Tianjin-Hebei Region China National Investment and Guaranty Corporation's Green Financing Platform Project 泛京津冀区域大气污染防治中投保投融资促进项目
Transport and Communications 交通和通信		
1	Loan 2962-PRC	Hunan Xiangjiang Inland Waterway Transport Project 湖南湘江内河航运交通项目
2	Loan 3082-PRC	Railway Energy Efficiency and Safety Enhancement Investment Program — Tranche 4 铁路节能和安全投资规划项目—第四批次
3	Loan 3459-PRC	Chongqing Integrated Logistics Demonstration Project 重庆综合物流示范项目
Urban and Social Development 城市和社会发展		
1	Loan 2760-PRC	Gansu Tianshui Urban Infrastructure Development Project 甘肃天水城市基础设施发展项目
2	Loan 3115-PRC	Yunnan Chuxiong Urban Environment Improvement Project 云南楚雄州城市环境改善项目

Agriculture and Nature Resources
农业和自然资源

Loan 2941-PRC:
Anhui Chao Lake Environmental Rehabilitation Project

安徽巢湖流域水环境综合治理项目

A. Project Background
项目背景

Chao Lake, Hefei, Anhui Province, is on the banks of the Yangtze River, with an average depth of 2.8 meters. It covers an area of 769 km^2. It is the largest freshwater lake in Anhui Province, and the fifth largest in the People's Republic of China (PRC). Its basin area is 13,680 km^2, accounting for 9.8% of Anhui Province. It is an important industrial and agricultural water source in the region, providing water resources for water transport and tourism. The river basin in which Chao Lake is located is home to the five municipalities of Hefei, Maanshan, Wuhu, Lu'an, and Anqing and a total of 17 counties, among which Hefei is the capital of Anhui province. The terrain of the river basin is generally high in the west, low in the east, and low-lying in the central region, in line with the overall slope of the Yangtze River. The main geomorphic units are plains, hills and mountains, which are easily affected by the accumulation of pollutants. The basin of Chao Lake is shallow, while the proportion of basin area to lake volume is high. Lake water circulation is very limited, nearly 40% of the soil in the basin is naturally high in phosphorus, while the negative impact of rapid population and economic growth on the environment has intensified environmental degradation in a vicious cycle.

巢湖属长江左岸水系，多年平均水位8.52米（吴淞高程），平均水深2.8米，面积769平方公里，是安徽省最大、中国第五大淡水湖，其流域面积13,680平方公里，占安徽省面积的9.8%，是区域内重要的工农业水源、并提供水运资源以及旅游和休闲资源。巢湖流域涉及合肥、马鞍山、芜湖、六安、安庆5市共17个县（市、区），其中安徽省省会合肥全境位于流域内。流域内地势总体西高东低、中部低洼，整体向长江倾斜，主要地貌单元为平原、丘陵和山地，地理构造上极易受污染物累积的影响。巢湖湖盆深度浅，流域面积与湖泊体积之比很高，湖体水循环十分有

Water environment improvement through wastewater treatment
污水处理厂净化水质

限，流域内近40%的土壤天然高磷，同时显著的经济和人口增长对环境的不利影响加剧了这种恶性循环趋势。

The Asian Development Bank (ADB) approved a $250 million loan for the Anhui Chao Lake Environmental Rehabilitation Project on 16 November 2012. The project has improved Chao Lake's sustainable aquatic ecosystem, as well as the quality of lives of those living in its vicinity. It rehabilitated water resources and the environment in Chao Lake and upstream rivers. The project outputs were: (i) increased municipal point-source pollution control; (ii) enhanced non-point source (NPS) pollution control; (iii) improved institutional capacity of the Chao Lake Management Administration (CLMA); and (iv) strengthened project management capacity. The project is distributed over four municipalities—Hefei Municipality, Lu'an Municipality, Ma'anshan Municipality, and Wuhu Municipality—and 10 counties and districts.[1]

安徽巢湖流域水环境综合治理项目于2012年11月16日获得亚行董事会批准。项目贷款2.5亿美元，总投资29.48亿元人民币。项目实施期为2013年4月至2020年3月。该项目预期影响为改善巢湖流域居民生活质量、提高巢湖淡水生态系统的可持续性。项目预期成果为巢湖及其上游河流的水资源和环境状况得到改善。项目产出包括：（1）加大对城市点源污染的控制；（2）改善面源污染控制；（3）加强巢湖管理局机构能力；（4）增强项目管理能力。项目分布于合肥市、六安市、马鞍山市和芜湖市等四个地级市，十个县、区、县级市。[2]

[1] Feidong County, Feixi County, Changfeng County, Lujiang County, Chaohu City, Binghu New District, Hanshan County, Wuwei County, Shucheng County, and East New District.

[2] 这些县、区、市为肥东县、肥西县、长丰县、庐江县、巢湖市、滨湖新区、含山县、无为县、舒城县以及东部新城。

B. Implementation Arrangements and Project Management
实施安排与项目管理

1. Sound and Powerful Project Management System
健全有力的项目管理体系.

A provincial, municipal, and county-level project management structure was established with a focus on county-level project implementation agencies to improve the organization of the project. The provincial-level executive agency oversaw the project. The project management office director had rich experience and excellent organizational skills, with a team comprised of experienced personnel from relevant agencies, providing the basic conditions for top-notch design and implementation of the project. In order to effectively put forces into play and promote project progress, monthly scheduling, quarterly notifications, half-year notices, and year-end summaries were established with a focus on key links such as procurement, project construction, withdrawals, and reimbursements.

项目成立了省、市、县三级管理机构。作为统领项目全局的省级执行机构，巢湖管理局选调协调能力强、具有丰富县区工作经验的项目办主任，组建来自相关行业管理部门的有经验的省级项目管理队伍，为做好项目的顶层设计和有效组织项目实施奠定了重要基础。省项目办确立了“月调度、季检查、半年一通报，年度一总结”的工作模式，紧紧围绕项目招标采购、工程推进、提款报账等重点环节和任务开展工作,以有效调度各方力量和推动项目进展。

2. Active and Effective Project Coordination Mechanism
积极有效的项目协调机制.

Since project preparation, Anhui Finance Department, Anhui Provincial Development and Reform Commission, Anhui Audit Office and the Anhui Provincial Chao Lake Management Authority established a project leadership team to guide and coordinate project implementation. Effective coordination and cooperation between the various departments ensured the smooth and effective implementation of the project. The project leadership team also coordinated with the project cities and counties, providing timely counterpart funds. The Anhui Finance Department, Anhui Provincial Development, Reform Commission, and Anhui Audit Office all participated in ADB's regular project supervision and inspection activities, and liaised with the ADB mission on issues related to project implementation, discussing approaches to solving problems, which effectively promoted smooth project implementation.

自项目准备起，就成立了由省财政厅、省发改委、省审计厅和安徽省巢湖管理局等部门领导组成的项目领导小组，以指导和协调项目的执行。各部门的有效协调和合作确保了项目的顺利和有效实施。项目领导小组还协调各项目市（县、区）及时提供配套资金、支持项目实施。省发改委、财政厅、审计厅都全程参与定期开展的亚行项目实施督导检查活动，就项目实施中的问题与亚行检查团及时进行交流，商讨解决方案，有效促进了项目的顺利实施。

During project implementation, the Anhui Province Project Management Office (APPMO) focused on coordination and communication with local governments,

conducting on-site coordination and bridging ADB regulations and domestic policies. An organic combination of project implementation and local environmental responsibility was implemented and environmental quality assumed an important role in assessing the work of principle government leaders. Local government support in terms of policy and funding is an important prerequisite for smooth project implementation.

项目实施中，省项目办注重与地方政府的协调沟通，赴项目实施地与当地政府现场协调，讲解亚行规定与国内政策的衔接。通过将辖区环境质量作为考核政府主要领导人工作的重要内容，推动项目与地方环保责任制的有机结合，提升地方政府的重视程度。地方政府在政策和资金上对项目的大力支持，是本项目顺利执行的重要前提条件。

3. Normative Operational Management System.
规范可操作的管理制度.

Firstly, a business training system was established. ADB, Anhui Finance Department and APPMO held several annual business management training courses, conducting systematic training on business issues such as procurement, withdrawals, financial management, acceptance inspections, and file management. Through these training sessions, the professional quality of management improved, which provided strong support for the project. Secondly, in 2013, when the project commenced, the APPMO formulated “Management Measures for ADB-Financed Chao Lake Environmental Rehabilitation Project,” “Financial Management Measures for ADB-Financed Chao Lake Environmental Rehabilitation Project,” and specific file management and acceptance systems. Systematic, targeted, and useful operational management methods were implemented, maintaining the implementing agency’s consistency in terms of project implementation standards and methodologies, improving project management and execution, while also providing systemic guarantees to ensure smooth implementation. Thirdly, a project financial management information system was established. This involved incorporating the project plan management, withdrawals and final accounts into the management system, realizing resource sharing, improving the informatization level of the project’s financial management, and improving the efficiency of financial management.

一是建立业务培训制度。省项目办每年举办业务管理培训班，对项目招标采购、提款报账、财务管理、验收检查、档案管理等方面的业务进行系统培训。针对不同问题邀请亚行、省财政厅、省审计厅直接予以培训和指导。这些能力建设提升了管理人员的业务素质，为项目的顺利实施提供了有力支撑。二是完善项目管理制度。项目启动之初，省项目办制定了《巢湖流域水环境综合治理亚行项目管理办法》、《巢湖流域水环境综合治理亚行项目财务管理办法》及具体的档案管理、验收等制度，为项目实施提供了系统实用的操作管理办法，保证了各项目实施机构执行标准和方法的一致性，为项目的顺利实施提供了制度保障。三是建立项目财务管理信息系统。将项目的计划管理、提款报账、资金决算等主要业务纳入系统，提升了项目财务管理信息化水平，提高了财务管理工作效率。

River after dredging
治理后的河道

C. Managerial Safeguards
为巢湖治理保驾护航

With the implementation of the ADB loan project, the joint support of the project management offices (PMOs) at all levels and the cooperation of various departments—based on the loan as the platform and the project as the carrier—played an important role in achieving comprehensive treatment of Chao Lake.

在各级项目办的共同努力和各部门的协同配合下，亚行项目以贷款为平台，以项目为载体，在巢湖综合治理过程中发挥了重要的“画龙点睛”作用。

1. Leading role
引领作用

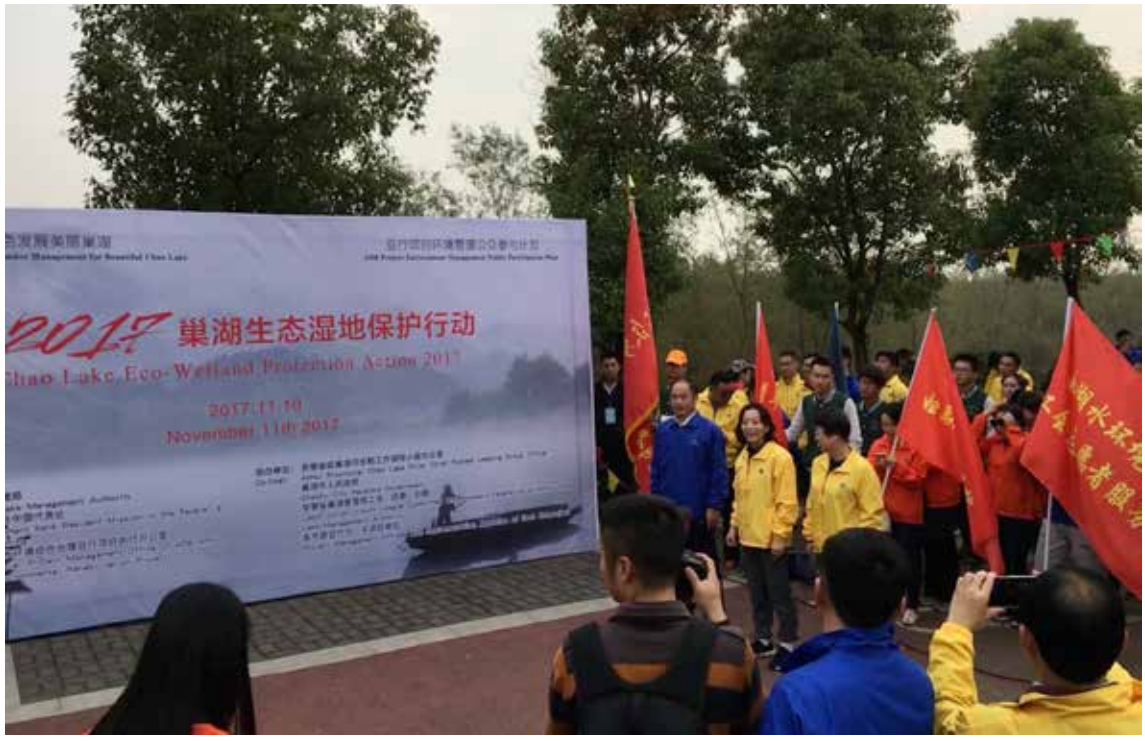
Firstly, institutional capacity-building activities established a Chao Lake basin pollution source and water-quality dynamic-supervision information system, a Chao Lake cyanobacteria early-warning monitoring system, and a Chao Lake basin agricultural non-point source pollution monitoring information system. A coordinated and unified action plan for Chao Lake basin governance framework and integrated governance was also established. Field visits and training sessions in collaboration with academic institutions greatly enhanced the institutional capacity of the Chao Lake Management Authority in river-basin planning, basin-

development management, comprehensive environmental management, and aquatic-environment monitoring and management, all of which played an important role in systemic reform of Chao Lake basin management. At the same time, it laid a solid foundation for further expanding the management authority of the Chao Lake Management Authority and implementing comprehensive and integrated management that included resource planning, development and protection, water-environment monitoring, and overall governance for the entire basin.

首先，通过实施机构能力加强活动，建立了巢湖流域污染源和水质动态监管信息系统、巢湖蓝藻预警监测系统和巢湖流域农业面源污染监测信息系统，并构建了协调统一的巢湖流域治理框架和综合治理的行动计划。通过组织实地考察和与学术机构合作培训，大大提升了巢湖管理局在流域规划、流域开发管理、环境综合治理和水环境监测与管理等方面的机构能力，为巢湖流域管理体制改革的顺利推进发挥了重要作用，引领巢湖管理局进一步扩大管理职权，对全流域范围的资源规划、开发和保护、水环境监测和治理等实施全面综合管理奠定坚实基础。

Secondly, the project focused on public participation. The focus on public participation promoted environmental awareness and changes in community behavior. This ensured project sustainability and attracted a wide range of social forces to participate in improving the Chao Lake aquatic environment. At the time of project preparation, mobilizing public participation was considered important and a public participation plan and a specific implementation plan were formulated. During the implementation of the project, effective channels were formed to mobilize all social forces to actively support and participate in project construction activities, to further enhance the public's responsibility and participation in the protection of Chao Lake, propagating environmental protection concepts into the community. From 2014, each project city and county organized one or two annual environmental publicity activities on various topics with 300–400 people directly involved each time. In 2017 and 2018, the APPMO launched a series of public activities involving environmental management with the themes such as “Let the shore be greener, the water clearer” and “Beautiful Chao Lake, My Home.” The events significantly enhanced environmental awareness among residents who live on the peripheries of Chao Lake, which has had an important positive effect in terms of consolidating and expanding project implementation.

其次，本项目更加重视公众参与，以推动社区群众的环境意识提升和行为改变。这保证了项目成效的可持续性，并吸引了更广泛的社会力量参与巢湖水环境治理。在项目设计时将动员公众参与作为项目活动的一项重要内容，制定了项目公众参与计划和实施方案。项目实施过程中，通过有效途径动员各方面社会力量积极支持和参与项目建设活动，进一步提高公众对巢湖保护的责任和参与意识，让环保理念走进大众，走进生活。2014年以来，各个项目县（市、区）每年组织开展1至2次不同主题的环保宣传活动，每次直接参与人数达300至400人。省项目办在2017年和2018年分别开展了以“让岸更绿，水更清”、“美丽巢湖我的家”为主题的环境管理公众参与系列活动。通过项目公众参与活动的开展使得巢湖沿岸社区居民的环保意识得到明显提高，新生活理念得到显著增强，对巩固和扩大项目建设成效具有重要的积极作用。



Public awareness raising and environment protection campaign
环境保护公众参与活动

2. Supporting role
支撑作用

Eight wastewater treatment plants have been built and put into operation since 2016; a 484 km wastewater collection pipeline network has been completed; 103 km of rivers have been dredged and 123 km of embankments completed, removing a total of 3.15 million m^3 of sludge; 417 hectares of artificial wetlands have been constructed; and two garbage-transfer stations have been built. The effective implementation of the project has played a positive supporting role in improving the Chao Lake Basin aquatic environment and has also brought about social, economic, and environmental benefits.

项目实施以来，已建成8个污水处理厂并于2016年开始陆续投入运行；完成484公里污水收集管网扩建或改造；完成103公里的河道疏浚和123公里的护岸工程，累计清除淤泥315万立方米；恢复和建设人工湿地共417公顷；建设了2个垃圾中转站。项目的有效实施为巢湖流域的水环境改善起到了良好的支撑作用，并取得了良好的社会、经济和环境效益。

1) Social benefits
社会效益

The project has produced significant social benefits for the project cities and counties and has been a positive in terms of poverty alleviation in the project area. According to preliminary statistics, about 2 million

residents in the project area have benefited from improved wastewater collection and treatment services, newly created jobs and increased incomes, improved living environment and reduced health risks caused by aquatic diseases, safer and more spacious public spaces, and increased tourism and local economic growth promoted by investment. In short, living standards have significantly improved for local beneficiaries. As of December 31, 2018, the project had generated a total of 7,260 person-years in new jobs (including temporary and long-term positions), and the monthly average salary was CNY4,000–5,000. Of that number, 6,020 person-years went to local communities, accounting for 83% of the total, and 3,032 person-years in jobs have gone to vulnerable groups such as women and the financially distressed, accounting for 42%.

项目建设实施在项目县（市、区）产生了显著的社会效益，对项目区的脱贫有积极的贡献。项目区约200万居民在污水收集与处理服务的改善、创造就业岗位增加收入、居住环境的改善并降低水生疾病引发的健康风险、提供更安全与更宽敞的公共空间、提升水体的旅游和景观娱乐价值、以及环境质量的改善从而吸引投资促进当地经济增长等方面中得到受益，受益居民的生活水平和获得感得到明显提高。截止到2018年12月31日，项目建设与运行累计新增就业岗位（包括临时岗位和长期岗位）约7,260人年，月人均工资4,000元至5,000元。其中，6,020人年的岗位提供给了当地社区，占比83%；3,032人年的岗位提供给了妇女、贫困等弱势群体，占比达到42%。

Happy project beneficiary
项目收益人的笑颜

2) Economic benefits
经济效益

The project has created considerable economic benefits. It is estimated that by the end of 2018, the project had generated CNY180 million ($25.57 million) annually through wastewater collection and treatment and improvement of wastewater services, while the economic benefits of the ecological value created by 417 hectares of newly added or rehabilitated wetlands will reach CNY54.8 million ($7.78 million) per year.

项目建设实施与运行创造了可观的经济效益。初步估算，至2018年底，项目因新增污水收集与处理改善污水服务而实现的经济效益达1.8亿元/年，新增或恢复的417公顷人工湿地产生的生态价值所折合的经济效益达5,480万元/年。

3) Environmental benefits
环境效益

The project has produced significant environmental benefits. The dredging of 103 km of rivers was completed, while the total amount of nitrogen and phosphorus in 3.15 million m^3 of silt cleared was cumulatively 2,443 tons and 896 tons respectively. A 484-km wastewater collection system and eight wastewater treatment plants were expanded or reconstructed by the project, resulting in 166,000 tons of daily wastewater collection and treatment, while the annual reduction of COD, BOD, ammonia nitrogen, phosphorus, and suspended solids discharged into the waters of Chao Lake and lake area reached 24,535 tons, 13,180 tons, 1,764 tons, 274 tons, and 16,241 tons respectively. It is estimated that the project reduced the discharge of pollutants into the Chao Lake by more than 10%, playing an active and effective role in basically curbing the deterioration of the Chao Lake aquatic environment and improving the aquatic environment throughout the entire lake and basin area.

项目的实施与运行产生显著的环境效益。项目实施完成103公里河道的疏浚，累计清除315万立方米淤泥中的总氮约为2,443吨、总磷约为896吨；项目支持扩建或改造的484公里污水收集系统与8个污水处理厂，新增日污水收集与处理能力达16.6万吨，每年分别可减少排入巢湖流域与湖区水体的COD、BOD、氨氮、磷和悬浮物24,535吨、13,180吨、1,764吨、274吨和16,241吨；项目实施恢复的湖中和河岸湿地，每年减少巢湖水域的总氮、总磷和氨氮的数量分别达58吨、15吨和35吨。初步测算项目建设实施和运行对减少入湖污染物总量的贡献率超过10%，为基本遏制巢湖水环境恶化状况、促进湖区和流域的水环境整体向改善的方向发展开始发挥积极有效的作用。

3. Demonstration role
示范作用

Through the implementation of the demonstration project, various technological solutions and innovative mechanisms that were developed provided a reproducible and promotable non-point source pollution control plan for the comprehensive environmental management of the entire Chao Lake basin. Consulting services were provided to implement the demonstration project. According to the overall requirements of “one control, two reductions and three basics,” which involved controlling the total amount of agricultural water utilized, the use of chemical fertilizers and pesticides was reduced, as utilization of livestock and poultry excrement, likewise the utilization of crop straw, and

agricultural packaging materials and abandoned agricultural film was recycled.

通过该示范项目的实施，开发的各种技术解决方案和机制创新方案，为整个巢湖流域环境综合治理提供可复制推广的面源污染治理方案。通过提供咨询服务实施该示范项目，聘用的咨询专家团队按照控制农业用水总量、减少化肥与农药使用量、基本实现畜禽养殖排泄物资源化利用、基本实现农作物秸秆资源化利用以及基本实现农业投入品包装物及废弃农膜有效回收处理等的“一控二减三基本”总体要求。

On this basis, the Chao Lake Management Authority innovatively formulated and organized the implementation of ecological compensation and operational mechanism schemes suitable for agricultural non-point source pollution prevention and control on the south bank of the Chao Lake. It established bilateral and multilateral regional ecological compensation funds in the Chao Lake Basin, and established and improved regional diversified and market-oriented ecological compensation mechanisms through beneficiary payments, resource use, counterpart cooperation, and industrial transfers, and implementation of a compensation system for instances in which river water quality exceeded standards. The ecological compensation mechanism gives full play to potential economic development, forming an effect that enhances self-development and achieving sustainable development. Regional development achievements were evaluated in terms of “green GDP,” with the aim of greening industry. The aim was to gradually introduce innovative technologies and mechanisms that can be replicated and promoted for non-point source pollution control in the Chao Lake basin, and further establish the project as a provincial and even a national model.

在此基础上，巢管局创新性地制定并正在组织实施适合巢湖南岸农业面源污染防控的生态补偿与运行机制方案。在巢湖流域建立双边、多边区域生态补偿基金，通过受益者付费、资源有偿使用、对口协作、产业转移等方式建立健全区域的多元化、市场化生态补偿机制，实行河流断面水质超标补偿制度。探索“造血型”的生态补偿机制，使环境受补偿者充分发挥经济发展的潜能、积极性和主观能动性，形成造血机能与自我发展机制，实现可持续性发展。以绿色“GDP”评价区域发展政绩，实现产业的生态化和生态的产业化。逐步提供适合巢湖流域实际的面源污染治理可复制推广的技术与机制创新方案，并进一步建立全省示范乃至全国样板。

D. Main effects of Chao Lake governance
巢湖治理主要成效

Since the project went into its preparatory stage eight years ago, the basin’s economy has more than doubled in size, the urban population has nearly doubled, and urban wastewater has increased by 80%. The pressure on Chao Lake’s aquatic environment is enormous. With the accelerated construction of environmental protection projects such as the ADB loan project, the water quality of the main rivers and lakes has not deteriorated, but improved. The results are as follows:

自项目准备至今8年以来，流域经济总量翻了一番多、城镇人口增长近一倍，城镇污水增加80%，巢湖水环境恶化的压力巨大。随着亚行贷款项目等一系列环巢湖治理项目的加速建设，主要河湖水质不仅未恶化，反而有所好转，成效展现：

The water quality of heavily polluted rivers has improved significantly. The water quality

of the Shuangqiao River has been upgraded to Class III, and the concentration of major pollutants in the Nanfei River has decreased by 20%–30%. The water quality of the Pai River and the Shiwuli River has become significantly better. It is expected that Category V rivers will be eliminated in 2019.

重污染河道水质明显变好。双桥河水质已提升至Ⅲ类，南淝河主要污染物浓度下降20%~30%，派河和十五里河明显变好。2019年有望消除劣Ⅴ类。

The water quality of lake stream sources has been maintained. The indices of COD, ammonium nitrate and total phosphorus in the Hangbu Estuary, the largest river entering Chao Lake, have basically been steadily in the high end of Category III surface water. Driven by urban development, livestock and poultry farming and heavy rains, levels of ammonium nitrate and total nitrogen have fluctuated recently from year to year.

入湖清流河道水质维持稳定。 2011年以来，巢湖最大入湖河流杭埠河口断面COD、氨氮、总磷指标基本保持优于Ⅲ类地表水标准，近年来受城镇发展、畜禽养殖影响和暴雨驱动，氨氮、总氮指标在年内年际间存在波动。

The concentration of nitrogen and phosphorus in the waters of the lake area have decreased significantly. Since 2000, the total concentrations of nitrogen and phosphorus have decreased by 33.1%, and that of total phosphorus by 39.5%. The concentrations of total nitrogen and total phosphorus in the overall lake area have shifted from Category V to Category IV, and the concentrations of total nitrogen and total phosphorus in the eastern lake region are higher than Category IV.

湖区水体氮磷浓度明显下降。自2000年以来，全湖区总氮和总磷浓度下降33.1%，总磷浓度下降39.5%。全湖总氮、总磷浓度已由劣Ⅴ类变为Ⅳ类，其中东部湖区总氮、总磷浓度优于Ⅳ类。

Beautiful Chao Lake
美丽巢湖

Outbreaks of cyanobacterial blooms has been reduced. Affected by complex factors such as hydrological and meteorological conditions, lake flow and nutrient intake, the frequency and area of cyanobacterial blooms in the lower lake area are still relatively frequent, but the algae density, or biomass, in the lake area has been basically low in recent years.

蓝藻水华爆发程度有所减轻。受水文气象条件、湖区流场和营养盐摄入等复杂因素影响，目前下级湖区蓝藻水华发生的频次及面积仍处易发、高发阶段，但近年湖区藻密度或生物量基本处于较低水平。

Flood control and disaster reduction efforts have brought great benefits. In 2016, a basin-type catastrophic flood occurred in Chaohu city. But the inundated area in Hefei City was small, providing evidence that flood control in urban areas, parks, gullies, and important facilities was effective. The comprehensive benefits accruing from flood control and disaster reduction reached CNY40 billion ($5.68 billion).

防洪减灾效益巨大。2016年巢湖发生了流域型特大洪水，合肥市境内洪水淹没面积较小，确保了城区、园区、圩口及重要设施防洪安全，综合防洪减灾效益达400亿元。

The quality of lake water flowing into the Yangtze River has remained good. Since 2011, COD, ammonium nitrate, and phosphorus in the Yuxikou section of the Chao Lake, which flows into the Yangtze River, exceeded Class II level, which comprehensively reflects the obvious effects of the Chao Lake management and reflects the great benefits of protecting the Yangtze River.

出湖入江（长江）水质保持良好。2011年以来，巢湖入江的裕溪口断面COD、氨氮、总磷指标一直处于优于Ⅱ类地表水状态，综合体现了巢湖治理的明显效果，集中反映了保护长江的巨大效益。

Loan 3336-PRC:
Hunan Dongjiang Lake Integrated Environmental Protection and Management Project

湖南东江湖生态环境保护与综合利用项目

A. Project Introduction
项目介绍

Dongjiang Lake, southern Hunan Province, has a surface area of 160 m^2 and a total storage capacity of about 8.12 billion m^3 with an average depth of 61 m and a maximum depth of 141 m. The catchment area of Dongjiang Lake is 4,719 m^2. In addition to supplying water to the 1 million population in Chenzhou Municipality and Zixing City, Dongjiang Lake serves as a strategic water source for Hunan Province's major cities of Changsha, Xiangtan, and Zhuzhou in Xiang River basin. Support for Dongjiang Lake has been selected as a priority in the national plan for ecological and environmental protection of relatively good-quality lakes. Dongjiang Lake has been listed as "National 5A Scenic Spot."

