Loan
Indonesia: Tangguh Liquefied Natural Gas Project

In accordance with ADB's public communication policy (PCP, 2005), this extended annual review report excludes information referred to in paragraph 126 of the PCP.
CURRENCY EQUIVALENTS

Currency Unit — Rupiah (Rp)

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ABBREVIATIONS

- AMDAL — (in Indonesia) environmental and social impact assessment
- BP — BP Plc
- DSCR — debt service coverage ratio
- EIRR — economic internal rate of return
- EITI — Extractive Industries Transparency Initiative
- EP — external panel
- FIRR — financial internal rate of return
- ISP — integrated social program
- LARAP — land acquisition and resettlement action plan
- LIBOR — London interbank offered rate
- LNG — liquefied natural gas
- PSC — production-sharing contract
- RRP — report and recommendation of the President
- SPA — sales and purchase agreement

WEIGHTS AND MEASURES

- BBTU — billion British thermal units
- m³ — cubic meters
- MMBTU — million British thermal units
- MMSCF — million standard cubic feet
- MT — million tons
- MTPA — million tons per annum
- TCF — trillion cubic feet

NOTE

In this report, “$” refers to US dollars.
<table>
<thead>
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<th>Role</th>
<th>Name and Position</th>
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</thead>
<tbody>
<tr>
<td>Vice President</td>
<td>L. Venkatachalam, Private Sector and Cofinancing Operations</td>
</tr>
<tr>
<td>Director General</td>
<td>P. Erquiaga, Private Sector Operations Department (PSOD)</td>
</tr>
<tr>
<td>Director</td>
<td>C. Thieme, Infrastructure Finance Division 2, PSOD</td>
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<tr>
<td>Team leader</td>
<td>M. Kanda, Investment Specialist, PSOD</td>
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<td>Team members</td>
<td>R. Caluag, Senior Investment Officer, PSOD</td>
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<td>M. Manabat, Senior Investment Officer, PSOD</td>
</tr>
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<td></td>
<td>J. Munsayac, Safeguards Specialist, PSOD</td>
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<tr>
<td></td>
<td>M. Pascua, Senior Safeguards Officer, PSOD</td>
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In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.
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BASIC DATA
Tangguh Liquefied Natural Gas Project
L2214/7224 – Indonesia

<table>
<thead>
<tr>
<th>Key Project Data</th>
<th>As per ADB Loan Documents ($ million)</th>
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<td>XARR mission</td>
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*Per the ADB loan agreement, “completion” means the date construction of the Tangguh plant was completed in accordance with the plant engineering, procurement, and construction contract and the Operator had issued the taking over certificate for all sections and specified as such by notice from the ADB tranche borrower to the ADB tranche lender.
EXECUTIVE SUMMARY

On 14 December 2005, the Board approved a direct loan of up to $350 million for the Tangguh Liquefied Natural Gas Project. Sponsors of the project comprise a consortium of international oil and gas investors led by BP Plc. The project is cofinanced by Japan Bank for International Cooperation and international commercial banks.

The project is an integrated greenfield liquefied natural gas (LNG) facility on the south shore of Bintuni Bay in Papua Barat Province, located 3,200 kilometers from the national capital of Jakarta, Indonesia. It runs both upstream and downstream operations in the LNG value chain including gas production, processing, liquefaction, storage, and shipping of LNG. It supplies clean energy to key industry users in diversified markets which include the People’s Republic of China, United States, South Korea, and Japan.

This extended annual review evaluates ADB’s assistance to help develop the project. It is based on the findings of an extended annual review mission fielded in August 2012, which included a site visit and interviews with operations and management of BP Berau (the Operator), and on information gathered from project processing files, ADB Board documents, the Operator’s regular operating and compliance monitoring reports, the Trustee Borrower’s regular account statements on the receipt and disbursement of funds, the independent External Panel’s audit reports, and public information.

The evaluation criteria for the project are based on Project Administration Instructions 6.07b on Extended Annual Review Reports for Nonsovereign Operations issued in July 2008. The project was evaluated using four criteria: (i) development impact and outcomes, (ii) ADB investment profitability, (iii) ADB work quality, and (iv) ADB additionality. The results of this evaluation were then aggregated to derive an overall rating for the project.

The project’s development impact and outcomes are evaluated using four subcriteria: (i) private sector development; (ii) business success; (iii) economic sustainability; and (iv) environmental, social, health, and safety performance. The project has had major positive impact and demonstration effect on private sector development on international, national, and local levels in relation to its stated development objectives. As the first extractive operation established in Indonesia’s least-developed province, it serves as a model for the industry as well as the government by demonstrating new standards and practices for sustainable clean energy development with a rigorous and systematic approach to operational integrity, governance, safety, and risk management.

The project has contributed to maintaining Indonesia’s key position in the global LNG market and to its economic growth. The project helped to boost Indonesia’s gas export by 34.2% in 2010, which accounted for $13.6 billion or 8.7% of Indonesia’s total exports in that year. It also brings a substantial economic contribution to the national and local fiscal accounts. Due to this private sector initiative, and including its designing and implementing an integrated social program, the host province has benefitted from multiplier effects leading to tremendous economic growth and social development.

