



Report and Recommendation of the President to the Board of Directors

Project Number: 43031-013
November 2012

Proposed Loan
People's Republic of China: Hunan Xiangjiang
Inland Waterway Transport Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 2 November 2012)

Currency unit	–	yuan (CNY)
CNY1.00	=	\$0.16024
\$1.00	=	CNY6.2405

ABBREVIATIONS

ADB	–	Asian Development Bank
dwt	–	deadweight ton
GWh	–	gigawatt-hour
HPDOT	–	Hunan provincial department of transport
HPG	–	Hunan provincial government
IWT	–	inland waterway transport
km	–	kilometer
m	–	meter
MW	–	megawatt
MOT	–	Ministry of Transport
NPIWP	–	National Plan for Inland Waterways and Ports
PRC	–	People's Republic of China
ton-km	–	ton-kilometer
WTDC	–	waterway transport development committee
XNCD	–	Hunan Xiangjiang Navigation Construction and Development Company

NOTES

- (i) The fiscal year (FY) of the Government of the People's Republic of China and its agencies ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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PROJECT AT A GLANCE

1. Project Name: Hunan Xiangjiang Inland Waterway Transport Project		2. Project Number: 43031-013	
3. Country: China, People's Republic of		4. Department/Division: East Asia Department/Transport and Communications Division	
5. Sector Classification:			
		Sectors	Primary
		Transport, and information and communication technology	√
		Subsectors	
		Water transport	
6. Thematic Classification:			
		Themes	Primary
		Economic growth	√
		Environmental sustainability	
		Governance	
		Capacity development	
		Subthemes	
		Widening access to markets and economic opportunities	
		Eco-efficiency	
		Economic and financial governance	
		Institutional development	
6a. Climate Change Impact		6b. Gender Mainstreaming	
Adaptation	Low	Gender equity theme (GEN)	
Mitigation	Medium	Effective gender mainstreaming (EGM)	
		√	
		Some gender elements (SGE)	
		No gender elements (NGE)	
7. Targeting Classification:		8. Location Impact:	
General Intervention	Targeted Intervention		
	Geographic dimensions of inclusive growth	Millennium development goals	Income poverty at household level
√			
		Regional	Low
		Rural	High
		Urban	Medium
9. Project Risk Categorization: Complex			
10. Safeguards Categorization:			
		Environment	A
		Involuntary resettlement	A
		Indigenous peoples	C
11. ADB Financing:			
	Sovereign/Nonsovereign	Modality	Source
	Sovereign	Project loan	Ordinary capital resources
	Total		150.0
			150.0
12. Cofinancing:			
	Financier	Category	Amount (\$ Million)
	China Construction Bank Corporation	Commercial-Loan	65.40
	Total		65.40
13. Counterpart Financing:			
	Source	Amount (\$ Million)	
	Government	177.92	
	Total	177.92	
14. Aid Effectiveness:			
		Parallel project implementation unit	No
		Program-based approach	No

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Hunan Xiangjiang Inland Waterway Transport Project.¹

II. THE PROJECT

A. Rationale

2. Inland waterway transport (IWT) is an efficient, cost-effective, and environmentally friendly way to move bulk commodities over long distances. Efficient use of waterways in a country to transport cargo can reduce congestion on roads and railways, lower the average amount of energy needed for freight transport overall, and cut back emissions of greenhouse gases. IWT can also be developed in ways that bring other benefits, such as the generation of hydroelectric power.

3. The People's Republic of China (PRC) has the world's largest IWT network, both in terms of length and freight volume.² About 24,000 kilometers (km) of the country's waterways, or roughly 20% of the overall IWT network, are in the commercially significant class I–V category, which means they can accommodate sizeable vessels for navigation. Another 50% of the waterways are unclassified and 30% are in classes VI–VII. However until 2000, the government put more emphasis on improving highways and railways than on developing IWT. Public investment fell below what was needed to maintain and renew IWT infrastructure. Many inland ports on the network are old and lack specialized berths and modern handling equipment. The contribution of IWT to the overall transport system has also been constrained by weak institutional coordination between the local, regional, and national agencies involved.³

4. The government is now paying more attention to IWT. In 2007, it issued the National Plan for Inland Waterways and Ports (NPIWP), which was based on an assessment of IWT conditions and performance and outlined a program of investments to establish a network of upgraded, interlinked IWT routes. The NPIWP aims to increase the class I–III waterway network—navigable by vessels of 500 deadweight tons (dwt)⁴ and above—to 19,000 km by 2020 from less than 9,000 km in 2006. Priority projects will aim to upgrade main national waterways to each of the main IWT systems in the PRC from low classifications and make complementary improvements in their ports. This will create a core waterway network that can handle larger vessels and help realize the full economic potential of the country's extensive IWT network.

