



# Report and Recommendation of the President to the Board of Directors

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Project Number: 48281-001  
November 2014

## Proposed Loan China Gas Holdings Limited Natural Gas for Land and River Transportation Project (People's Republic of China)

This is an abbreviated version of the document approved by ADB's Board of Directors that excludes information that is subject to exceptions to disclosure set forth in ADB's Public Communications Policy 2011.

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 27 October 2014)

Currency unit	–	yuan (CNY)
CNY1.00	=	\$0.16
\$1.00	=	CNY6.12

## ABBREVIATIONS

ADB	–	Asian Development Bank
CGH	–	China Gas Holdings Limited
CNG	–	compressed natural gas
EMP	–	environmental management plan
ESMS	–	environmental and social management system
FIRR	–	financial internal rate of return
IWT	–	inland waterway transport
LNG	–	liquefied natural gas
PRC	–	People's Republic of China

## NOTES

- (i) The fiscal year (FY) of China Gas Holdings Limited ends on 31 March. "FY" before a calendar year denotes the year in which the fiscal year ends, e.g., FY2014 ends on 31 March 2014.
- (ii) In this report, "\$" refers to US dollars unless otherwise stated.

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## PROJECT AT A GLANCE

<b>1. Project Name:</b> Natural Gas for Land and River Transportation Project		<b>2. Project Number:</b> 48281	
<b>3. Country:</b> People's Republic of China		<b>4. Department/Division:</b> Private Sector Operations Department Infrastructure Finance Division 2	
<b>5. Sector Classification:</b>			
	Sectors	Primary	Subsectors
	Energy	✓	Oil and gas transmission and distribution, energy efficiency and conservation
	Transport		Water transport, urban public transport
<b>6. Thematic Classification:</b>			
	Themes	Primary	Subthemes
	Environmentally sustainable growth	✓	Urban environmental improvement, eco-efficiency
	Private sector development		Private sector operations
	Inclusive economic growth		Economic opportunities, including jobs, created and expanded
<b>6a. Climate Change Impact:</b>		<b>6b. Gender Mainstreaming:</b>	
Adaptation		Gender equity theme	
Mitigation	✓	Effective gender mainstreaming	
Not applicable		Some gender elements	
		No gender elements	✓
<b>7. Targeting Classification:</b>		<b>8. Location Impact:</b>	
	<b>Targeted Intervention</b>		
	Geographic dimensions of inclusive growth	Millennium development goals	Income poverty at household level
✓			
	Rural		
	Urban	High	
	National	Medium	
	Regional		
<b>9. Nonsovereign Operation Risk Rating : NSO 5 (Notional Group Rating)</b>			
<b>10. Safeguard Categorization:</b>			
	Environment		<b>B</b>
	Involuntary resettlement		<b>B</b>
	Indigenous peoples		<b>C</b>
<b>11. ADB Financing:</b>			
	<b>Modality</b>	<b>Source</b>	<b>Amount (\$ million)</b>
<b>Sovereign/Nonsovereign</b>			
Nonsovereign	A loan	OCR	Up to \$150 million in US\$/CNY dual currency
Nonsovereign	complementary loan	Commercial lenders	Up to \$300 million in US\$/CNY dual currency
<b>12. Cofinancing:</b>			
	<b>Financier</b>	<b>Category</b>	<b>Amount (\$ million)</b>
	International commercial lenders	General corporate facility	Up to \$100 million
	<b>Total</b>		
<b>13. Counterpart Financing:</b> Not Applicable			
<b>14. Aid Effectiveness:</b> Not Applicable			



## I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed dollar–yuan loan facility of up to \$450 million equivalent to China Gas Holdings Limited (CGH), comprising (i) a dollar–yuan A-loan of up to \$150 million equivalent, and (ii) a dollar–yuan complementary loan of up to \$300 million equivalent, for the Natural Gas for Land and River Transportation Project in the People’s Republic of China (PRC).

## II. THE PROJECT

### A. Project Identification and Description

#### 1. Project Identification

2. Air pollution continues to be a major environmental challenge in the PRC. Less than 1% of the 500 main cities in the PRC meet the air quality standards recommended by the World Health Organization.<sup>1</sup> Although industrial emissions have stabilized in the past few years, a rapid increase in vehicular traffic volumes has created a new threat in the form of vehicle and vessel emissions. This factor, as well as the technological developments inspired by successful cases in Europe, has created renewed interest in the application of both compressed natural gas (CNG) and liquefied natural gas (LNG) in the transport sector, since heavily polluting fuels such as diesel can be replaced with natural gas, which produces no particulate matter, 25% less carbon dioxide, less than one-third as much nitrogen oxides, and 99% less sulfur dioxide than conventional fuel.