The project has contributed to inclusive growth by creating thousands of jobs and work opportunities locally as well as improving local expertise. It was the first oil and gas company in Indonesia to conduct public consultation with the local communities and government during the AMDAL (environmental and social impact assessment) development process. As the largest foreign direct investment in Indonesia since the Asian financial crisis, the project also paved the way for resumption of the private sector's confidence in the country and continues supporting the country in addressing its challenge to achieve sustainable economic growth driven by the private sector. The project is rated excellent for private sector development.
The project’s financial performance outperforms its original projection. The project is rated excellent for business success.

The project’s economic sustainability is rated excellent. It has brought gas-derived revenues and foreign exchange flows to the country. It has contributed to economic growth and social development in an inclusive way by offering opportunities for local procurement, employment, and participation through community development programs which also promote local business development. The project has contributed to the social and economic well-being and quality of life of people in the area it serves.

In terms of environmental, social, health, and safety performance, the project is rated excellent. It meets all activities and compliance requirements of the AMDAL and environmental management system, of permit regulations, and of stakeholders. Robust frameworks for internal and external audit and monitoring are in effect. The project’s safety record is among the first quartile in BP’s global operations. The project also practiced innovative approaches for sustainable community development through the integrated social program, which has brought significant improvement in local livelihoods, health and education status, and public infrastructure; stronger roles for women in families and communities; better functioning and managed local government; and development of trust among key stakeholders.

ADB’s investment profitability is rated satisfactory, as payments of fees, interest, and principal are made on time. ADB’s overall work quality in relation to screening and appraisal, monitoring and supervision, and its role and contribution is rated satisfactory. ADB examined the environmental and social aspects very cautiously and the assessment was among the most comprehensive ever undertaken by the private sector operations. Following ADB’s review and recommendations, the project investors made significant revisions and improvements to its safeguard documents. ADB is actively monitoring the project’s implementation and compliance.

Meanwhile, ADB’s additionality is rated excellent. ADB’s commitment added special value to the project by enhancing its development impact, particularly in terms of facilitating sustainable industry development and inclusive growth as well as promoting the global use of a clean energy alternative. Foremost among ADB’s value added are the improvements in environmental and social risk mitigation. There is also the value of ADB loan covenants which safeguard long-term compliance to enhance the project’s developmental benefits. ADB’s participation (as the sole multilateral development bank involved) ensures the project’s accountability and transparency of its reporting mechanisms.

Overall, the project is considered highly successful with strong demonstration effect. It has set new standards in environmental and social risk assessment and rigorous environmental, social, health, and safety management for sustainable resource development in partnership with key stakeholders that include the local community. Its lessons learned and best practices are shared with the industry as well as the Indonesian government for replication in its future oil and gas projects. The project contributed to the resumption of the private sector’s confidence in the country. From a viewpoint of economic sustainability, the project provided Indonesia with new LNG production and export capacity and contributed to economic growth by bringing additional revenue to the national and local governments. In addition, it has promoted the use of clean energy through increasing natural gas supply to key industry users globally.
I. THE PROJECT

A. Project Background

1. Indonesia has abundant oil and natural gas resources. It has been a key player in the industry and a major exporter for many decades. As of the end of 2011, Indonesia ranked 14th in the world with 3.0 trillion cubic meters (m$^3$) of proven natural gas reserves,\(^1\) equivalent to 39 years of supply at current production rates.\(^2\) The country, with output of 75,600 billion m$^3$ in 2011, also ranked 10th in global natural gas production. Indonesia used to be the world’s largest exporter of liquefied natural gas (LNG), but its global market share has been eroded over the years by such emerging producers as Qatar, Malaysia, Australia, and Algeria. In 2011, Indonesia exported 21.4 million tons (MT) of LNG, equivalent to 8.9% of total global LNG exports of 241.6 MT, which amount was 9.3% lower than the previous year’s 23.6 MT.\(^3\)

2. For more than three decades since 1977/78, Indonesia has operated two LNG production centers: (i) Arun in North Aceh with 12 million tons per annum (MTPA) production capacity, and (ii) Bontang in East Kalimantan with 22.5 MTPA capacity. The gas reserves at these two sites have steadily declined over the years. Arun, for example, is reported to have depleted 90% of its reserves. To capitalize the potential reserves, the Indonesian government has encouraged investors to explore the eastern part of Indonesia. The natural decline of oil reserves has also prompted the government to emphasize the use of gas. Thus, the Tangguh LNG Project was developed as a national priority in order to develop a third primary center and to augment Indonesia’s position as a leading LNG exporter.

3. The project is in the Bintuni Bay area of Papua Barat Province, located 3,200 kilometers from the national capital Jakarta. The project took shape in the mid-1990s upon the discovery of substantial gas reserves in the area. Proven reserves are around 14.4 trillion cubic feet (TCF). The project was initiated in 1997 by Atlantic Richfield Company (a US oil company) and Pertamina (a state-owned oil and gas enterprise). In April 1999, BP Plc (BP) acquired Atlantic Richfield Company and took over its lead role. Its 7 gas fields, under production-sharing contracts (PSCs), are developed under a partnership between consortia of international contractors (the PSC Contractors) and BPMIGAS as the governmental counterparty.\(^4\) The PSC Contractors, led by BP Berau as the Operator, operate jointly in upstream development and LNG processing for export to international markets.

4. In May 2003, BP approached multilateral and bilateral financial institutions to seek financial assistance together with a commitment to assist the project in implementing best practices following international environmental and social guidelines. ADB Board approved a direct loan of up to $350 million for the project on 14 December 2005. The project is cofinanced by Japan Bank for International Cooperation and international commercial banks.