5. **Potential in Hunan province.** Hunan is a landlocked province with a population of 68.4 million. One of six provinces supported by the government's Central Region Development Strategy, it is rich in navigable waterway resources and has the third longest provincial IWT network in the PRC, with over 11,495 km of waterways, 107 ports, and 1,880 berths. However, only 6% of its waterways and berths can accommodate vessels of up to 1,000 tons carrying

¹ The design and monitoring framework is in Appendix 1.

² The total length of navigable waterways stood at 123,683 kilometers (km) in 2009, of which 61,546 km were rated classes I–VII and 62,137 km were navigable but unclassified. Waterways are divided into classes based on the maximum size of the vessels they can accommodate, measured by a vessel's carrying capacity in deadweight tons (dwt): class I (3,000 dwt), class II (2,000 dwt), class III (1,000 dwt), class IV (500 dwt), class V (300 dwt), class VI (100 dwt), and class VII (50 dwt).

³ Sector Assessment: Transport, and Information and Communication Technology (accessible from the list of linked documents in Appendix 2).

⁴ Deadweight tonnage (or dwt) is a measure of how much weight a vessel is carrying or can safely carry.

capacity. In 2009, the network carried only 10% of the overall freight transported in the province in terms of ton-kilometers (ton-km). This reflected the longstanding low level of investment in IWT, when compared with investment in other modes. For example, investment in Hunan IWT in 2009 was CNY551 million, less than 1% of total road investment in the same year.

6. The Xiang River⁵ is one of the largest tributaries of the Yangtze River⁶ and the largest river in Hunan. It originates in Guangxi Zhuang Autonomous Region and its 969 km length includes 773 km in Hunan (see map). The river flows from south to north, joins with Yangtze River,⁷ connecting six of Hunan's cities⁸ and major concentrations of population with the PRC's east coast seaports. Hunan's population and industry are concentrated along the Xiang River, which offers great opportunities for transporting minerals and agricultural products from the PRC's inland to its major eastern seaboard markets through the use of IWT shipping services.

7. Under vessel standardization programs of the Ministry of Transport (MOT), the average vessel capacity in Hunan has increased from 213 dwt in 2005 to 318 dwt in 2010. The largest vessel now in operation is 5,600 dwt. Traffic on the Xiang River has grown 21% per annum since 2000 but most of the increase in vessel size and traffic has occurred downstream near the Yangtze River.⁹ The limited depth of the water and long rocky shoals along the Xiang River's middle and upper reaches have prevented safe year-round access by large vessels.¹⁰ Further traffic growth is also constrained by obsolete and insufficient infrastructure and loading facilities in the river's ports. The government is prioritizing the removal of these bottlenecks, which increase the freight costs and voyage times on these parts of the river.

8. **Need for inland waterway infrastructure.** The Hunan provincial government (HPG) has recognized the potential role of IWT and is pursuing a more balanced transport strategy. In 2007, it formulated the Xiang River Network Master Plan, 2008–2020, which lays out a comprehensive navigation, water resources, and hydroelectric power development approach to 2020 and emphasizes IWT infrastructure development more than previous schemes did.¹¹ The plan aims to gradually make the Xiang River navigable year-round for barges of up to 1,000 dwt in its middle and upper reaches and for barges of up to 2,000 dwt on its lower reaches so as to lower average transport costs by one-third to one-half. Once the plan is carried out, the Xiang River will become one of the most important freight corridors in Hunan.

9. To increase traffic on the waterway and reduce the transport costs, port capacity will also need to be expanded, particularly in the river's middle and upper reaches. The existing inland ports are aging and poorly equipped. Larger and more specialized barges will also be needed to improve the economics of the industry and reduce IWT costs. The average size of vessels using the Zhuzhou complex (see map), which was expanded under a World Bank IWT project, was

⁵ The Xiang River is also called Xiangjiang in Chinese.

⁶ Yangtze River is also called Changjiang in Chinese.

⁷ The Yangtze River (6,300 km), the largest waterway in the PRC, flows from Qinghai in the west to Shanghai in the east.

⁸ Together with its tributaries (the Xiaoshui, Leishui, and Lushui), the Xiang River waterway is navigable for a total length of 2,826 km. The six cities along the river (Changsha, Hengyang, Yueyang, Xiangtan, Yongzhou, and Zhuzhou) are the source of 65% of the province's gross domestic product.

⁹ Freight on the Xiang River waterway increased from 20 million tons in 2002 to 118 million tons in 2009.

¹⁰ The river can be navigated by vessels of up to 1,000 dwt on the lower reaches, 300–500 dwt on the middle reaches, and 50–100 dwt on the upper reaches.

¹¹ The plan included nine ship locks and powerhouse complexes, of which five are already in operation. The other complexes are either under construction (Changsha and Xiangqi) or at the planning stage, including Tugutang (output 1 of the proposed project) and Taizhou (in Guangxi).

increased steadily from 175 dwt in 1998 to 230 dwt in 2006.¹² With further support and incentive schemes under the project, the upgrading of the fleet size and modernization process can be accelerated.