3. CNG is suitable for short-distance inner-city transportation and, therefore, can be used by cars, taxis, and buses. LNG has superior energy density and is more appropriate for long-distance transportation, such as long-distance trucking.<sup>2</sup> Furthermore, there is untapped potential for further greening transportation using LNG for inland waterway transport (IWT). The PRC has the world’s largest IWT network, both in terms of length and freight volume. Since 2007, the government has emphasized improving IWT infrastructure to handle larger vessels, which would allow for greater transportation efficiency. LNG can replace diesel and bunker oil as an alternative fuel for long-distance IWT vessels.

4. The PRC per capita gas consumption is still among the lowest of gas-consuming countries in Asia and the rest of the world, despite the fact that the PRC has abundant undeveloped natural gas reserves, estimated at approximately 3.1 trillion cubic meters.<sup>3</sup> The government is actively trying to increase natural gas usage as a part of the PRC’s overall energy mix,<sup>4</sup> and specifically encourages its use in land and water transportation.<sup>5</sup> While gas supply—both from domestic and international sources—has increased, natural gas demand still

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<sup>1</sup> Asian Development Bank (ADB). 2012. *Toward an Environmentally Sustainable Future: Country Environmental Analysis of the People’s Republic of China*. Manila.

<sup>2</sup> LNG requires only 30% of the storage space of CNG.

<sup>3</sup> BP. 2013. *BP Statistical Review of World Energy 2013*. London.

<sup>4</sup> Government of the People’s Republic of China, State Council. 2013. *The 12th Five-Year Plan for Energy Development*. Beijing.

<sup>5</sup> Government of the People’s Republic of China, National Development and Reform Commission. 2012. *The 12th Five-Year Plan for Natural Gas Development*. Beijing; Government of the People’s Republic of China, National Development and Reform Commission. 2012. *Natural Gas Utilization Policy*. Beijing; Government of the People’s Republic of China, State Council. 2013. *Air Pollution Prevention and Control Action Plan*. Beijing.

remains unmet, largely because of a lack of distribution and refueling infrastructure, particularly in long-distance transport corridors which cross municipal and provincial boundaries.

5. In response to the continued environmental challenges faced by the PRC and the government's desire to promote the use of natural gas in the transportation sector, sustainable transportation has become a new focus area for the business development efforts of the Asian Development Bank (ADB). Through continuous project screening and discussion with private sector gas operators, ADB selected CGH as the ideal partner to develop natural gas distribution infrastructure targeted at the transportation sector. CGH distinguished itself from its peers by having (i) greater geographical coverage, including in least-developed rural areas; (ii) substantial technical expertise in small-sized LNG refilling stations; and (iii) a clear strategy for gas distribution in IWT.

## **2. Project Design**

6. The proposed project is designed to facilitate the use of natural gas as a transportation fuel by building CNG and LNG refueling stations along long-distance land transportation corridors and IWT networks in the PRC that cross municipal and provincial boundaries. With the proposed facility, CGH plans to build and operate subprojects of 600 CNG and 200 LNG filling stations for land-based vehicle use and another 20 LNG filling stations for IWT vessel use during 2015–2018.

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## **3. The Borrower**

7. CGH, the borrower of the ADB loan, is a company incorporated in Bermuda and listed on the Hong Kong Stock Exchange.<sup>6</sup> Following the government's 2002 policy to open natural gas distribution to private sector investment, CGH has focused its operations on the construction and operation of city gas pipelines and supply of natural gas to residential, industrial, and commercial end users, thereby replacing coal and coal gas usage. In FY2009, CGH entered the liquefied petroleum gas distribution business to become an integrated gas distribution company. In FY2014, CGH had revenues of HK\$26.0 billion (\$3.4 billion), a gross profit of HK\$5.3 billion (\$682 million), and a net profit of HK\$3.0 billion (\$384 million).