东江湖位于湖南省资兴市境内，水域面积160平方公里，流域面积4,719平方公里，正常蓄水量81.2亿立方米，平均水深61米，最大水深141米，是资兴市和郴州市100余万人口集中式饮用水源地、湖南省长株潭衡湘江城市群战略水资源，国家重点保护湖泊，国家5A级旅游景区。

The project, with a loan $130 million from ADB aims to improve the ecological system of Dongjiang Lake and establish integrated mechanisms to protect and manage "mountains, water, forest, farmland, lake, and grass" in the Dongjiang Lake area, so that Dongjiang Lake water quality is maintained at a surface-water Class I standard.

本项目亚行贷款1.3亿美元。项目的目的是改善东江湖生态文系统并建立统筹“山水林田湖草”系统的生态治理体系，确保东江湖出湖水质稳定保持在地表水I类水质。

B. Project Management
项目管理

1. New mechanisms of integrated management, combining forces for ecological and environmental protection in Dongjiang Lake
积极探索系统治理管理新机制，形成东江湖生态环境保护强大合力

In order to establish an integrated management system for the Dongjiang Lake environment, the Zixing City Government developed an integrated management mechanism and established a leading group for the Dongjiang Lake ecological and environmental protection project in May 2014 (the party secretary as advisor and the mayor as the group leader). A project management office (PMO) headed by the executive deputy mayor, with four departments—administration, contract management, finance, and engineering—was established under the project leading group for the purpose of project implementation and coordination.

为探索建立东江湖山水林田湖草系统治理体系，2014年5月，资兴市市委、市政府创新系统治理体制机制，成立了东江湖生态环境保护项目领导小组（由市委书记任顾问，市长任组长），领导小组下设项目办（由常务副市长任办公室主任），统筹推进东江湖生态环境保护。

Overview of Dongjiang Lake
东江湖风景

i) Centralized management of well-equipped professional personnel.
Seventeen staff were transferred from Zixing City Government's bureaus of environmental protection, housing, urban and rural development, finance, and development and reform to the PMO to work fulltime on project implementation, laying sound foundations for seamless coordination within the Dongjiang Lake management team. Together they have implemented integrated management from design and project arrangement to project construction, including effective implementation of preliminary work, bidding and construction, acceptance and inspection, and operation and maintenance (O&M).
So far, 60 contracts have been awarded, accounting for 91% of a total of 66 contract packages, while 53 components have been accepted and inspected, accounting for 80% of a total of 66 contract packages.

一是统一人才集中办公。市政府整合环保、水利、林业、农业、国土、住建、发改、财政等部门17名骨干在项目办集中办公，确保了东江湖体系治理从顶层设计、项目安排到具体施工实现无缝对接，项目建设从前期准备、招标施工、验收运营快速推进。到目前为止，我市亚行贷款项目共66个包，已完成采购合同签订60个、合同签订率91%，竣工验收项目53个，竣工验收率80%。

ii) Overall planning and designing.
Advanced environmental protection consulting institutes were recruited to prepare the feasibility study report (FSR) for the project. Several rounds of discussions were held at Zixing City level, and national and international experts were recruited for guidance on revisions of the FSR. The FSR was approved by Hunan Development and Reform Commission and Hunan Provincial Government.

二是统一规划设计。我们先后聘请国内顶级环境保护咨询机构编制了《东江湖生态环境保护总体方案》、《东江湖生态环境保护与综合利用项目可研方案》，这两个方案不但资兴市上下反复讨论优化，还聘请了国内外专家指导修订，最后均得到了湖南省人民政府和湖南省发改委批复。

iii) Integrated management in project implementation.
The Zixing City Government delegated tasks to 14 bureaus including overseeing environmental protection, housing, urban and rural development, and agriculture based on their respective roles and responsibilities. Project implementation units or subproject management offices (sub-PMOs) were established in all townships responsible for construction management surrounding Dongjiang Lake. At the beginning of each year, detailed annual project work plans are established, and all sub-PMOs sign duty pledges with the mayor. In each quarter, the mayor holds a project implementation meeting, during which the mayor issues task-assignment letters to the sub-PMOs. Every month, the executive deputy mayor organizes a director-level meeting to discuss problems related to project implementation. Quarterly progress supervision and semi-annual specific reviews and assessments are carried out based on the Comprehensive Performance Evaluation and Assessment Scheme of the Dongjiang Lake Ecological Environmental Protection Project in Zixing City.

三是统一项目管理。市政府把所有子项目按职能分工分解到环保、住建等14个部门，每个部门成立一个子项目办，负责与本部门相

关的项目建设，环湖每个乡镇也成立一个子项目办，具体负责施工环境。每年都制定详细的项目年度工作计划，每个子项目办与市长签订责任状；每季由市长召开项目推进调度会，由市长给每个子项目办下达季度工作市长督办令；项目办每月由常务副市长主持召开一次主任会，对项目推进过程中存在的问题和重大事项进行集体决策。加强督查考核，专门出台了《资兴市东江湖生态环境保护项目综合绩效评估考核方案》，每季一进度督查通报，每半年一专项考核，奖惩兑现，强化问责，全市通报，形成了全市上下凝心聚力抓项目推进的强化合力。

2. New fund-raising channels to guarantee timely fund availability for integrated management
积极探索系统治理经费筹措新渠道，项目建设各项经费及时足额到位

In accordance with General Planning of Dongjiang Lake Ecological Environmental Protection, CNY1.6 billion ($210 million) is to be invested in Dongjiang Lake ecological environment protection phase 1. In addition to ADB loan of $130 million (equivalent to CNY800 million), a counterpart fund of CNY800 million is required. As a county-level government, this is a great burden on Zixing City Government. The city government has made great efforts to explore new fund-raising channels, such as seeking supports from higher authorities based on the fact that environmental protection of Dongjiang Lake has been a national priority and cumulative special funding for Dongjiang Lake protection had amounted to CNY470 million at the end of 2016. The city government also launched a social fund-raising campaign for project components which directly benefit the general public such as improvements of bamboo forest. The social fund raising has been successful in relieving pressure on city government's finances. Furthermore, Zixing City Government has fully budgeted for the remaining outstanding funding. So far, CNY810 million in total has been assured for the project design and implementation.

根据《方案》,东江湖生态环境保护体系（第一期）建设需要投入16亿元。除亚行贷款1.3亿美元（约合人民币8亿元）外，还需要配套8亿元。作为一个县级政府，光靠本级财政难以为继。为保护好母亲湖，我们积极探索经费筹措新渠道，一是争取上级支持。通过竞争立项，把东江湖成功纳入全国湖泊生态环境保护重点保护湖泊，到2016年止，先后争取到上级东江湖保护专项资金4.7亿余元；二是向社会筹措。像楠竹低改等群众直接受益的项目，采取由受益群众筹措一定比例的方式，既广受群众欢迎，又一定程度上缓解了市本级财政压力。三是剩下部分通过对政府预算资金、上级补助资金进行整合，现全部足额安排。到目前为止，合计8.1亿元的项目建设费用以到位。

3. New approaches to achieve integrated management and establish green mountains and clear water in the Dongjiang Lake basin
积极探索系统治理实现新途径，建立东江湖流域绿水青山保障体系

Based on the fact that mountains, water, forest, farmland, lake, and grass are all parts of an interconnected ecosystem, Zixing City established an overall and comprehensive plan for habitat restoration.

根据“山水林田湖草是一个生命共同体”的科学理念，我们按照生态系统的整体性、系统性以及内在规律，统筹考虑自然生态各要素，将林草植被生境恢复与田溪河湖水系综合治理统筹规划，从而实现了治山与治水相结合、生物措施和工程措施相结合、源头预防和末端治理相结合。

(i) Integrated management of the environment has been implemented with the following components:

(a) Construction of nine wastewater treatment plants in Townships surrounding Dongjiang Lake with an investment of CNY65.7 million to achieve comprehensive wastewater collection and treatment in areas surrounding Dongjiang Lake;

(b) Establishment of integrated environmental management in rural Districts of Zixing City with an investment of CNY178.24 million, including construction of 272 small-scale wastewater treatment facilities for rural villages, 4,000 separate four-tank systems for wastewater treatment, and eight garbage transfer and treatment stations and plants;

(c) Implementation of livestock and poultry pollution prevention with an investment of CNY54 million, including establishment of regulations on "Livestock and Poultry Breeding Pollution Prevention Planning Applicable for Areas Surrounding Dongjiang Lake," closure of pig farms in prohibited pig-farming areas (affecting 549 pig farms), and regulation of pig farms in restricted pig-farming areas;

(d) Implementation of nonpoint-source pollution management with the investment of CNY49.9 million, including utilization of 537 solar insecticidal lamps and 99 sprayers, 3.39 million sticky boards, 2,705 tons of site-specific formulated fertilizer and 11,100 tons of organic fertilizer, and 419 tons of biological pesticide, to effectively reduce nonpoint source pollution surrounding Dongjiang Lake;

(e) Establishment of a fish breeding base and abolition of cage fishing with an investment of CNY114 million, including construction of a fish incubation base with an annual output of 500 million fingerlings, construction of a fish breeding base of 300 *mu* (20 hectares) and a fish proliferation platform capable of releasing 40 million fingerlings, and reduction of controlled cage fishing area from 249,000 m^2 to 100,000 m^2 (all cage fishing will be demolished in 2020);

(f) Managing pollution by boats and fuel transformation with an investment of CNY16 million, including elimination of boats with less than 40 seats and old boats (172 in total), the installation of wastewater, garbage, and oil collection equipment on the remaining boats so as to achieve zero discharge from the boats, and closure of 23 on-lake restaurants;

(g) Clearance and treatment of floating materials on the lake with an investment of CNY5.13 million, including procurement of five floatage clearance boats and one oil collection ship;

(h) Rehabilitation of river courses with an investment of CNY64.2 million, including clearances of blockages, dredging, and ecological embankment

in and along five rivers (the Xingning River, the Guangqiao River, the Qingyao River, the Lianping River, and the Tianeshan River) for a total length of 27.5 km.

全面实施了田溪河湖水系综合治理工程，包括：

（1）投资6,570万元，建设了环湖9个集镇污水处理厂，实现环湖乡镇集镇区污水收集处理全覆盖。

（2）投资17,824万元，实施了全市农村环境综合整治工程。共建成农村集中式生活污水处理设施272个，农村分散四格式污水处理设施4,000余个；建成垃圾中转站或垃圾无害化处理厂8个，在全市建立起完善的城乡生活垃圾、生活污水收集处理体系。

（3）投资5,400万元，实施畜禽养殖污染防治工程。编制了《东江湖周边畜禽养殖污染防治规划》，对禁养区养殖户实行退出，对限养区养殖企业进行治理，现东江湖禁养区内规模养殖户549户全部退出；对限养区规模养殖企业实行以奖代补建立污染治理设施建设。

（4）投资4,990万元，实施农业面源污染治理工程。共树立太阳能杀虫灯537盏、喷雾器99台，发放或计划发放粘虫板339.26万张，发放或计划发放测土配方肥2,705吨，发放或计划发放有机肥 11,100吨，购置或计划购置生物农药419吨，有效减少了环湖农业面源污染入湖。

Xinning Wastewater Treatment Plant
兴宁污水处理厂

（5）投资1.14亿元，实施了苗种繁殖基地建设、网箱退水上岸工程、增殖放流工作，建设了年产5亿尾鱼苗的孵化基地、300亩苗种繁殖基地和增殖放流码头，投放了各类鱼苗4,000万尾，东江湖原有网箱从24.9万平方米控制到了10万平方米以内，决定到明年全面退出。

（6）投资1,600万元，实施了船舶污染治理与燃料改造工程。 对现有40座以下的旅游船只和老旧船只全部淘汰，共淘汰172艘；对保留的船舶加添污水、垃圾、油污收集装置，建设收集体系，把船舶产生的污染全部上岸处置。目前，我市115艘船舶加装生活污水储存柜、5套污水收集上岸处理系统建成，投入使用，从而实现了船舶污水零排放。对东江湖水面23艘水上餐饮全面取缔，结束了水上开设餐饮网点的历史。

（7）投资513万元，实施了湖面漂浮物打捞处置工程，购置了5艘漂浮物打捞船和1艘油污收集船。

（8）投资6,420万元，实施了河道整治工程。对兴宁河、光桥河、青腰河、连坪河、天鹅山河5条入湖河流共27.5公里进行了生态护岸、淤沙清运、清水产流恢复等综合整治。

(ii) Habitat restoration has been fully implemented, including:

(a) Afforestation for water conservation, rehabilitation of areas affected by desertification, and rehabilitation of bamboo forests in townships surrounding Dongjiang Lake with an investment of CNY250 million (including investments to farmers), including new plantations or upgrades in 175,600 *mu* (11,706 hectares) for water conservation, afforestation or reforestation in 28,000 *mu* (1,866 hectares) of desertification areas, creation of 753 *mu* (50 hectares) of fire-prevention forest belts, and upgrades of 11,000 *mu* (733 hectares) of bamboo forest;

(b) Construction of Hangxi River wetland, Xingning River wetland, and Bailang–Jiangkou lakeside wetland and riverbank greening with an investment of CNY258 million, including construction of 4.2 km of lakeside road, rehabilitation of 4,200 *mu* (280 hectares) of lakeside wetland, and construction of six km of associated wastewater main pipeline and 10 km of wastewater branch pipelines, to improve tourism infrastructure, reduce pollution and nonpoint source pollution, and restore biodiversity;

(c) Ecological restoration in mines, such as Dongping, Qingyao, and Qingjiang with an investment of CNY36 million, including vegetation of 350 *mu* (23.3 hectares) of abandanedmines, construction of 4.5 km of roads, safe disposal of 177 tons of cyanide wastewater, transfer and disposal of 6,000 tons of hazardous waste, and the settlement of historical problems of mines such as Dongping gold mine;

(d) Ecological restoration in Grade I drinking-water source protection zone of Dongjiang Lake where rural houses providing catering services were demolished, with an investment of CNY14 million, including ecological

restoration of 301 *mu* (20 hectares) in the protection zone, construction of 8.6 km of rail and 14.4 km of fences, construction of 8.6 km of standard sidewalks, establishment of 20 landmarks, 20 billboards for water-source protection, and 10 warning signs.

全面实施了林草植被生境恢复工程，包括：

（1）投资2.5亿元（包括农户配套投资），实施环东江湖周边乡镇水源涵养林建设、石漠化治理、楠竹低改项目，通过6年的努力，新增或提质水源涵养林建设面积17.56万亩，新造或补植石漠化造林28,000亩、完成防火林带753亩，楠竹低改11,000亩。

（2）投资2.58亿元，实施了杭溪河湿地、兴宁河入湖河口湿地、环湖路二期及台前村湖滨湿地、环湖路一期湖滨湿地等项目，建设了环湖公路4.2公里，恢复湖滨湿地4,200亩，配套建设污水主管网6公里、支管网10余公里，通过些项目的建设，对完善东江湖旅游基础设施，削减生活污染、农业面源污染入湖和保护生物的多样性起到了重要作用。

（3）投资3,600万元，实施了东坪、青腰、清江等矿山生态修复项目，恢复矿山植被350亩，修建了雷公仙公路4.5公里，安全处理含氰废液177吨、转运处理危废6,000吨，东坪金矿等历史遗留问题得到妥善解决。

（4）投资1,400万元，完成了东江湖饮用水源一级保护区餐饮农户拆迁产生的生态修复工程，修复保护区生态301亩；完成围栏建设8.6公里，围网建设14.4公里，规范化人行走道8.6公里；设立界标20块、水源保护宣传牌20块、警示牌10块。

(iii) **To improve monitoring and supervision of environmental protection and management,** CNY45 million has been invested in the construction of Yangxing automatic water quality monitoring station, Toushan automated water quality monitoring station, and Donjing Lake monitoring and supervision center, development of capacities of secondary monitoring stations, and baseline survey on environmental protection, detailed investigations of water quality, sediment, and aquatic life, ecological health, loss of service functions, and impact of human activities on ecological security. Further CNY36 million will be invested for construction of online monitoring stations for 16 drinking water resources and an online application platform for Dongjiang Lake environmental monitoring information system.

全面加强治理体系监测监察能力建设。投资4,500万元，建设了羊兴水质自动监测站、头山水质自动监测站，东江湖监测监察业务用房及二级监测站能力；开展了湖泊生态环境保护基线调查，对东江湖水质状况、底泥、水生物开展了详细调查，对其生态健康、服务功能损失、人类活动对生态安全影响形成了详实调查报告。下一步，还将投资3,600万元，一是建设16集中式饮用水源自动监测站建设，二是开展东江湖智慧湖长以及智慧环保平台建设。

(iv) **Livelihood skills training was carried out for farmers in the Dongjiang Lake surroundings.** In order to reduce the permanent population in areas surrounding Dongjiang Lake and relieve people pressure on the environment, CNY21 million has been invested in skill capacity training and public environmental protection promotion

for 30,000 lakeside residents to ensure that each household has at least one person specializing in an industrial technology, so that they will gradually move away from Dongjiang Lake, which will be beneficial to the local environment.

实施生计培训工程。为不断减少湖周村民常住人口，减轻湖泊保护压力，我们安排了2,100万元，对东江湖周边村民进行3万人次的技能和环保意识培训，确保流域内每户家庭都有一个以上的产业技术工人在外就业，从而引导他们逐步走出湖外，从长远上实现对东江湖生态环境更好的保护。

It is estimated that the project will reduce chemical oxygen demand (COD) by 3,431 tons, total nitrogen by 646 tons, ammonia nitrogen by 494 tons, and total phosphorus by 56.8 tons, while 4,550 *mu* (303 hectares) of lakeside and riverside wetland will be newly rehabilitated and 175,600 *mu* (11,706 hectares) of areas will be newly afforested for water conservation. At present, a relatively well-developed pollution prevention system, ecosystem conservation system, and environment monitoring and supervisory system have been established in the Dongjiang Lake basin. Consequently, Dongjiang Lake has become one of a few large lakes in the PRC with stable water quality with Class I surface water. Since Zixing City has been successful in achieving harmony between the lake and human at relatively low cost, putting protection and prevention first, it provides a good example nation-wide.

经测算，通过这些项目的建设，每年可消减COD 3,431吨，总氮吨646吨，氨氮494吨，总磷56.8吨，新增修复湖滨河滨湿地面积4,550亩，新增水源涵养林面积17.56万亩，从而在环东江湖流域建成起较完善的污染防治体系、生态保育体系和环境监测监察体系。现东江湖水质稳中向好，成为全国少数几个出湖水质稳定保持地表水I类的大型湖泊,为全国湖泊保护提供了“资兴经验”。

4. Actively explore new methods of integrated management and O&M to assure the effective performance of constructed environmental protection infrastructure
积极探索系统治理运营新做法，建成环保设施绩效充分发挥

In order to ensure effective performance of the constructed environmental protection infrastructures, the Zixing City Government has made great efforts to explore new methods of integrated management and O&M, including the followings.

(i) Adapting designs to local conditions to ensure attainable performance goals of the constructed environmental protection infrastructure and affordable O&M funds.

(ii) Establishing overall and detailed rules and regulations to assure high operability. At the beginning of 2019, the Zixing City Government issued a number of directives on O&M methods such as “Operation and Maintenance of Wastewater Treatment Facilities in Towns and Villages of Zixing City in the Dongjiang Lake Basin,” “Ship Wastewater Collection and Treatment Methods in Dongjiang Lake,” “Domestic Waste Collection and Treatment Methods in Towns and Villages of Zixing City,” “Lake Surface Floatage Clearance and

Treatment Methods" and "Dongjiang Lake Wetland Management and Maintenance Methods." Furthermore, all the O&M methods have stipulated responsible operation units, assessment mechanisms, and funding sources.

(iii) Raising O&M funding from various channels to establish long-term operation mechanisms. The Zixing City Government has established a beneficiary sharing mechanism for wastewater treatment fees and garbage collection and transfer fees. Agencies related to electricity generation and tourism have set up beneficiary enterprise compensation mechanisms, adopting two methods for issuance of receipts and disbursements. Since 2018, Zixing City Government has budgeted approximately CNY40 million for O&M from various channels yearly. A long-term operation mechanism has already been established in Zixing City with defined responsibilities, sufficient operation funds, and effective environmental protection performance.

为保证建成环保基础设施绩效充分发挥，我市多措并举积极探索系统治理运营新做法。一是从设计开始因地制宜，确保建成环保设施功能绩效能满足、运营费用能承受。二是从制度上管细管全，确保每项制度具有很强的操作性。今年初，我市市政府常务会先后对镇村生活污水、生活垃圾、船舶污水收集处理设施运营，湖面漂浮物打捞，湖滨及入湖河口湿地维护管理进行了专题研究，正式出台了《资兴市东江湖流域镇村生活污水处理设施运行维护管理办法》、《东江湖船舶污水收集处理管理办法》、《资兴市村镇生活垃圾收集处理设施运行维护管理办法》、《湖面漂浮物打捞处置管理办法》、《湖滨及入湖河口湿地维护管理办法》等管理办法，每个办法都清晰地明确了运营管护责任单位，运营管护目标，运管人员聘用及培训，运营管护效果考核及结果运用，经营经费来源等。三是从运营经费上多渠道筹措，着力建立长效机制。如污水处理费、垃圾收运费建立了受益群众共担机制，发电、旅游等相关单位建立了受益企业补偿机制，并实行收支两条线，不足部门由市财政兜底，从2018年起，我市财政每年从各渠道安排预算4,000余万元运行经费，从而在全市建立起项目运营主体明确、运行经费到位，环保绩效明显发挥的长效运营机制。

5. Actively explore new paths for making environmental protection profitable to facilitate Zixing City's green industrial transformation
积极探索绿水青山转化为"金山银山"实践新路径，全市转型绿色发展

Putting "protection first," the Zixing City Government has focused on making environmental protecting profitable, by (i) supporting industries to achieve environmental beautification for construction and relevant training with the aim of making Dongjiang Lake an attractive eco-tourism destination and making tourism the main source of income for local inhabitants; and (ii) using special resources to develop new industries, such as utilization of cold-water resources to develop Dongjiang Lake big-data industrial park and taking advantage of high quality water resources to develop the Dongjiang Luowei Food Industrial Park. Dongjiang Lake has played an important role in the economic development of Zixing City and is set to play an even greater role in improving the lives of local people.

在保护优先的前提下，我市着力变生态优势为经济优势，积极探索把东江湖绿水青山转化为群众“金山银山”实践新路径。一是做好结合文章扶持湖内优势产业。在项目设计时，立足保护功能，同步考虑环境美化和产业发展等功能元素，并做好培训及相关配套建设，现东江湖生态旅游、东江湖特色农业等品牌叫响全国，成为当地群众增收主要渠道。二是利用特有资源湖外大力发展新兴产业。如充分利用出湖冷水资源发展了东江湖大数据产业园，依托东江湖优质水资源在下游建设了罗围食品工业园等，这些产业富民强市，正成长为资兴市支柱产业和群众致富新门路。现在的资兴市，山更青、水更绿，百姓更安康！

Loan 3400-PRC: Shandong Groundwater Protection Project

山东地下水漏斗区域综合治理示范项目

A. Background
项目背景

Shandong Province is water scarce, with one-sixth per-capita supply compared to the national average. With the rapid development of the economy and society, the demand for water resources is sharply increasing. A large number of cone-depression areas has appeared in Shandong province due to the long-term excessive extraction of groundwater. As of 1 July 2016, the total cone depression area in Shandong Province was 14,529 km^2. The Weifang-Zibo area is the largest cone depression area in Shandong and the second largest in the People's Republic of China (PRC), with an over-extracted area of 5,422 km^2, and a depth reaching 34.48 m. This area is also an important grain and vegetable producing area. In recent years, environmental damage has caused land subsidence, drying up of wetlands, intrusion of seawater and groundwater pollution, which have serious consequences for the environment and people's health and livelihoods.

山东省属于水资源短缺地区，人均水资源量是全国的六分之一。随着经济社会的快速发展，对水资源的需求量越来越大，长期大量超采地下水造成山东省出现大量漏斗区域，截至2016年7月1日，总面积为14,529平方公里。潍坊—淄博地区是山东省重要粮食、蔬菜产地，超采区面积达5,422平方公里，中心埋深达34.48米，是山东省最大、全国第二大地下水超采区。近年来，超采区内环境地质灾害及生态环境破坏现象频发，造成地面沉降、湿地干涸、海咸水入侵、地下水污染加重，对当地水生态环境、人民生产生活带来了严重危害。

Shandong is a demonstration province for modern water-resources management, and is recognized as a national pioneer in areas such as the implementation of strict water-resources

management, the “three red lines” system for promoting water-conservancy practices, as well as limiting and forbidding groundwater extraction, and other measures to rehabilitate and control cone depression areas. Due to lack of experience in cone depression rehabilitation in the PRC, Shandong applied for a loan from ADB for comprehensive rehabilitation of cone depression areas, as well as water environmental restoration, to further improve its standards of integrated groundwater management, providing a groundwater and water-resources demonstration for the country.

山东省是现代水利示范省，各项水利工作走在全国前列，实施最严格水资源管理制度，采取划定“三条红线”、大力推行节水、压采限采地下水等措施治理漏斗区并取得一定效果。申请利用亚行贷款，是由于漏斗区综合整治及水环境修复没有现成经验可循，利用亚行贷款，引进国际先进技术、治理模式和管理经验，进一步提高山东省地下水超采区综合治理建设与管理水平，为我国地下水漏斗区综合治理提供创新模式。

The project intends to prevent further deterioration of the groundwater in the Weifang–Zibo area, with the aim of improving groundwater protection in a sustainable manner. The project aims to serve as a model of varied integrated approaches to environmental rehabilitation and improved management of overexploited groundwater areas. The project promotes the integration of innovative demonstration activities such as (i) groundwater replenishment through water harvesting and storage in smart greenhouses; (ii) demonstration of comprehensive water-management information systems; and (iii) capacity development in water-resources management, including water-resource policy and regulation, water pricing, and water markets.

项目的预期目标是保障潍坊—淄博地区的地下水不再持续恶化，预期成果是提高该地区地下水资源的保护水平与可持续利用。该项目将为综合治理地下水超采和环境修复提供示范性的方法，促进以下几个方面的综合创新示范措施：(i) 建设智能大棚进行雨水收集、储存及地下水回补；(ii) 建立综合的水资源管理信息系统（MIS）；(iii) 水资源管理的能力发展，包括水资源政策与法规，水价改革和水权市场等。

The Loan Agreement and Project Agreement were signed on 13 September 2016, and the loan became effective on 10 January 2017. Project construction is planned to be completed on 31 December 2021. Total cost of the project is estimated at $344 million, of which ADB financing accounted for $150 million. The project scope comprises:

该项目于2016年9月13日签订了贷款协议与项目协议，2017年1月10日生效，计划2021年12月31日完工。项目总计划投资3.44亿美元，其中利用亚行贷款1.5亿美元。项目内容包括：

Output 1: Groundwater replenishment and conservation. Output 1 will support the introduction of groundwater replenishment technologies in the project area to increase shallow groundwater replenishment and reduce the use of deep groundwater. Output 1 will have two components: (i) rehabilitation and construction of about 880 hectares of wetland areas, including canals, which will contribute to the replenishment of shallow groundwater resources; and (ii) technological innovation for monitoring shallow groundwater replenishment in Huantai County.

产出1：地下水补源与保护。支持引进地下水补源技术提高浅层地下水补源和置换，减少深层地下水的使用。有两项内容：（1）880公顷湿地修复，包括修建沟渠用于浅层地下水补源；（2）桓台县监测浅层地下水补源的技术创新。

Output 2: Optimal allocation and monitoring of surface water. Output 2 will improve water allocation and monitoring to increase water availability in water-scarce parts of the project area and indirectly reduce the pressure on groundwater resources. The output will have three components: (i) improvement of surface-water allocation, (ii) retention of storm water, and (iii) establishment of hydrological facilities in Changle County.

产出2：地表水优化配置与监测。将通过地表水的配置和监测，提高项目区缺水区域的供水量，从而间接减少地下水开采量。有三项内容：（1）地表水优化配置；（2）雨洪水拦蓄；（3）昌乐县水文设施。通过优化水资源配置减少地下水开采。

Output 3: Development of water-resources management capabilities. Output 3 will have two components: (i) institutional strengthening of ADB's project management procedures and policy development support, and (ii) project management.