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\(^1\) Proven reserves of natural gas are those quantities that geological and engineering information indicates within reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions. (Source: BP p.l.c., 2012. BP Statistical Review of World Energy June 2012. London)

\(^2\) BP Statistical Review of World Energy June 2012.


\(^4\) BPMIGAS (Badan Pelaksana Kegiatan Usaha Hulu Migas) is Indonesia’s regulatory authority for the upstream oil and gas sector.
B. Key Project Features

5. The project is an integrated greenfield LNG facility with 404 hectare footprint on the south shore of Bintuni Bay. It runs both upstream and downstream operations in the LNG value chain including gas production, processing, liquefaction, storage, and shipping of LNG. The plant is comprised of two main components: (i) the offshore gas production facilities including 14 producing wells, 2 platforms, and subsea pipelines to feed gas to the onshore facilities; and (ii) the onshore LNG production facilities and associated facilities, which include two identical production trains (Train 1 and 2) with total annual capacity of 7.6 million tons, storage tanks for LNG (2 x 170,000 m³) and condensate (1 x 120,000 barrel), marine berthing facilities, utilities, offices and living facilities, off-site camp, airfield and jetty. Design optimizations together with deferral of the airfield and associated access road almost halved the site footprint.

6. The LNG plant uses proven technology for both main warm and cold end facilities. The process trains are designed based on technology licenses from BASF (for acid gas removal) and Air Products & Chemicals, Inc. (for LNG liquefaction), which accounts for 55% of global nameplate liquefaction capacity.\(^\text{5}\) Green design concept was applied, with acid gas incinerated and CO₂ emission reduced. The plant’s innovative heat and power integration enables energy efficient production. Meanwhile, the conventional offshore platforms were installed to maximize reliability and availability of the reserve base to support prolific well production rates. The entire plant operation is undertaken under robust manuals taking into account lessons learned to date.

7. The project sells LNG under long-term sales and purchase agreements (SPAs) with offtakers in People’s Republic of China, Mexico, South Korea and Japan. Its commercial structuring entitles the project to divert certain amount of the contracted volume to other markets, which has enabled the project to undertake strategic marketing for the additional shorter-term SPAs and the spot market in changing market dynamics, thereby contributing to increased liquidity in the market that has enabled price and demand fluctuations to be met.

8. The project was financed using the offshore trustee borrowing structure which is common to LNG projects in Indonesia. The government owns all project assets in accordance with Indonesian law.

9. The project expects to set new standards as a comprehensive approach to sustainable resource development that integrates environmental, social, and economic considerations into all aspects of its design and management. It meets high standards in responsible resource development through the environmental and social impact assessment (known in Indonesia by the acronym “AMDAL”) process, which conforms to the guidelines and frameworks set out by the government and fulfills applicable international standards and practices, including those of ADB and the World Bank.

C. Progress Highlights

10. The project’s construction program began following the resettlement in July 2004 of Tanah Merah village (the LNG plant site). The engineering, procurement, and construction contracts were entered into with a consortium of Kellogg Overseas Corporation, JGC, and PT Pertafenikki (KJP; for onshore facilities) and with PT Saipem Indonesia (for offshore facilities) in March 2005, followed by immediate issuance of the notice to proceed to start the construction.

11. The offshore facilities were handed over to the project by May 2007. The onshore facilities were ready for start-up in January (Train 1) and June (Train 2) 2009. The first LNG production (first drop) occurred in Train 1 in June 2009. The first LNG shipment was made on 6 July 2009 using the Tangguh Foja LNG carrier.

12. Following the project’s achievement of ready for start-up status in 2009, the start-up process continued until mid-2011 to address technical issues, perform modification works, and ensure the stable operation and higher production efficiency of the LNG plant. Over a 3-year period from first drop in June 2009 up to June 2012 the project had produced a total of 37.8 million m³ of LNG and 5.1 million barrels of condensate.

13. The project obtained ISO14001 certification in December 2010 and is on track to deliver its AMDAL commitments. The project is a demonstration of industry development under close partnership between public and private stakeholders. It enjoys continued support from the government where the plan of further development has been received with a positive response from both the President and Minister of Energy and Mineral Resources. On behalf of the PSC Contractors, the Operator (BP Berau) has submitted a plan of further development to BPMIGAS to build a third LNG train (Train 3) in September 2012.

II. EVALUATION

A. Project Rationale and Objectives

14. The Indonesian government designated the project as a national priority and strongly encouraged ADB to support it. ADB supported the project in view of its objectives to (i) generate financial benefits for both central and local governments in the long term to support their goal of reducing poverty via sustainable economic growth; (ii) supply and promote usage of natural gas at competitive prices to countries endeavoring to improve the environment and broaden their energy mix, as well as increase energy supply and alleviate energy price hikes and fluctuations; (iii) demonstrate resumption of private sector confidence in Indonesia and the government’s reform initiatives in the energy sector; (iv) display ADB’s strong commitment to assist development of the energy infrastructure in Indonesia which requires a large amount of private sector investment; and (v) inspire investor confidence and reassure project participants that the project is properly structured and operated in line with international standards and best practices while fully satisfying critical environment and social requirements.