[CONFIDENTIAL INFORMATION DELETED]

8. Since 2006, ADB has been closely collaborating with CGH to address natural gas demand in small and medium-sized cities. The Municipal Natural Gas Infrastructure Development Project Phase 1 provided a \$25 million equity investment, a \$50 million A-loan, and a \$75 million B-loan for natural gas distribution to commercial and residential customers in cities.<sup>7</sup> To meet the government's urban–rural integration initiative, in 2010 ADB arranged phase

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<sup>6</sup> Bermuda is on the "white list" of Organisation for Economic Co-operation and Development jurisdictions, which have substantially implemented the internationally agreed tax standard. Bermuda has passed phase 1 and phase 2 peer review by the Global Forum for Transparency and Exchange of Information for Tax Purposes and been rated as a "largely compliant" jurisdiction. ADB's review of the entity does not give ADB cause to believe that such entity has been established, or is being used for cross-border tax evasion, money laundering, or terrorism financing in the jurisdictions involved in the project.

<sup>7</sup> ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Equity Investment and Loans to the People's Republic of China for the Municipal Natural Gas Infrastructure Development Project*. Manila; ADB. 2010. *Extended Annual Review Report: Loan and Equity Investment to the People's Republic of China for the Municipal Natural Gas Infrastructure Development Project*. Manila.



2 financing, which included a \$100 million A-loan and a \$100 million B-loan to support CGH's efforts to provide natural gas to smaller cities.<sup>8</sup> With ADB's assistance, CGH was able to build and operate natural gas pipeline networks in 160 cities and sell more than 8 billion cubic meters of natural gas in FY2014, which displaced coal, coal gas, and gasoline consumption.

9. Currently, CGH operates 295 CNG vehicle refilling stations servicing inner-city public transportation and 58 LNG vehicle refilling stations servicing long-distance, cross-provincial transportation. Furthermore, CGH is implementing a pilot IWT LNG filling station along the Yangtze River, which has the most river transportation traffic of any PRC inland waterway.

## **B. Development Impact, Outcome, and Outputs**

10. **Impact.** Successful implementation of the project and deployment of natural gas for multimodal transportation will diversify the energy mix in the PRC by increasing the proportion of natural gas, and increase the availability of natural gas as a transportation fuel in the country.

11. **Outcome.** The outcome will be development of a commercially viable low-carbon transport fuel system. The project is expected to generate new jobs and reduce greenhouse gas emissions while also acting as a catalyst for private sector participation in the sector.

12. **Output.** The expected outputs include the increased availability of CNG and LNG stations meeting safeguards standards. The project will involve the construction and operation of 600 CNG and 200 LNG refueling stations for use by land-based vehicles and 20 LNG refueling stations for IWT vessel use during 2015–2018, all of which will comply with ADB safeguard standards and technical eligibility criteria.

## **C. Alignment with ADB Strategy and Operations**

13. **Consistency with midterm review of Strategy 2020.** The project is consistent with ADB's Midterm Review of Strategy 2020, which identifies infrastructure and environment as two of the four strategic priorities to sharpen ADB's operational focus.<sup>9</sup> Regarding infrastructure, the project is in line with the midterm review's focus on inclusive growth, as well as with its emphasis on public–private partnership. Regarding the environment, the project mitigates air pollution and health threats, and promotes environmentally sustainable growth.

14. **Consistency with country strategy.** By supporting environmental sustainability, the project directly addresses key development goals of the PRC country partnership strategy<sup>10</sup> and aligns with the strategy's sector priority of pollution control. Environmental sustainability will continue to be a major strategic objective of ADB support to the PRC, as will the PRC's delivery of environmental regional and global public goods. The project strongly complements the ADB East Asia Department's current initiatives in climate change mitigation energy projects and greening transport portfolio.

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[CONFIDENTIAL INFORMATION DELETED]

<sup>8</sup> ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Equity Investment and Loans to the People's Republic of China for the Municipal Natural Gas Infrastructure Development Project (Phase 2)*. Manila.

[CONFIDENTIAL INFORMATION DELETED]

<sup>9</sup> ADB. 2014. *Midterm Review of Strategy 2020: Meeting the Challenges of a Transforming Asia and Pacific*. Manila.

<sup>10</sup> ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila.