产出3：水资源管理能力发展。产出3包括两项内容：（1）水资源管理能力提高和政策发展支持；（2）项目管理。

Zhulong East River in Huantai County after rehabilitation
桓台东潴龙河治理现状

B. Project Team and Coordination
项目团队和协作方面的亮点介绍

Timely formation of strong project coordination and implementation agencies. Sound institutions are the organizational guarantee for smooth implementation of a project. At the very start, Shandong Provincial Government established a Comprehensive Project Management Office (CPMO) with related provincial departments as members. These included Development and Reform Commission, Finance Department, Water Resources Department, Land Resources Department, and Environmental Protection Department, as well as the municipal governments of Weifang and Zibo. The CPMO is responsible for general coordination and macro-management of the project. Each project county and city government also established corresponding coordination teams and project offices. All teams and project offices have their own clear responsibilities, while cooperating each other as a comprehensive team.

及时组建强有力的项目协调和执行机构。健全的机构是项目顺利实施的组织保障。项目启动之初，山东省政府成立了以发改、财政、水利、国土、环境等省直部门及潍坊市、淄博市水利部门为成员的联合管理办公室，负责项目总协调，具体负责项目的宏观管理工作。各项目县（市）政府也成立相应的协调机构和项目办。上下级部门间既各有分工，又相互配合，形成整体合力。

The provincial Development and Reform Commission, and the Department of Land, Resources, and Environmental Protection provided timely responses and approvals for the preparation work, such as feasibility studies and project fund management reports, which shortened the time spent on project preparation significantly. The Provincial Finance Department provided strong guidance and support for loan commitment guarantees, re-lending and on-lending, establishment of an advance account, funds management, and provision of counterpart funds, ensuring rapid and standardized implementation of the project loan procedures. The Provincial Water Resources Department and agencies at the county and city level established professional teams that are familiar with water-resources management and experienced in the management of foreign funds financed projects.

省发改委、省国土厅、省环保厅在项目立项、可研、项目资金管理报告等前期工作方面，快速响应、及时批复，大大缩短了前期工作的周期；省财政厅在贷款承诺担保、逐级转贷、财务评审、专用账户开设、资金使用管理、配套资金落实、提款报账、财务培训等方面给予了强有力的指导和支持，保证了项目贷款程序的快速落实、财务管理的规范化及项目的顺利实施；省水利厅及市县水利部门有一支既熟悉水利专业，又有外资项目管理经验的技术队伍，在推进开展工程建设与管理方面具有较强的优势。

Effective collaboration with ADB project team. Close cooperation between the government and ADB has been critical for the successful implementation of the project. During project preparation, negotiation, and implementation, the two sides conducted close and effective coordination based on the principles of sincerity, friendship, consistent goals, mutual understanding and mutual support, and the project has been progressing smoothly. ADB project team leader, with a consulting team to facilitate communication, has impressed the PRC participants with

professionalism, coordinated ability and a rigorous work style. Close cooperation has been an important contributing factor in promoting project implementation and ensuring the quality of project construction.

中方与亚行合作卓有成效。中方与亚行密切合作是保证项目成功实施的基础。中方成立了精干高效的执行团队，亚行派出了优秀的项目经理。在项目前期准备、谈判立项、实施管理等各个阶段，双方本着坦诚友好、目标一致、相互理解和相互支持的原则，进行了富有成效的密切协作，项目进展一直比较顺利。亚行项目经理带领的项目团队作为双方密切合作的桥梁，工作耐心细致、善于沟通，他们的专业水平、协调能力以及严谨的工作作风，都给中方人员留下了深刻的印象，在推进项目顺利实施、保证项目建设质量等方面作出了重要贡献。

Early recruitment of a high-level, professional consulting team. The earlier consulting experts became involved in the project, the better for its smooth implementation. After loan negotiation in April 2016, the PMO immediately formulated the consultants' Term of Reference and commenced recruitment of the consulting team. In a relatively short period of time, the main advisory experts and institutions completed the recruitment work. Until December 2016, consultants and firms were recruited progressively for project management, overseeing resettlement, environmental issues, external resettlement monitoring, water-policy research (international consultants), and smart greenhouse research (international consultants). After the loan agreement came into effect, the water-policy research consultant team was recruited in July 2017 and started to carry out studies. Meanwhile, the PMO provided convenient office conditions and transportation services for the consultant team to ensure smooth implementation.

及早选聘高水平的专业咨询团队。咨询专家介入工作越早，对项目顺利实施越有利。2016年4月协议正式谈判后，省项目办立即制订了咨询工作大纲，启动了咨询团队的选聘工作。在较短的时间内，完成了主要咨询专家和机构的选聘工作。至2016年12月，先后选聘的项目管理、移民和环境方面的国际专家、外部移民监测咨询单位、水政策研究国际专家、智能大棚水资源国际专家投入工作；协议生效后，于2017年7月，完成水政策研究机构选聘并正式开展研究工作。同时，省项目办为保证专家顺利开展工作，及时为专家提供办公、交通等便利条件及协调服务。

C. Project Management Highlights
项目管理方面的亮点介绍

Strengthen project management training and improve project execution capacity. Due to the lack of experience of implementation agencies in ADB project management, the PMO elaborated the loan agreement, project agreement, and project administration manual to all implementation agencies after the loan negotiation. Before the loan signing, the PMO compiled and distributed the domestic and standard ADB documents commonly used in IFI-funded projects to all IAs. In late August 2016, the PMO organized a comprehensive training workshop, covering project management, policy safeguards, financial management, procurement procedures, and basic construction procedures. More than 80 representatives from the IAs at all levels participated in the workshop and familiarized the gaps between ADB and domestic procedures, which ensured smooth

implementation of the project. During the implementation of the project, training on safeguards policies, such as resettlement and environment, were conducted on a regular basis, which helped timely resolve safeguards issues during implementation.

加强项目管理培训，提高项目执行能力。针对基层项目实施单位执行亚行项目经验不足，项目谈判后，省项目办及时向项目区解读了贷款协议、项目协议、项目管理手册。项目法律文件正式签署前，印发了外资项目管理国内及亚行常用规范性文件汇编。2016年8月底，组织项目各级财政、项目管理人员、实施支持机构等人员80余人的综合业务培训，开展项目管理、保障政策、财务管理、招标采购、基本建设程序等相关业务培训，使基层项目实施单位熟悉亚行和国内程序如何衔接，保证了项目的顺利实施。项目实施期间，每年定期开展移民和环境等安全保障政策培训，结合项目实施进展，及时解决各子项目在安全保障方面的疑问和难题。

Develop a feasible procurement plan and conduct procurement in advance. Making full use of ADB retroactive financing policy, while also meeting the government timeframe to promote flood-rain reutilization, the PMO formulated a feasible procurement plan that included six contract packages to be procured in advance. From October 2015, all six contract packages were procured following the plan, which ensured the project completion on time.

合理制订采购计划，提前进行招标采购。充分利用亚行项目提前采购政策，在满足政府推进雨洪水资源化建设期及地方相关项目建设时间要求的同时，还要满足亚行项目追溯期的

Wu River in Huantai County after rehabilitation
桓台乌河一期治理效果

规定，经与亚行充分协商，合理制订包含六个合同包的提前采购计划。从2015年10月开始，在追溯期内完成了大部分提前采购的合同招标工作并开始实施，为工程按期完成并提前发挥效益奠定坚实基础。

Enhance quality and progress controls to accelerate project construction. Every project construction unit strictly followed the requirement of establishing the project legal person responsibility system. The PMO actively monitored project implementation progress, supervised quality control measures, and regularly visited the project sites, which ensured the project implementation progress, construction quality, and safeguards compliance as primary project objectives.

加强质量进度控制，加快推进工程建设。各项目建设严格执行项目法人制、工程监理制、招标投标制、合同管理制管理。实行进度督导、质量监督、现场检查等制度，将项目建设的质量、进度、环境管理和安全生产作为项目实施的首要目标常抓不懈，有效地保障了项目工程建设质量。

Improve the documentation and records management system to achieve standardized management of archives. The archives management system was established with clear responsibilities. The management regulations were formulated with sufficient staffing. From project application to completion, to operation, clear requirements, standard procedures for all aspects of file management were established. The formation, accumulation, sorting, filing, transfer, and management of project documents meet standard norms in terms of being complete, accurate, standardized, systematic, and secure.

健全档案管理制度，实现档案规范化管理。建立了档案管理体系，明确了档案管理职责，制定了档案管理制度，配备了档案管理人员与设备。从工程申报到竣工验收和运行管理等各个环节的档案管理均有明确的要求、标准和程序，项目文档资料形成、积累、整理、立卷、移交和管理基本达到了齐全、完整、准确、规范、系统、安全的标准。

D. Social, Economic, and Environmental Benefits
项目的社会、经济、环境效益介绍

The completed works have already brought initial benefits. During the two big floods in 2018, the completed works survived the floods and played important roles in flood discharge. Notable benefits stem from the expansion project of Nanzhai Reservoir in Changle county, the connecting project of Xiashan Reservoir to Chengbei Reservoir in Gaomi City, and the water management project in Huantai County. Nanzhai Reservoir (originally with a total storage capacity of 4.25 million m^3 and after expansion the total storage capacity was 10.36 million m^3) provides 7.5 million m^3 of flood storage from upstream, greatly reducing flood pressure on downstream channels and protecting life and property safety in the reservoir area and for downstream residents. In recent years, Gaomi City has experienced continuous droughts. The connecting project between Xiashan Reservoir and Chengbei Reservoir was a timely corrective. According to calculations, water-supply capacity has reached the design standard. From 2017 until now, surface-water diversion has reached a capacity of 35.46 million m^3, addressing rural–urban drinking-water security in Gaomi City. Zibo City is meteorologically defined by the fact it is higher in south and lower in north, which means the

upstream catchment area leads to frequent floods during the flooding season. Ecological measures and dredging and connecting work was undertaken for the Xiaofu River Improvement (Phase I), the Wuhe River Improvement (phases I & II), the Matahu Wetland (replenishment), the Dong Zhulong River, the Yellow River northern main canal, and the Laozi River, improving water-storage capacity and flood-discharge capacity. During the last flood season, the project played a significant role in drainage, offering initial optimization of water resources, with improved ecological and environmental functions. In addition, three-reservoir connecting works have been put into trial operations, with a total of 3 million m^3 of surface water diverted to the Yinmi canal.

已建项目发挥初步效益。在2018年汛期两场台风大水中，已建工程多数经受住了考验。效益较为突出的是昌乐县南寨水库扩建工程、高密市峡山水库—城北水库连通工程和桓台县水系治理工程。南寨水库（原总库容425万立方米，扩建后总库容1,036万立方米）共接蓄上游洪水750万立方米，极大的减少了下游河道行洪压力，保护了库区及下游居民的生命和财产安全。高密市近几年连续大干旱，峡山水库—城北水库连通工程完成后及时投入使用，经测算，供水能力达到设计标准，2017至今共引调地表水3,546万立方米，解决了高密市近几年城乡饮水安全问题。淄博市南高北低的地形地貌特征导致桓台县成为上游主要的汇水、集水区域，汛期经常发生洪涝灾害，孝妇河一期、乌河（一期、二期）、马踏湖湿地补水、东潴龙河、引黄北干渠、涝淄河等河道通过清淤、连通、生态等措施，提高了河道的槽蓄能力和行洪能力，在去年汛期中发挥了显著的排涝作用，初步具备水资源优化配置作用，改善了水生态环境。另外，青州市三库串联工程已试通水，效果良好，引弥干渠已引调地表水300万立方米。

The construction of the demonstration area is expected to effectively reduce groundwater exploitation and increase the replenishment of groundwater. By 2023, the project aims to achieve the goal of rehabilitating the groundwater table in the 1,200 km^2 of groundwater depression cone.

通过示范区工程建设，预期有效减少地下水开采量，增加地下水入渗补给，至2023年争取实现项目区1,200平方公里漏斗区地下水位有所回升。

Through construction of the demonstration area, joint scheduling and scientific allocation of various water systems and water sources in the depression cone area will provide sufficient water supply, fully impede the accumulation of rain and flooding, and reduce groundwater exploitation. The demonstration will also store flood waters as a water resource, reducing groundwater exploitation. The project supports adjusting water allocation during both the drought and flood seasons, providing complementary resources, solving the problem of water shortages, and improving flood control and drought relief capacity. The annual increase of rain and flood water is 63.09 million m^3, and the annual increase of water supply is 52.09 million m^3. Moreover, 13,300 *mu* (around 887 ha) of wetlands has been rehabilitated, with 48.86 million m^3 of purified water supplied to rivers and wetlands.

通过示范区工程建设，对漏斗区内不同水系、多种水源进行联合调度、科学配置，为漏斗区提供充足水资源供应，充分拦蓄雨洪水资源，减少漏斗区内地下水开采量，丰枯调剂、余缺互补，统筹解决项目区水资源短缺问题，提高防洪抗旱减灾能力。年新增雨洪水利用

量6,309万立方米，年增加供水量5,209万立方米，湿地修复1.33万亩，河道及湿地净化水量4,886万立方米。

Through construction of the demonstration area, major river channels and their tributaries have been brought under comprehensive control. Flood-control standards for general rivers are governed by the principle of once-in-20-year floods, for key rivers once-in-50-year floods, and for key river sections once-in-100-year floods—or more. Flood-control capacity has improved in waterlogging areas of 320,000 *mu* (around 21,333 ha) and irrigation areas of 218,000 *mu* (around 14,533 ha), effectively alleviating potential disasters and improving the capacity of water conservancy projects in the project area. Through comprehensive treatment of the cone depression area, a secondary disaster threat in the area has been effectively alleviated, providing a safe and reliable guarantee for local livelihoods and industrial and agricultural production.

通过示范区工程建设，骨干河道及其重要支流均进行了综合治理。一般河流的防洪标准达到20年一遇，重点河流达到50年一遇，重点河段达到100年一遇或者更高标准。改善防洪除涝面积32万亩、灌溉面积21.8万亩，有效提高了项目区水利工程的防洪、减灾能力，通过对漏斗区的综合治理，有效缓解漏斗区的次生灾害威胁，为当地人民群众生活和工农业生产提供安全可靠保障。

E. Innovation Features
项目创新

Water-resource policy research. The project conducted pilot studies on water-rights policy development, including introduction of innovative water management practices and regional water rights market-trading experiments. The pilot study established a very strict pilot water-resources management system throughout the project area, undertaking policy research on setting water quotas, determining water rights, water-rights trading, water price reforms, water-resources allocation, legislation, water user associations, and management with an emphasis on agricultural water conservation. The policy study created new policy recommendations for improving integrated and sustainable management of water resources in the region.

水资源政策研究。进行水权政策开发试点研究，包括引进创新性水资源管理实践和区域性水权交易市场试验。试点研究将在整个项目区建立最严格的试点水资源管理系统，范围包括水定额设置的政策研究、水权确定、水权交易、水价改革、水资源配置、立法、用水者协会与管理等，重点是农业节约用水。政策研究将为改善地区综合性水资源可持续管理创建新的政策建议。

Smart IC card promotion project. Huantai County was selected as a pilot area for an upgraded IC card system and for introducing a control demand management system for agricultural water management. The IC card system will include an IC card operational system, data transmission systems, and central data units. The central data unit, combined with the management information system, will record the water table to monitor impacts. Substantial parts of the system will be supplemented by water-user registration rules, the identification of water quotas, and the cost of using groundwater. Users of wells will be integrated into water-user associations to facilitate joint management and improve water rights and water management.

智能IC卡提升项目。在桓台县选取示范区试点升级IC卡系统，引入农业用水管理的控制需求管理。IC卡控制需求系统将包括IC卡运行井、数据传输系统和中央数据单元。其中中央数据单元将结合MIS系统，记录地下水位以监测影响，还将分析不同用水村民的用水数据。对系统的实质部分将补充用水者注册规则、用水定额的识别和使用地下水的费用等内容。使用水井的用户将被统一纳入用水者协会，以方便联合管理，并改善水权状况提高水资源管理水平。

Smart greenhouse rainwater-harvesting demonstration. The Shouguang City sub-project introduced advanced domestic and foreign technology for smart greenhouse-rainwater harvesting. In conjunction with corresponding techniques for water and fertilizer integration, as well as soil-moisture monitoring, the pilot rainwater harvesting, and storage recycling can help reduce the use of groundwater. It is expected to make the project a water-saving model that can be replicated for the greenhouse industry in the future.

智能大棚雨水收集示范项目。在寿光市引进国内外先进技术，开展智能大棚雨水收集试点，配合相应的水肥一体化、风光互补、墒情监测等内容，试点利用雨水收集储存回用，减少地下水的使用，争取成为大棚产业未来在节约用水方面的样板，总结经验并逐步进行推广。

F. Good Experience in Project Implementation
成功经验总结

The friendly cooperation between Shandong Province and ADB is the basis for the successful implementation of the project. The successful implementation of a project requires close communication, mutual understanding and support, and consensus at each stage, each link and on each item. Since the preparation of the project, Shandong has seen fruitful collaboration with ADB, ensuring smooth implementation of the project.

中方与亚行友好合作是项目成功实施的基础。一个项目的成功实施，都需要双方密切地交流与沟通，互相理解和支持，并在每个阶段、各个环节、逐项内容上达成共识。自本项目立项以来，中方与亚行进行了卓有成效的合作，确保了项目的顺利实施。

An efficient management organization and coordination mechanism were key to the successful implementation of the project. The government at all levels attached great importance to the project and established project leading group and project implementing agencies in a timely manner. The relevant departments have clear responsibilities and have cooperated closely, forming a unified team. ADB paid close attention to the project and assigned excellent project team and experts to guide and supervise the project throughout its entire process, providing a strong organizational guarantee for smooth implementation.

高效的管理组织与协调机制是项目成功实施的关键。各级政府对本项目高度重视，分别及时组建了项目领导小组和项目执行机构，相关职能部门之间分工明确、密切配合、形成合力。亚行对该项目高度关注，派出了优秀的项目经理和专家，全过程对该项目指导、监督，为项目的顺利实施提供了强有力的组织保障。

Strict project management guaranteed successful implementation of the project.

Firstly, intensive training facilitated project personnel understanding of ADB policies and relevant domestic policies, regulations, and requirements, improving the implementation capacity of project personnel at all levels. Secondly, strict management of finance, procurement, as well as engineering and construction, was helpful in terms of carrying out ADB policies and the relevant domestic provisions to the designed standard, as well as supervision of progress and quality, and of the construction site, ensuring effective implementation in a timely manner.

严格的项目管理是项目成功实施的保障。首先加强培训，通过培训使用项目执行人员充分了解亚行和国内相关政策、规定和要求，提高各级项目单位人员的执行能力；其次严格管理，项目实施过程中，在项目管理、财务管理、招标采购、工程建设等方面严格执行亚行政策并与国内有关规定做好衔接，做到规范管理，实行进度督导、质量监督、现场检查等形式，确保了项目顺利实施并及时发挥效益。

Energy
能源

Loan 3308-PRC: Chemical Industry Energy Efficiency and Emission Reduction Project

化工行业节能减排项目

A. Background
项目概况

On 30 October 2015, Asian Development Bank (ADB) approved a $150 million loan to support ChemChina's energy efficiency and emission reduction project. The loan agreement was signed on 29 January 2016 and became effective on 14 June 2016. This project is expected to be completed on 28 February 2021 and the loan will be closed on 31 August 2021.

2015年10月30日，亚行批准1.5亿美元贷款以支持中国化工集团节能减排项目。贷款协议于2016年1月29日签署，2016年6月14日生效。该项目预计将于2021年2月28日完工，贷款将于2021年8月31日关账。

The project will significantly enhance the environmental sustainability of the PRC's chemical industry. It will reduce energy intensity and emissions from polyvinyl chloride (PVC) and organic fluoride production at ChemChina. It is expected that by 2022, 70% of ChemChina's PVC will use mercury-free, new technology (2013 baseline: 0%). Fluoroform (HCF-23) emissions from ChemChina's production of fluoropolymer will be reduced to 0% (2013 baseline: 85%). And a revolving escrow fund (REF) will reinvest at least an additional $100 million in the second batch of ChemChina subprojects (2015 baseline: none). The outputs of the project will be (i) more efficient and less hazardous PVC production using mercury-free, new technology at the Dezhou Shihua Chemical Company (DSC) plant, and (ii) technical renovation of the organic fluoride production system for energy conservation and emission reduction implemented at the Chenguang Research Institute of Chemical Industry (CGY) to reduce greenhouse gas (GHG) emissions.

The main VCM unit of DSC under renovation using mercury-free new technology
德州实华无汞新工艺改造VCM主装置

该项目将对中国化工行业环境的可持续发展产生很大影响。(a) 将大幅降低中国化工聚氯乙烯(PVC)和有机氟生产能耗和废物排放，预计到2022年，中国化工70%的PVC生产将使用无汞新工艺技术(2013年基线：0%)；(b) 中国化工生产有机氟聚合物副产物(HCF-23)排放量减少至0% (2013年基线：85%)；(c) 周转托管基金(REF)在第二批化工行业节能减排子项目中至少再投资1亿美元(2015年基线：没有)。该项目产出将是 (i) 德州实华使用效率更高、危害更小的无汞新工艺技术生产PVC；(ii) 在晨光院实施有机氟生产系统节能减排技术改造项目，减少温室气体排放。

The project consists of DSC and CGY subprojects. The total investment is estimated at $207.98 million, of which $100 million is ADB loan. The CGY subproject comprises (i) plasma cracking furnaces with an annual treatment capacity of 1,000 tons of HFC-23—commissioned in December 2015, built in place in August 2015 and put into operation in May 2016; (ii) energy efficiency optimization and renovation for organic fluorine production—bid-based procurement and construction completed in 2019—and (iii) renovation of the fluoropolymer drying system by continuous microwave, which is expected to be completed in 2019. The DSC subproject consists of (i) the energy-efficient renovation of 200,000 t/a vinyl-chloride monomer (VCM) production chain using mercury-free, new technology (Phase 1), (ii) 200,000 t/a PVC production chain (Phase 2), and (iii) a 200,000 t/a VCM production chain using mercury-free, new technology.

该项目由德州实华化工有限公司和中昊晨光化工研究院有限公司子项目组成。总投资估算为2.0798亿美元,其中亚行贷款为1亿美元。晨光院子项目包括以下: (i)等离子体裂解装置，处理HFC-23能力为年产1,000吨，2015年8月建成，12月开车,2016年5月投入运行; (ii) 有机氟生产能效优化和改造: 2019年完成招标采购和施工; (iii) 含氟聚合物干燥系统改造，新技术采用微波连续干燥技术，预计2019年完成完工。德州实华子项目建设 (i) 年产200,000吨氯乙烯单体(VCM)节能改造,采用无汞新工艺技术(阶段1)；(ii) 年产200,000吨聚氯乙烯装置(阶段2), 和 (iii) 年产200,000吨VCM装置，同样采用无汞新工艺技术。

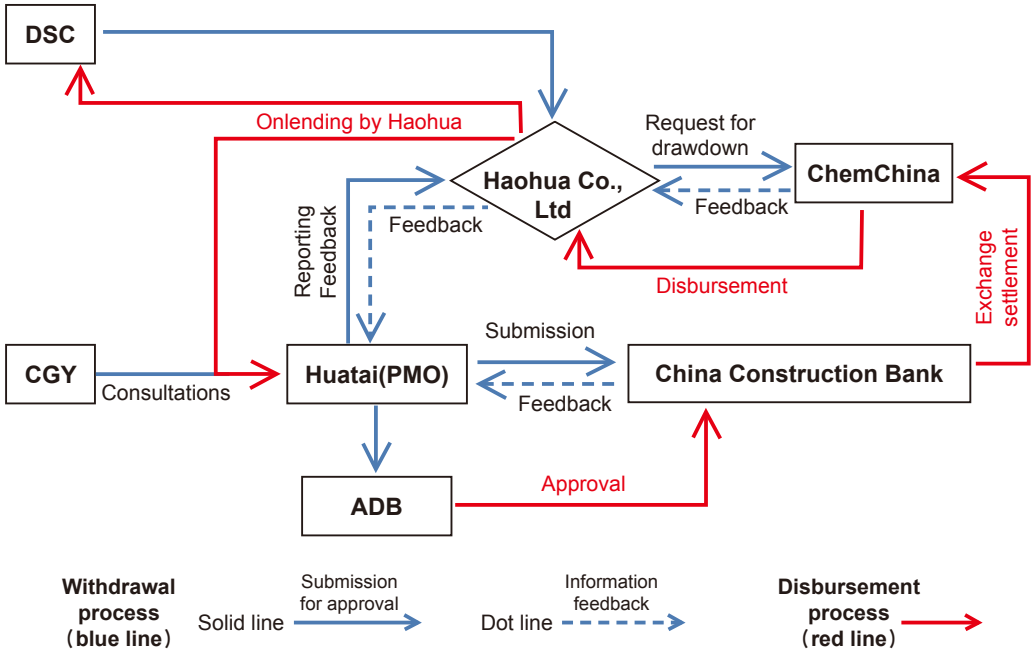
Since the loan agreement took effect, the project has proceeded smoothly. As of 31 June 2019, the accumulated contract awards and disbursements were $100 million (100% of the total loan) and $45 million (45% of the total loan) respectively. It is expected that the project will be completed before closing in 2021 and that the expected output and objectives of the project will be achieved.

自贷款协议生效以来，项目进展顺利，截至2019年6月31日，累计合同金额和支付金额分别为1亿美元(贷款总额的100%)和4,500万美元(贷款总额的45%)。已预计2021年关账前能够完成工程建设，可以实现项目设计的预期产出和目标。

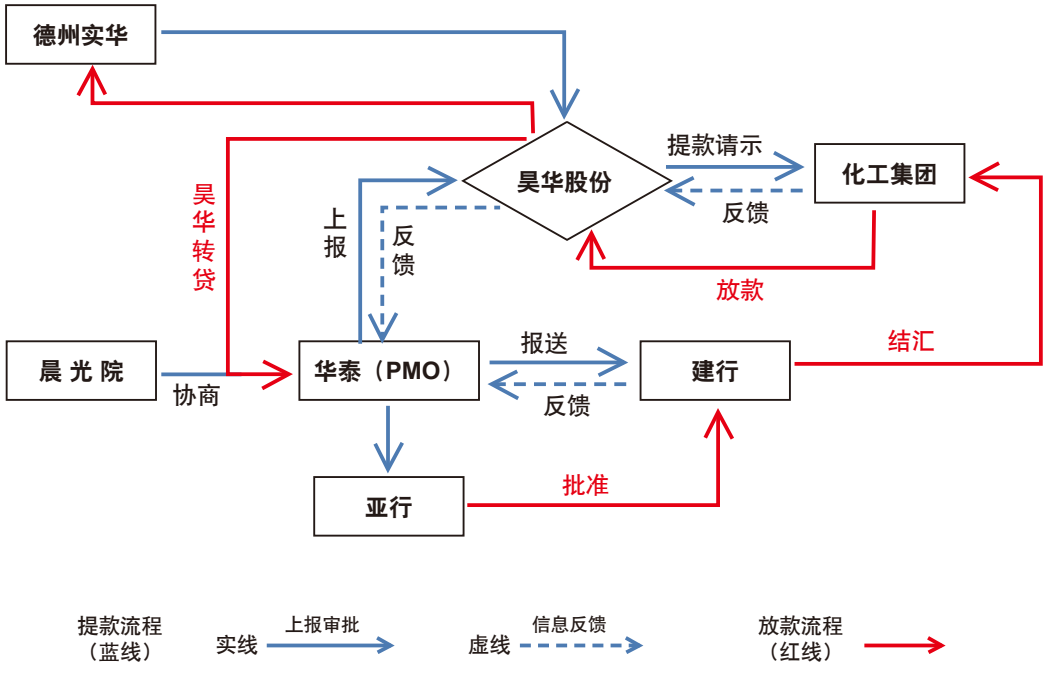
B. Funds approval management
资金审批管理

The project loan was on-lent by the Ministry of Finance (MOF) through a financial intermediary (China Construction Bank, CCB) to ChemChina, which in turn issued the funds to China Haohua in the form of an entrusted loan after exchange settlement at the current USD–CNY exchange rate, and in turn issuing the funds to the beneficiaries of DSC and Energy Services Company (Zhonghao Huatai) in the form of entrusted loan according to the ADB's disbursement requirements. Due to the fact that the loan disbursement approval process is lengthy and wide-ranging, involving numerous critical points and complexities, the project management office drew up a funds approval and collaboration process chart in order to increase efficiency and ensure proper management in order that, in the event of activities that allow for parallel approval process, they will be subject to simultaneous approval processes. For example, when requesting disbursements, DSC, Huatai and CGY may undergo the withdrawal application process at the same time and the nodes are converged at Haohua, thus reducing the time required for approval. In another example, when Haohua files a withdrawal request to ChemChina, CCB can conduct a parallel withdrawal request procedure. Moreover, the responsibility for managing the nodes of the approval process is assigned to individuals in organizations and departments to ensure adequate tracing and tracking in the interests of rigorous fund management.