B. Development Impacts and Outcomes

1. Private Sector Development

15. The project has been developed in Papua Barat, Indonesia’s least-developed province, which was new to the extractive industry. The project’s sustainable operation balances the economic aspects with the environmental vulnerabilities and social considerations without any major disruption in the local community and government. It has demonstrated a good example of how industry development in a remote, untapped region can be led by the private sector with broad acceptance and cooperation from various stakeholders. As the largest foreign direct investment in Indonesia since the Asian financial crisis, the project, has also paved the way for resurgence of the private sector’s confidence in the country.

16. The project was Indonesia’s first greenfield LNG project since the late 1970s. It contributes in promoting the global use of LNG as a clean energy alternative by providing the
country with an upsized export capacity in response to surging demand\textsuperscript{6} in diversified, changing market dynamics.\textsuperscript{7} Oil and gas export serves as a primary source of foreign exchange income in Indonesia. That income had dropped by an annual average 4.6% during 2004–2009 due to declining oil production and increase in domestic energy consumption. The project’s start-up in mid-2009 brought a 2.8% year-on-year increase in total oil and gas export volume. More specifically, following successive years of decline during 2003–2008, Indonesia’s gas export grew by 8.9% to 22.7 MT in 2009 and by 34.2% to 30.5 MT in 2010.\textsuperscript{8} This accounted for $13.6 billion or 8.7% of Indonesia’s total exports in that year.

17. Along with securing Indonesia’s role as a major LNG exporter, the project has a substantial economic impact on the country’s fiscal accounts at both national and local levels. The project’s economic impact is more outstanding at local level, as evidenced by rapid growth in the regional gross domestic product. In 2010, the first full year of start-up operation, Papua Barat’s economic growth jumped by 28.5% and 24.4% on a total and per capita basis, respectively.\textsuperscript{9} That was the highest across the country. The project’s impact is particularly notable inasmuch as these growth measures for 2010 would have been 8.6% and 5.1%, respectively, without the oil and gas sector.

Table 1: Gross Domestic Product of Papua Barat and Indonesia
(at 2000 constant market prices)

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<td>Total in Rp billion (% growth)</td>
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<td>9,366 (28.5%)</td>
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<td>Excluding oil &amp; gas sector</td>
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<td>Total in Rp billion (% growth)</td>
<td>5,447 (9.2%)</td>
<td>5,916 (8.6%)</td>
<td>6,534 (10.5%)</td>
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<td>Per capita in Rp thousand (% growth)</td>
<td>7,402 (5.3%)</td>
<td>7,780 (5.1%)</td>
<td>8,282 (6.5%)</td>
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<td>Indonesia</td>
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<td>All sectors</td>
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<tr>
<td>Total in Rp billion (% growth)</td>
<td>2,178,850 (4.6%)</td>
<td>2,313,838 (6.2%)</td>
<td>2,463,242 (6.5%)</td>
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<td>Per capita in Rp thousand (% growth)</td>
<td>9,294 (3.1%)</td>
<td>9,737 (4.8%)</td>
<td>10,219 (5.0%)</td>
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18. The project has contributed to inclusive growth by creating thousands of jobs and work opportunities locally. Employment levels during construction peaked at 10,920 personnel in August 2007, with 97% of those workers coming from the directly affected villages around the site, Papua, and/or Indonesia. During operations, the project maintains a workforce of about 2,815 per July 2012, comprised almost wholly of Indonesian nationals and of which 54% are Papuans. The hiring and development continues toward a target of 85% Papuan workers by 2029. The project has also encouraged the efforts of national vendors to comply with

\textsuperscript{6} In the 5 years during 2005–2009, global LNG trade grew by an average of 7% per annum while the trade volume jumped by 22% to 223.8 MT in 2010, driven by newly commissioned facilities including the project.

\textsuperscript{7} The project contributes in diversifying Indonesia’s gas export market through its first-ever planned deliveries to the People’s Republic of China, the industry’s first-ever deliveries to private South Korean industries, deliveries to the first LNG import terminal on the North American west coast, as well as the first LNG trade between Asia and North America. It also allocated available quantities to Japan following the major eastern earthquake in 2011.


\textsuperscript{9} Statistical Yearbook of Indonesia 2012.
international industry standards as well as developed and disseminated local expertise \(^{10}\) of its employees, contractors, and business partners to operate the world-class LNG facility.

19. Another key pillar of the project’s contribution to inclusive growth is its integrated social program (ISP). The project delivers livelihood programs to the directly affected villages to increase their household incomes as well as a business empowerment program to train local business enterprises supporting sustainable economic growth in the region. The 2011 census survey conducted by PSKK University Gadjah Mada (Center of Population Study of University of Gajah Mada) evidences the rising household income level of the directly affected villages, which grew by 168% from 2003. \(^{11}\) The project continues facilitating economic and social development in the Bintuni Bay area, with broader impacts that include the development of supporting businesses for the project and the promotion of a rural electrification program jointly with Perusahaan Listrik Negara (the state electricity company) supplying the region an initial 4-8 MW of electricity. \(^{12}\)

20. The project has demonstrated new standards for sustainable business operation with a rigorous and systematic approach to operational integrity, governance, safety, and risk management. Its approaches and lessons have been followed by the government and industry, including the Donggi-Senoro LNG project, Indonesia’s fourth LNG center under construction in Central Sulawesi, which also focuses on establishing sustainable corporate social responsibility programs. \(^{13}\)

21. As the first integrated LNG operation in Indonesia, the project has required transfer and alignment of broader knowledge, practice, and skills of the Operator, including its global common processes and operating culture. The project’s commitment to transparency and good governance took shape in its innovative initiative in strict compliance with the anti-bribery and anticorruption policy designed on the pattern of national and international anticorruption legislation. \(^{14}\) The project contributes in facilitating transparency of revenue flow information between central and local government, and, in partnership with local nongovernment organizations, strengthening governance in the Bintuni Bay area and Papua Barat. Its partnership with local nongovernment organizations provides effective oversight and advocacy to the local community as well as the local government to strive towards good governance in public services, revenue management, socioeconomic development, security, and human rights.