15. **Consistency with energy policy and sustainable transport initiative.** ADB's Energy Policy<sup>11</sup> requires energy operations to be aligned with ADB's overall strategy of emphasizing energy security, facilitating a transition to a low-carbon economy, universal access to energy, and achieving ADB's vision of a region free of poverty. The policy requires ADB to help developing member countries provide reliable, adequate, and affordable energy for inclusive growth in a socially, economically, and environmentally sustainable way. It sets out three pillars for policy implementation: (i) promoting energy efficiency and renewable energy; (ii) maximizing access to energy for all; and (iii) promoting energy sector reform, capacity building, and governance. The proposed project is in line with the policy, as further penetration of natural gas will contribute to promoting enhanced access to clean energy. It will also demonstrate ADB's commitment to focusing future transport sector support on the more sustainable forms of transport, in line with the Sustainable Transport Initiative.<sup>12</sup> The project will serve as a demonstration of the potential of natural gas for IWT use in the PRC and in other developing member countries with IWT potential.

#### D. Project Cost and Financing Plan

16. CGH's land and river transportation sector investment plan indicates a total investment of \$1.1 billion equivalent, including civil works, equipment and materials, other local procurement, and working capital for 2015–2018.  
[CONFIDENTIAL INFORMATION DELETED]

#### E. Implementation Arrangements

17. Table 2 summarizes the implementation arrangements.

**Table 2: Summary of Implementation Arrangements**

Aspects	Arrangements
Regulatory framework	The regulatory requirements for CNG and LNG refilling stations include approvals from the Ministry of Commerce and the National Development and Reform Commission. The stations should comply with the applicable construction standards and safety regulations, and the operators should obtain licenses and permits such as gas operation licenses, gas supply licenses, and road transport permits for dangerous goods. For conversion of diesel-based inland water vessels into LNG–diesel dual-fuel vessels, approval by the China Classification Society is also required.
Management	CGH is led by a team of experienced and qualified managers, and will centrally control all project development, procurement, and financing arrangements across its operations. CGH will be responsible for identifying, evaluating, selecting, negotiating, implementing, and administering each subproject. [CONFIDENTIAL INFORMATION DELETED]
Implementation period	January 2015–December 2018
Construction arrangements	The goods and services will be required to be procured from contractors and suppliers from ADB member countries in a transparent manner, through competitive bidding procedures.
Operation arrangements	
Revenue structure	[CONFIDENTIAL INFORMATION DELETED]
Supply arrangements	[CONFIDENTIAL INFORMATION DELETED]
Operation and maintenance	The project will rely on CGH for its successful track record of operation and maintenance. CGH has experienced and competent in-house teams to undertake operation and maintenance of CNG and LNG refilling stations.

<sup>11</sup> ADB. 2009. *Energy Policy*. Manila.

<sup>12</sup> ADB. 2010. *Sustainable Transport Initiative Operational Plan*. Manila.

Aspects	Arrangements
Performance monitoring	CGH will report on key performance indicators, including the output and outcome indicators identified in the design and monitoring framework in Appendix 1.

ADB = Asian Development Bank, CGH = China Gas Holdings Limited, CNG = compressed natural gas, LNG = liquefied natural gas.

Source: Asian Development Bank.

## F. Projected Financial and Economic Performance

18. Each subproject has to satisfy CGH's minimum financial internal rate return (FIRR) therefore the aggregate Project FIRR will also exceed the weighted average cost of capital. The project is economically sustainable as the economic return on invested capital is higher than the social discount rate of 12%.

[CONFIDENTIAL INFORMATION DELETED]

## III. THE PROPOSED ADB ASSISTANCE

### A. The Assistance

19. ADB's proposed assistance consists of (i) an A-loan of up to \$150 million equivalent in dollars and yuan, and (ii) a complementary loan of up to \$300 million equivalent in dollars and yuan funded by participating banks with ADB acting as lender of record. The proposed A-loan will have a maturity of up to 10 years from the date of the first disbursement.

[CONFIDENTIAL INFORMATION DELETED]

20. The complementary loan will have a maturity equal to or shorter than that of the A-loan, and will be on terms and conditions to be agreed. The complementary loan syndication will be undertaken on a best-efforts basis.

[CONFIDENTIAL INFORMATION DELETED]

### B. Value-Added by ADB Assistance

21. ADB's support is crucial to encourage the use of natural gas for multimodal transport systems. The use of gas as a transportation fuel offers the opportunity to significantly mitigate climate change. This approach has been successful in Europe, where major projects were implemented to meet the strict emission standards on rivers such as the Rhine. However, LNG vehicles and vessels are new in Asia. ADB's support is expected to highlight this untapped potential and facilitate development in distribution and refueling infrastructure, the key bottleneck to CNG and LNG utilization.