本项目是财政部将亚行资金通过金融中介机构（中国建设银行）转贷给中国化工集团，化工集团按美元汇率结汇后以委贷形式发放给中国昊华股份公司，昊华股份再以委贷的形式按照亚行放款要求发放给用款的德州实华和能源服务公司(中昊华泰)。由于贷款发放审批流程周期长，涉及面广，关键点多，实际情况复杂，为提高效率，做好管理，项目办绘制了资金审批与协同作业流程图，为高效率工作，可以并行审批的环节同时走审批流程，如提款申报时，德州实华、华泰、晨光院同时走申请提款流程，节点在昊华股份汇合，节约了审



Funds Approval and Collaboration Process Chart



资金审批与协同作业流程图

批时间；再如，昊华股份向化工集团提款申报时，建行也能并行走他们的并行请款程序等。并且，对管理审批节点，落实的每个单位每个部门的每个人，追踪到位，责任到人，跟踪到位，确保资金管理的严谨性。

C. Social, economic and environmental benefits of the project
项目的社会、经济和环境效益

Once the project is built in place and put into operation, it is expected that it will generate good social, economic and environmental benefits and can achieve the intended results. The technical renovation projects commissioned have already realized good social and economic benefits.

项目建成投产后，预计能产生良好的社会、经济和环境效益，可以达到立项设计的效果。投运的技改项目，已经实现了良好的社会效益和经济效益。

1. Social Benefits
社会效益

After completing and commissioning the technical renovation project of the 400,000 t/a PVC plant for energy conservation and emissions reduction using mercury-free and new technology, DSC will be able to eliminate mercury pollution in the conventional calcium carbide-based PVC production process. Eliminating mercury pollution from the process is a worldwide challenge, involving upgrades of the conventional calcium carbide-based PVC production route and employing many new energy-saving technologies. The project has been listed as a national energy conservation and emission reduction demonstration project for the chloralkaline industry and will be rolled out nationwide after completion and commissioning.

德州实华采用无汞新工艺改造年产40万吨PVC装置节能减排项目建成投产后，可以完全消除传统电石法PVC生产工艺中的汞污染，彻底解决电石法PVC产业汞污染这一世界难题，不仅实现传统电石法PVC生产路线的升级换代，还在设计中采用了很多新的节能技术，降低传统PVC生产工艺过程中的能耗。该项目被列为国家氯碱行业节能减排示范项目，建成投产后将在国内予以推广。

After the technical renovation of the organic fluoride production system for energy conservation and emissions reduction at CGY, the energy consumption of all of the company's products has been remarkably reduced, with annual energy savings of 12,389.13 tons of standard coal and an energy conservation rate of 7.5%. Meanwhile, by adding automated controls, using state-of-the-art, stable equipment and constructing an energy-control center building, the company has reduced the work intensity of its workers, enhanced employee safety and improved working conditions.

晨光院有机氟生产系统节能减排技术改造后，企业产品能耗均明显降低，年节能12,389.13吨标煤，节能率7.5%，节能效益明显；同时，通过增加自动化控制、使用先进稳定的设备及建设能控中心大楼，降低了职工劳动强度，保障了职工安全，改善了职工劳动条件。

A bird view of Dezhou Shihua Chemical Company
德州实华有限公司鸟瞰图

2. Economic Benefits
经济效益

After the DSC's project is built and put into operation, it is expected to generate additional annual sales revenue of CNY1.27 billion ($178.63 million) and profits and taxes of CNY112.58 million, with a total return on investment (ROI) of 17.95% and an internal rate of return (IRR) of 14.34% (after tax), a net present value of CNY234.19 million (after tax), an investment payback period of 7.89 years (after tax) and other significant economic benefits.

德州实华项目建成投产后，预计年增销售收入126,788万元，利税11,258万元，项目总投资收益率17.95%,财务内部收益率14.34%(税后)，财务净现值23,419万元(税后)，投资回收期7.89年(税后)，经济效益显著。

According to preliminary estimates, the technical renovation of the organic fluoride production system for energy conservation and emissions reduction at CGY will generate additional annual sales revenue of CNY41.49 million and profits and taxes of 1.51 million, with an FIRR of 24% (after tax), a net present value of CNY225.67 million (after tax), an investment payback period of 6.2 years (after tax) and a total ROI of 23.09%, representing significant economic benefits.

经初步测算，晨光院有机氟生产系统节能减排技术改造项目建成投产后，预计年增销售收入4,148.51万元，利税150.6万元，财务内部收益率24.00%(税后)，财务净现值22,567.32万元(税后)，投资回收期6.2年(税后)，项目总投资收益率23.09%，经济效益突出。

3. Environmental Benefits
环境效益

Two subprojects have been implemented strictly following national and local environmental regulations, standards and procedures, as well as ADB's environmental policies. The projects also complied with the safety and environmental measures and monitoring requirements specified by the environmental impact assessment report and the safety management plan.

在两个项目建设过程中，严格执行国家和地方政府的环境法规、标准与程序，以及亚行的安全环保政策，满足环境影响评价报告和安全管理计划规定的安全环保措施与监测要求。

The post-treatment system of the plasma cracking furnace at CGY
晨光院等离子体裂解装置后处理系统

After its 400,000 t/a PVC unit is built in place, DSC's waste gas emissions will be reduced by 42,200 normal cubic meters (nm^3) per hour and 337.60 million nm^3 per year. Wastewater (effluent) emissions will be reduced by 280.68 m^3 per hour and 2.25 million m^3 per year. Waste residue discharge will be reduced by 521,256 tons per hour (moisture content 38%) and 4.17 billion tons per year (moisture content 38%). Annual water and electricity savings will be 1.79 million tons and 8.38 million kWh respectively. The utility energy consumption per ton of PVC will be reduced by 1,465.97 kg of standard coal, resulting in standard coal savings of about 586,388 tons and an overall energy saving rate of 46.2%. CO_2 emissions will be reduced by 1.5 million t/a, SO_2 emissions by 14,074 t/a and NOx emissions by 4,105 t/a, with about 39 t/a mercury usage reduction.

德州实华40万吨PVC/年装置建成后，可减少废气42,200标准立方米/小时，每年减少废气排放33,760万标准立方米。减少废水(液)排放280.68立方米/小时，每年减少排放224.544万立方米。废渣排放减少52.1256万吨/小时(含水率38%)，每年减少排放417,004.8万吨(含水率38%)。年节水179.6万吨，年节电837.8万千瓦时。 每吨PVC的公用工程能耗降低1,465.97公斤标煤，节标煤约586,388吨，综合节能率达46.2%。减少二氧化碳排放1,524,648吨/年，二氧化硫14,074吨/年，氮氧化物4,105吨/年，降低用汞量约39吨/年。

The CGY project consists of a HFC-23 plasma cracking furnace, production system energy optimization and new fluoropolymer drying technology. The subproject 1, the HFC-23 plasma cracking furnace has been completed and commissioned. According to the China Quality Certification Center, a third-party certification agency commissioned by the National Development and Reform Commission (NDRC), as of December 2018, the newly-built plasma cracking furnaces decomposed a total of 2,414.18 tons of HFC-23, a byproduct from two production lines of 12kt/a HCFC-22 and 20kt/a HCFC-22—equivalent to a reduction of 35.73 million tons of CO_2 emissions.

晨光院项目包括HFC-23等离子体裂解装置、生产系统能量优化、含氟聚合物干燥工艺新技术三个子项目，其中子项1——HFC-23等离子体裂解装置已经完工运行，由国家发改委委托的第三方认证机构——中国质量认证中心已经完成对该项目的核查，截止到2018年12月，新建等离子体裂解炉已累计分解12千吨/年HCFC-22和20千吨/年HCFC-22两条生产线副产的HFC-23共2,414.18吨，折合减排约3,572.99万吨CO_2当量，二氧化碳减排效益显著。

Subproject 2, the production system energy optimization project, has an estimated investment of CNY40 million, with annual energy cost savings of over CNY9 million. Subproject 3, new fluoropolymer drying technology, employs three sets of continuous microwaves drying equipment and will save 3,444.79 tons of standard coal per year.

子项2——生产系统能量优化项目预计投资约4,000万元，年可节约能耗成本约900余万元。子项3——含氟聚合物干燥工艺新技术采用微波连续干燥设备3套，将年节约3,444.79吨标准煤。

D. Innovation Features 项目创新

The innovation features of this project mainly involve technical innovation, mechanism innovation and management innovation.

本项目创新主要涉及技术创新、机制创新和管理创新三方面。

1. Technical innovation 技术创新方面

(i) Developed an advanced new PVC production process using mercury-free catalytic synthesis. An industry–academia–research–design joint development team comprising DSC, Zhongke Yigong, Shanghai Advanced Research Institute of Chinese Academy of Sciences and Shanghai Huaiyi developed the "new PVC production process using mercury-free catalytic synthesis of acetylene and dichloroethane", as well as a new catalyst that replaces the mercury catalyst, eliminating the issue of mercury pollution problem that faces the PVC industry and reducing the consumption of energy and resources required to treat mercury-containing catalysts.

开发出先进的无汞催化合成PVC新工艺.德州实华与中科易工公司、中国科学院上海高等研究院、上海华谊公司组成“产学研设”的联合开发团队，合作开发了“乙炔和二氯乙烷无汞催化合成氯乙烯新工艺”，同时研究开发了替代汞触媒的新型催化剂，彻底解决氯乙烯行业面临的汞污染问题；也减少了由于处理含汞催化剂所需的能量和资源消耗。

(ii) In-house development and application of HFC-23 treatment technology using plasma cracking. The technology developed can remarkably reduce the difficulty of treating of various kinds of exhaust (smoke, acid gases, and dust, etc.) and resolve such GHG gases as HCFCs and HFCs generated in the fluorine chemical industry, with 90% of incinerated flue gas transformable into about 30% aqueous-hydrofluoric acid for sale through recycling and absorption. It is China's first industrial device to make it possible to realize cracking-enabled non-hazardous treatment of HFC-23 using homemade technologies, with two patents received—"A Method for Treatment of Organic Halides through Plasma Incineration" (Patent No: ZL200610089595.8) and "A Device and Method for Plasma Incineration of Organic Fluorine Residue" (Patent No: ZL2012101441835).

自主开发应用等离子裂解HFC-23处理技术本项目对全球大气环境带来的影响，具有重要的示范和推广价值。该技术可以大量减少尾气(烟气量、酸性气体和粉尘等)处理的难度，解决了氟化工行业生产过程中副产的HCFCs、HFCs等温室气体，90%的焚烧烟道气可通过循环吸收，转化成30%左右的有水氢氟酸外销。该装置成为国内第一家采用国产技术实现HFC-23分解无害化处理的工业性装置形成两项发明专利：《一种等离子焚烧处理有机卤化物的方法》(专利号ZL200610089595.8)《一种等离子体焚烧有机氟残液的装置和方法》(专利号ZL2012101441835）。

2. Innovation in lending modality 贷款模式创新

The loan project employed innovative energy service companies and financial intermediary loan (FIL) mechanisms, designed a loan-funds revolving process, employed an interest-differential supervision and distribution process, supported the development of energy service companies, and incentivized the project implementation agencies to better achieve the project objectives.

贷款项目采用了创新性的能源服务公司和中间信贷融资机制，设计了贷款资金循环使用机制，采用了利差监管和分配机制，支持能源

服务公司的发展，激励项目实施单位更好的完成项目目标。

The loan was onlent by the MOF to China Construction Bank, which relent it to China Haohua through ChemChina. The financial intermediary loan was chosen to allow cyclic utilization of the ADB loan through the revolving escrow fund. In the implementation of the project, support is also provided for the financial intermediary (CCB Beijing Anhui Branch) to innovate execution mechanisms. In line with the innovation model of this project, the Anhui Branch continuously optimizes its management practices through the business model of international financial organization on-lending, improving its capacities in terms of implementing energy conservation projects based on loans from international financial institutions.

该笔贷款从财政部转贷给建行，从建行通过中国化工转贷给中国昊华。选择金融中介贷款(FIL)的方式是为了允许亚行贷款通过循环托管基金对贷款资金进行循环利用。本项目实施过程中，还对中介金融机构（建行北京安慧支行）的执行机制创新提供了支持，安慧支行适应本项目的创新模式，通过国际金融组织转贷款的业务模式不断优化管理，提升了该行利用国际金融机构贷款实施节能项目的能力。

3. Management innovation
管理创新

To ensure the successful implementation of the project, Zhonghao Huatai engaged a project management company with international experience for the CGY project. A specialized team experienced in turnkey project management performs project management activities under the authority of a joint-management body comprising Zhonghao Huatai and CGY, accelerating the construction progress, reducing expenditures, ensuring the quality of project construction and preventing the occurrence of safety and environmental accidents. For example, the HFC-23 plasma cracking furnaces at CGY were successfully installed, tested and commissioned within just three months.

为保证亚行项目顺利实施，中昊华泰在晨光院项目建设过程中，引入了具有国际先进经验的项目管理公司，由具有工程建设总包管理经验的专业队伍进行项目管理，并由中昊华泰与晨光院组成联合管理机构，充分授权管理公司开展管理，加快了建设进度，减少了费用支出，保证了项目建设质量，防止安全环保事故的发生。如晨光院HFC-23等离子体裂解装置只用了不到3个月时间，就顺利完成了安装、调试及开车。

Loan 3504-PRC:

Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region China National Investment and Guaranty Corporation's Green Financing Platform Project

泛京津冀区域大气污染防治中投保投融资促进项目

A. Project Profile
项目概况

Air Quality Improvement in the Greater Beijing–Tianjin-–Hebei (BTH) Region[1]—China National Investment and Guaranty Corporation (I&G)'s Green Financing Platform (GFP) Project was approved by ADB on 12 December 2016 and became effective in August 2017, with a total amount of €458 million ($505 million equivalent) and a term of 15 years. It aims to provide better access to finance, especially for small- and medium-sized enterprises (SMEs) to scale up investments in energy saving, clean energy use, green transportation, waste recovery, and pollution reduction projects.

亚行贷款“泛京津冀区域大气污染防治中投保投融资促进项目”贷款总额4.58亿欧元，期限15年，于2016年12月12日批准，2017年8月正式实施，为位于京津冀及山东、山西、河南、内蒙

[1] Greater BTH region comprises of Beijing, Tianjin, Hebei Province, Henan Province, Shandong Province, Shanxi Province, Liaoning Province and Inner Mongolia Autonomous Region.

古、辽宁8省市的节能减排、清洁能源使用、绿色交通、废弃物能源化利用等项目提供金融服务。

I&G, a holding subsidiary of the State Development & Investment Corporation (SDIC). It acts as the executing and implementing agency of the GFP project, which uses the financial intermediation loan modality to establish a green financing platform, through which various financial instruments can be introduced and applied to mobilize domestic financing and scale up investment into air-quality improvements in the greater BTH region.

本项目由国家开发投资公司控股子公司—中国投融资担保股份有限公司（简称“中投保”）作为执行机构，通过金融机构转贷形式建立绿色金融平台，利用多种金融工具扩大全社会的资金投入，促进大京津冀地区空气质量的改善。

It is estimated that the GFP Project will leverage more than €3.6 billion ($3.9 billion) of social capital investment and reduce coal consumption by 40.2 million tons, contributing to the reduction in CO_2 emissions by 27.33 million tons, SO_2 emissions by 510,000 tons, PM emissions by 780,000 tons, and NO_X emissions 360,000 tons.

本项目预计将带动社会总投资36亿多欧元，约达270亿元人民币，有望降低标煤消耗约4,020万吨，相应减少二氧化碳排放约2,733万吨，二氧化硫51万吨，烟尘78万吨，氮氧化物36万吨，为降低京津冀区域的空气污染和提升空气质量做出贡献。

B. Project Progress
项目实施情况

By the end of 2018, the GFP project has invested CNY1.77 billion ($251.45 million) in entrusted loans to finance 30 qualified subprojects—including nine SMEs—leveraging a total investment of CNY 6.3 billion ($884.9 million). In terms of regional distribution, five subprojects have been implemented in Beijing, Hebei, and Henan, respectively; one in Tianjin, Liaoning, and Inner Mongolia, respectively; and 12 in Shandong. After completion, these subprojects are expected to reduce annual coal consumption by approximately 1.12 million tons, resulting in annual emissions reductions of CO_2 by 2 million tons, SO_2 by 28,000 tons, PM by 73,800 tons, and NO_X by 6,488 tons. In addition, a guaranty subproject was approved to provide guaranty service amounting to CNY 584 million ($83 million) to help the enterprise raise funds for the implementation of two qualified subprojects.

截至2018年底，已对30个合格子项目(包括9个中小企业)发放委托贷款17.7亿元，带动社会总投资约63.02亿元；从地域分布看，子项目所在地位于北京5个，天津1个，河北5个，山东12个，河南5个，辽宁1个，内蒙古1个。这些项目建成投产后预计将每年减少煤炭使用约112.67万吨，相应减排二氧化碳208.06万吨、二氧化硫2.8万吨、烟尘等颗粒物7.38万吨，以及氮氧化物6,488吨。另外，本项目还审批通过了一个担保项目，担保金额5.84亿元，将帮助企业募集资金用于实施两个子项目。

For project promotion and capacity enhancement, seven trainings were delivered by ADB and I&G on energy-saving and emission-reduction technologies,

environmental safeguards, financial assessment, and post-loan management, with over 300 participants (including more than 120 participants from SMEs)

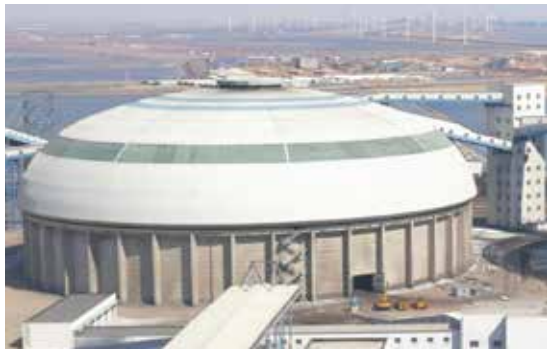
项目推广和能力建设方面，先后举办了7期能效管理及环境和社会影响评价培训班，约有300多人（120多位来自中小企业）获得了节能减排技术、环境影响评估、财务评价、贷后管理等方面的培训。

C. Typical Subprojects
典型子项目介绍

1. Construction of Enclosed Round Coal Yard of SDIC Beijiang
国投北疆露天煤场封闭改造项目

The SDIC Beijiang Power Plant lies in the Tianjin Binhai New Area. As a national demonstration project for circular economy, and one of the most advanced thermal-power plants in China, it is equipped with 4×1,000 MW ultra-supercritical coal-fired units. The early-built coal storage yard was open with a strip shape, which had caused dust pollution. At the end of 2017, the GFP project invested CNY220 million ($31 million) to construct two enclosed round coal yards (diameter of 120 m) with supplementary facilities such as coal-belt conveyors. Once the construction is completed, raw coal will be loaded, unloaded, and transported within the enclosed space, resulting in an annual reduction of PM emissions of 2,452 tons and significant improvement in local air quality.

国投北疆电厂位于天津市滨海新区，是中国循环经济示范单位，也是国内目前技术设备最先进的火电厂之一，装有4×1,000MW超临界燃煤机组。其早期建设的堆煤场为露天条形煤场，容易形成扬尘污染。2017年底，本项目对其发放贷款2.2亿元，支持其在原址上建设2座直径120米的圆形封闭煤场，并配建输煤栈桥等辅助设施，使原煤装卸和运输均在封闭场所内进行。该项目建成后每年可减少颗粒物排放约2,452吨，对改善周边区域的空气质量做出一定贡献。



Newly built enclosed coal storage yard in Tianjin
新建的封闭天津堆煤场

2. SDIC Tieling Biofuel Ethanol Subproject
国投铁岭生物质燃料乙醇子项目

Bioethanol fuel is a form of green and renewable energy. Its utilization is of great significance in alleviation of energy crisis and environmental protection. In October 2017, SDIC Biotech Investment Company initiated a biofuel ethanol subproject with an annual output of 300,000 tons in Tieling, Liaoning Province. The biofuel ethanol is produced from aged and rotten corns, with an annual output of 276,000 tons of distilled and soluble dried grains and 20,000 tons of corn oil as byproducts. CNY300 million ($43 million) was financed by the GFP project in July 2018. Upon completion, it will reduce annual CO_2 emissions by 250,000 tons and CO emissions by 18,000 tons. Meanwhile, it will

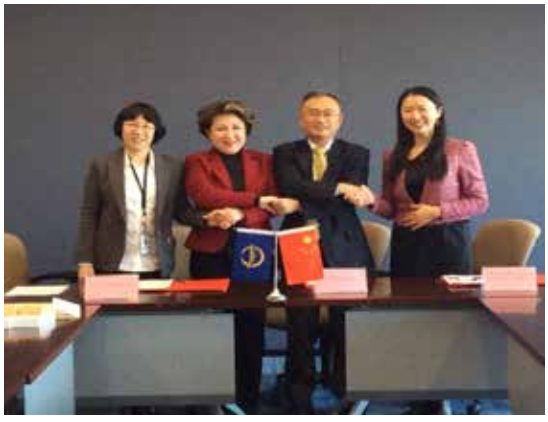
consume around 950,000 tons of aged and rotten corn each year, which will help solve associated storage problems in the local and surrounding regions, provide benefits in terms of the stability of agricultural production, and increase farmers' income.

生物质燃料乙醇是一种绿色可再生能源，其使用具有缓解能源危机和保护环境的双重意义。2017年10月，国投生物公司在辽宁省铁岭市开工建设了年产30万吨的燃料乙醇项目，以陈化玉米为原料生产燃料乙醇，副产品还包括年产酒糟蛋白饲料27.6万吨和玉米油2万吨。2018年7月，该子项目通过本项目获得贷款3亿元，建成投产后有望每年通过汽油替代减排二氧化碳约25万吨，一氧化碳约1.8万吨；同时，年可消化陈化玉米约95万吨，有利于解决当地及周边省区的陈化粮消纳问题，稳定农业生产和促进农民增收。

3. 60 MW Centralized Solar PV Power Generation and Poverty-Alleviation Subproject in Shandong Wudi
山东无棣60MW集中式光伏扶贫项目

The 60 MW centralized solar PV power station, situated in Xixiaowang Town, Wudi county of Shandong Province, was financed CNY100 million ($14 million) by means of financing leasing in the second half of 2018. It is in a less-developed rural region, covering an area of about 133.3 ha, and serves as a typical poverty-alleviation subproject, with a combination of power generation and cash crops growing under the photovoltaic modules. Through generating electricity over the land and planting crops on the land, the subproject has achieved sound economic and social benefits. It can provide

Biofuel ethanol production plant in Liaoning
辽宁铁岭燃料乙醇生产工厂



ADB, Huaxia Bank, and I&G signing memorandum of understanding for co-financing
亚行、华夏银行与中投保共同签署联合融资备忘录

financial assistance to more than 1,600 poor households with annual incomes of CNY 3,000 ($426) per household.

2018年下半年，本项目通过融资租赁公司转贷的方式，对山东省无棣县西小王镇60MW集中式光伏电站项目发放贷款1亿元。该项目属于农光互补和农村扶贫项目，项目所在地属于农村贫困地区，占地面积约133.3公顷，在地面上的光伏发电组件发电的同时，光伏组件之下种植经济作物，实现“上发电，下种植”的有机结合，取得了良好的经济和社会效益，约有1,600多户贫困户得到了帮扶，户均年帮扶资金约3,000元。

4. Elion Technology Micro-Fine Atomization Boilers
亿利科技微煤雾化锅炉建设项目

Traditional coal-fired boilers are widely used for steam supply and heating in China and their pollutant emissions result in severe air pollution. In May 2018, the GFP project granted an entrusted loan of CNY 220 million ($31 million) to Elion Technology for replacement of existing low-efficiency boilers with new energy-saving ones. The new boilers make use of micro-fine coal atomization technology to convert raw coal into fine particles, then apply aviation vortex technology to fully mix the pulverized coal with air for combustion. Compared to traditional coal-fired boilers, the micro-fine coal atomization boilers can improve combustion efficiency up to 98% and thermal efficiency to over 90%. Meanwhile, emissions of pollutants such as NO_X, CO_2 and SO_2 will also be significantly reduced.

传统的燃煤锅炉是中国供热供气系统中广泛使用的设备，但却容易造成严重的空气污染。2018年5月，该项目向亿利科技发放2.2亿元委托贷款，用于建设新的高效节能锅炉，以取代原有的低效锅炉。新锅炉采用微煤雾化工艺，将原煤转化为细颗粒，并采用航空涡流技术，使煤粉与空气充分混合后燃烧。与传统的燃煤锅炉相比，微煤雾化锅炉的燃烧效率将提高到98%，热效率升至90%以上，同时氮氧化物、二氧化碳、二氧化硫等污染物的排放也将明显降低。

D. Implementation Highlights
项目实施亮点

1. Enhancing Co-financing to Scale up Investments in Green and Low Carbon Initiatives
与金融机构合作，吸引更多社会资本进入绿色低碳领域

Air pollution control is an arduous systemic task that requires participation from all walks of life and sustained financial support. I&G has developed close partnerships with commercial banks to leverage more co-financing. In December 2018, I&G signed a memorandum of understanding of $600 million collaborative co-financing with

Huaxia Bank, Bank of Beijing Zhongguancun Branch, and ADB under the GFP project. I&G will further cooperate with more financial institutions to scale up investments in improving energy efficiency and pollution-reduction projects.

大气污染治理是一项艰巨的系统工程，需要社会各方面的共同参与和持续的资金支持。为了撬动更多社会资本进入低碳领域，中投保积极与商业银行等金融机构开展合作。2018年12月，中投保与亚行、北京银行、华夏银行在北京签署了6亿美元联合融资备忘录，以带动国内金融机构加大对节能减排领域的资金投入。

2. Tailoring Financial Products for Diverse Financial Demands at Different Levels
设计不同的金融产品，解决不同层级的资金需求

(i) Taking Advantage of Rich Experience and Brand Effect to Promote Guaranty Business
利用自身经验和品牌优势，积极扩展担保业务

The GFP Project has played a leverage role by setting a guaranty loss reserve and introducing a guaranty mechanism. In December 2018, a guaranty subproject was approved for Sound Group, in which I&G would provide a CNY584 million ($83 million) guaranty service to facilitate the issuance of a "Sound Green Asset-Backed Security" (ABS). The funds raised through the ABS from the capital market will be used for odor control of two sewage treatment plants in Fatou and Wulituo of Beijing to improve air quality and sanitary conditions in the surrounding areas.

本项目通过设定担保准备金，引入担保增信机制，起到了积极的杠杆作用。2018年12月，该项目平台审批通过了桑德担保项目，中投保将为“桑德环保绿色资产支持专项计划”(ABS) 提供5.84亿元的增信服务，帮助其在资本市场募集资金用于北京垡头和五里坨两个污水处理厂的除臭和封闭改造工程，以改善周边地区的卫生环境和空气质量。

(ii) Providing Targeted Services to Specific Customers and Expanding the Scope of Support through Financial Leasing
通过融资租赁公司转贷，为特定客户提供针对性服务，扩大扶持面

Considering the heavy investments of fixed assets in green fields, the GFP project introduces a financial leasing mode to provide loans to companies in need of fixed-assets procurement such as machines or equipment. This mode, on one hand, can extend the depth of subprojects' implementation and facilitate their sustainable development; on the other hand, it can cater to the specific needs of targeted customers. The GFP Project has granted CNY700 million ($99 million) to the sub-borrowers through three financial leasing companies, leveraging co-financing of CNY595 million with a total investment of CNY2.56 billion.

针对绿色领域内固定资产投资较重的特点，引入融资租赁公司转贷模式，为需要购置机器设备等固定资产的企业提供融资服务。这种模式，一方面延伸了项目的深度，让项目的可持续发展有了借力；另一方面，更好地满足了特定客户的特定需求。本项目通过三个融资租赁公司放款7亿元人民币，带动融资租赁公司联合融资 5.95亿元，拉动总投资25.6亿元。

(iii) Supporting the Development and Capacity Building of Green SMEs
支持中小绿色企业发展，强化其能力建设

Green SMEs are important entities in terms of low-carbon development. However, they

Environmental protection supervision billboard of Daihai subproject
岱海项目环保监督公示牌

are always confronted with difficulties in accessing affordable financing. In order to incentivize SMEs and promote their contributions to environmental protection, the GFP project has worked hard on approaching SMEs and strengthening their capacity to access financing, with capacity building initiatives on energy-saving and emission-reduction technologies, environmental safeguards, financial assessment, and post-loan management, etc. The GFP project has provided tailored financing services to green SMEs, and nine of them have passed the comprehensive assessment of ADB and I&G for total financial support of CNY200 million ($28 million).