10. **Need for hinterland waterway connections.** Raw materials and agricultural products produced in the hinterlands of Hunan are transported to urban areas for processing. This provides an important source of income and employment in poor rural areas¹³ and contributes to poverty reduction. Better transport and lower transport costs are needed to expand these activities. This includes the need to improve the IWT connections and related IWT services in the hinterland. The upstream stretches of the Xiang River are fed by an IWT network of navigable minor rivers and streams that services rural communities. New loading facilities are needed to give these remote areas better access to IWT.

11. **Need for an integrated and sustained development policy.** Stakeholders have many competing demands for the use and development of rivers in the PRC for irrigation, flood control, power generation, water supply, and transport. Lack of coordination between competing government agencies has impeded the growth of IWT. An integrated, sustained IWT development policy is needed, along with closer cooperation among government agencies.

12. The Asian Development Bank (ADB) helped HPG design an IWT development road map in 2009.¹⁴ In line with this road map, the HPG established a permanent, high-level waterway transport development committee (WTDC) in September 2011. It is chaired by the provincial governor and its members represent 19 related provincial agencies.¹⁵ The WTDC will develop and implement a medium-term development and reform agenda that will include creation of an IWT development fund in Hunan, the mobilization of increased public funding, enhanced cooperation with relevant agencies, endorsement of incentive policies to promote inland shipping, and implementation of a comprehensive multimodal transport system. The Hunan Xiangjiang Inland Waterway Transport Project will finance a team to provide advice to the WTDC. This team will comprise representatives from the Hunan provincial department of transport (HPDOT), the Hunan Maritime Affairs Bureau, and the Hunan Xiangjiang Navigation Construction and Development Company (XNCD). It will be assisted by project implementation consultants. The support and advisory team will prepare a policy working paper on IWT development, including a reform agenda and action plans to accelerate IWT development in Hunan. The plan will be discussed and endorsed by the WTDC.

13. To realize the NPIWP, arrangements for financing and managing waterways in Hunan will need to be consolidated and enhanced. The project will support the establishment of a new IWT enterprise, the Hunan Waterway Transportation Construction and Investment Company. The company will be established by 31 December 2013 to construct, develop, operate, and maintain inland waterway channels and associated assets in Hunan.

14. The development of the inland waterway sector in Hunan has been hampered by a lack of awareness among decision makers and shippers of IWT's potential and their continued use of outmoded vessels, methods, and skills. Through policy dialogue during project preparation, ADB and HPG agreed that the project would support steps to address several constraints:

¹² The World Bank. 2008. *Implementation Completion and Result Report: Third Inland Waterway Project*. Washington, DC.

¹³ The main commodities are metallic ores, coal, iron and steel, salt, grain, cement, fertilizer, and general cargo.

¹⁴ ADB. 2009. *Technical Assistance to the People's Republic of China for Preparing the Hunan Xiangjiang Inland Waterway Project*. Manila.

¹⁵ The composition of the WTDC is detailed in the Sector Assessment (Summary): Transport, and Information and Communication Technology (accessible from the list of linked documents in Appendix 2).

- (i) **Advocacy and promotion.** The project will pilot IWT promotion schemes to raise awareness and influence land development policy and shippers' modal choice decisions.
- (ii) **Innovation and modernization program.** The project will promote fleet modernization programs to encourage safer, cleaner, better quality inland shipping. This will be done by replacing older vessels with better ones, equipping inspection and patrol vessels, and introducing a green reward incentive system for vessel-related waste collection.
- (iii) **Skills improvement.** The project will initiate modern IWT management and support systems, improve capacity building of HPDOT and XNCD, and increase the level of professionalism in the IWT sector by enhancing monitoring and inspection skills and initiating vocational and other training programs.

15. **Rationale for ADB involvement.** The project will build on ADB's past involvement in infrastructure development in Hunan. One road project is ongoing and the completed Hunan Expressway, Hunan Lingjintan Hydropower, and Hunan Roads Development II projects were rated *satisfactory*.¹⁶ The project will make a significant contribution toward realizing the considerable potential for using IWT in the PRC and thereby to making the country's transport system more sustainable. Since this is ADB's first IWT project in the country, it will also demonstrate ADB's commitment to focusing future transport sector support on the more sustainable forms of transport, in line with ADB's Sustainable Transport Initiative.¹⁷ The project will serve as a demonstration of the potential of IWT for wider use in the PRC and in other developing member countries with IWT potential.