22. Backed by rapidly evolving government policies, significant investments are required to realize the technical and economic potential of natural gas in the PRC. Access to finance has been identified as one of the key bottlenecks to natural gas sector development. Commercial banks are confronted with rapidly evolving technologies and emerging contractual structures that challenge the tolerance of their credit committees. A further challenge for natural gas distribution finance is the limited number of project sponsors compared to other infrastructure areas. Those companies are also undertaking investments in natural gas assets as diverse as upstream development, long-distance pipelines, and liquefied petroleum gas. The PRC traditional corporate lending based on balance sheet is not up to the task of funding the required investment for natural gas distribution infrastructure in new areas, particularly IWT.

23. ADB's assistance is designed to lower transaction costs by bundling technical clusters along long-distance transportation corridors, which are often too small and time-consuming for international banks to finance on a stand-alone basis. The local city commercial banks are less active in servicing project companies outside the boundaries of the designated cities. ADB's value addition is to link the cluster of projects with the wider financing community, including international banks, by providing in-depth technical and safeguard due diligence.

### C. Risks

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24. **Adoption risk.** CNG and LNG vehicles are more expensive than conventional vehicles. Also, conversion of conventional engines on existing vehicles to allow for use of CNG and LNG requires up-front investment by vehicle owners. These costs may create barriers to the adoption of CNG and LNG as a transportation fuel and result in a lack of demand for CNG and LNG. Due diligence confirmed that the payback period for incremental costs associated with buying CNG and LNG vehicles and converting conventional engines to CNG and LNG is less than 2 years. Furthermore, ADB is supporting adaptation by enhancing access to finance.<sup>13</sup> The technology associated with the conversion of conventional engines to CNG and LNG is proven and has a positive track record. Adoption risk is also expected to be mitigated by government policies and incentives that aim to increase natural gas usage in the transportation sector.

25. **Market risk.** Though natural gas faces competition from other conventional and alternative fuels, it is more cost-effective than conventional fuels such as oil and diesel, giving it a distinct economic advantage. Regarding competition from other alternative fuel technologies, electric vehicles are emerging but are limited to the large cities with high population density in the PRC.

[CONFIDENTIAL INFORMATION DELETED]

26. **Regulatory risk.** Natural gas for long-distance transportation involves new contractual arrangements. Legal due diligence confirmed CGH's capacity to obtain all necessary approvals as well as the government's strong policy support for this emerging sector.

[CONFIDENTIAL INFORMATION DELETED]

27. **Completion and operation risk.** CGH has a proven technical and management track record in construction, operation, and maintenance of natural gas distribution infrastructure, including CNG and LNG refilling stations servicing land transportation. The risk is also mitigated by the homogeneous nature of the subprojects, and the modularized and standardized nature of the stations.

[CONFIDENTIAL INFORMATION DELETED]

28. **Foreign exchange risk.** This risk arises from potential currency mismatches between the borrower's foreign debt service obligation to ADB and local currency receipts of the project. The dual currency feature of the ADB loan will allow the borrower to draw in local currency, thereby mitigating any foreign exchange risk.

[CONFIDENTIAL INFORMATION DELETED]

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<sup>13</sup> ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the People's Republic of China for Clean Bus Leasing Project*. Manila.

## IV. POLICY COMPLIANCE

### A. Safeguards and Social Dimensions

29. In compliance with ADB's Safeguard Policy Statement (2009), the project is classified category B for environment. The potential adverse environmental impacts are site specific and mostly reversible. CGH's environmental and social management system (ESMS) will ensure development of quality initial environmental examinations with environmental management plans (EMPs), and implementation of the EMPs. Initial environmental examinations will be prepared for all ADB subprojects. With regard to LNG station sites, only those which avoid any adverse impacts on biodiversity will be selected. The land transport CNG and LNG stations will have no or negligible adverse impacts on biodiversity as they will be constructed adjacent to highways. For climate change mitigation, CGH implements boil-off gas compressors in its facilities to recover any leaked natural gas and feeds into the cities' natural gas networks. Potential adverse impacts associated with construction will be minimized by the ESMS through EMP implementation. Potential adverse environmental impacts of gas refilling station operation are associated with accidents. A quality ESMS can minimize the accident risks.