22. The project was also the first in Indonesia in which an oil and gas company conducted public consultation with the local communities and government to solicit their aspirations and assess their needs during the AMDAL development process. It has supported the government in developing the institutional priority on social risk management and its strategic community-based approach, as seen in the ISP and the integrated community-based security program, and has set a new standard for business operation with increased community participation and

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\(^{10}\) The project implements the Papuan Capability Development Program for ensuring the proper capability of Papuan trainees and technicians to achieve long-term commitment to the project and to build a base for the future.

\(^{11}\) Average increase in monthly household income for 10 villages (Ekam, Mogotira, Onar, Otoweri, Saengga, Tanah Merah, Taroy, Tofoi, Tomu, and Weriagar), ranging from 84% in Onar (from Rp1,268,000 in 2003 to Rp2,331,642 in 2011) to 274% in Otoweri (from Rp1,158,000 in 2003 to Rp4,332,845 in 2011).

\(^{12}\) It is expected the project will continue to contribute in providing the communities access to energy. In addition to rural electrification, the domestic supply (up to 25% of production) which the project will undertake in the Train 3 expansion will contribute significantly to mobilizing LNG for the domestic market, including the Papua region.

\(^{13}\) The ISP approach has been shared with BPMIGAS and other PSC Contractors (especially new PSCs in Bintuni areas such as Genting and ENI), as well as sharing the integrated community-based security program with Freeport and INPEX. BP actively shares technical and nontechnical papers, lessons learned, and best practices with the industry through the Indonesian Petroleum Association and other associations and networks.

\(^{14}\) Including the UK’s Bribery Act and the US’s Foreign Corrupt Practices Act.
ownership. The project maintains close engagement with the government as well as coordinates with the Indonesia Petroleum Association to resolve and/or provide advocacy on industry issues for further private sector investments. With its extensive country and sector experience, BP Berau continues to support the government in keeping the upstream energy sector conducive to cooperation in meeting the nation’s energy demand.

23. The project has had major positive impacts on private sector development on international, national, and local levels in relation to its stated development objectives. Private sector development impact is therefore considered excellent.

2. Business Success

24. From first drop in June 2009 to June 2012, the project produced a total of 37.8 million m$^3$ of LNG. The project’s financial performance outperforms its original projection.

25. The project benefits from two key factors contributing to its outperformance - (i) the significant rise in LNG prices and (ii) marketing flexibility enabled by its commercial structuring under SPA.

26. The project is rated excellent for business success.

3. Economic Sustainability

27. The project has brought gas-derived revenues and foreign exchange flows to Indonesia. It has contributed to economic growth and social development in an inclusive way by offering opportunities for local procurement, employment, and participation through community development programs which also promote local business development. The project has contributed to the social and economic well-being and quality of life of people in the area it serves.

28. The project is rated excellent for economic sustainability.

4. Environmental, Social, Health, and Safety Performance

29. The project was classified as Environmental Category A based on ADB’s previous Environmental Policy (2002), requiring an environmental impact assessment and summary environmental impact assessment. Both of these were based on the project’s integrated AMDAL completed and approved by the government in 2002. A comprehensive environmental management plan and environmental monitoring plan were also formulated and approved as part of the AMDAL process.

30. As part of ISO 14001:2004 environmental management system requirements, the project has developed management plans and mitigation measures for the following specific environmental impacts: wastewater discharge, air emissions, potential spills, and solid and hazardous waste generation. The implementation of these plans and degree of compliance with the environmental safeguard covenant were evaluated. The project set strict safety standards (zero tolerance policy) and its safety record is among the first quartile in BP’s global operations. The project has received safety awards from BPMIGAS for the past 2 consecutive years.

31. As confirmed by the extended annual review mission, all activities and compliance requirements associated with the project are adequately met. The project assures its day-to-day compliance with the AMDAL and environmental management system requirements, permit
regulations, and requirements of stakeholders including BP and lenders. Robust frameworks for internal and external audit and monitoring are in effect, which include audits by the Ministry of Environment and the independent External Panel. There is regular and transparent communication with other stakeholders, including the government, nongovernment organizations, and local communities. The project has taken consistent actions to address compliance issues raised by the Ministry of Environment and the independent External Panel.

32. The project was classified as Category A with respect to involuntary resettlement and indigenous peoples impacts. In accordance with ADB’s Involuntary Resettlement Policy (1995), Policy on Indigenous Peoples (1998), and relevant operations manual, the project prepared and implemented a land acquisition and resettlement action plan and an ISP. Implementation of these social plans and degree of compliance with the social safeguard-related covenant were evaluated. That evaluation finds the project has met the land acquisition and resettlement action plan’s objectives as evidenced by improved socioeconomic living conditions, improved land tenure status, and increased income levels in Onar Baru and Tanah Merah Baru.