16. The project has been given high priority under the NPIWP. It is fully in line with ADB's country partnership strategy, 2011–2015 and country operations business plan, 2012–2014 for the PRC since it will (i) contribute to the greening of ADB's transport portfolio, (ii) address the management of resource scarcity and environmental conservation by reducing air pollution and conserving water resources, and (iii) increase accessibility of rural poor to IWT infrastructure.¹⁸ ADB's involvement will strengthen IWT policy, institutions, capacity, and efficiency in Hunan. The project will provide further momentum to IWT policy reform in Hunan.

17. **Lessons.** The project design benefits from several lessons from seven inland waterway projects in the PRC financed by the World Bank,¹⁹ including two projects involving the XNCD.²⁰ First, a barrage can improve navigation by raising the water level but also provides opportunities for hydroelectric power generation. This dual benefit feature can enhance the economic and financial return of barrage construction. Second, achieving an integrated inland water policy requires sustained efforts at the senior level across several jurisdictions. This will be facilitated under the project through the WTDC, which will bring together the main agencies involved in inland shipping to maximize the benefits of water resources utilization and conservation. Third, full cost recovery from IWT alone is difficult to achieve because revenues rarely cover all costs. However, these costs are small compared with those of other modes, both in absolute terms and

¹⁶ Details of these projects are in Table 2 of Development Coordination (accessible from the list of linked documents in Appendix 2).

¹⁷ ADB. 2010. *Sustainable Transport Initiative Operational Plan*. Manila.

¹⁸ ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila; ADB. 2012. *Country Operations Business Plan, People's Republic of China, 2011–2013*. Manila.

¹⁹ Three of the previous World Bank projects were rated *satisfactory*, including both projects in Hunan province, and four are still under implementation.

²⁰ Established in 1994, XNCD is responsible for the implementation and operational management of Xiang River navigation infrastructure projects. XNCD has implemented the Hunan components of two waterway projects financed by the World Bank in a satisfactory manner.

in proportion to traffic handled. Given IWT's greater energy efficiency and smaller environmental footprint, the project will promote the adoption of increased public funding for IWT as a WTDC priority. Fourth, a realistic procurement and civil works construction plan is essential for navigation improvements. To ensure readiness, project preparation gave special attention to technical design and implementation planning. Preliminary engineering design for the project has been substantially completed. Fifth, creating a technical advisory panel can help to ensure high technical, operational, and safety standards. Such a panel, to be financed by the ADB loan, will be established under the project to assist in ensuring that the navigation complex will be built in accordance with high technical, operational, and safety standards.

B. Impact and Outcome

18. The impact will be an efficient, safe, affordable, and sustainable inland waterway transport system developed in Hunan province. The outcome will be a low carbon waterway transport system improved on the Xiang River in Hunan province.

C. Outputs

19. The project aims to achieve integrated development of water resources in a poor area of Hunan province through three outputs. Details of the project description are in Appendix 1 of the project administration manual.²¹

20. **Output 1: Tugutang navigation-cum-hydropower generation complex constructed.** The complex will be located about 39 km upstream of Hengyang City. It includes a ship lock capable of accommodating class III vessels. It will also have a run-of-the-river barrage with a low head (10 m) to regulate river levels and flows and a power plant with a capacity of 90 megawatts that will capture the river's hydropower to generate 363 gigawatt-hours (GWh) of hydroelectric power per year. Other works will include 3.1 km of 110-kilovolt transmission lines connecting the power plant to Yunji substation; 4.4 km of access roads to the complex on both banks; operational access over the river at the crest of the barrage; reservoir bank protection; dredging and channel improvements; and installation of navigational aids and other auxiliary facilities, including a fish pass 774 meters (m) long. Upon completion, the complex will expand the waterway's navigable capacity by deepening an 89 km stretch of the river between Jinweizhou and Hengyang to a minimum water depth of 2.4 m. This will allow 1,000 dwt capacity vessels and towed barges to navigate to and/or from all cities along the Xiang (773 km) and Yangtze Rivers.

21. **Output 2: Cargo terminal berths at Songbai and Yunji and public landing stages improved.** Two 80 m long, 1,000 dwt berths will be constructed at Songbai and Yunji. The economy of Songbai, which is rich in mineral resources, is now constrained by the small size of its 300 dwt berth. The proposed 1,000 dwt berth and associated dredging at Yunji will serve the new town of Hengnan county and the factories manufacturing garments, shoes, and other consumer products in its industrial park. The project will also provide 71 landing stages to give rural communities better access to IWT. This output will be financed by the government's counterpart funding.

22. **Output 3: Capacity and performance of waterway management agencies enhanced.** The project will strengthen Hunan's institutional capacity for developing and administering its inland waterway system by providing consulting services, training, equipment, and studies. It will help the HPG formulate policies and measures to promote IWT development. An IWT development road map is in Appendix 2 of the project administration manual (footnote 21).