绿色中小企业是低碳领域的重要参与者，但始终面临着融资难与融资贵的困境。为了更好地提升中小企业参与环境治理的积极性和贡献度，本项目积极接洽和开发中小客户，并对其强化获得融资所必须的能力建设，包括节能减排技术普及、环境影响评估、财务评价、贷后管理等。本项目有针对性地推出了中小企业融资业务，并有9家中小企业通过了亚行和中投保的综合评估，获得了2亿元的资金支持。

3. Creating New Approaches to Promote Commercial and Sustainable Development of Green and Low-Carbon Business
创新机制，促进绿色低碳业务的商业化运营及可持续发展

Green and low-carbon business tends to follow strict requirements in terms of both technical feasibility and environmental and social compliance. Meanwhile, they also contain certain features of public goods, such as large upfront investments, remarkable positive social effects, and spillover effects. In some low-carbon areas (e.g., the replacement of coal with electricity and gas), government investment and fiscal subsidy policies have played significant roles. However, in order to achieve sound and sustainable development, it is critical to come up with feasible business modes. Therefore, I&G has discussed with Langfang and Zhangjiakou governments in Hebei Province on mechanism innovation and cooperation modes (e.g., commercial funds as basis, government funding as supplement, and policies as support) through which green enterprises can benefit from market-oriented modes and achieve sound and sustainable development in the long run.

绿色低碳业务既要求技术可行，又要满足环境与社会合规。该类业务还有一定的公共产品的特点，往往前期投资成本较大，但社会正效益也比较突出，且具有外溢性。在部分低碳领域 (煤改电、煤改气)，政府的资金投入和财政补贴政策对项目实施起到了积极的推动作用，但要实现长期的良性发展，依然要依赖于可行的商业化路径。为此，中投保积极与河北廊坊、张家口等市政府接洽，探讨商业性资金铺路、政府资金补充、国家政策倾斜等联合发力的模式，创新机制，帮助绿色企业通过市场化的模式获得助力，实现绿色业务的长期健康和可持续发展。

E. Successful Experiences
成功经验总结

1. Building an Efficient and Professional Project Team
打造高效专业化的项目团队

A highly efficient and professional team is essential for the successful implementation of the Project. I&G has long practiced and promoted the green development concept and established ADB Program Center (i.e. Project Management Office(PMO)), comprising 22 professionals, including two environmental and social safeguard managers with engineering, finance, legal affairs and foreign languages background. In addition, a think tank consisting of experts on foreign exchange management and environmental assessment has also been set up to provide comprehensive support to the project implementation. PMO staff have been provided with a series of skill trainings, including two English sessions at Beijing Foreign Studies University, and participating in business exchanges study tours at home and abroad for more than 30 times. More than 20 special research reports covering sectors such as energy-conservation, green transportation, and photovoltaic power generation have been prepared by the PMO. I&G is now undertaking a study funded by the United States Energy Foundation on the control of scattered coal. Through learning, practicing and sharing, the PMO's business and management capacity has been improved gradually, laying a solid foundation for efficient and high-quality project implementation and maximizing the implementation effects.

高效、专业化的项目团队是项目顺利实施的保障。中投保拥有一支践行绿色实践，宣传推广绿色发展理念的专业团队—亚行项目业务中心 (即项目管理办公室PMO)，由技术、财务、法务、外语等领域的22名专业人士组成(其中两名环境和社会保护经理)，并建立了由外汇管理、环境评估等方面专家组成的智囊库，为项目实施提供全方位的指导与支持。PMO还开展了系列技能培训活动：在北京外国语大学组织了2次英语培训班，同时还派员参加了30多次国内外业务交流活动，完成储能、绿色交通、光伏发电等细分领域的专题研究报告20多篇，并承担了美国能源基金会关于“散煤污染治理”的研究课题。通过学习、实践和分享，项目团队的业务能力和管理水平不断提高，为高效、高质量地推动项目开展，最大限度提升实施效果奠定了基础。

2. Leverage Effect
充分发挥杠杆效应

In order to give full play to the role of ADB loans and leveraged capitals for all walks of life to invest in the green and low-carbon sectors to the maximum extent, I&G has been actively partnering with commercial banks, energy conservation associations, local financial platforms and financial leasing companies. By using various financing modalities, such as co-financing, guaranties and intermediary loans, more capitals have been attracted to flow into energy conservation and environmental protection areas. Until now, the GFP project has successfully attracted more than CNY7 billion ($994 million) in investments to support green and low-carbon subprojects by offering entrusted loans and guaranty services, realizing the leverage and demonstration effect.

为了充分发挥亚行贷款的作用，最大限度地拉动全社会的资本投资于绿色低碳领域，中投保积极与商业银行、节能协会、地方金融平台、融资租赁公司等机构合作，利用联合融资、担保、转贷等多种形式，吸引更多资金进入节能环保领域。目前，该平台通过发放委托贷款和批准担保服务成功带动社会总投资超过70亿元，支持了绿色低碳项目的发展，取得了良好的杠杆和示范作用。

3. Emphasis and Development of Tailored Services
重视并开展量身定制化服务

In line with the specific features of the low-carbon business and varying needs of customers, the GFP project has focused on providing customized services to develop more targeted and practical financial products for customers in diverse circumstances with full consideration of risk control. Under the GFP project, I&G has signed a cooperative framework agreement with Shanxi Provincial Financing Re-guaranty Company, which has enabled I&G to communicate with potential green SMEs in Shanxi Province in advance and provide comprehensive credits. As a result, once their projects are initiated, the SMEs can receive loans easily and in a timely manner, and quickly proceed to implementation.

本项目根据低碳业务特点和客户不同需求开展量身定制化服务，竭力在风险可控的前提下为不同场景的客户提供更精准、更贴心的金融产品。本项目下，已与山西省融资再担保公司签署了合作框架协议，中投保可以提前与山西省内潜在的中小绿色企业进行对接并提供授信，使企业在项目启动时可以便捷、及时、快速地获得贷款，用于项目实施。

Transport and Communications
交通和通信

Loan 2962-PRC:

Hunan Xiangjiang Inland Waterway Transport Project

湖南湘江内河航运交通项目

A. Project Profile
项目概况

The Hunan Xiangjiang Inland Waterway Transport Project comprises (i) construction of the Tugutang Navigation and Hydropower Complex; (ii) construction of a 1,000-ton integrated berth in Songbai port of Changning and a 1,000-ton integrated berth in Yunji Port, Hengnan County; (iii) and capacity building for waterway management. Total project investment is CNY2.95 billion ($419.55 million), including an Asian Development Bank (ADB) loan of $150 million. The loan agreement and project agreement were signed on 25 January 2013 and the project loan became effective on 25 April 2013.

湖南湘江内河航运交通项目包括 (i) 土谷塘航电枢纽工程建设；(ii) 常宁松柏港1个千吨级综合泊位和衡南云集港1个千吨级泊位的建设；(iii) 水运管理能力建设。项目总投资约29.5亿元人民币，其中，亚行贷款为1.5亿美元 (折合9.54亿元人民币)。2013年1月25日，本项目的《贷款协议》和《项目协议》正式签字，项目贷款协议于2013年4月25日生效。

The project's primary focus is inland waterway transport, encompassing power generation, irrigation, water supply, and other comprehensive water-resource solutions. The project's main structures include a ship lock, sluice gates, a power station, a fishway, and related facilities. The ship lock is a Class III waterway engineering project with a designed annual throughput capacity of 14.2 million tons, the power station has installed four units with a total capacity of 90 mw and an average annual power generation capacity of 365 million kWh. The project also involves the construction of 17 sluice gates and one fishway.

项目以航运为主，兼有交通、发电、灌溉和供水等水资源综合利用效益，主要建筑物包括船闸、泄水闸、电站、鱼道及相关设施。其中船闸工程为三级航道标准，设计年通过能力1,420万

吨；电站装机4台，总装机容量9万千瓦，年均发电量3.65亿千瓦时；设置17孔泄水闸和鱼道一座。

The project will eliminate bottlenecks in the middle reaches of Xiangjiang River. Connecting the Xiangjiang River with the Yangtze River system is strategically important in terms of realizing direct mainstream-to-tributary and river-to-sea intermodal transport, optimizing Hunan Province's transportation network, improving environmental conditions in the Xiangjiang River basin, and giving full play to the advantages of green transportation, low carbon outputs, and large-scale transportation volumes at low transportation costs.

工程建成后，可消除湘江中游的“瓶颈”航道。对连通长江水系，实现干支直达，江海联运，优化湖南交通运输结构，改善湘江流域环境，充分发挥水运绿色、低碳、环保、运量大、运输成本低等优势具有十分重要的战略意义。

B. Project Management and Capacity Building
项目管理和能力建设

1. Procurement Management
招投标管理

On the basis of ADB's procurement guidelines and consulting service guidelines, Hunan Provincial Water Transportation Construction & Investment Group (HPWT)

Tugutang navigation and hydropower gomplex monitoring center
厂房中控室

Navigation lock
船闸工程

developed a detailed procurement plan. Bidding procedures closely followed ADB procurement guidelines.

根据亚洲银行项目《采购指南》、《咨询服务指南》的规定和项目的采购计划，湖南水运建设和投资公司制定了较为详细的采购方案。在招投标实施过程中，严格遵循亚洲开发银行采购指南的规定。

The ADB loan covered two main civil-engineering outputs—ship-lock and sluicegate works, and equipment packages—turbine generators and accessory equipment, ship-lock metal structures, powerhouse and sluicegate equipment, hydraulic hoists, a barge, and an emergency boat, and one technical consulting service contract to carry out institutional capacity strengthening. A domestic competitive bidding method was adopted for procurements of the barge and the emergency boat, and an international competitive bidding method was adopted for the other items.

亚行贷款支付的工程采购分为船闸工程、电站厂房及泄水闸工程两个主体土建项目合同，货物采购分为水轮发电机组及其附属设备、船闸金属结构制造、电站厂房及泄水闸金属结构制造、液压启闭机制造、趸船设备采购、应急艇设备采购等六个合同，机构能力加强技术咨询服务合同一个。上述项目招标中，除趸船设备采购、应急艇设备采购两个合同包采用国内竞争性招标方式外，其余均采用国际竞争性招标方式。

2. Quality Control
质量管理

A four-in-one quality control system was established, consisting of a project legal entity, supervision unit, construction unit, and government supervision authorities to implement total quality management and division of responsibilities. Project construction was undertaken according to scientific and technological principles, as well as strict management protocols, and in adherence with advanced quality controls, promoting advanced construction techniques and strengthening quality control of the entire process. By strictly following construction drawings and relevant national technical standards, comprehensive inspections of materials used, and the construction quality of the project were conducted. Meanwhile, on-site inspections that set key quality monitoring points for critical working procedures and parts, stand-by supervision for critical

Water release gates
泄水闸工程

processes, and strict construction quality controls were implemented. The project has had no issues with quality or accidents. Individual work units have a qualification rate of 100%, while the overall quality rating of the project exceeds 90%. The project won an honorary title as “Safe Construction Site” as a demonstration project in Hunan Province for two consecutive years of 2014 and 2015 and was recognized as a “Superior Organization” in terms of management of provincial key projects for two consecutive years from 2013 to 2014.

项目建立了由项目法人(建设单位)、监理单位、施工单位和政府监督部门四位一体的质量管理体系，推行全面质量管理，实行质量分工负责。施工过程中，依靠科技进步和严格的质量管理程序，采用先进的质量管理模式和管理手段，推广先进的施工工艺，加强工程全过程质量控制；严格按图纸施工，严格遵守国家有关的技术标准，对工程所用材料和施工质量进行全面检查；加强现场巡查，对重点工序和部位，设置质量监控重点，对关健工序实行旁站监理，严格控制施工质量。本工程没有发生质量问题和质量事故，单位工程合格率100%，总体质量优良率在90%以上，该项目在2014—2015年连续两年荣获湖南省“平安工地”示范工程荣誉称号、2013—2014年连续两年获得省重点工程目标管理优胜单位。

3. Enhancing Capacity of Waterway Transport Management
水运机构能力加强

Historically, inland water transport was the most important transportation mode in Hunan Province. But today, due to insufficient investment, inland water transport accounts for only 10% of the total freight volume in Hunan Province. Population clusters and industries in Hunan Province all line the Xiangjiang River, providing great potential for further development. Realizing potential growth of waterway traffic and reductions in transportation costs is of great significance.

内河航运历史上是湖南省最重要的运输方式,因投资不足影响，内河航运仅占湖南省货运总量的10%。湖南省人口聚集区及工业均沿湘江发展，湘江具备进一步开发的巨大潜力，实现航道交通的潜在增长及运输成本的降低，意义重大。

By means of international competitive bidding, a joint venture was engaged to provide consulting services for enhancing the institutional capacity of the project. Through detailed market research and with advanced experience in international water transportation buildout, operations, and management, “Promoting Inland Waterway Transport in the People’s Republic of China (PRC): Challenges, International Experiences and Recommendations” was compiled and published by ADB. The report proposes an inland water transportation promotion plan to raise awareness and influence inland waterway development policy, promoting it as a transport choice, encouraging fleet modernization, and safer, cleaner and higher quality inland water transportation. The report recommends building a modern inland water transport management and support system, improving capacity building, and enhancing technical level of the industry. It also put forward constructive advice with positive significance for improving water transport construction and management capacity in Hunan Province, as well as providing an opportunity to learn from advanced foreign water transport management experience.

Tugutang navigation and hydropower complex
湘江土谷塘航电枢纽

湖南湘江内河航运项目机构能力加强咨询服务项目采用国际竞争性招标方式，确定了一个联合体为项目咨询机构，经过详尽的市场调研，结合国外水运建设、运营管理的先进经验，编制完成了《提升中国内河口航运交通项目——挑战、国际经验和建议》，该报告已在亚洲开发银行出版。报告提出了内河航运促进计划，提高对内河航运发展政策及运货商运输模式选择的意识及影响，促进船队现代化，鼓励更加安全、清洁和高质量的内河航运，建设现代内河航运管理及支持系统，提高能力建设，增强行业专业技术水平，提出了良好的建设性意见，对提升湖南水运建设管理能力，学习国外先进的水运管理经验，有着积极的意义。

C. Safeguards Policy
保障政策

1. Land Acquisition and Resettlement
征地移民安置工作

Establish a thorough complaints mechanism. A systematic reporting system was in place, from affected households, to village groups, to township government, to county and city government, which in turn reports to the contractors and Hengyang City in coordination with HPWT. On this basis, a communication network was established at each level, with designated organizations and personnel to deal with complaints. The mechanism has not only ensured smooth progress of the project, but also effectively protects legitimate rights and interests.

建立健全的移民申诉机制。为了有效保障移民群众申诉问题的渠道畅通，按照省水运投与衡阳市和项目涉及的衡南县、常宁市、耒阳市的协调工作机制，确定了移民群众反映问题和处理问题的的途径：移民→村组→乡镇政府→县市协调机构→项目建设方和衡阳市协调机构。在此基础上，还建立了各级信访问题联络网，各级都明确了专门的机构和专门的人员调查处理群众来信来访。由于这种工作机制的良好运行，既保障了工程顺利推进，又有效保护了群众的合法权益。

Relocation and resettlement have resulted in a management transformation and have also successfully led to the establishment of the first reservoir area in the entire province that uses permanently submerged boundary piles to carry out a physical index survey. It is the first reservoir area in the province to seek advice on resettlement from all sectors of society through public consultations, and the first reservoir area to systematically establish a basic information database for the immigrants.

移民安置工作中，实现了由过去的粗放型管理向精细化管理转变，成功实现了四个全省第一即全省第一个采用永久淹没界桩开展实物指标调查的库区；全省第一个采用公开听证方式向社会各界征求移民安置意见的库区；全省第一个系统建立移民基本信息数据库的库区。

2. Environmental Protection Measures 环境保护措施

In order to strengthen environmental protection, the project established a special environmental management organization—Environmental Protection Office (EPO) to undertake environmental management during the construction and operational period and also deal with environmental problems, so as to assure the timely and effective implementation of environmental protection work and measures.

为加强环境保护工作，项目业主特别设置了专门的环境管理机构环境管理办公室，以完成工程建设期和营运期的环境管理任务，对施工期和营运期的环境问题进行管理，以确保环保工程和环境保护措施得到及时有效的实施。

The introduction of independent and professional third-party monitoring and supervision not only offers a scientific basis for environmental management during construction, but also raises the awareness of project contractors in terms of environmental protection and water conservation. It also makes it possible for responsible persons to learn advanced monitoring means and methods and acquire professional and technological knowledge to make it possible to prevent environment and water-conservation.

通过引进独立专业的第三方进行监测监督指导，不仅为施工过程中的环境管理提供了科学依据，还提高了工程各参建单位高度重视环保、水保工作的意识，相关负责人也学习到了先进的监测手段和方法，预防环保、水保问题的专业知识和技术，对切实做好环保、水保工作提供了坚强的保障。

Fishery recovery measures were implemented for the Xiangjiang River, involving: (1) artificial breeding and releasing activities; (2) construction of the Tugutang fishway, allowing fish migration; and (3) construction of the Tugutang fish breeding and releasing station, as well as an artificial fish reef within the reservoir area.

实施湘江渔业资源修补措施。一是开展人工增殖放流活动。二是修建土谷塘鱼道。现试运时有鱼类沿鱼道洄游，效果非常明显。三是建设土谷塘鱼类增殖放流站和库区内人工鱼礁。

3. Assistance for Women and Children
帮助妇女儿童

Assistance for women and children was considered as a priority. Consultations were undertaken with the local government, village representatives and women to discuss assistance schemes for women and children under the project. A total of 213 women received agricultural and non-agricultural skills training in areas that included lotus root cultivation, fish farming, logistics, and catering services, and 96 of them were employed during project implementation. During the construction of the dam, reservoir, and other areas, a significant part of the labor force included women, who participated at reasonable salaries.

项目对妇女儿童援助工作也相当重视。多次联合当地政府、村民及妇儿代表召开了座谈会，商定土谷塘项目妇女儿童援助实施方案。项目组织213名妇女接受了农业和非农业技能培训，包括莲藕种植、鱼类养殖、后勤及餐饮服务等，这213名接受培训的妇女中，共计有96人受雇于本项目。在坝区、库区等项目建设过程中也雇佣了相当部分的当地劳动力，其中有妇女参与了技术含量不高的简单劳动，并支付了合理的报酬。

D. Social, economic and environmental benefits
项目社会、经济、环境效益

The powerhouse No. 1 unit was grid-connected on 23 December 2015. The No. 2 Unit was grid-connected on 31 March 2016. The No. 3 Unit was grid-connected on 6 July 2016 and the No. 4 Unit was grid-connected on 10 October 2016. The cumulative generating capacity of Tugutang Navigation and Hydropower Complex was 1.25 billion

Artificial breeding and releasing stations
鱼类增殖站

kWh, and the cumulative on-grid energy was 1.226 billion kWh on 31 July 2018.

2015年12月23日，枢纽电站首台机组(1号机组) 正式并网发电；2016年3月31日，2号机组正式并网发电；2016年7月6日，3号机组正式并网发电，4号机组于2016年10月10日并网发电。截止2018年7月底，土谷塘航枢纽电站累计发电量12.5亿千瓦时，累计上网电量12.26亿千瓦时。

As the standard coal consumption of the thermal power plant is 370 g/kWh, and burning a ton of coal results in emissions of about 2.6 tons of CO_2, the emissions were reduced by 336,700 tons, 116% of the target. Meanwhile, the annual growth rate for shipping freight in Hunan Province is 10.04% and the annual growth rate of shipping freight turnover is 15.46% from 2016 to 2018.

火力发电厂标准耗煤370克/千瓦时，一吨煤燃烧约排放2.6吨的CO_2，以发电量3.5亿千瓦时测算，减少CO_2排放量336,700吨，实现目标116%。湖南省航运货运年平增长率为10.04%；航运货运周转量年平增长率为15.46%。

After implementation of the project, the channel conditions, the navigation level, and capacity of the Xiangjiang River upstream have been greatly improved, which provided the foundation for constructing the Xiangjiang main channel. This project has made navigation of the Xiangjiang, the main channel for water transportation, smoother and more reliable, significantly improving overall provincial transportation conditions and improving conditions for shipping freight in and out of Hunan Province. It is promoting the development of the shipping industry and bringing new hope and good returns to the province's heavy shipping companies, as well as tens of thousands of shipping sector workers.

项目实施后，湘江衡阳以上航道条件大为改善，通航等级和能力大大提高，为形成湘江主航道和建设奠定了基础。本项目使湘江这一水运主通道更加畅通，运输保证率更高，显著改善了我省综合运输条件，提高了进出湘物资的运输能力。可促进航运业较大发展，给我省负担沉重的航运企业和数万较为困难的航运职工带来新的希望及良好的回报。

The project will speed up urban construction in Hengnan County, improve the city's investment environment, benefit the residents, and greatly promote economic development of the Hengyang region. As the dam area is an unique urban scenic spot, and the reservoir area is a beautiful scenic belt spanning dozens of kilometers, the project will greatly improve the quality of life for people on both sides of Xiangjiang river, significantly promoting the development of tourism industry, bringing more employment opportunities for local residents. Residents can also use the reservoir to develop large-scale aquaculture and increase their incomes. Increasing the reservoir water level can provide favorable conditions in terms of urban water supply and polder irrigation, while also reducing the cost of urban and farmland irrigation.

项目能加快衡南县城城市建设，提高城市品位，改善投资环境，使当地居民受益，并能极大地促进衡阳地区乃至上游地区经济的大发展。枢纽坝区是一处壮观的别具一格的城市旅游景区，枢纽库区更是绵延几十公里赏心悦目的美丽风景带，能大大改善湘江两岸人民的生活质量，大大促进旅游业和娱乐休闲业发展，

给两岸居民带来更多的就业机会。当地居民可充分利用水库发展大型人工水产养殖业，增加经济收入；水库水位提高后，给两岸城市供水、堤垸灌溉提供了有利条件，降低了城市供水、农田灌溉成本。

E. Key to Success
成功经验总结

1. Highly valued by leadership for sound and effective project management.
领导高度重视，项目管理机构健全有效

The project has received strong support from leadership at all levels, and sound and effective project management have allowed for smooth implementation of the project. The Hunan Provincial government and leadership at all levels of the prefectural and county governments have provided strong support for the project planning and implementation. Organizational structuring of the project execution and implementation units has been effective and marked by efficient personnel allocation. Management has strictly adhered to ADB and state administrative regulations, stipulating in detail the responsibilities and authority of the various government departments, consultants, the project implementing agencies, and the supervision units. Management also clearly defined the working procedures, established regulations for procedures such as procurement, safety management, withdrawals, reimbursement and payment procedures, and funding controls, providing a solid systemic guarantee for the organization and management of the entire project.

各级领导的大力支持和健全有效的项目管理机构是项目顺利实施的前提。湖南省政府和项目实施地市县政府各级领导对本项目给予了大力支持和高度重视，为项目的执行提供总体部署和政策指导。项目执行和实施单位机构设置合理，人员配置精干。项目实施过程中按照亚洲开发银行和国家相关的管理办法和规定进行严格管理，全面、详细地规定了项目相关的各政府部门、咨询专家、项目实施机构、监理单位之间的职责和权限，明确了工作程序，并就招标采购、安全管理、提款报账和支付程序、资金控制等项目实施的各个关节建章立制，为做好整个项目的组织管理工作提供了强有力的制度保障。

2. Focusing on innovative and scientific concepts has made the project effective.
重视理念和科技创新，项目工作科学高效

The central laboratory of the Tugutang navigation and hydropower complex was established. It is the first central laboratory for a large-scale water transportation construction project in Hunan Province. The setting of the central laboratory not only assisted in controlling the project quality by conducting parallel testing, but also standardized construction site work and supervision of the construction unit. It can also strengthen inspections and supervision of the central laboratory. The result has been standardized quality management that provides strong support for solving technical problems and optimizing design.

成立了土谷塘航电枢纽工程业主中心试验室，是湖南省大型水运建设项目第一家业主中心试验室。中心试验室的设置，不仅可以通过开展平行检测工作协助业主更好地控制工程质量，规范了监理与施工单位工地试验室工作，还可以通过中心试验室的检测检查监督指导，强化了参建各方的质量观念和意识，规范了质量管理行为，同时为业主解决有关技术难题、设计优化等提供了有力支持。

3. Technical and management personnel trained during the project implementation.
依托工程建设，锻炼和培养了一批工程技术和管理人员。

The project emphasized the training of engineers and managers during its implementation. Various and lively activities such as the “one on one” labor competition and job training sessions have been carried out to improve everyone's professional skills. Through guidance and assistance from technicians with engineering construction experience, the employees’ professional abilities and their ability to solve practical problems have improved. At present, about 30 professionals have been assigned to other similar projects.

项目在建设过程中重视工程技术和管理人员的培养。为了人人练就过硬的业务技能，开展了形式多样、生动活泼的“一帮一”、劳动竞赛、岗位练兵等活动，通过具有工程建设经验的技术人员的传帮带，致力于提高员工的业务能力和解决实际问题的能力，目前已向其他项目建设单位输送约30位专业技术人员。

Loan 3082-PRC:

Railway Energy Efficiency and Safety Enhancement Investment Program—Tranche IV

铁路节能和安全提升投资规划项目—第四批次

A. Project Overview
项目概况

Under the $1 billion multitranche financing facility (MFF) for the Railway Energy Efficiency and Safety Enhancement Investment Program, the tranche IV project has received an Asian Development Bank (ADB) loan of $180 million for procurement of the energy-efficient equipment for Chongqing–Guiyang Railway Energy Expansion and Reconstruction Project (Chongqing–Guiyang Railway), and of line-safety maintenance equipment that is urgently required for certain lines in keeping with the China Railway's 12th Five-Year General Maintenance Plan.

根据财政部与亚行签订的“铁路节能和安全投资规划项目”10亿美元多批次融资协议，第四批次获得亚行贷款1.8亿美元，用于重庆至贵阳铁路扩能改造工程项目（下称“渝黔铁路”）轨道材料以及铁路“十二五大养规划”中急需解决的部分线路安全维护设备采购。

The Chongqing–Guiyang Railway is a key project implemented by the former Ministry of Railways and Chongqing Municipality in order to promote the strategy of western development and speed up the construction of regional railways. It is an important part of the rapid railway corridor in the Northwest, Southwest, and South of the People's Republic of China (PRC) and plays an important role in the development of the regional national economy. The Chongqing–Guiyang Railway, a double-track, electrified, mixed-use railway for both passengers and freight transport with a designed speed of 200 km/h and a main line length of 344 km. Construction

commenced in May 2013 and it went into service on 25 January 2018.

渝黔铁路是原铁道部、重庆市为促进西部大开发战略、加快区域铁路建设而实施的重点项目，是我国西北、西南至华南地区快速铁路通道的重要组成部分，在区域国民经济发展中发挥着重要作用。渝黔铁路为客货共线双线电气化铁路，设计时速200公里/小时，正线长344公里，于2013年5月全线开工建设，2018年1月25日开通运营。

At the same time, the implementation of the 12th Five-Year General Maintenance Plan provided 11 large-scale maintenance machines such as 1,200 m^3 full-section line-cleaning machines and line-tamping machines for the Southwest PRC railways, highlighting comprehensive operational functions in keeping with the rapid expansion of operational mileage. The equipment has effectively guaranteed the safe and efficient operation of railways in the Southwest.

同时，落实铁路“十二五大养规划”，为西南地区铁路装备1,200立方米全断面线路清筛机和线路捣固车等11台大型养路机械，突出综合作业功能，满足运营里程迅速扩大带来的装备需求，有力保障了西南地区铁路的安全高效运行。

B. Financial Management 财务管理

The total contract amount for the Railway Energy Efficiency and Safety Enhancement Investment Program—Tranche IV was $178 million, and the utilization rate of loan funds was 98.9%. In terms of financial management, auditing and allocation processes were optimized. Since the launch of the ADB online-payment system, the company has actively adopted timely direct-payment procedures. In addition to the small amount of $1.5 million for small contracts from the imprest account, other direct payment methods have shortened return times for the supplier's capital and improved the efficiency of fund disbursements.