30. At this stage, ADB proceeds are not allocated for implementing specific subprojects. CGH commissioned qualified external experts to conduct a corporate audit of its current ESMS and the company's past and current performance against the objectives, principles, and requirements of the Safeguard Policy Statement. CGH will improve its ESMS to fully comply with the Safeguard Policy Statement with regard to the project. The improved ESMS will include (i) public consultation for subproject planning and implementation, (ii) a project screening system to avoid potential significant adverse environmental impacts, (iii) an initial environmental examination quality assurance system, (iv) EMP implementation arrangements of ADB subproject subsidiaries, and (v) an ESMS implementation reporting system from the subsidiaries to ADB through CGH. ADB will confirm the company's improved ESMS before the first disbursement of each tranche.

31. The project is classified category B for involuntary resettlement and category C for indigenous peoples. CGH has been developing an innovative LNG business model and technology for long-distance transportation. Refilling station locations can be flexibly selected and they are commonly sited along main roads. The construction of refilling stations will be mainly in medium-sized cities. Land acquisition is not expected to be significant and is normally carried out by the local governments before awarding of the concession. CGH will follow its improved ESMS prior to the disbursement for the first subproject of each tranche and recruit capable staff and/or consultants to ensure that the ESMS is implemented. The ESMS will include resettlement policy principles and procedures to ensure that subprojects using ADB funds are screened. If the subprojects entail physical and economic displacement, resettlement plans will be prepared following national laws of the PRC and in accordance with the Safeguard Policy Statement requirement 2 on involuntary resettlement. The project will not have any adverse impact on ethnic minorities. The potential environmental and social impacts of the project have been identified and effective measures to avoid, minimize, mitigate, and compensate for the adverse impacts will be incorporated in the safeguard reports and plans. CGH has committed to enhance its institutional capacity to adequately manage the project's social and environmental impacts.

32. **Other social dimensions.** The project is categorized as having no gender elements. CGH upholds gender equality and provides equal employment opportunities for men and women during project design, construction, and operation. CGH complies strictly with the Law of

PRC on the Protection of Rights and Interests of Women. Jobs to be created by the project will be offered to the local labor force regardless of gender, and priority will be given to women where interest is high, such as in the financial and human resource offices. CGH will comply with ADB's Social Protection Strategy and report regularly to ADB on its compliance (including that of contractors) with national labor laws and adherence to internationally recognized core labor standards.<sup>14</sup> Information disclosure and consultations with affected people, as applicable, will be conducted in accordance with ADB requirements.

## **B. Anticorruption Policy**

33. CGH was advised of ADB's policy of implementing best international practice relating to combating corruption, money laundering, and the financing of terrorism. ADB will ensure that the investment documentation includes appropriate provisions prohibiting corruption, money laundering, and the financing of terrorism, and remedies for ADB in the event of noncompliance.

## **C. Investment Limitations**

34. The proposed direct loan is within the medium-term, country, industry, group, and single-project exposure limits for nonsovereign investments.

## **D. Assurances**

35. Consistent with the Agreement Establishing the Asian Development Bank (the Charter),<sup>15</sup> the government's no objection to the proposed assistance will be obtained. ADB will enter into suitable finance documentation, in form and substance satisfactory to ADB, following approval of the proposed assistance by the Board of Directors.

## **V. RECOMMENDATION**

36. I am satisfied that the proposed loan facility would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the dollar–yuan loan facility of up to \$450,000,000 equivalent to China Gas Holdings Limited for the Natural Gas for Land and River Transportation Project in the People's Republic of China, comprising

- (i) a dollar–yuan A-loan of up to \$150,000,000 equivalent from ADB's ordinary capital resources; and
- (ii) a dollar–yuan complementary loan of up to \$300,000,000 equivalent to be funded by participating banks,

with such terms and conditions as are substantially in accordance with those set forth in this report, and as may be reported to the Board.

Takehiko Nakao  
President

11 November 2014

<sup>14</sup> ADB. 2003. *Social Protection*. Manila (adopted in 2001).