²¹ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

D. Investment and Financing Plans

23. The project is estimated to cost \$393.32 million, including taxes and duties of \$21.17 million (Table 1). The government has requested a loan of \$150,000,000 from ADB's ordinary capital resources to help finance the project. The loan will have a 27-year term, including a grace period of 7 years, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility,²² a commitment charge of 0.15% per year, and such other terms and conditions set forth in the draft loan and project agreements. The loan will also finance transport, insurance, local bank charges, and taxes and duties²³ on the expenditures financed by ADB.

24. The ADB loan proceeds will be made available to the HPDOT through the HPG on the same terms and conditions as the ADB loan. The HPG will onlend the loan proceeds to the implementing agency (XNCD or its successor) on the same terms and conditions as those of the ADB loan. The HPDOT and XNCD will assume the foreign exchange and interest rate variation risks for the ADB loan. The government will finance contingencies and financing charges during implementation.

Table 1: Project Investment Plan (\$ million)

Item	Amount ^a
A. Base Cost^b	
1. Tugutang navigation-cum-hydropower complex	
a. Civil works	151.64
b. Equipment procurement and installation	86.82
c. Land acquisition and resettlement compensation	80.10
d. Services (design, survey, supervision, management)	26.83
Subtotal	345.39
2. Two 1,000 dwt berths	10.91
3. Institutional development and strengthening	2.11
Subtotal (A)	358.41
B. Contingencies^c	
1. Physical contingencies	13.45
2. Price contingencies	7.48
Subtotal (B)	20.93
C. Financing Charges During Implementation^d	13.98
Total (A+B+C)	393.32

^a Includes taxes and duties of CNY132.96 million (\$21.17 million). Transport, insurance, and bank charges are also included in the costs.

^b In mid-2012 prices.

^c Physical contingencies are computed at 5% of base costs less resettlement and cargo terminals. Price contingencies are 4% of base costs plus physical contingencies.

^d Includes interest and commitment charges. Interest during construction for the ADB loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.4%. Commitment charges for an ADB loan are 0.15% per year, to be charged on the undisbursed loan amount.

Sources: ADB and Hunan provincial department of transport estimates.

25. The ADB loan will finance 38.1% of the project cost. The remaining cost will be financed by the MOT and the HPG and by collaborative value addition cofinancing through loans from

²² The interest includes a maturity premium of 0.2%. This is based on the above loan terms and the government's choice of repayment option and dates.

²³ ADB agreed to finance the amount of taxes and duties under this project because (i) it is within reasonable country threshold, (ii) it does not represent the excessive share of the project investment plan, (iii) it applies only with respect to ADB-financed expenditures, and (iv) financing of taxes and duties is material and relevant to the success of the project.

China Construction Bank Corporation, which has appraised the project and provided a commitment letter. The MOT and HPG have made budgetary provisions for the counterpart funds. The financing plan is in Table 2.

Table 2: Financing Plan

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank	150.00	38.1
Ministry of Transport	50.53	12.9
Hunan provincial government	127.39	32.4
China Construction Bank Corporation	65.40	16.6
Total	393.32	100.0

Source: Asian Development Bank estimates.

E. Implementation Arrangements

26. The implementation arrangements are summarized in Table 3 and described in detail in the project administration manual (footnote 21).

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	1 January 2013–31 December 2017		
Estimated completion date	31 December 2017		
Management			
(i) Oversight body	Hunan provincial government		
(ii) Executing agency	Hunan provincial department of transport (HPDOT)		
(iii) Key implementing agencies	Hunan Xiangjiang Navigation Construction and Development Company (XNCD or its successor) for outputs 1 and 2 and HPDOT for output 3		
(iv) Implementation units	Project management office of XNCD for outputs 1 and 2 Foreign capital project office of HPDOT for output 3		
Procurement ^a	International competitive bidding for civil works	2 contracts	\$110.57 million
	International competitive bidding for equipment	4 contracts	\$59.04 million
	National competitive bidding for equipment	1 contract	\$0.50 million
Consulting services ^a	Institutional strengthening (quality- and cost-based selection, 80:20) —26 person-months of national consulting services —12 person-months of international consulting services		\$0.60 million
	Technical advisory panel (individual consultants selection) —7 person-months of national consulting services		\$0.06 million
Retroactive financing and advance contracting	Advance contracting approved. Retroactive financing will apply to up to 20% of the ADB loan amount, with respect to expenditures incurred prior to loan effectiveness but not earlier than 12 months before signing of the loan agreement.		
Disbursement	The loan proceeds will be disbursed in accordance with ADB's <i>Loan Disbursement Handbook</i> (2012, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.		

^a For ADB-financed contract packages.

Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

27. The engineering design is based on adequate reliable data obtained through detailed geological and hydrological investigations, as well as a due diligence review conducted under the project preparatory technical assistance (footnote 14). During the feasibility study and preliminary design phases, alternatives were analyzed and the design was optimized, with a focus on the key

technical elements. Aspects addressed included the navigation-cum-hydropower complex site and layout, river water level, flood control, the layout of the complex, ship lock capacity, and the type of hydropower plant. These efforts will limit the need for any further design changes. They will also help ensure that a realistic construction schedule, based on up-to-date information, is adopted in the tendering documents. The technical specifications are provided in the project administration manual (footnote 21). The project will finance a five-member technical advisory panel to review all technical, operational, and safety aspects of the detailed design, procurement, and construction, among other aspects. The panel will conduct periodic reviews in the fields of geology, seismology, sedimentation, concrete placement, environmental protection, land acquisition, and resettlement.

B. Economic and Financial

28. Cargo traffic is increasing steadily on the Xiang River, which shows that IWT is a cost-effective method for transporting bulk freight. IWT carried 12% of the total ton-km of freight in Hunan in 2010. Once the project is complete and the intended water level reached, the average size of vessels using the Tugutang section is projected to increase from 225 dwt in 2010 to 516 dwt in 2020 and 649 dwt in 2030. IWT on the Xiang River will become more cost-effective, because larger vessels will be able to navigate upstream to Jinweizhou (see map) from Shanghai or Chongqing on the Yangtze River during the dry season. The traffic forecast is in Appendix 3 of project administration manual (footnote 21).

29. This is a multipurpose project. Its quantified economic benefits comprise (i) savings in the cost of inland waterway transport, (ii) benefits from hydropower generation, and (iii) reduction in greenhouse gases and air pollution through clean energy production. On average, the project will avoid the emission of approximately 290,000 tons of carbon dioxide into the atmosphere each year by generating electricity through hydropower rather than fossil fuels. It will further reduce such emissions by reducing highway traffic congestion as the transport of bulk cargo shifts to waterways from roads. The project will also contribute to more reliable irrigation. The project is economically viable, with an estimated economic rate of return of 14%. Sensitivity analysis confirms the robustness of its economic viability.

30. The financial analysis confirmed that the project is financially viable. The estimated financial internal rate of return of 3.32% exceeds the weighted average cost of capital of 2.25%. Electricity revenues will allow the project to meet debt service obligations as well as provide for operation and maintenance. The HPG has agreed to provide budgetary support to cover any shortfall of funds if needed.

C. Governance

31. All procurement to be financed under the ADB loan will be carried out in accordance with ADB's Procurement Guidelines (2010, as amended from time to time). The relevant sections of the ADB's Anticorruption Policy (1998, as amended to date) will be included in all procurement documents and contracts. ADB's Anticorruption Policy was explained to and discussed with the government, the HPG, the HPDOT, and XNCD. The specific policy requirements and supplementary measures are described in the project administration manual (footnote 21).

D. Poverty, Gender and Social

32. Waterway users will benefit from the expanded, more affordable, and more reliable IWT services the project will provide. The complex's hydropower facility will generate health and

environmental benefits through better air quality by replacing a new thermal power plant that would have been needed in a without-project scenario to meet demand for electricity.

33. The project will extend IWT cargo services to remote areas. It will reduce transport costs between the comparatively less developed inland province of Hunan and the PRC's economically dynamic coastal region. This will benefit 14 million people in cities of Hengyang and Yongzhou, and Guiyang county. The beneficiaries will include 637,000 rural residents and 273,000 urban dwellers who are poor, based on the government's average annual per capita net income of CNY1,196 for rural areas and its minimum living standard scheme for urban areas. The poor will benefit in particular through the improved access to markets they will gain for their products. Starting in 2017, the project's annual power output of 363 GWh of clean and renewable energy will meet the electricity needs of about 300,000 households. Local officials in the project area estimate that at least 50,000 additional jobs will be created during implementation.

34. **Gender benefits (effective gender mainstreaming).** The project design includes several gender-sensitive measures, with a focus on consultation with women and their involvement in non-farm training. XNCD will work with women's federations, contractors, and communities to facilitate paid work for women in the project's physical works, and to ensure that all PRC labor laws and core labor standards are respected. Livelihood restoration and gender mainstreaming measures associated with resettlement are incorporated in the resettlement plan and project design. The project will allocate \$50,000 to provide non-farming skills training to women that will open up new job opportunities for them in the project's two port improvement areas. The project will ensure active participation by women by appointing a qualified staff member in XNCD to be responsible for the dissemination of information, implementation, and monitoring of the gender action plan.