33. The project utilized innovative approaches to achieve sustainable community development through the ISP. The integrated plan was designed and implemented with community participation; partnerships with relevant civil society organizations at the national, regional, and community levels; consultations with relevant stakeholders; and by practicing corporate social responsibility. The ISP implementation was marked by several achievements that are summarized in several studies commissioned by the project as well as the external monitoring reports prepared by the independent External Panel. These studies and reports documented significant improvement of livelihoods, health, and education status of local people; public infrastructure improvements in the villages; stronger roles of women in families and communities; better functioning and managed local government; and development of trust among key stakeholders. The project’s contribution to local development is well accepted by beneficiary communities, local people’s organizations, and other district and provincial stakeholders, and now it is considered to be a higher standard that other project developers in the area should meet. These findings were validated in the field by the extended annual review mission and the External Panel. In conclusion, the project has benefitted the indigenous peoples in the project area and has satisfactorily met ADB’s relevant policy requirements.

34. The project’s performance on environmental, social, health, and safety performance is considered excellent.

C. ADB Investment Profitability

35. The interest rate margin charged on the ADB loan reflects the risks associated with the project and was benchmarked against market trends. The project has performed its due debt service.

36. ADB investment profitability is considered satisfactory.

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15 The firm GHD was engaged as the first External Panel to assist in monitoring, reporting, and advising on three safeguards aspects of the project for the first 3 years or during construction. Mott MacDonald has been appointed as the second External Panel during the operational period from 2011 to 2016.

16 The mission visited and interviewed affected people in several villages, namely, Babo, Onar Baru, Onar Lama, Saengga, Tanah Mera Baru, Taroy, and Tofoi.

17 The implementation land acquisition and resettlement action plan aims to “achieve ‘resettlement with development’ and thereby ensure that resettled households achieve better livelihoods than they would have if resettlement had not taken place,” and “to secure standards of living higher than those attained prior to project entry.”
D. ADB Work Quality

37. After ADB was first approached by BP in May 2003, ADB’s due diligence process, focusing primarily on social and environmental aspects, took almost 2 years to complete. ADB very cautiously examined the environmental and social aspects, and the assessment was among the most comprehensive ever undertaken by the private sector operations. ADB, in close coordination with the project investors, contributed to significant revisions and improvements to the safeguard documents. To date, the project continues to employ multiple oversight layers to monitor and ensure its compliance with national regulations as well as applicable ADB and Japan Bank for International Cooperation policies and the Equator Principles. In parallel with the Tangguh Independent Advisory Panel established by BP, the independent External Panel was appointed in March 2007 by the lenders group, represented by ADB, Japan Bank for International Cooperation, and Mizuho Corporate Bank, to separately undertake regular audit and monitoring of the project’s social and environmental compliance. The scopes of the two independent panels differ to avoid duplication of external reviews and together provide a more holistic view of the project’s impact on noncommercial aspects.

38. ADB actively monitors the project’s implementation and compliance with its environmental and safeguard policies and loan covenants through such various reports as well as regular communication and coordination with the lenders’ environmental and social consultant. Both the Operator and Trustee Borrower have complied with all reporting requirements in a timely manner. ADB’s regular review has been conducted annually.

39. ADB’s performance in relation to (i) screening and appraisal is considered satisfactory, (ii) monitoring and supervision is satisfactory, and, (iii) ADB’s role and contribution is excellent. Thus, overall work quality is rated satisfactory.

E. ADB’s Additionality

40. At project processing in 2005, the project was considered as one of the most significant transactions in ADB’s private sector operations given the unprecedented size of the ADB loan, the scale and magnitude of the project, the project’s location, and its potential development impacts. It has been ADB’s first and largest private sector investment in Indonesia’s LNG sector. ADB’s commitment added special value to the project by enhancing its development impact, particularly in terms of facilitating sustainable industry development and inclusive growth and in promoting the use of a clean energy alternative.

41. Foremost among ADB’s value added are the improvements in environmental and social risk mitigation. ADB’s participation is meaningful, especially in terms of its leading role in advising and improving the project’s environmental and social standards. ADB contributed to further enhancements to an environmental and social safeguard framework prepared by BP.

42. In addition, there is the value of ADB loan covenants which support long-term compliance to enhance developmental benefits, ensure the highest environmental and social safeguard standards are adopted, and promote higher environmental and social performance. Moreover, lenders, including ADB and Japan Bank for International Cooperation, aligned their

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18 The Equator Principles comprise a credit risk management framework to assess environmental and social risk in project finance transactions which are voluntarily adopted by financial institutions. The Equator Principles are based on the International Finance Corporation Performance Standards on social and environmental sustainability and on the World Bank Group Environmental, Health and Safety Guidelines. http://www.equator-principles.com/

19 BP established the Tangguh Independent Advisory Panel in February 2002 to provide external guidance regarding noncommercial aspects of the project and how to achieve its potential as a world-class model for development.
loan agreements to have a common safeguard monitoring framework designed and implemented under ADB’s continued lead.

43. ADB’s presence provides the project an additional measure of credibility. Stakeholders, which included private sector investors and the government, represented by both the Minister of Finance and Director-General of BPMIGAS, expressed a strong desire to see ADB as part of the project and are convinced that ADB’s participation was critical for the project’s success. As the only multilateral development bank lender, ADB’s participation ensures the project’s accountability and transparency of its reporting mechanisms. The project has set new standards in transparency and has made external audit reports, such as those of the Tangguh Independent Advisory Panel and External Panel, available to all stakeholders. ADB regularly uploads the Operator’s environmental, health, and safety semi-annual reports and the External Panel reports to its website. In addition, Indonesia and BP have pledged to adhere to all of ADB’s policies on anti-money laundering and anticorruption.