铁路节能和安全投资计划第4批次项目累计签订采购合同金额1.78亿美元，贷款资金使用率98.9%。在财务管理上优化审核、拨付流程，自亚行网上支付系统上线以来，铁总积极采用流程短、时效快的直接支付程序。除了153万美元小额零星货款使用周转金账户支付外，其余全部采用直接支付方式，缩短了供货商资金回收时间，提高了资金拨付效率。

C. Key and Difficult Works 重难点工程

As the poet Li Bai said "Travelling to Sichuan is harder than scaling the blue sky.” The southwest China is mountainous and cut through by rivers. Challenges facing the Chongqing–Guiyang Railway Project comprise high mountains, deep valleys, ravines and gullies, sensitive ecological conditions, and a generally diverse topography, all of which create problems for project management. Other challenges include 62 expressway crossings and 39 existing railway crossings, and thorough engineering measures had to be taken to ensure normal operations of highways and existing railway lines. Coexisting bridge structures include long-span beam bridges and other bridge structures such as continuous steel structures, continuous beam and cable-stayed bridges, which span major traffic trunks and navigable rivers. Much of the rock surrounding the tunnels is soft—

grades IV and V account for 58.6%—and this must be taken into consideration during the construction process to ensure normal operations of the existing railway. Karst tunnels account for 81.7 km, with 13 tunnels passing through coal seams and 17 tunnels passing through gas fields. The Chongqing hub has required a large degree of land requisition and demolition, and there are many tie lines and moving trains, and lines of varying speed standards coexist. Specific difficulties are typical of projects such as the New Baishayu Yangtze River Bridge, the Yelang River Bridge and the Tianping Tunnel.

李白诗云：“蜀道难，难于上青天”。山多水长，出行维艰，是西南山区的显著地形特点。渝黔铁路项目沿线山高谷深、沟壑纵横、生态敏感，各种不良地质发育齐全，给项目管理带来了严峻挑战。主要体现在：线路与高速公路或二级以上公路交叉62次，与既有铁路交叉39次,建设过程必须采取妥善的工程措施，以保证公路、既有铁路的正常运营；桥梁多种孔跨结构并存，跨越主要交通干线或通航河流采用连续钢构、连续梁、斜拉桥等特殊结构的大跨度梁式；隧道软弱围岩比例大，Ⅳ、Ⅴ级软弱围岩占58.6%，通过岩溶区隧道81.7公里，沿线有13座隧道穿越煤层，有17座隧道通过气田构造区或侵染区；重庆枢纽内征地拆迁量大，联络线和动车走行线众多，不同速度标准线路并存。具体重难点工程以新白沙沱长江大桥、夜郎河大桥、天坪隧道为典型代表。

(i) The New Baishatuo Yangtze River Bridge crosses the natural barrier of the Yangtze River in Chongqing and is an important passageway for the Chongqing–Guiyang passenger line and the Sichuan–Guizhou freight line to the Chongqing hub. It is the world's first double-layer, six-track, twin-tower, double-cable-plane, steel-truss girder railway cable-stayed bridge. At the same time, it is the world's largest heavy-load bridge. The total length is 5,320 m, of which the six-line construction segment is 2,098 m. The weight of the bridge's steel-truss girder is 41,000 tons. The steel-truss girder assembly and the cable-stayed pipeline positioning were high precision in construction and extremely difficult to control while the main bridge foundation and pier abutment were technically demanding—in terms of engineering, all very difficult and dangerous.

新白沙沱长江大桥在重庆市境内横跨长江天险，是渝黔客车线、川黔货车线引入重庆枢纽的重要过江通道。该桥是世界上首座双层六线双塔双索面钢桁梁铁路斜拉桥，同时是世界上延米载荷最大的桥梁。全长5,320米，其中六线合建部分2,098米。全桥钢桁梁重达4.1万吨，钢桁梁拼装、斜拉索索道管定位等施工精度极高、控制难度极大，主桥基础、墩台施工技术要求高，具有“高、精、尖、难、险”等工程技术特点。

(ii) The Yelang River Bridge spans the Yelang River Valley and Xixin Highway with a total length of 1,121 m and a height difference of 210 m between the deck and the ditch bottom. The main bridge adopts an X-shaped basket-style arch with a 370 m span of reinforced concrete—the biggest bridge span of its kind in the PRC. The main arch foundation adopts a penetrating large-volume rock-socketed pile foundation that is unique worldwide. The cable crane has a span of 549 m with a designed lifting weight of 200 tons, while the transverse moving distance of the saddle is 33 m, making it No.1 in the PRC.

夜郎河大桥跨越夜郎河沟谷、习新公路，全长1,121米，桥面与沟底高差210米，主桥采用1跨370米上承式钢筋混凝土X形提篮式拱

New Baishatuo crossing Yangzi River Bridge
新白沙沱长江大桥

桥，为国内同类型桥梁跨度第一，主拱基础采用贯入式大体积嵌岩桩基础，设计属于世界首创；缆索吊单跨跨度549米，设计吊重达200吨，索鞍横向移动距离达到33米，横移距离国内第一。

(iii) The Tianping Tunnel, 13,978 m in length, is the longest tunnel along the Chongqing–Guiyang Railway. The geological conditions are highly complex, comprising high gas concentrations, high ground stress, high ground temperatures, karst muddy water, toxic gasses, fault fracture zones, and expansive rocks and soils, leading it to be ranked as a Level I risk tunnel.

天坪隧道全长13,978米，为渝黔铁路最长的隧道，地质条件极其复杂，集高瓦斯、高地应力、高地温、岩溶突泥涌水、有毒有害气体、断层破碎带、膨胀性岩土等不良地质于一体，被列为Ⅰ级高风险隧道。

D. Project Innovation
项目创新

1. Applying advanced equipment
应用先进设备

The anchor and cap of the Yelang River Bridge cable crane system are connected to reduce impact on the natural environment and reduce the consumption of resources, while the structure of the tower is hinged, which resolves issues associated with its force. Eight load-bearing main cables are combined into one by pulleys, and the force of the main cable can be adjusted automatically after the saddle is moved transversely, which resolves the uniformity of the force of the eight main cables under any working conditions, maintaining equal force for each cable, while a special continuous jack is designed to solve the erection of the arch frame in the bifurcated section of the

arch foot, which is five times more efficient than that of conventional traction equipment. Through sensing, electronic control and video monitoring equipment, automatic control of lifting weight, automatic control of lifting height, and double review of safety monitoring data and operations lifting weight issues are resolved.

夜郎河特大桥缆索吊系统，缆索吊后锚与承台采用永临结合，减少对自然环境扰动并降低资源消耗；塔座结构形式设置为铰接式，解决了塔架受力大的问题；采用滑轮将8根承重主索连成一根，索鞍横移后可以自动调节主索受力，解决了8根主索在任何工况下受力的均匀性，实现了每根索的受力相等；索鞍横移设计了专用的连续千斤顶，解决了拱脚分叉段拱架的架设，比采用常规牵引设备效率提高5倍；通过传感、电控、视频监控设备，解决了起重量超限自动控制、起吊高度超限自动控制、安全监控数据及操作指令双重复核。

On-water multifunctional construction platform. A multifunctional construction platform was developed for the New Baishatuo Yangtze River Bridge, and five kinds of construction measures were employed in the same structure. During the construction of the positioning column pile, the steel guard tube supported the drilling platform, and during the construction of the bored pile, the platform and the steel guard tube formed a bench structure. During the construction of the cofferdam, the drilling platform was partially cut off and then lowered as an internal support, and during the construction of bridge tower, it can be used as the main beam of the cast-in-place support and cast-in-place support of upper beam, employing construction technology for a large multifunctional platform. Work efficiency was improved, and the amount of steel used in the temporary engineering was reduced.

Yelanghe River Bridge
夜郎河大桥

水上多功能施工平台。新白沙沱长江特大桥研究开发出一种多功能施工平台，在一座桥梁中实现了同一结构解决了5种施工措施，定位柱桩施工期间，钢护筒支撑钻孔平台；钻孔桩施工期间，平台与钢护筒形成板凳结构；围堰施工期间，将钻孔平台局部切除后整体下放作为内支撑 ，桥塔施工期间，可用作桥塔下横梁现浇支架主梁、上横梁现浇支架主梁，构建了大型多功能平台施工技术。提高了工效，节约了临时工程用钢量。

The Tianping Tunnel energy-saving and automatic-control ventilation system transmits gasses and concentrations of harmful gasses detected on the excavation surface to the control center, and automatically adjusts the operating frequency of the inverter fan in real time, according to the test data and the ventilation scheme, so that the fan is constantly in tune with construction. The fan is always in an optimal energy-saving state, which not only meets construction requirements, but it can also be operated at low frequency, realizing automatic energy-savings for the ventilation system during the construction process. Meanwhile, the energy-saving ventilation technology is integrated, so that the circulation of air and the influence of crosswinds between the work area and the working surface are avoided during construction, and the problem of harmful gas hazards in the extra-long tunnel is resolved.

天坪隧道节能通风自动控制系统，将开挖面检测到的瓦斯和有害气体浓度实时传输到控制中心，依据检测数据和施工通风方案实时自动调整变频风机的运转频率，使风机始终处于既满足施工要求又能低频率运转的最佳节能状态，从而实现了施工过程中对通风系统的自动节能控制。并且结合天坪隧道揭煤施工工况，同时将节能通风技术合理融入，避免了工区之间、工作面之间揭煤施工时的污风循环和串风影响，解决了长大瓦斯隧道有害气体危害的问题。

2. Promoting technological innovation 推进技术革新

The project components actively explored construction workmanship and methods that are compatible with new-era railway construction so as to promote technological innovation. The major, difficult projects—the New Baishatuo Yangtze River Bridge, the Yelang River Bridge and the Tianping Tunnel—have won 19 national invention patents, 21 utility model patents and four provincial and ministerial construction method prizes. In the construction of the New Baishatuo Yangtze River Bridge, rapid construction technology for inclined rock foundations in deep water was adopted, and a multifunctional construction platform was developed. A new type of assembled-steel frame with large-bearing capacity, convenient installation and demolition, high versatility, reusability, and arbitrary combination extension was innovatively adopted. The application of building information modeling (BIM) technology in railway bridge construction was carried out for the column-support system. In the construction of the Yelanghe Bridge, the technology of rock-socketed pile foundation construction, cable-hoisting construction, steel-tube arch construction, and steel-concrete composite beam construction were adopted. In the construction of Tianping Tunnel, a wireless gas monitoring sensor was developed, and explosion-proof and trackless transportation mechanical equipment were successfully put into use.

积极探索与新时代铁路建设水平相适应的施工工艺工法，推进技术革新，仅新白沙沱长江大桥、夜郎河大桥、天坪隧道等3个重难点工程，便获得国家发明专利19项、实用新型专利21项、省部级工法4项。在新白沙沱长江

大桥施工中采用深水无覆盖层倾斜岩面基础快速施工技术，并研究开发了一种多功能施工平台，创新采用了一种承载能力大、安装和拆除方便、通用性高、可重复使用、可任意组合延伸的大承载力装配式型钢立柱支撑系统，开展了BIM技术在铁路桥梁施工中的应用。在夜郎河大桥施工中采用了拱座超大截面倾斜隧道式嵌岩桩基础施工、缆索吊吊装施工、钢管拱施工、钢混结合梁施工等技术。在天坪隧道施工中研制了隧道无线瓦斯监测传感器，成功应用了防爆改装无轨运输机械设备等。

1) Application technology of BIM in railway bridge construction
铁路桥梁施工BIM应用技术

Using BIM technology, the New Baishatuo Yangtze River Bridge and the Yelang River Bridge seamlessly integrated heterogeneous data sources, interconnecting design and construction information, realizing cross-stage digital delivery, engineering quantity review, structural collision inspection, and spatial information extraction. Interdepartmental, cross-platform collaborative material management, and integration of BIM-rich information provided a powerful statistical analysis function. Construction progress was available in real time, making it possible to dynamically predict the completion of the project, and efficiently manage the actual and planned progress. Macro-information on construction arrangements, overall construction control technology, micro-control complex nodes for 3D visual disclosure and construction process simulation were employed. Meanwhile, BIM was integrated with cable force and stress monitoring and quality inspection data, so as to comprehensively control construction safety.

新白沙沱长江特大桥、夜郎河特大桥利用BIM技术，无缝集成异构数据源模型，打通设计与施工信息交互，实现跨阶段数字化交付、工程量复核、结构碰撞检查、空间信息提取；跨部门、跨平台协同物料管理，集成BIM的丰富信息，提供强大的统计分析功能；实时掌握大桥施工进度，动态分析项目完成情况，高效管理实际与计划进度；宏观把握大桥施工安排，整体控制施工工艺，微观把控复杂节点三维可视化交底、施工过程模拟、方案研讨；将BIM与索力、应力监测和质检资料相集成，综合把控桥梁安全施工。

2) Construction technology for extra-large inclined tunnel-pile foundations
拱座超大截面倾斜隧道式嵌岩桩基础施工技术

The surrounding rock of the arch pedestal foundations of the Yelang River Bridge is mudstone. The section area is 310 m^2, the tilt angle is 55.19°, and the oblique length is 47 m. There was no construction technology for this kind of pile foundation in the PRC. Based on research into construction technology for inclined tunnel rock-socketed pile foundations with large-scale arch seats, full-section excavation combined with pre-stressed anchor cable and sectional steel arch-frame support was determined to be the way forward, leading to the creation of vertical three-dimensional slag-removal technology involving gantries, excavators and large dump slag hoppers. The problem of machinery not being able to get in and out of the hole is solved by setting the movable gantry above the arch base and the hoisting platform of the excavator. At the same time, the problem of high efficiency and extreme angled slag discharge could not be solved by vertically lifting the large dump slag hopper.

夜郎河特大桥拱座基础围岩为泥岩弱风化围岩，断面面积310平方米,倾斜角度为55.19°，斜向长度为47米，目前国内还没有针对此种桩基施工工艺。通过对拱座超大截面

倾斜隧道式嵌岩桩基础施工技术研究，确定了预应力锚索与型钢拱架支护结合全断面开挖，开创了龙门、挖机配合大型自卸式渣斗垂直立体出渣工艺。通过在拱座基础上方设置可移动式龙门配合挖掘机吊装平台解决了机械无法进出洞口难题，同时通过垂直提升大型自卸式渣斗解决了无法高效大角度出渣难题。

3) Jacking construction technology for existing railway trunk lines across multiple roads
跨多股道既有铁路干线顶推施工技术

The Chongqing side-span steel beam span of the New Baishatuo Yangtze River Bridge carries the existing Sichuan–Guizhou line, the Chengdu–Chongqing line and the Xiaoli line railway, and the bottom of the steel beam is about 9 m away from the top of the railway catenary column. The double main truss, no guide beam, multipoint synchronization and successive push-construction technology were adopted to ensure construction safety of the steel beam across three existing railway trunk lines and to reduce the interference to operations of the existing railway.

新白沙沱长江特大桥重庆侧边跨钢梁跨有既有川黔线、成渝线和小梨线铁路，钢梁下弦杆底面距离铁路接触网立柱顶面距离约9米。采用双主桁、无导梁、多点同步、分次要点分次连续顶推施工技术，确保2#墩边跨钢梁跨越三条既有铁路干线施工安全，减少了对既有铁路运营的干扰。

4) Construction technology for double-cantilever erection of steel-truss beam
钢梁双悬臂架设施工技术

The steel-truss beam was set up by using the double cantilever of a two-stand beam crane, hanging a corresponding Internode cable-stayed cable. The cable-stayed cable tension-lag steel beam was set up with two internodes. In the process of erection, the elevation of the anchor point and the position of bridge midline were routinely checked, achieving high-precision closure of a heavy-duty railway cable-stayed bridge that meets the requirements of bridge-quality line control.

利用两台架梁吊机双悬臂对称架设钢桁梁，并挂设张拉相应节间斜拉索，斜拉索张拉滞后钢梁架设两个节间。架设过程中，随时核对下锚点的高程和桥梁中线位置，实现重载铁路斜拉桥高精度合拢，达到了成桥质量线型控制的要求。

5) Construction technology for dealing with coal-seam gas
穿层网格预抽煤层瓦斯施工技术

In the Tianping Tunnel, the gas content and the pressure in the coal seam were greatly reduced prior to excavation and construction via a one-use set of drainage systems to drain a positive hole, realizing a flat-guide gas by using the advance flat guide. The total amount of gas combining with tunnel air flow during the excavation process was greatly reduced after the gas was drawn and discharged. The time required for ventilation and the energy consumption were greatly reduced, while the problems associated with gas prevention and control during construction were also reduced. The safety of the construction personnel and the equipment was also ensured.

天坪隧道通过采用穿层网格预抽煤层瓦斯施工技术，在开挖施工前大幅度降低了煤层中的瓦斯含量和压力，为揭煤施工提供了前期安全防突保障；实现了煤系地层区段内多煤层的一次性瓦斯抽放，利用超前平导实现了正洞与

平导瓦斯抽放公用一套抽放系统一次性完成；通过瓦斯抽放后，开挖过程中涌入隧道风流的瓦斯总量大幅度降低，施工通风时间和能耗大幅度降低，施工中瓦斯防控难度降低，保障了施工人员及设备的安全。

3. Cultural features
突显人文特色

The station buildings along the railway highlighted local design characteristics. For example, in view of the importance of Zunyi to the “Long March” of the Communist Party of China, Zunyi Station has a three-section facade based on the buildings at the site of the Zunyi Conference. Other features are the traditional colonnades and arches. The two-story roof represents Xie-shan Mountain, while an elevated pedestal aims to evoke historical memories of the city. The Loushanguan South Station building evokes the city’s ancient buildings—dignified and solemn, with a highly elevated middle section, imposing columns, and protruding eaves. The Qijiang East Station building evokes the beautiful Qihe River, reflecting the abundant and beautiful local natural resources. The atmospheric but dynamic characteristics of the traffic buildings complement nearby business buildings and were designed with the theme of “setting sail.” The Chongqingxi Station building integrated the space on both sides of T-shaped station building, evoking the confluence of two rivers with the theme of “two rivers converging to shine on the pearl of the west,”—a reference to Chongqing.

沿线车站站房在设计上突显地方特色和人文特点。如遵义车站的站房设计，出于遵义特定的红色文化考虑，站房以遵义会址建筑为基石，加以提炼和提升，吸收会址三段式的立面风格，保留柱廊、拱等特色元素，采用传统风格，通过大气的两层歇山屋顶和厚重的石材墙面以及质朴的高台基座，带给人们扑面而来的历史气息，强调了城市的历史记忆。娄山关南站站房汲取古城楼符号，整体建筑端庄稳重，以现代手法重塑，中部高昂提拔，立柱坚挺有力，屋檐倾斜挑出，突显建筑的大气和震撼力。綦江东站站房设计与美丽的綦河相呼应，体现了当地自然资源丰富、秀美的特点，将交通建筑大气动感的特点与商业建筑时尚潮流的特点有机完美结合，充分体现了交通综合体的气度，寓意“起航”。重庆西站站房整体结合“T”型站房两侧空间，通过层叠的形态构成两江汇聚的壮阔景象，体现“两江汇聚耀西部明珠”的建筑创意，充分表达出重庆这座西部中心城市的明珠形象。

E. Significant Social and Economic Benefits Have Laid the Foundation for Sustainable Development
社会、经济效益显著，奠定可持续性发展基础

The construction of the Chongqing–Guizhou Railway has realized the goal of maximum speed of 220 km/h and an actual operating speed of 200 km/h, while achieving the safety goal of eliminating major safety accidents, eliminating road-traffic accidents, eliminating fire accidents, and realizing the construction-period goal of completion within 60 months.

渝黔铁路的建设，实现了实车最高检测速度220公里/时以及开通速度达到设计速度200公里/时的质量目标；实现了杜绝重大及以上施工安全事故，杜绝重大及以上道路交通责任事故，杜绝重大及以上火灾事故的安全目标；实现了总工期60月的工期控制目标。

The construction and opening of the Chongqing–Guiyang Railway has effectively

Chongqing West Railway Station
重庆西站

solved the railway transportation "bottleneck" between Chongqing and Guiyang. The Chongqing–Guiyang Railway adopted a high-standard double-track electrification scheme, and formed a three-line pattern with the existing Sichuan–Guiyang Railway, significantly improving passenger and freight services. The average rail travel time between Chongqing and Guiyang was shortened from ten hours to two hours, bringing Chongqing and Guiyang closer, improving the regional traffic structure, strengthening the division of labor between cities, promoting the development of tourism along the railway, and the development of small- and medium-sized cities. It has also effectively promoted logistical exchanges between the Southwest, the Northwest, and the Pearl River Delta/ Hong Kong/Macao, enhancing employment opportunities along the railway. In 2018, 125 pairs of trains operated at full capacity, serving 18.55 million passengers and achieving good economic and social benefits.

渝黔铁路的建成开通，有效解决了重庆至贵阳之间铁路运输的“瓶颈”问题。渝黔铁路采用高标准双线电气化方案，与既有川黔铁路形成三线格局，铁路客货运输服务水平显著提升。重庆至贵阳之间铁路平均旅行时间由10小时缩短至2小时，大幅压缩了重庆与贵阳的时空距离，改善了区域交通结构，加强了城市间分工协作和优势互补，带动了沿线旅游资源开发和中小城市发展，有效促进了西南、西北与珠三角、港澳等地区人员、物资交流，带动沿线地区人员就业。2018年项目最高开行列车125对，累计发送旅客1,855万人次，取得了良好的经济效益及社会效益。

Loan 3459-PRC:

Chongqing Integrated Logistics Demonstration Project

重庆综合物流示范项目

A. Project Overview
项目概况

The project was initiated and implemented by the Chongqing Municipal Government under the strategy to develop Chongqing's logistics industry as a key driving force and gateway for outward development and opening-up. The project includes five major outputs: (i) Chongqing Transportation Logistics Park, (ii) Nanpeng Highway Logistics Park, (iii) Yangtze River Inland Waterway Roll-on Roll-off (Ro-Ro) operations, (iv) Chongqing Intelligent Logistics Information Platform, and (v) institutional capacity building. The project's total investment is $427.79 million, of which Asian Development Bank (ADB) loan accounts for $150 million. The project will help Chongqing better realize its advantages in terms of the outbound logistics corridor, promote development of an innovative of logistics hub, optimize the distribution of logistics resources, improve the quality and efficiency of hub development, strengthen demonstration role of Chongqing's national logistics hub network in the western region, and boost development of Chongqing's inland international logistics hub.

重庆综合物流示范项目由重庆市政府策划实施。项目包括重庆交运物流基地项目、重庆公运南彭物流园CD区项目、长江水陆甩挂运输项目、重庆智慧物流公共信息平台项目和机构能力加强五个产出。重庆现代物流示范项目总投资4.2779亿美元，其中利用亚洲开发银行贷款1.5亿美元，其余部分依靠国内配套资金进行实施建设。项目建设将有助于重庆发挥出海出境大通道体系优势，推动物流枢纽发展创新，优化物流资源配置，提高枢纽发展质量和效益，强化重庆国家物流枢纽网络在西部区域支撑示范作用，助推重庆内陆国际物流枢纽和开放高地建设。

B. Project Management and Implementation Highlights
项目管理及实施方面亮点

1. Highlights on Institutional Arrangement
机构设置亮点

Timely establishment of a three-level management mode with clear responsibilities at all organizational levels, and an improved communication mechanism, which has laid the foundation for orderly implementation of the project.

及时组织设立三级管理模式，明确各级机构职责，完善沟通机制，为项目有序实施奠定基础。

The executive agency, Chongqing Municipal Government established Chongqing Project Management Office (CPMO) within Chongqing Development and Reform Commission (CDRC), responsible for guiding, supervising, coordinating, and managing the project. The CPMO has many years of experiences in implementing ADB-funded projects and adopted a functional organizational structure and flat management mode to ensure timely planning and arrangements for overall project implementation, while also guiding and supervising the project implementation. The implementing agency, Chongqing Transportation Holdings Group, is one of the largest integrated transport backbone enterprises in the People's Republic of China (PRC), with large-scale assets, wide network coverage, and the competitive strengths. It developed a suitable management method for implementing the project and the related matters. This overall institutional arrangement laid a solid foundation for project quality control and timely implementation.

执行机构重庆市政府在重庆市发改委设立了重庆市亚行办，对项目进行全面指导，监督，协调和管理。重庆亚行办具有多年亚行项目策划和实施经验，采用职能型组织架构及扁平化的管理模式，宏观方面对项目实施进行合理的时间规划与安排，微观方面对项目实施的具体工作进行指导和监督。实施机构重庆交通运输控股 (集团) 有限公司及时在集团内部成立了实施机构项目办，对四个子项目实施单位进行统一监督管理。重庆交通运输控股 (集团) 有限公司作为重庆市重点国有企业，是全国资产规模最大、网络覆盖最广、综合实力最强的大型综合运输骨干企业，在项目之初就积极制定了适用于的亚行贷款的管理办法等相关制度，对项目进行了系统化管理，落实了相关责任主体。以上设置为项目保质量、按计划实施奠定基础。

2. Highlights on Project implementation
项目实施进展方面亮点

Once the project was approved, the executing agency and the implementing agency designated adequate staff to be responsible for project management, and a regular reporting mechanism was established to provide timely reports on the progress of project implementation. The CPMO also mobilized consultants to visit the project sites regularly to ensure construction quality.

项目批准后，执行机构和实施机构指定专人负责项目管理，建立了定期报告制度全面监控项目实施进展，重庆市亚行办组织专家定期前往现场检查，确保项目施工质量。

The loan agreement and project agreement were signed on 5 June 2017 and became effective on 15 August 2017. By the end of 2018, implementation of the project was progressing smoothly and two civil construction contracts and seven consulting services were in place. Earthworks for zones A and B and the subproject (Phase I), Chongqing Transportation Logistics Base, was under construction. A detailed proposal for a Yangtze River Ro-Ro transport inland waterway was further optimized. Meanwhile, the Nanpeng Logistics Park subproject was completed and started operations in March 2017.

亚行的贷款协议和项目协定于2017年6月5日签订，于2017年8月15日生效，截止2018年底，已顺利完成2个土建合同及7个咨询服务采购；交运物流基地子项目下重庆交运物流基地AB区土石方工程、重庆交运物流基地建设工程 (一期) 已开始施工建设；长江水陆甩挂运输项目内容做了进一步的完善；南彭物流园子项目已于2017年3月完成并已开始运营。

3. Highlights on Safeguards
保障政策亮点

1) Enhancing public consultation
加强公共参与

An independent mechanism for addressing complaints has been set up for the project, which has enhanced the supervisory role of the public on environmental protection and resettlement activities. At the same time, CPMO and the project implementation units have maintained close contact with affected villages and towns, following up promptly on their demands and opinions through external monitors on environmental and resettlement issues.

Nanpeng Logistics Park under construction
建设中的南彭物流园

坚持以人为中心的发展思想，加强了公众参与的力度，设立了项目的独立申诉机制，充分发挥公众在环境保护与移民安置的监督作用。同时，重庆市亚行办及项目实施单位与乡镇紧密联系，聘请环境、移民外部监测专家对受影响人民群众进行问询，及时了解和解决群众诉求。

2) Enhancing Information Disclosure
加大宣传力度

In line with the project's overall mandate to rehabilitate waterways and green the countryside, CPMO regularly mobilized consultants to conduct training to contractors on ADB practices and policies, as well as on national policies on environmental protection, resettlement, gender action plans, and other relevant issues.

牢固树立和践行“绿水青山就是金山银山”理念，重庆市亚行办定时组织咨询专家组织相关培训，对亚行及国家关于环境保护、移民安置、性别行动计划等方面的政策和要求进行普及。

4. Highlights on Financial Management 财务管理方面的亮点

Establishing an organizational structure for financial management with clear responsibilities. A three-level financial management system was established for the project. The Chongqing Finance Bureau is responsible for overall management, guidance, and supervision of implementation, as well as the fund management and financial management of the entire project. CPMO has designated staff responsible for overall project management, guidance, and coordination. The finance division of the transportation group is responsible for daily management, coordination, guidance, and supervision of financial issues for the four project implementation units. The finance divisions of the four project implementation units are responsible for the routine financial management of their respective subprojects under the guidance and supervision of the finance division of the transportation group.

建立职责明确的财务管理组织构架。本项目实行执行机构、项目实施机构、项目实施单位三级财务管理组织机制，财务管理工作分工明确。重庆市财政局负责管理、指导和监督整个项目的实施、资金管理和财务管理等工作，重庆市亚行办设有专人负责整体项目的管理、指导和协调工作；交运集团财务部负责对4个项目实施单位的财务管理工作进行管理、协调、指导和监督；4个项目实施单位的财务部负责各自项目日常财务管理工作，同时接受交运集团财务部的指导和监督。

Preparing project financial management regulations. In order to standardize the use of funds and regulate the financial management, Chongqing Finance Bureau developed a “Financial Management Manual for ADB Loan of Chongqing Integrated Logistics Demonstration Project” in accordance with ADB and national rules and regulations. The manual clarifies financial management regulations, procedures, permissions, and responsibilities.