E. Safeguards

35. **Environment (category A).** There are no nature reserves or protected areas around the project complex. The complex will have a run-of-the-river barrage structure with a low head of 10 meters. An environmental impact assessment was prepared in compliance with the PRC regulatory framework and ADB's Safeguard Policy Statement (2009).²⁴ Two rounds of public consultations were undertaken, including a community survey. The environmental impact assessment was circulated to ADB's Board of Directors and made public through the ADB website on 4 August 2011. The potential effects include adverse impacts on water quality through re-suspension of heavy metals in sediments and subsequent impacts on downstream water quality. The project environmental management plan provides \$16.5 million for mitigation measures to prevent or reduce project's potential environmental impacts. The HPDOT and XNCD will implement the environmental management plan, which will be incorporated in the bidding documents and contracts for civil works. Impacts will be monitored and semiannual reports submitted to ADB. In addition to the project's mitigation measures, the HPG will invest \$9.2 billion to support a variety of environmental mitigation measures to prevent water pollution in Xiang River from 2011–2015.

36. **Resettlement (category A).** A resettlement plan was developed in accordance with the PRC's laws and regulations and ADB's Safeguard Policy Statement, with participation from local governments and the affected people.²⁵ Resettlement information booklets have been distributed to affected villages. The project will affect 53 villages in 14 townships and/or towns in three

²⁴ Environmental Impact Assessment (accessible from the list of linked documents in Appendix 2).

²⁵ Resettlement Plan (accessible from the list of linked documents in Appendix 2).

counties. The project will permanently acquire 386.1 ha of land and will temporarily occupy 13.1 ha of land. Most of the affected households will lose only part of their total landholding. Land acquisition and house demolition is expected to affect 5,286 persons. A total of 30 households (127 persons) will need to be relocated. The resettlement budget is estimated at CNY467 million, or about 19% of the project cost. The project is classified as category C for impact on indigenous peoples, with none expected and no action required.

F. Risks and Mitigating Measures

37. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.²⁶

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Weak coordination between agencies limits the development potential of IWT.	The Hunan provincial government has set up a waterway transport development committee. This high-level committee for IWT development will coordinate all relevant agencies and resolve potential conflicts.
The upgrading of IWT vessels is slow and shippers remain reluctant to shift freight through IWT.	Risks will be mitigated by implementing the agreed incentive measures for modal shift as well as publicity campaign to make shippers aware of benefits and lower costs of using the improved all-year navigation channel.

ADB = Asian Development Bank, IWT = inland waterway transport.
Source: Asian Development Bank.

IV. ASSURANCES

38. The Government of the PRC and the HPG have assured ADB that implementation of the project shall conform to all applicable ADB policies including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the project administration manual and loan documents. The government has agreed with ADB on certain covenants for the project, which are set forth in the draft loan and project agreements.

V. RECOMMENDATION

39. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of \$150,000,000 to the People's Republic of China for the Hunan Xiangjiang Inland Waterway Transport Project, from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 27 years, including a grace period of 7 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Haruhiko Kuroda
President

15 November 2012

²⁶ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
<p>Impact An efficient, safe, affordable, and sustainable inland waterway transport system developed in Hunan province</p>	<p>On average, the total traffic ton-km carried by IWT in Hunan increases by 5% per annum from 2010 to 2023. (2010 baseline: 35.1 billion ton-km)</p>	<p>Hunan Navigation Statistical Yearbook</p>	<p>Assumption Government investments in waterway transport projects are implemented as planned.</p>
<p>Outcome A low carbon waterway transport system improved on the Xiang River in Hunan province</p>	<p>Safe navigation for vessels up to 1,000 dwt throughout the 495 km channel between Jinweizhou on the Xiang River and the Yangtze River by 2018.</p> <p>Average size of vessels navigating through the project site increases from 225 dwt in 2010 to 450 dwt in 2018, offering the lowest per ton-km tariff mode.</p> <p>By 2018, about 290,000 tons of potential carbon dioxide emissions are eliminated each year through the project's clean hydroelectric generation, compared with projected without-project emission levels.</p>	<p>Hunan Navigation Statistical Yearbook</p> <p>HPDOT</p> <p>PCR</p>	<p>Assumptions Construction of other navigation complexes on Xiang River proceed as planned.</p> <p>The MOT and the HPDOT maintain policies to modernize the IWT vessel fleet.</p>
<p>Outputs 1. Tugutang navigation-cum-hydropower generation complex constructed</p>	<p>The Tugutang complex is constructed by 2017, including a class III ship lock of 180 m x 23 m x 4 m, and a power plant with installed power generation capacity of 90 megawatts.</p> <p>Water has minimum depth of 2.4 m on Xiang River waterway up to Jinweizhou Junction (class III standard) in 2017. (2010 baseline: 1.0 m)</p> <p>The cycle time of Tugutang ship lock operation is not more than 50 minutes from 2017.</p>	<p>XNCD, progress reports, and PCR</p>	<p>Risk Large variations to design and work quantities become necessary, resulting in cost overruns.</p>