44. ADB’s additionality is considered excellent.

F. Overall Evaluation

45. The project is considered highly successful and with strong demonstration effect. As evidenced by its effective project design and profitable and environmentally sustainable operations, its vision of becoming a model project was realized. The project has set new standards in environmental and social risk assessment and rigorous environmental, social, health, and safety management for sustainable resource development in partnership with key stakeholders, including the local community. Its lessons learned and best practices are shared with the industry as well as the Indonesian government for replication in future oil and gas projects. The project contributed to the resumption of investor confidence in the country. From an economic sustainability viewpoint, the project provided Indonesia with new LNG production and export capacity and contributed to economic growth by bringing additional revenue to the national and local governments. In addition, it has promoted the use of clean energy through increased supply to key industry users globally.

Table 4: Evaluation of the Tangguh Liquefied Natural Gas Project

<table>
<thead>
<tr>
<th>Indicator/Rating</th>
<th>Unsatisfactory</th>
<th>Partly Satisfactory</th>
<th>Satisfactory</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development impact</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>Private sector development</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business success</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic sustainability</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Environment, social, health, and safety performance</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>ADB investment profitability</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>ADB work quality</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADB additionality</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Overall rating</td>
<td></td>
<td></td>
<td>Highly successful</td>
<td>X</td>
</tr>
</tbody>
</table>
III. ISSUES, LESSONS, AND RECOMMENDED FOLLOW-UP ACTIONS

A. Issues and Lessons

46. **Lagged start-up process of the LNG plant.** The project achieved the contractual takeover of the LNG plant in June 2011, which was 24–30 months behind the original schedule. The lagged start-up process was caused primarily by unexpected technical issues associated with equipment suppliers and plant modification works to ensure stable operation and higher production efficiency. As lessons learned, the project established a supplier quality management function and undertook an improvement process for key plant components in preparation for the future plant expansions. The impact of the delay was minimal, including upon the project’s due debt service. Upon completion of the start-up process, the plant entered into a steady operation state at nearly full design capacity and the Operator monitors and maintains the reliability of the LNG plant.

47. **Developing regulatory framework.** The government has undertaken continued sector reforms for the oil and gas industry. Several regulations enacted since commencement of the project have potentially conflicting impacts on the industry through the amended revenue sharing and tax regime, the mandatory domestic gas allocation, and the regulated revenue flow through onshore accounts. These may create future uncertainties for production-sharing contractors, including those of the project. The House of Representatives in Indonesia is currently formulating a revision to the oil and gas law as well as implementing regulations still to be issued for policy clarity. The institution is gathering inputs and suggestions for consideration from nongovernment organizations, industry, and other government bodies.

48. **Value of partnership among stakeholders in sustainable development efforts.** The project was conceptualized as a long-term business catalyzing social development in Papua. The design of its solid social programs builds on five pillars: consultation, empowerment, participation, partnership, and sustainability. The project has made successful progress under a strong partnership and with mutual trust among the stakeholders, including local communities and government. Recently, the project has redirected its process of “development for communities” to “development with communities” in order to foster a stronger sense of ownership of the development process in the communities, counteract the community dependency culture, and, with the end goal of moving towards “development by the community,” to ensure that the project’s pioneering efforts will be sustained over the longer term.

49. **Long-term compliance and accountability enhanced by a multilateral development bank.** The project has demonstrated consistent actions improving environmental and social outcomes of activities and addressing issues and challenges. This has been facilitated by the project’s robust environmental and social management and monitoring framework directed to avoiding impacts, meeting safeguard commitments, and seeking design improvements for optimization. The monitoring framework, enhanced by international standards, including those of ADB, has been effective in ensuring long-term compliance and accountability by providing feedback for continued improvement in the project’s implementation of the existing AMDAL as well as key inputs and considerations for development of the new AMDAL supporting sustainable implementation of the project’s expansion.

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50. **Leading role of key sponsors.** The importance of a strong sponsor with significant sector experience; strong commercial, technical, and financial capability; and firm commitment to the host country and local community are essential to the project's success. BP’s vision of the project as a world-class model of responsible industrial development could not have been realized without its leading role and continuing dialogue and coordination among various stakeholders to overcome various challenges during implementation.

B. **Recommended Follow-up Actions**

51. ADB will continue monitoring the project’s implementation progress and compliance as well as overall progress in the regulatory reforms within the oil and gas sector in Indonesia to assess its impact on the project. The Train 3 expansion is under planning, and ADB will remain in close discussions with BP for its continued value addition to the project.
PROJECT-RELATED DATA

BASIC DATA
Investment Summary

A. Investment Identification
1. Country: Indonesia
2. Loan numbers: LN2214 and EI7224
3. Type of business: Conventional energy generation (other than hydropower)
4. Project title: Tangguh Liquefied Natural Gas Project
5. Investee company/borrower: HSBC Bank USA, National Association (as Tangguh Trustee)
7. Amount of approved ADB assistance
   - Direct loan: $350.00 million
8. Safeguard categories
   - Environment: A
   - Resettlement: A
   - Indigenous people: A