<sup>15</sup> ADB. 1966. *Agreement Establishing the Asian Development Bank*. Manila.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
<p><b>Impacts</b></p> <p>Energy mix in the PRC is diversified through increased use of natural gas</p> <p>Increased availability of natural gas as a transportation fuel</p>	<p>Proportion of natural gas in the energy mix increases to 15.0% by 2025 from 5.9% in 2013<sup>a</sup></p> <p>All major highways and inland waterways have access to natural gas stations by 2025</p>	<p>Five-Year Plans for Natural Gas Development published by the PRC National Development and Reform Commission</p> <p>Published environmental market and industry reports</p>	<p><b>Assumptions</b></p> <p>The PRC remains committed to improving environmental protection and diversifying the energy mix.</p> <p>More private sector LNG and CNG stations are established</p> <p><b>Risk</b></p> <p>Reduced international supply of natural gas</p>
<p><b>Outcome</b></p> <p>A commercially viable CNG and LNG low-carbon transport fuel system developed for inland and water transport</p>	<p>10,000 new long-distance trucks operate under wholesale contracts for LNG with CGH by 2020<sup>b</sup></p> <p>350 new vessels convert engines to LNG by 2020<sup>b</sup></p> <p>Avoided greenhouse gas emissions are approximately 2 million tons per annum from 2020<sup>c</sup></p> <p>8,200 full-time equivalent jobs are generated by fuel stations by 2020<sup>d</sup></p>	<p>Project monitoring reports</p> <p>Project monitoring reports</p> <p>Project monitoring reports</p> <p>Development effectiveness monitoring reports</p>	<p><b>Assumptions</b></p> <p>Upstream natural gas suppliers honor the contracts and supply sufficient natural gas</p> <p>Sufficient demand for natural gas in the transportation sector</p> <p>O&amp;M activities are properly planned and undertaken for the fuel stations to operate efficiently</p> <p><b>Risk</b></p> <p>Increased competition from other LNG and CNG fuel stations</p>
<p><b>Outputs</b></p> <p>Increased availability of CNG and LNG stations meeting safeguard standards</p>	<p>600 new CNG stations for land transport built by 2018</p> <p>200 new LNG stations for vehicles and 20 new LNG stations for vessels built by 2018</p> <p>CGH's environment and safeguards systems comply with ADB or the PRC policies</p>	<p>Project monitoring reports</p> <p>Project monitoring reports</p> <p>Project monitoring reports</p>	<p><b>Assumptions</b></p> <p>Project sponsor maintains technical capacity to undertake construction</p> <p>Relevant permissions for construction works are given from regulatory agencies in a timely manner</p>

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Creation of job opportunities	CNY2.2 billion (\$350 million) of goods purchased locally by 2018 <sup>e</sup>  12,300 full-time equivalent jobs generated during construction by 2020 <sup>f</sup>	Project monitoring reports  Development effectiveness monitoring reports	Transportation operators are willing to replace diesel and gasoline  <b>Risk</b> Construction of the stations is delayed
<b>Activities with Milestones</b> <ol style="list-style-type: none"> <li>1. Signing of loan agreements by Q1 2015</li> <li>2. Financial closure by Q1 2015</li> <li>3. Clearance of all loan drawdown conditions by Q1 2015</li> <li>4. Improved ESMS to be adopted prior to the first disbursement</li> </ol>		<b>Inputs</b> ADB: Up to \$150 million equivalent A-loan in dual currency Up to \$300 million equivalent B-loan in dual currency  CGH: Equity to meet debt–equity ratio	

ADB = Asian Development Bank, CGH = China Gas Holdings Limited, CNG = compressed natural gas, ESMS = environmental and social management system, LNG = liquefied natural gas, O&M = operation and maintenance, PRC = People's Republic of China, Q = quarter.

<sup>a</sup> China National Petroleum Corporation. 2014. *Domestic and International Oil and Gas Industry Development Report 2013*. Beijing.

<sup>b</sup> CGH estimate.

<sup>c</sup> ADB estimate.

<sup>d</sup> Assuming 10 operation staff per refilling station x 820 CNG and LNG stations to be developed under the project = 8,200 full-time jobs during operation.

<sup>e</sup> Assuming total investment cost of the project of \$1.1 billion x 40% (proportion of cost for equipment procurement) x 80% (proportion of local procurement) = about \$350 million of goods purchased locally.

<sup>f</sup> Assuming 15 workers hired during construction of a CNG or LNG station x 820 CNG and LNG stations to be built under the project = 12,300 jobs created during construction.

Source: Asian Development Bank.