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms		Assumptions and Risks					
	At least 20% of employment generated during construction and operation goes to women.								
<p>2. Cargo terminal berths at Songbai and Yunji and public landing stages improved</p> <p>3. Capacity and performance of waterway management agencies enhanced</p>	<p>Songbai and Yunji ports can serve 1,000 dwt ships from 2017.</p> <p>71 project landing stages are in operation by 2017.</p> <p>500 women trained in various vocations under project utilize their skills for either employment or self-employment in the two port areas.</p> <p>A waterway transport development committee to promote IWT is established by 2012, and IWT development policy is formulated for consideration by HPG by 2016.</p> <p>A comprehensive waterway transportation construction and investment company is incorporated and in operation by 2013.</p> <p>HPG endorses and HPDOT actively implements IWT innovation and promotion programs by 2014.</p> <p>HPDOT has the capacity to monitor dangerous goods vessels and respond in case of emergencies by 2017.</p> <p>Gender awareness and sensitization training program has covered 80% of XNCD staff by 2017.</p>	<p>XNCD, progress reports, and PCR</p> <p>HPDOT, XNCD, progress reports, and PCR</p>		<p>Risks The effectiveness of the committee may be hampered by the complexities of interagency coordination.</p> <p>Government's commitment to a greener Xiang River is sustained.</p>					
Activities with Milestones		Start	Completion	Inputs					
1. Tugutang navigation-cum-hydropower generation complex				ADB: \$150.00 million					
1.1 Prepare land acquisition and resettlement plan	Jan 2012	Dec 2013	<table border="1"> <thead> <tr> <th data-bbox="1027 1768 1170 1835">Item</th> <th data-bbox="1170 1768 1446 1835">Amount (\$ million)</th> </tr> </thead> <tbody> <tr> <td data-bbox="1027 1835 1170 1885">Works</td> <td data-bbox="1170 1835 1446 1885">88.56</td> </tr> <tr> <td data-bbox="1027 1885 1170 1925">Equipment</td> <td data-bbox="1170 1885 1446 1925">59.94</td> </tr> </tbody> </table>	Item	Amount (\$ million)	Works	88.56	Equipment	59.94
Item	Amount (\$ million)								
Works	88.56								
Equipment	59.94								
1.2 Implement land acquisition and resettlement	Jan 2013	Dec 2016							
	Oct 2012	Dec 2014							

Activities with Milestones	Start	Completion	Inputs
1.3 Disseminate information on employment opportunities	Dec 2012	Dec 2016	Institutional development and strengthening 1.50
1.4 Prepare and implement construction plans	Nov 2012	Dec 2016	
1.5 Build diversion works	Mar 2013	Jun 2015	
1.6 Construct ship lock			
1.7 Build and install powerhouse works	Oct 2014	Dec 2017	MOT and HPG: \$177.92 million China Construction Bank Corporation: \$65.40 million
1.8 Build and install gate barrage works	Jan 2013	Mar 2017	
1.9 Build auxiliary barrage works	Apr 2014	Mar 2017	
1.10 Build bank protection works	Jul 2013	Mar 2016	
1.11 Complete final finishing works	Jan 2017	Mar 2017	
2. Improved cargo terminal berths at Songbai and Yunji and public landing stages			
2.1 Organize separate consultations for women groups	Jan 2014	Oct 2016	
2.2 Build two 1,000 dwt berths in Songbai and Yunji	Jan 2016	Dec 2016	
2.3 Construct 71 landing stages	Jan 2014	Dec 2016	
2.4 Non-farming skills training for women groups	Oct 2012	Dec 2017	
3. Enhanced capacity and performance of waterway management agencies	Mar 2013	Mar 2014	
3.1 Establish a waterway transport development committee to promote IWT	Dec 2013	Dec 2014	
3.2 Appoint support and advisory team to support the waterway transport development committee	Dec 2012	Dec 2014	
3.3 Engage technical advisory panel	Dec 2015	Dec 2016	
3.4 Prepare IWT (including inland port) development policy for consideration by HPG	Dec 2013	Dec 2014	
3.5 Establish Hunan Shipping and Port Corporation	Dec 2015	Dec 2015	
3.6 Identify and support IWT innovation and promotion programs on a pilot basis	Jan 2012	Dec 2017	
3.7 Training, including gender awareness training	Dec 2017	Dec 2017	
3.8 Procure emergency response vessels	Jan 2012	Dec 2017	
3.9 Implementation of the environmental management plan, resettlement plan, and gender action plan			

ADB = Asian Development Bank, dwt = deadweight ton, HPDOT = Hunan provincial department of transport, HPG = Hunan provincial government, IWT = inland waterway transport, km = kilometer, m = meter, MOT = Ministry of Transport, PCR = project completion report, XNCD = Hunan Xiangjiang Navigation Construction and Development Company.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=43031-013-3>

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Transport, and Information and Communication Technology
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Gender Action Plan
12. Environmental Impact Assessment
13. Resettlement Plan
14. Risk Assessment and Risk Management Plan