及时制定项目财务管理规则。为规范贷款资金使用和财务管理，重庆市财政局根据国家相关规章制度和亚行相关规定，结合项目法律文件和项目特点，及时制定《亚洲开发银行贷款重庆现代物流示范项目财务管理手册》，明确项目财务管理方面规则、程序、权限和责任。

Strengthening financial management institutional capacity. In line with the progress of project implementation, CPMO arranged the consultants to conduct training on accounting and reimbursement procedures to the concerned staff at the thee levels. Prior to the annual audit, CPMO also conducted an annual financial inspection to ensure compliance with financial management regulations. The training sessions and inspections have helped the stakeholders better understand ADB's financial management requirements and procedures and ensured smooth execution of financial management activities.

加强财务方面机构能力建设。根据项目实施进展情况，重庆市亚行办多次组织咨询专家组进行财务核算、提款报账等培训，提高项目相关方财务管理能力。每年审计组进场前，重庆市亚行办组织咨询专家组进行项目年度财务检查，确保项目财务管理合规。通过以上培训和检查，加深相关方对于亚行财务管理要求和程序的认识，确保后续财务工作的顺利开展。

C. Social, Economic, and Environmental Benefits
社会、经济效益、环境效益

1. Social benefits
社会效益

The project will directly benefit 2.92 million people in the three project areas, indirectly benefiting 7.22 million residents in Chongqing, as well as 8,412 enterprises engaged in the logistics business with some 386,800 employees. Specific benefits include, improving logistics facilities, improving the efficiency of logistics operations and management, ensuring the supply of goods needed in the daily lives of local residents, reducing the cost of freight transport and consumer prices, improving urban traffic conditions (safety and congestion), reducing urban pollution and automobile emissions, and increasing employment opportunities.

项目将使目前生活在三个项目区的292万人直接受益，使重庆市722万居民、8,412家从事物流业务的企业和386,800名从业人员间接受益。具体效益包括改善物流设施、提高物流运营和管理效率、保证商品供应和当地居民的日常生活、降低货物运输成本及消费品价格、改善市区交通状况(安全和拥堵)、减少市区污染和汽车排放、增加就业机会。

2. Economic benefits
经济效益

The main economic benefits of the project include expanded storage capacity, reducing the cost of loading and unloading goods, and reducing urban traffic congestion. When fully operational, the annual benefits of the expanded storage capacity, the reduced costs of loading and unloading goods and avoiding traffic congestion will be CNY329.4 million, CNY46.5 million and CNY15.4 million respectively. The profits for zones C and D at Nanpeng Logistics Park will be CNY121.07 million, CNY53.84 million, and CNY10.13 million respectively, through expanded storage capacity, reduced loading and unloading costs, and reduced traffic congestion. When the Yangtze River Inland Waterway Drop-and-Haul Transport system subproject is fully operational, total annual savings in terms of fuel consumption, wages, maintenance, and recurring costs could amount to CNY92.55 million (63% of which will be savings on fuel). The quantitative economic benefits of the logistics information system are in saved time and reduced idle time waiting for loading. Assuming that the system can serve 50% of 3,000 trucks per year and that the daily cost for each truck idle in Chongqing is CNY400 and that the average waiting time for trucks can be reduced by an average of one day when the waiting time exceeds 14 days, savings of CNY750 could be realized for each truck, or a total annual saving of CNY15.6 million, while the total added value for transportation would be CNY73.6 million.

项目的主要经济收益包括扩充仓储容量、降低装卸载货物成本及降低市内交通拥堵情况。在满负荷运作条件下，扩充仓储容量，降低装卸载货物成本和避免交通拥堵三方面每年所获收益分别为人民币32,940万元、4,650万元和1,540万元。南彭物流园C和D区子项目，每年通过扩充仓储容量，降低装卸载货物成本和避免交通拥堵所获收益分别为人民币12,107万元、5,384万元和1,013万元。长江内河甩挂联运系统子项目在满负荷运作条件下，每年通过燃料消费、工资、维修和经常费用所节约的成本总计人民币9,255万元（其中63%来自燃料消耗）。物流信息系统的可量化经济收益来自于时间节省和减少空跑和等候装货的

闲置时间。假设系统每年能为3,000辆货车中的50%服务，每辆在重庆搁置的卡车每日成本为人民币400元，本项目货车等待时间超过14天的情况下减少平均1天的等待时间，可实现每趟运输附加值人民币750元，每年时间节省计人民币1,560万元，运输附加值总计人民币7,360万元。

3. Environmental benefits
环境效益

The project will reduce urban traffic jams, reduce air pollution, save energy, and reduce emissions. When the project enters the operational phase, it could reduce CO_2 emissions by 3,180 tons per year.

项目将减少城市内部的交通堵塞，减少空气污染，节能减排，当项目进入运营阶段，每年将减少二氧化碳排放3,180吨。

D. Innovation Features
项目创新

1. The Cloud-Based Intelligent Logistics Public Information System，the core innovation of the project will provide a good demonstration effect for the entire industry.
智慧云物流信息系统——智慧物流平台子项目是本项目最核心的创新内容，具有很好的行业示范性：

Based on the mobile internet, cloud computing, big data and other emerging technologies, the project is developing a logistics industry chain-cloud platform and logistics industry big data platform covering all modes of transport. It also contributing to opening up all logistics links, connecting all kinds of logistics resources, realizing interconnection, improving the integration

Chongqing transportation logistics base under construction
建设中的重庆交运物流基地

Intelligent logistics platform unveiled for the first time
智慧物流平台亮相首届中国国际智能产业博览会

of information for the logistics industry as a whole, realizing the overall online and digital logistics business, improving overall logistics operational efficiency, and reducing logistics costs for all of society.

是依托移动互联网、云计算、大数据等新兴技术搭建的物流全产业链云平台和物流行业大数据平台，覆盖所有运输方式，打通每个物流环节，联接各种物流资源，实现互联互通，整体提高物流行业信息化水平，实现全行业物流业务全面在线化、数据化，从而提升物流整体运营效率、降低全社会物流成本。

Based on the three international logistics channels/corridors from Chongqing, international logistics big data will be gathered and processed, promoting the growth of Chongqing as an inland international logistics distribution center, as well as the inland open highlands. Logistics industry big data will promote logistics innovation. Taking logistics field station resources and urban and rural logistics distribution as the driving forces, an intelligent logistics platform can further mobilize and integrate social logistics resources, international domestic trunk highway transportation, urban and rural logistics distribution, and realize integrated logistics development.

是依托重庆三大国际物流通道，集聚形成重庆国际物流大数据，助推重庆内陆国际物流分拨中心和内陆开放高地建设。能集聚形成物流行业大数据，进而依托大数据促进物流创新发展。以物流场站资源和城乡物流配送体系为带动，依托智慧物流平台集聚社会物流资源，打通国际国内干线运输、城市物流配送和农村物流，实现物流一体化发展。

This platform innovation model is relatively new to the logistics industry in the PRC. The project can, in other words, successfully introduce advanced ideas, effectively solve problems associated with logistics informatization, assist in adapting to the development trend of intelligent innovation of big data in the industry, while also promoting coordinated development of the western provinces and cities with Chongqing as the operations center, and providing replicable and referential experience for the implementation of other similar ADB projects.

这种平台创新模式在中国的物流领域，这是相对较新的内容，通过本项目，可以成功引进先进理念，有效解决物流业信息化问题，适应行业大数据智能化创新发展趋势，进而促进以重庆为运营中心的西部省市协同发展，也将为亚行其他的同类型项目执行提供可复制及可参考的经验。

2. Ecological Logistics Park—the design of two logistics parks integrates the concept of ecological logistics park development, based on the concept of ecological and environmental protection, energy conservation, and green development.
生态物流园区——两个物流园区的设计整合生态物流园发展的理念，基于生态和环境保护、能源节约、绿色发展的理念进行设计。

1) Focus on integrated Planning of Ecological Park
注重生态园区规划

A circular route around the park was planned in order to relieve internal traffic flow. Planning also featured various functional zones based on a logistics simulation mode and other technologies, with the aim to reduce interference to business operations. The general layout was in line with logistics development trends, with optimized transportation routes to minimize emissions. Logistics modes are well integrated with the topography of the project area and with the aim to maximize benefits. In order to reduce project implementation risk, intensive development is a critical step.

使用环状路线规划缩短物流园内部交通流线，采用物流仿真模式等技术，以业务流程为导向，按照业务流程和流向设置各功能分区，减少业务操作的交叉和干扰；根据物流生态化发展趋势，合理设计物流总平面布局，运输线路达到最优、减排量降到最低；根据项目区的地形，合理将各物流形态完美结合，切实做好规划设计的独特性和可操作性，创造效益最大化；以集约化发展为准则，为减少项目实施风险。

2) Focus on Ecological Environmental Protection and Green Building Materials
注重生态环保与绿色建材

In terms of the project facilities' vertical design, the elevation has been adjusted to the maximum extent. Earthworks in the field have also been balanced as far as possible to minimize impact on traffic in the park. In accordance with the planning, building density has been strictly controlled, with minimized hardened ground (concrete, stone), more green spaces, and permeable paving and green roofs. The layout of each building is also optimized for natural lighting and natural ventilation in accordance with the topography. Local species of trees have been planted for easy survival and low maintenance and local building materials were used. Low-E glass reduces thermal radiation and reduces energy costs for buildings. Appropriate thermal insulation materials coupled with a technical system were also adopted in view of possible increases of heat dissipation requirements in the future.

项目竖向设计最大限度的调整标高，在满足合理交通组织的前提下，尽可能场内平衡土方，根据规划条件、要求严格控制建筑密度，尽量减少硬化地面，(混凝土、石材、板材) 保持足够的绿地和透水植草铺装，并且设置了屋顶绿化；依照地形特征，尽量将每栋建筑布置为最佳朝向，建筑群体和建筑单体的布置有利于天然采光和自然通风；树种采用优良的地方乡土树种，易成活及养护，建筑材料就地取材，建筑玻璃的选择LOW-E玻璃，降低热辐射从而较少建筑物的能耗损失；选取合适的保温材料和机械系统，以考虑未来可能增加散热要求。

3) Focus on the Recycling of Energy Resources
注重能源资源循环利用

Hygienic water-saving solutions were applied to fully take advantage of the municipal water supply network's water pressure for direct water supply. Surrounding greenery is watered via micro-spray, drip irrigation and other water-saving methods. The water storage pools (boxes) were equipped with alarms in the event of water overflow to prevent long-term overflow. Permeable pavement was adopted for areas with no freight-vehicle traffic, allowing collected rainwater runoff to replenish underground water. These approaches are based on the sponge city concept, with controlled surface runoff. Energy-saving features, such as LED lighting, were also widely used to improve the efficiency of energy utilization.

选用节水型卫生洁具及配水件，充分利用市政给水管网的水压直接供水；绿化用水采用微喷滴灌等节水方式浇洒；水池 (箱) 设报警溢流水位，防止长时间溢流排水；非货运车辆通行区采用透水路面，部分雨水径过雨水径流渗透到地下补充地下水源；海绵城市按设计设置透水铺装，下沉式绿地等，合理控制地表径流系数；加大LED等节能设备的使用，提高能源利用率等。

Urban and Social Development
城市和社会发展

Loan 2760-PRC:
Gansu Tianshui Urban Infrastructure Development Project
甘肃天水城市基础设施发展项目

A. Project Briefing
项目概况

Asian Development Bank (ADB) approved a $100 million loan on 29 June 2011 to promote balanced and environmentally sustainable urbanization, and to improve living conditions in Tianshui by improving heat, transport, and flood control services. The loan and project agreements were signed on 25 Oct 2011 and became effective on 14 May 2012. The project has now been completed and is in operation.

亚洲开发银行于2011年6月29日批准提供1亿美元贷款，通过改善供热、道路交通和防洪设施改善天水的生活条件，以促进天水市平衡发展和环境可持续的城市化进程。该项目贷款于2011年10月25日签署贷款文件，2012年5月14日贷款生效。目前，项目已建成投产。

The project site is located in the poverty-stricken Qinzhou and Maiji districts of Tianshui City. The project comprises four parts: an urban district heating network, Chengji road and flood control facilities, Tianshui urban transportation improvements, and institutional strengthening and capacity building. Total investment is estimated at $229.6 million, of which ADB loans account for $100 million. The executing agency is the Tianshui Municipal Government, with the urban district heating network project implemented by Tianshui City Heating Company, and the road and bridge project implemented by Tianshui City Construction Investment Group.

项目地点位于天水市秦州区和麦积区（贫困区）。项目由城区集中供热管网、成纪大道及防洪综合治理、天水城市交通改善及机构加强和能力建设四部分组成，估算总投资2.296亿美元，

其中亚行贷款1亿美元。项目执行机构为天水市人民政府，其中城区供热管网工程由天水市供热公司实施，路桥项目由天水市城市建设投资（集团）有限公司实施。

B. Project Construction Achievements
项目建设成果

1. Urban District Heating Network
城区集中供热管网工程

The project laid a 2x39 km primary heating network, built 76 heat exchanger stations and one centralized thermal dispatching center. Huaneng Tianshui Thermal Power Plant was originally planned to be constructed as the main heating source in the urban heating network subproject, but construction was cancelled by Huaneng Group. In July 2013, the Tianshui Municipal Government reported to representatives of ADB, the National Development and Reform Commission (NDRC) and the Ministry of Finance (MOF) in Beijing on the construction of the Qinzhou Heat Source Plant to replace the Huaneng Tianshui Thermal Power Plant as the main heating source, agreeing to build a self-funded 580 = 5x116 MW Heat Source Plant to replace the Huaneng Thermal Power Plant. The environmental protection of the new system meets the highest requirements of the latest “Boiler Air Pollutant Discharge Standard” with close to super-clean emissions. It was put into trial operation in 2018. The new system covered 8.48 million m^2 of district heating in 2018. It is expected that by 2020, the heating coverage of this project will reach 15 million m^2, and more than 400,000 users will directly benefit from the new system.

该项目设计敷设一级供热管网2x39公里，建设换热站76座，配套建设集中热力调度中心1座。城区供热管网子项原定利用华能天水热电厂作为主供热源，后因华能集团取消天水热电厂建设项目，2013年7月，天水市政府于北京，就建设秦州热源厂替代华能天水热电厂作为主供热源事宜，向亚行代表、国家发改委及财政部进行了汇报，并取得了一致同意，利用自有资金新建一座580=5x116兆瓦的热源厂来替代华能热电厂。新系统环保排放满足最新《锅炉大气污染物排放标准》最高要求，接近超净排放，并于2018年正式开始试运行。新系统覆盖的区域供热服务面积2018年达到848万平方米。预计到2020年，本项目供热覆盖的服务面积将达到1,500万平方米，超过40万用户直接受益于新系统。

2. Chengji Road and Flood Control Facilities
成纪大道及防洪综合治理工程

Located on the banks of Jihe River, the project comprises a main road connecting Qinzhou and Maiji districts, starting from Minshan Road in Qinzhou District in the west and Xiakou Village in Maiji District in the east, and connecting Weibin North Road in Maiji District via Xiakou Weihe River Bridge. The total length of the road is 12 km, the width of the road is 24 m, the length of the bridge is 1,370 m, and the total length of Jihe River flood dike is 10.65 km. Construction started in June 2012 and was completed and opened to traffic in June 2016.

工程位于藉河北岸，是连通秦州和麦积两区的主要道路，西起秦州区岷山路，东至麦积区峡口村，并通过峡口渭河大桥横跨渭河与麦积区渭滨北路相连。道路全长12公里，道路宽24米，桥梁长度1,370米，藉河防洪堤总长10.65公里。该项目于2012年6月开工建设，于2016年6月竣工通车。

Maiji new town road network
麦积新城路网

3. Maiji New Town Road Network Project
麦积新城路网工程

The project, Located in Maiji District, comprises four new roads with a total length of 3 km and a red-line width of 24–30 m, all constructed according to the Class II Standard. Construction started in January 2013 and was completed and opened to traffic in June 2016.

该项目位于麦积区，新建4条道路，总长度3公里，红线宽度24~30米，均为城市Ⅱ级次干道，该项目于2013年1月开工建设，于2016年6月竣工通车。

4. Chiyu Municipal Road Project
赤峪路市政道路工程

The construction of this project aims to solve a traffic bottleneck problem at the west exit from Tianshui City, improve the connection between the Tianding Expressway entrance and the main traffic trunk road in Tianshui City. The road starts from Tianshui County crossing in the east, and the entrance to the Tianshui West Toll Station of the Baoji–Tianshui Expressway in the west. The road is 1,980 m long and the red-line width is 40 m. Construction began in January 2013 and was finally completed and opened to traffic in June 2014.

该项目的建设是为了解决天水市西出口当前面临的交通瓶颈问题，改善天定高速出入口与天水市区主要交通性干道的联系，道路东起天水郡十字，西至宝 (鸡) 天 (水) 高速公路天水西收费站出入口，道路全长1,980米，红线宽40米，该项目于2013年1月开工建设，2014年6月竣工通车。

5. Shetang Weihe River Bridge Project 社棠渭河大桥工程

The project, located in Shetang National Economic and Technological Development Zone, Maiji District, Tianshui City, is an important bridge connecting the northern and southern regions of the development zone. The total length of the bridge is 836 m and the width is 20 m. Construction began in January 2013 and was completed and opened to traffic in May 2015.

工程位于天水市麦积区社棠国家级经济技术开发区，是连接开发区南北区域的重要桥梁,线路总长836米，宽20米，该项目于2013年1月开工建设， 2015年5月竣工通车。

6. Shuangqiao Bridge Project 双桥大桥工程

The project, located in Qinzhou District of Tianshui City, starts from Xihuang Avenue in the south, and crosses Jihe South Road, the Jihe River and Jihe North Road, ending at Yongqing Road. The width of the Shuangqiao Bridge is 24 m and it is 807 m in length. Construction began in May 2014 and was completed and opened to traffic in June 2016.

工程位于天水市秦州区，南起羲皇大道，依次上跨藉河南路、藉河及藉河北路，终点接永庆路。双桥大桥主桥宽度为24米，路线全长807米。项目自2014年5月开工建设，于2016年6月竣工通车。

Shetang Weihe River Bridge
社棠渭河大桥

7. Institutional Strengthening and Capacity Building
机构加强和能力建设

Institutional strengthening and capacity building were implemented throughout the entire process of project construction, and the quality of institutions and staff skills have been greatly improved.

机构加强和能力建设贯穿项目建设全过程，机构及全员素质得到很大提高。

C. Project Highlights
项目亮点

1. Project Team and Collaboration
项目团队及协作

The strong support of MOF, ADB, and provincial, municipal, district and township governments has provided an important support for the smooth implementation of the project. Government departments operated with a clear division of labor and made full efforts to cooperate with each other. In terms of fund management, land requisition, land acquisition and resettlement, project review and approval, the implementing units cooperated fully with each other, and the functional departments performed their duties and responsibilities. The local government in particular made great efforts to ensure the project was a success, despite considerable financial difficulties, securing the funds required for project construction.

财政部、亚行、省、市、区、乡镇政府的大力支持，对项目顺利实施提供了重要的组织保障。政府相关职能部门分工明确，通力协作，在项目实施中的资金管理，征地拆迁与移民安置，项目评审与批复等环节中，各实施单位配合默契，各职能部门尽职尽责，尤其是项目所在地政府，在财政相当困难的情况下，经努力保证了项目建设所需要的资金。

2. Project Management
项目管理

The introduction of ADB's advanced concepts and management methods played a good demonstration role in urban development for Gansu Province. Urban infrastructure construction investment levels are huge, but direct economic benefits are more difficult to see. The use of ADB loans to implement urban infrastructure construction is a useful attempt to correct this. The macro-friendly development concept advocated by ADB not only ensured the smooth implementation and sustainable operation of the project, but also provided a good demonstration effect in terms of infrastructure construction and management of operations for other cities.

引入亚行先进理念和管理方式，对甘肃省城市发展起到了良好的示范作用。城市基础设施建设投资额较大，但产生的经济效益难以直接体现，此次利用亚行贷款实施的城市基础设施建设，就是一个有益的尝试。通过亚行所倡导的宏观友好的发展理念、不仅保证了本项目的顺利实施和可持续运行能力，而且对其他城市基础设施建设和运营管理产生了良好的示范效应。

The International Branch of the Gansu Provincial Finance Department has rich experience in project management for international financial organizations and an effective work style, which has played a key role in promoting the smooth implementation of the project, constantly implementing innovative working methods in accordance

with changing situations, and effectively guiding the implementation of the project.

甘肃省财政厅国际处具有丰富的国际金融组织项目管理经验和卓有成效的工作作风，对项目顺利实施起到了关键性的推动作用，并且根据情况变化不断创新工作方法，有力的指导了该项目的实施。

The roles of the consulting firm and the bidding agency were brought into full play, providing strong technical support for the smooth implementation of the project. Consulting experts, comprising a group of experienced engineers and experts in related fields of infrastructure engineering at home and abroad, have done a lot of work in land acquisition, environmental monitoring, design review, bidding and procurement, contract management, financial management, and institutional strengthening, which has played a positive role in promoting the implementation of the project.

充分发挥了咨询公司和招标代理机构的作用，为项目顺利实施提供了有力的技术支撑。咨询专家由一批国内外经验丰富的工程师和基础设施工程相关领域的专家组成，在移民征地、环境监测、设计审查、招标采购，合同管理、财务管理与机构加强等方面做出了大量的工作，对项目的实施起到了积极的推动作用。

D. Social, Economic and Environmental Benefits
项目的社会、经济、环境效益

The total GDP of Tianshui City in 2011 was CNY35.76 billion ($5.1 billion), and the average annual disposable income of urban residents was CNY13,051 ($1,862).

In 2018, the total GDP of Tianshui City was CNY65.205 billion ($9.303 billion), and the average annual disposable income of urban residents was CNY26,581 ($3,792).

项目基期 2011年天水市的GDP总量为357.6亿元，城市居民年均可支配收入为13,051元。2018年天水市的GDP总量为652.05亿元，城市居民年均可支配收入为26,581元。

The completion of the project has played a positive role in promoting the social, economic, and ecological development of Tianshui City. Firstly, the implementation of the Chengji road and comprehensive flood-control project not only provided protection for urban rivers but also mitigated the threat of flood disasters. The project has solved the difficult problem of simultaneously resolving traffic issues and the threat of flooding, improving traffic conditions in Qinzhou and Maiji districts, and promoting the development and utilization of roadside land. The construction of future municipal pipelines, electric power, communications, and other urban infrastructure will have a spillover effect on other economic centers, bringing Tianshui City's situational advantages into full play, and promoting regional socio-economic overall development. Secondly, the implementation of urban road and bridge infrastructure projects, will organically link urban functional areas, forming a link between the outer ring road and the inner ring skeleton road network, improving urban traffic problems that were in need of an urgent solution Thirdly, the heat supply network project and related projects in the urban area covered by the Qinzhou Heat Source Plant Project covers the entire urban area between the north and south mountains.

项目的建成对天水市的社会、经济和生态发展起到积极地推动作用。一是通过实施成纪大道及防洪综合治理工程既处理好了城市河流保护，又能避免洪水灾害的威胁，项目比较好地解决了交通与防洪相结合的难题，改善了秦州、麦积两区的区域交通条件，推动了道路周围土地的开发和利用，带动沿线市政管道、电力、通讯等其它城市基础设施的建设，增强经济中心城市的辐射作用，促进天水市区位优势的发挥，推动了区域社会经济的全面发展。二是通过实施城市路桥基础设施项目将城区功能区间有机的串联起来，形成外围环路与环内骨架路网的联接，有针对性的提升了城区急需解决的交通问题。三是城区供热管网工程和关联项目——秦州热源厂项目供热区域涵盖南北两山之间的整个主城区。

Through the use of an efficient central heating system and advanced emission control equipment, the project will consume less coal (237,120 tons of standard coal per year), replacing 194 small, high-polluting, low-energy efficiency boilers and thousands of household heating furnaces, significantly improving the air quality of the city, reducing emissions such as TSP, PM10, SO_2, NOx, etc. and contributing to reducing acid rain, which has a negative impact on crop production and water quality. At the same time, the project also promoted the reduction of emissions from motor vehicles, and promoted improved ambient air quality by achieving more efficient operating conditions, while also shortening

Qinzhou Heat Source Plant
秦州热源厂

travel times. Over the next 20 years (2017–2036), a total of approximately 746.6 million liters of gasoline are expected to be saved—an average of 37.33 million liters annually, reducing greenhouse gas emissions by about 85,859 tons annually. In other words, the environmental and social benefits are significant.

该项目通过使用高效集中供热系统和先进的排放控制设备，将消耗更少的煤炭 (每年减少237,120吨标准煤)，以取代194座高污染、低能效的小型锅炉和上千个家庭取暖炉，显著改善了城市的空气质量，减少了TSP、PM10、SO_2、NOx等污染物排放和有助于酸雨减少，对农作物生产和水污染负面影响降低。同时项目也促进机动车污染物减排，并通过实现更高效运营条件以促进环境空气质量改善，同时缩短出行时间。未来20年 (2017至2036年) 预计总共节省汽油燃烧约7.466亿升，即年均节省汽油3,733万升，从而年减少约85,859吨的温室气体排放(二氧化碳当量)。环保效益和社会效益显著。

E. Experience in Project Implementation
项目实施的经验

1. The importance of government departments placed on the project were key to its success
政府各部门的高度重视是项目成功的关键

Leaders of various government departments attached great importance to the project, actively implementing supporting funds, often listening to reports on the implementation of the project, personally inspecting and guiding work in the project area, and holding many special meetings to study and deploy project construction, while also coordinating and providing important instructions with regard to certain major project problems. This ensured smooth completion of the project.

政府各部门领导对项目非常重视，积极落实项目配套资金，经常听取项目实施情况汇报，亲自到项目区检查指导工作，并多次召开专门会议，研究部署项目建设相关工作，对项目中一些重大问题出面协调并给予重要指示，从根本上保证了项目的顺利完成。

2. Perfect organization and good cooperation between departments guaranteed project success
健全的机构和搞好部门配合是项目成功的保障

The Tianshui Finance Bureau, Development and Reform Commission, Construction Bureau, Water Conservancy Bureau, and Environmental Protection Bureau set up project leadership groups to coordinate and manage the work of the implementing agencies, strengthening project organization and ensuring smooth implementation of the project. The municipal project management office and the project implementation organization were headed by Tianshui City Construction Investment Group. and Tianshui City Heating Company. Their experienced professionals were enthusiastic about their work. Most had participated in the organization and management of national projects. Through on-site consultation and training courses, employees played an irreplaceable role in project design and implementation, providing strong technical support for project implementation.

财政局、发改委、建设局、水利局和环保局组建了项目领导小组，协调管理各实施机构的工作，加强项目组织机构，确保项目的顺利

实施。其下设市项目管理办公室，项目实施机构设在天水城市建设投资（集团）有限公司和天水市供热公司。配备有本专业的骨干专业人员，对工作充满热情。他们中的大多数都有丰富的经验，参与了国家项目的组织和管理。通过现场咨询和培训课程，员工在项目设计和实施中发挥了不可替代的作用，为项目实施提供了强有力的技术支持。

3. Perfecting the system and standardizing management were crucial to smooth project implementation
制度完善、管理规范是项目顺利实施的重要条件

In order to realize the standardization and systematization of project management, the executing agency issued a series of rules and methodologies in the early stage of project implementation, such as a resettlement scheme, project management methods, project bidding and procurement management methods, project financial management methods, project fund extraction and reimbursement management methods, and accounting methods. The project contractor followed the overall requirements of EAS in accordance with local conditions. These management methods provided clear procedures and standards for project implementation, and provided a path to follow for project implementation and management.

为了实现项目管理的规范化、系统化，项目执行机构在项目实施初期发布了一系列的规章制度和方法，如移民安置方案、项目管理办法、工程管理办法、项目招标采购管理办法、项目财务管理办法、项目资金提取和报销的管理方法和核算方法。项目承包商遵循项目执行机构的总体要求，并符合当地条件。这些管理方法为项目实施提供了明确的程序和标准，使项目实施和管理有了一条可遵循的道路。

4. Scientific planning and elaborate design are the foundation of project success
科学规划、精心设计是项目成功的基础

The purpose of the project was to solve key issues that restrict the development of urban infrastructure. Combining the city's recent economic trends and problems of urban economic development, the project team scientifically designed activities and implementation plans. In order to solve the contradiction of scarcity of land resources and the need for urban development through comprehensive planning, the project adopted an urban planning method that combined engineering, economy, and management, and achieved its actual urban infrastructure construction goals. It is worth mentioning that the basic principles for achieving optimum design were introduced during midterm review. It encouraged municipalities to use the research results of recent decades to assess project areas from the perspective of optimum design and sustainable development. On this basis, suggestions were put forward, and the project design was adjusted to optimize the overall design of the project, representing a new way of scientifically guiding practice.

本项目的切入点是解决制约城市基础设施发展的关键因素。结合城市经济发展的新形势和新问题，项目组科学设计了活动和实施方案。为解决土地资源稀缺与城市发展的矛盾，突出综合规划，本项目采取工程、经济、管理相结合的城市规划方式，实现了真正意义上的城市基础设施建设目标。值得一提的是，在项目实施中期，引入了适应最优设计的基本原理。它促使市政当局使用近几十年的研究成

果，从适应最佳设计和可持续发展的角度评估项目区域。因此，提出了建议，并在此基础上对项目设计进行了调整，以优化项目的总体设计。这是科学指导实践的新途径。

5. A training and technical assistance focus was fundamental to project success
注重培训和技术援助是项目成功的根本

Science and technology were the primary productive forces. The project adhered to the principle of relying on scientific and technological progress to improve project implementation. According to statistics, in the past seven years, the project involved some $1.43 million in consultation, accounting for 1.43% of total ADB funding. The investment was mainly used for introduction, demonstration, technology, and technical training. Through the provision of training and through participation, consultation by higher-education and academic institutions promoted the adoption of new technologies and improved project implementation.

科学技术是第一生产力。项目坚持依靠科技进步提升项目实施效果的原则。据统计，近七年来，该项目在咨询方面投入约143万美元，占亚行基金总投资的1.43%。投资主要用于引进、示范、技术和技术培训。通过提供培训和参与，参与项目实施的高等教育和学术机构的咨询，促进了新技术和成果的采用，提高了项目实施水平。

6. Good financial management measures were the key to project success
良好的财务管理措施是项目成功的关键

It was ensured that project funds were earmarked for special uses such as setting up special accounts and special management and accounting by project implementing units, forming a perfect management system, employing experienced personnel in key links such as repayments and reimbursements to carry out regular financial and reimbursement training on annual basis, and strengthening the management and supervision of the entire project funding process, strengthening process audits to ensure the standardized use of funds.

保证项目资金专款专用，项目实施单位设置专用账户，专人管理、专人核算，形成了完善的管理体系，在提款报账等关键环节聘请有丰富经验的人员每年定期开展财务和提款报账培训，加强项目资金全过程管理和监督，强化过程审计工作，保证资金的规范使用。

Loan 3115-PRC:

Yunnan Chuxiong Urban Environment Improvement Project

云南楚雄州城市环境改善项目

A. Overview
项目概况

The aim of the project is to implement national strategy in developing the western region and enhance Yunnan Province's cooperation with and overall external competitiveness within the Greater Mekong Subregion (GMS). The project also aims to enhance the comprehensive strength of Chuxiong Prefecture in the central Yunnan city cluster, and to improve the relatively backward urban infrastructure level and living environment of Chuxiong, Wuding and Lufeng, exploring and practicing new low-carbon models, and environmentally friendly and livable small-and-medium-sized city planning, construction and development.

为认真贯彻实施国家西部大开发战略，增强云南在大湄公河次区域 (GMS) 合作和整体对外竞争力，提升楚雄州在滇中经济圈的综合实力，改善楚雄、武定、禄丰三个项目县 (市) 相对落后的城市基础设施水平和人居环境，探索和实践低碳、生态、宜居的中小城市规划与建设发展的新模式，提出亚行贷款实施楚雄州城市环境改善项目。

The project has involved a total investment of CNY2.48 billion ($350.46 million), including a loan of $150 million from ADB. The project comprises the construction of urban roads, ancillary facilities and sewage rainwater facilities for surrounding villages, river rehabilitation and landscaping, a flood early-warning system; construction of a storm-water retention pond and a sponge-city demonstration zone. It also involves procurement of urban municipal solid waste equipment, new-energy buses, intelligent transportation systems (ITS), and capacity building.

项目总投资24.87亿元人民币，其中利用亚行贷款1.5亿美元。主要内容包括城市道路建设、附属配套设施以及连接周围村庄污水雨水设施等，河道生态与防洪治理、两岸生态水土保持及景观建设以及防洪预警系统的建设，雨水调蓄池与海绵城市示范建设，固废垃圾收运体系完善，新能源公交车，智能交通系统设施设备，以及机构能力提升等内容。

The project launched and became effective at the end of 2014, and is currently in the mid to final stages of implementation. Construction and development goals have largely been achieved with impressive results.

项目于2014年底生效并启动实施，目前处于实施中后期，随着项目的逐步建成，建设与开发目标已基本实现，实施成效显著。

B. Main Management Measures
主要做法与采取的措施

Learnt from ADB regulations, the project team has continuously improved the management measures. From preparation to implementation of the project, prefectural and city/county project units have strictly adhered to ADB parameters in terms of construction and development, actively adapting and apply ADB regulations to manage the project, which has been essential to its effectiveness and success.

学习亚行规则，不断转变和提升管理理念。从项目准备到实施的全过程，州县始终坚持学习亚行建设发展的先进理念，主动适应、遵守和运用亚行规则建设和管理项目，成为项目取得成效和成功的重要前提和基础。

Establishment of an organizational structure and improvements to project management mechanisms. In terms of strengthening organizational structure in the interests of project implementation, a project management office was established at both the prefecture and city/county levels. The governor of the prefecture government held meetings on project implementation on a monthly basis. City mayors and county heads were responsible for project implementation. A mechanism to guide inspections guided by the project's targets was also established with the Chuxiong Prefecture Project Management Office (CPPMO) taking the lead in monthly inspections for project implementation and reporting in a timely manner to ensure project implementation. Furthermore, the project established a project-promotion mechanism to deal with problems, responsibilities and preparedness in the form of lists and a report. Lastly, the project management system improved rules and regulations in terms of construction, financial management, consulting services, and contractual obligation so as to safeguard the project.

建立组织机构，健全项目管理机制。一是加强组织机构建设。成立了州县两级利用亚行贷款项目领导小组及其办公室，全面负责项目的组织与统筹。在项目实施中州政府领导牵头每月召开一次项目推进会，涉及项目县市的县市长亲自抓，有力地保证了项目推进。二是建立督查检查机制。以目标为导向，由州亚行办牵头，每月对项目实施情况进行检查，及时通报情况，促进项目的有序推进。三是建立“三清单、一报表”的项目推进机制。以问题为导向，研究制定项目的问题清单、措施清单、责任清单及倒排的实施进度计划表，压实责任，形成有效推进保障机制。四是完善规章制度。在亚行项目管理体系的基础上，制定了项目管理办法、施工管理细则、财务管理手册、咨询服务管理办法、合同与工程变更办法等制度，为规范项目管理提供了制度保障。

Strengthened learning and training, effectively improving institutional capacity building. ADB's consulting experts and support effectively improved project management and professional capacity at a prefecture and county project-unit level. The project has introduced and implemented new urban construction concepts and technologies related to green ecological construction and management in small- and medium-sized cities. It provided training and institutional capacity improvement in terms of planning and design of low-impact urban development, riverine ecological rehabilitation and flood control, urban transportation planning, traffic management, solid waste collection and management, public participation and anti-corruption. The project also facilitated on-site training and expert advice on issues related to the environment, immigration, social issues, procurement, contracts and construction. All involved parties became familiar with ADB regulations and procedures, effectively promoting standardized project management. ADB consultation throughout, involving both domestic and international experts, provided an opportunity for project units to learn about advanced urban development concepts—both overseas and in China—and train professional teams on the subject of advanced urban developing concepts and provide them with experience of project management.

不断加强学习与培训，有效提升机构能力建设。一是通过亚行和咨询专家的专业力量，全方位提供项目的实施支持，有效提升州县项目单位的项目管理和专业能力和。另二是引入和实施城市建设与开发的新理念和新技术，探索实践中小城市绿色生态建设与管理路径。为州县提供有关城市低影响开发的规划与设计、河道生态与防洪治理、城市交通规划、交通管理、固废垃圾收运与管理、公众参与、反腐败等内容的培训与机构能力提升。三是结合项目实际和进展情况适时开展环境、移民、社会、采购、合同与施工管理等培训和专家现场服务。促使各方熟知亚行规则和流程，有效促进

ADB board group visit
亚行执董团考察楚雄项目

项目有序规范管理。通过亚行以及国内外专家全过程的项目咨询，为我们提供更多学习借鉴国内外城市先进建设理念的机会，培养了一批具有先进城市建设发展理念和项目管理经验的专业人才队伍。

Strictly abided by the loan covenants, improved procurement management and effectively prevented project-management risks. Prefectural and city/county project units took project documentation as the basis of project implementation, which strengthened contract management and overall project management implementation, effectively preventing project risks and ensuring standardized project management.

严格遵守贷款约文，强化采购与合同管理，有效防范项目管理风险。州、县始终把项目文件作为实施推进的主要依据，强化合同管理和项目全过程管理，有效防范项目风险，确保了项目管理规范。

C. Project Outcome
项目成果

The project has greatly improved infrastructure and the living environment of the project cities by promoting new urbanization. The urbanization rate of Chuxiong city and Lufeng and Wuding counties has increased to 63.01%, 50.77% and 38.64% in 2018 from 60.95%, 42.67% and 29.03% in 2014. The project has also promoted the construction of environmentally friendly, low-carbon, livable cities and townships in Chuxiong, Lufeng and Wuding.

亚行项目的实施，极大改善了地方城市基础设施水平和人居环境，较好地促进了新型城镇化的进程，通过亚行项目的实施与带动，楚雄、禄丰、武定城镇化率分别由2014年底60.95%、42.67%、29.03%提高到2018年底的63.01%、50.77%、38.64%，有效促进了项目地生态、低碳、宜居城市的建设。

Construction of urban roads and ancillary facilities have effectively promoted eco-friendly urbanization. The project counties/cities have built or renovated 25.93 km of municipal roads and ancillary facilities, and also encompasses stormwater collection and discharge in the project area. Stormwater detention ponds were built in Lufeng and Wuding. The construction of a regional road network of 8.35 km^2 and an environmentally friendly urbanization demonstration zone have effectively improved transportation and living environments for 29,900 people. Meanwhile, a 48,500 m^2 sponge demonstration area in Wuding county now serves as a recreational area for nearly 20,000 people.

新建城市道路和附属设施，有效促进生态环境友好型的城镇化建设。三个项目县市通过新建和改造25.93千米的市政道路及附属配套，结合项目区的雨水收集与排放，禄丰和武定设计建设了生态雨水调蓄池，形成了8.35平方公里的区域路网和生态环境友好型的城镇化建设示范区建设，并对周边影响的村庄道路、雨污水设施一并纳入项目建设，有效改善周边2.99万人的交通出行和人居环境。武定县配套建设4.85万平方米的海绵示范区，为近2万人提供了生活休闲空间。

Flood control and river rehabilitation has effectively improved the living environment, with 13.8 km of urban rivers subject to environmentally sound flood control and rehabilitation, an early warning flood system, and flood-hazard maps. The construction of 807,900 m^2 of ecological green space along river banks has significantly improved the

living environment of 450,000 people in the two counties and one city.

对城市河道进行生态防洪治理，有效提升了群众的生活环境和空间。对三个项目县市13.8公里的城区河道进行生态防洪治理，配套建设防洪预警预报系统，制作洪水风险图。沿河两岸建设80.79万平方米的生态绿地，供城市居民娱乐休闲，显著改善了三个项目县市45万人的人居环境，增强了居民生活的幸福感。

Solid-waste management equipment, new-energy buses and ITS were procured to improve urban management. The project procured 162 items of urban–municipal solid-waste equipment, optimizing urban garbage collection and the transportation system. The project also involved the purchase of 210 new-energy buses to facilitate public travel and provide local residents with a leisurely means of public transportation. The project has also established ITS that has improved the traffic management.

配套城市环卫、新能源公交、智能交通等设施设备，有效提升城市管理水平。购置162台覆盖三个项目县市的城市垃圾环卫设施设备，切实优化地方城市垃圾收运系统。购置210台新能源公交车，改善三个项目县市群众的出行，引导居民乘坐公共交通等以慢行交通为主的出行方式。建设覆盖三个项目地的智能交通系统，提升地方城市交通管理水平。

Strict compliance with ADB procurement policies has improved the effectiveness in utilization of funds. All procurement was conducted in accordance with the ADB's procurement guidelines, leading to procurement savings of 38.90%. This made it possible to make use of the procurement balance to encompass 12 new projects with an investment of CNY445 million ($62.75 million) while keeping the total investment basically unchanged. Meanwhile, the professional consulting team and contract management provided oversight for settlements and withdrawals in line with the actual progress of the project, keeping

Flood control facilities in Longchuanjiang River
楚雄市龙川江河道防洪设施

contract costs under control and within the contract funding scope and also ensuring that funds were fully utilized.

认真执行亚行采购规则和管理原则，有效提高了项目资金使用效益。严格按照亚行的清单招标和低价中标的原则进行采购，采购结余率达38.90%，并充分利用采购结余，在保持项目总投资基本不变的情况下中期调整新增建设项目12项，投资4.45亿元。同时，借助咨询团队的专业力量严格合同管理和变更，强化按工程完成实际进度进行时时结算和提款报账的规则要求，确保了多数项目成本均控制在合同范围和金额内，充分发挥了资金使用效益。

D. Project innovation and demonstration
项目的创新与示范性

Implementation of the project has improved infrastructure and the living environment, covering funding gaps in urban construction and development, providing the opportunity to learn about advanced and international planning and design concepts, while exploring and practicing green construction in small- and medium-sized cities, and achieving integration of “funding, technology, and intelligence.”

亚行贷款项目的实施，提升了我州城市基础设施水平和人居环境，弥补了城市建设和发展的资金缺口，学习借鉴了亚行及国际先进的设计规划理念，探索实践了中小城市绿色生态建设的路径，实现了引资、引技、引智的结合。

(i) The project provided an opportunity to learn about international concepts relating to building environmentally friendly livable cities. By making full use of ADB project preparatory technical assistance (PPTA) resources and local master plans, it was possible to consult on population forecasting, land use,

Electric bus purchased under the project
新能源公交车

resettlement plans, road system planning, public service facility planning, historical heritage treatment plans, environmental and ecological issues, and disaster prevention planning. Drawing on international urban-planning concepts, it was possible to control and scale expanded urban land use, matching population concentration with urban infrastructure capacity, protecting the urban environment and achieving harmony in terms of social and economic development and the urban natural environment in the construction of livable cities.

学习借鉴国际先进理念，构建生态宜居城市的规划建设与发展思路。充分借助亚行技术援助 (PPTA) 的资源，对三个项目县市城市上位规划和控制性详细规划进行评估，从人口预测、用地布局、安置方案、道路系统规划、公共服务设施规划、历史遗存处理方案、环境与生态问题、防灾规划等方面进行咨询，借鉴国内外先进城市的规划理念，合理控制城市用地规模扩张，使人口集疏水平与城市承载能力相匹配，保护城市生态基底和人文环境，实现经济社会发展与城市自然环境和谐共生，建设生态宜居之城的理念与思路。

(ii) River rehabilitation and stormwater detention ponds have improved the local environment. In accordance with environmental good practice, river rehabilitation seeks to maintain the natural flow of rivers, to avoid straightening them and restrict earthwork excavations. The river bank features a 1:1.5 gentle slope with viewing walkways and platforms. The river embankment features environmentally friendly pre-cast blocks. For flood control, non-engineering measures were taken, including flood-risk maps, and improved flood early warning systems. Construction and engineering works were strictly not allowed in areas at risk of 50-year floods so as to meet flood-safety requirements. Learning from international experience, stormwater detention ponds were constructed and integrated with the landscape. Project area stormwater drains into detention ponds, replenishing groundwater and reducing the need for flood control caused by urban hardening and stormwater runoff. Meanwhile, sediment basins were designed to prevent environmental non-point source pollution caused by stormwater runoff. Overall, the project has improved the urban living environment while achieving sustainable urban stormwater management.

生态河道治理与雨水调蓄池的设计与建设，极大改善了地方的生态和人居环境。河道治理采取生态设计理念，尽可能保持河流的自然流向，避免裁弯取直和限制土方开挖，采用1:1.5缓坡友好型的设计原则，增加亲水平台的建设内容，河堤使用生态预铸块进行铺设，实现了人与自然的和谐共存。防洪方面强化非工程措施设计理念，制作洪水风险图，完善防洪预警和预报系统，在50年一遇的洪水淹没区严禁进行工程建设，以达到防洪安全要求。借鉴国际经验，引入雨水调蓄池的建设，结合实际又融合了景观功能，将项目区的雨水接入调蓄池，以回补地下水，减缓城市硬化产生的雨水泾流带来的防洪压力，通过沉淀池的设计有效防止雨水泾流产生的环境面源污染。在实现可持续的城市雨水管理的同时，极大的改善了城市人居环境。

(iii) A public–private partnership (PPP) modality was adopted to improve urban services and management, with domestic funding of CNY1.0 billion provided by Beijing Enterprises Water Group (China) Investment. The project outputs, together with related domestic projects were included in the PPP scheme with the assistance of a professional

Stormwater management pond in Lufeng County
禄丰县雨水管理池

team, in order to achieve overall planning for integrated operations and management of urban roads, rivers, and sanitation. This was undertaken in conjunction with management mechanisms for government payments and performance appraisals, effectively promoting market-oriented reforms of local urban services and management.

项目采取与社会资本合作的模式，有效提升了地方城市服务与管理水平。项目通过PPP的模式撬动社会资本方——北控水务 (中国) 投资有限公司提供了10亿元人民币的国内配套资金，同时将项目的产出与地方原有存量一并纳入PPP合作范围，借助社会资本方的专业团队力量，统筹项目县的城市道路、河道、环卫一体化运营与管理，建立起政府付费与绩效考核的管理机制，有效促进了地方城市服务与管理的市场化改革。

Attachment
附件

Attachment 1

Selection Criteria for Best Performing Projects

This is to recognize projects with an effective institutional set up, timely start-up of implementation, smooth disbursement and procurement, strict compliance with loan covenants, and effective delivery of scheduled outputs.

Prescreening Criteria:

A project is ineligible to participate in the award if:

1. ADB has declared any misprocurement
2. ADB's Special Project Facilitator has registered any complaints against the project
3. National media have reported any serious construction quality or construction safety issues
4. A major loan covenant has not been complied with

Selection Criteria:

The following criteria will be used to evaluate project implementation performance. Narrative evaluation methodology provides details for the evaluation (Attachment 2). Scores will be based on these criteria and bonus and penalty points according to the list below. Nominated projects will be ranked according to their total score by sector.

Criteria	Proposed Allocated Points
1. Institutional Set Up	**15**
• Specific PMO set up	5
• PMO staffing	5
• Grievance redress mechanism	5
2. Implementation Start-up Performance	**20**
• Loan approval to first disbursement	10
• Supervision consultant Mobilization	10
3. Project Management	**15**
• Progress report submission	5
• Safeguards reports submission	5
• Project performance monitoring report or socioeconomic impacts monitoring report submission	5
4. Contract Award and Disbursement	**20**
• Contract Award Achievement	5
• Disbursement Achievement	5
• Gap between time elapsed versus percentage of cumulative disbursements	10

5. Safeguards Compliance	**20**
• Compliance with resettlement covenants	10
• Compliance with environment and indigenous people covenants	10
6. Financial Management	10
• Financial management system	5
• Audited project accounts and financial statements Submitted	5
Total	**100**

Additional Bonus/Penalty:

1. Loan Extension:

- 10 (for extension ≥ 24 months)
- 5 (for extension ≥ 12, but < 24 months)
+ 0 (for extension < 12 months)
+ 5 (within original closing date)

2. Total Project Cost Increase (in terms of CNY):

- 10 (over 40% of total project cost at appraisal)
- 5 (over 20% of total project cost at appraisal)

3. Change of Project Outputs:

- 10 each (cancelling any main project outputs listed in the RRP)

4. Counterpart Funds:

- 10 (inadequate or late counterpart funding)

附件1

最佳表现项目的评选标准

最佳表现项目是指建立了有效的项目管理机构、项目实施启动及时、支出和采购进展顺利、严格遵守贷款协议，并能切实实现项目的预期产出的项目。

筛选标准：

出现以下情况的项目无参评此奖项资格：

1. 被亚行宣布过错误采购的项目
2. 在亚行特别项目协调人处有对项目投诉的登记的项目
3. 被国家媒体报道过发生任何严重建筑质量或建筑安全问题
4. 存在贷款协议主要条款没有遵守的项目

评选标准：

项目实施绩效将按照以下标准进行评估。评价方法说明将对评价内容加以详细说明（附件2）。评估小组将根据这些标准，以及下表中的加分和扣分来确定项目得分，并分行业对候选项目按总得分进行排序。

标准	计划分值
1. 机构建设	**15**
• 成立专门的项目管理办公室	5
• 项目管理办公室的人员设置	5
• 对项目受影响人抱怨的申诉机制	5
2. 项目实施启动情况	**20**
• 自贷款批准到第一笔支付之间的时间跨度	10
• 咨询专家和监理的动员	10
3. 项目管理	**15**
• 进度报告的提交	5
• 保障政策相关报告的提交	5
• 项目绩效监测报告或社会经济影响监测报告的提交	5
4. 合同授予和支付	**20**
• 已签订的合同额	5
• 已完成的支付额	5
• 已过去时间百分比与累计支付百比例之间的差距	10
5. 保障政策的遵守	**20**
• 关于移民安置协定的遵守情况	10
• 关于环境和少数民族协定的遵守情况	10

6. 财务管理	**10**
• 财务管理体系	5
• 经审计的项目账目和财务报表的提交	5
总分	**100**

额外加分/扣分：

1. 贷款延期：

- 10 （延期 ≥ 24个月）
- 5 （延期 ≥ 12个月，但 < 24 个月）
+ 0 （延期 < 12个月）
+ 5（未超出原截止时间）

2. 项目总成本增加（以人民币为单位）：

- 10 （比预期项目总成本增加40%以上）
- 5 （比预期项目总成本增加20% 以上）

3. 项目产出变更：

- 10 每项 （取消任何一项行长报告和建议中的主要项目产出）

4. 配套资金：

- 10（配套资金不足或到位晚）

Attachment 2

Narrative Evaluation Methodology

1. Institutional Set up:

1.1 Specific PMO Set Up	Allotted Point
A PMO is set up specifically for the project	2
A PMO director or deputy director designated for the project	(full-time - 3; part-time - 1)

1.2 PMO Staffing	Allotted Point
Designated procurement/contract management staff	(full-time - 2; part-time - 1)
Designated disbursement staf	(full-time - 2; part-time - 1)
Designated coordinator/interpreter	(full-time - 1; part-time - 0)

1.3 Grievance redress mechanism (narrative justification needed)	Allotted Point
Available	5
Not available	0

2. Project Start-up:

2.1 Loan approval to first disbursement	% of Allotted Point
< 10 months	100
≥ 10, but < 14 months	75
≥ 14 months, but < 24 months	50
≥ 24 months	0

2.2 Fielding construction supervision consultants (firm or individual; ADB loan or domestic funded)

	% of Allotted Point
Within 6 months after loan effectiveness	100
≥ 6 months, but < 10 months	50
≥ 10 months	0

3. Project Management:

3.1 Submission of progress reports	Allotted Point
Reports timely submitted	Yes: 2; No: 0
Adequacy of reports	Very good: 3; Good: 2; Acceptable: 1

3.2 Submission of monitoring reports, including environmental, resettlement, and ethnic minority

	% of Allotted Point
Timely submitted all monitoring reports with adequate information	100%
One monitoring report submitted with delay or with inadequate information	50%
Two monitoring reports submitted with delay or with inadequate information	0%

3.3 Submission of project performance monitoring or socioeconomic impacts monitoring report

	Allotted Point
Reports timely submitted	Yes: 2; No: 0
Adequacy of reports	Very good: 3; Good: 2; Acceptable: 1

4. Contract Award and Disbursement

4.1 Contract Award Achievement (Cumulative, as of the end of last year)

	% of Allotted Point
Actual/Projection ≥ 90%	100
Actual/Projection ≥ 75%	50
Actual/Projection < 75%	0

4.2 Disbursement Achievement (Cumulative, as of the end of last year)

	% of Allotted Point
Actual/Projection ≥ 90%	100
Actual/Projection ≥ 75%	50
Actual/Projection < 75%	0

4.3 Gap between time elapsed (from loan approval) versus percentage of cumulative disbursement (as of the end of last year)

	% of Allotted Point
< 10%	100
≥ 10% and < 20%	80
≥ 20% and < 30%	50
≥ 30%	0

5. Safeguards Compliance

5.1 Compliance with resettlement covenants

	% of Allotted Point
Full complied	100
One noncompliance	50
More than one noncompliance	0

5.2 Compliance with environment and indigenous people covenants	% of Allotted Point
Fully complied	100
One noncompliance	50
More than one noncompliance	0

6. Financial Management

6.1 Financial management system	Allotted Point
Financial management system in use	1
Separate project account maintained	2
Designated disbursement staff	2

6.2 Submission of audited project accounts and financial statements	% of Allotted Point
Timely submission and acceptable	100
Timely submission but unacceptable	50
Delay in submission but acceptable	50
Delay in submission and unacceptable	0

附件2

评价方法说明

1. 机制建设：

1.1 成立专门的项目管理办公室	分值
专门为项目设立了项目管理办公室	2
项目有指定的项目管理办公室主任或副主任	（全职 - 3；兼职 - 1）

1.2 项目管理办公室的人员设置	分值
指定采购/合同管理人员	（全职 - 2; 兼职 - 1）
指定支付人员	（全职 - 2; 兼职 - 1）
指定协调员/翻译	（全职 - 1; 兼职 - 0）

1.3 对项目受影响人抱怨的申诉机制（需要详细叙述）	分值
有	5
没有	0

2. 项目实施启动：

2.1 自贷款批准到第一笔支付之间的时间跨度	占分值%
< 10个月	100
≥ 10个月，但 < 14个月	75
≥ 14个月，但 < 24个月	50
≥ 24个月	0

2.2 咨询专家和监理的到场时间（包括公司或个人；亚行贷款或国内出资）	占分值%
贷款生效后6个月内	100
≥ 6个月，但 < 10 months	50
≥ 10个月	0

3. 项目管理：

3.1 进度报告的提交	分值
及时提交报告	是：2；否：0
提交的报告内容翔实	非常好：3；良好：2；可接受：1

3.2 监测报告的提交，包括环境、移民安置和少数民族等	占分值%
及时提交所有监测报告且内容翔实	100%
一份监测报告延期提交或内容不充分	50%
两份监测报告延期提交或内容不充分	0%

3.3 项目绩效监测报告或社会经济影响监测报告的提交	分值
及时提交报告	是：2；否：0
报告内容翔实	非常好：3；良好：2；可接受：1

4. 合同授予和支付

4.1 已签订的合同额（截至上年末的累计数）	占分值%
实际数/计划数 ≥ 90%	100
实际数/计划数 ≥ 75%	50
实际数/计划数 < 75%	0

4.2 已完成的支付额（截至上年末的累计数）	占分值%
实际数/计划数 ≥ 90%	100
实际数/计划数 ≥ 75%	50
实际数/计划数 < 75%	0

4.3 已过去的时间百分比（自贷款批准之日起）与累计支付百分比（截至上年末）之间的差距

	占分值%
< 10%	100
≥ 10%，且 < 20%	80
≥ 20%，且 < 30%	50
≥ 30%	0

5. 保障规定的执行

5.1 关于移民安置协定的遵守情况	占分值%
完全遵守	100
一个相关协定没遵守	50
超过一个相关协定没遵守	0

5.2 关于环境和少数民族协定的遵守情况	占分值%
完全遵守	100
一个相关协定没遵守	50
超过一个相关协定没遵守	0

6. 财务管理

6.1 财务管理体系	分值
财务管理体系的建立	1
项目单独核算	2
专设提款报账人员	2

6.2 提交经审计的项目账目和财务报表	占分值%
及时提交且合格	100
及时提交但不合格	50
延迟提交但合格	50
延迟提交且不合格	0

About the Asian Development Bank
关于亚洲开发银行

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to the majority of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 68 members, including 49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

亚洲开发银行（亚行）的远景目标是实现没有贫困的亚洲和太平洋地区。亚行的工作旨在帮助其发展中成员体减少贫困，改善亚太地区人民的福祉。尽管亚太地区发展迅速，但全世界大部分贫困人口仍生活在该地区。亚行致力于通过包容性经济增长、环境可持续发展和区域一体化来帮助亚太地区减少贫困。

亚行总部设在菲律宾首都马尼拉，现有68个成员体，其中亚太地区成员49个。亚行主要通过政策对话、贷款、股本投资、担保、赠款以及技术援助等工具向成员体国家提供帮助。

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