B. Investment Data
1. Concept clearance approval: 18 June 2004
2. Board approval: 14 December 2005
3. Signing of legal documents
   - Loan agreement: 31 July 2006
4. Loan effectiveness: 31 July 2006
5. Disbursements
   - First disbursement: 1 September 2006
   - Final disbursement: 15 November 2010
   - Amount disbursed: $350.00 million
### PRIVATE SECTOR DEVELOPMENT INDICATORS AND RATINGS: INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Impact of the Project</th>
<th>Impact to Date</th>
<th>Potential Impact (Sustainability) and Risk to Its Realization</th>
<th>Combined Rating</th>
<th>Justification/Annotations</th>
</tr>
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<tbody>
<tr>
<td><strong>1. Beyond company impact</strong></td>
<td></td>
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</tr>
<tr>
<td>1.1. Private sector expansion.</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Moderate</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td>Satisfactory</td>
<td>Satisfactory</td>
<td>Low</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>1.3. Innovation.</td>
<td>Excellent</td>
<td>Satisfactory</td>
<td>Moderate</td>
<td>Excellent</td>
</tr>
</tbody>
</table>
shipping to international markets. The entire value chain is managed by BP as an industry leader having single-point accountability for its operation.

The project employs a unique commercial structure which (i) balances supply assurance and flexibility to best position itself in changing market dynamics, and (ii) contributes to increased liquidity in the market that has enabled price and demand fluctuations to be met. It has also demonstrated new standards for sustainable resource development with a rigorous and systematic approach to operational integrity, governance, safety, and risk management.

| 1.4. Linkages. | Relative to investments, contributes notable upstream or downstream linkage effects to business clients, consumers, suppliers, key industries, etc. in support of growth | Excellent | Excellent | Moderate | Excellent | The project is an integrated LNG operation which combines both upstream and downstream activities. It has promoted increased use of clean energy by key industry users in diversified markets which include the People’s Republic of China, the US, South Korea, and Japan. The project has also encouraged the efforts of national vendors to comply with international industry standards as well as developed and disseminated local expertise of its employees, contractors, and business partners to operate the world-class LNG facility.

The project’s sustainable operation balances the economic aspects with the environmental vulnerabilities and social considerations under close partnership with various stakeholders, including the local community and government. |
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</thead>
<tbody>
<tr>
<td>1.5. Catalytic element.</td>
<td>Contributes by including pioneering and/or catalytic finance, mobilizing or inducing more local or foreign market financing and/or foreign</td>
<td>Satisfactory</td>
<td>Satisfactory</td>
<td>Low</td>
<td>Satisfactory</td>
</tr>
</tbody>
</table>
Direct investment in the sector investors are diverse oil and gas industry players in the UK, Canada, People's Republic of China, and Japan.

Traditionally, upstream oil and gas investments in Indonesia have been financed by equity capital from investors while the project as an integrated LNG operation was the first in which a debt financing scheme was utilized. It was also the first time that BPMIGAS (Indonesia's regulatory authority for the upstream oil and gas sector) was introduced to the debt financing scheme.

With the project's high profile and successful precedent, it will be possible for other projects under BPMIGAS supervision to benefit from using a similar financing scheme.

| 1.6. Affected laws, frameworks, regulation. Contributes to improved laws and sector regulation for public–private partnership; concessions; joint ventures; and build, operate, and transfer projects; and to liberalizing markets as applicable for improved sector efficiency | Excellent | Satisfactory | Medium | Satisfactory | The government has undertaken continued sector reforms, which include a proposed revision to the oil and gas law as well as implementing regulations for improved policy clarity.

The project maintains close engagement with the central and local governments as well as coordinates with the Indonesia Petroleum Association to resolve, and/or provide advocacy on, industry issues for further private sector investments to support the country’s challenge in optimizing the economic benefits of oil and gas exports while ensuring domestic energy security. |

| 2. Company Impact with Wider Potential | Excellent | Excellent | Low | Excellent | As the first integrated LNG operation in Indonesia, the project has required the transfer and alignment of broader knowledge, practice, and skills of the Operator (BP Berau), including its global |
The project has developed the local expertise in Papua and Indonesia, not only of its own employees but also those of its contractors and business partners. Improving the technical and operational competency of employees, workers, and various partners, the project contributes to further development of the LNG industry as well as to other, related industries in the country.

The project (and BP) also actively shares its technical and nontechnical papers, lessons learned, and best practices through the LNG industry associations for reference and replication by any interested entities and/or individuals.

2.2. Demonstration of new standards. Demonstrates new ways to operate the business and compete, and investee performance against relevant best industry benchmarks and standards

| Excellent | Excellent | Low | Excellent |

The project demonstrated new standards for sustainable resource development with a rigorous and systematic approach to operational integrity, governance, safety, and risk management. Its approach and lessons, followed by the government and industry, includes the institutional priority on social risk management and a strategic community-based approach, which has set a new standard for business operation with increased participation and ownership from the community.

As the operator of the first integrated LNG business in Indonesia, BP Berau manages the entire value chain under its single point accountability and common operational culture, which has also demonstrated a new approach for stable, safe, and sustainable operation of the complex LNG operation.
### 2.3. Improved governance

As evident in set standards in corporate governance, stakeholder relations, environmental, social, health, and safety fields, and/or in good energy conservation standards.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>Excellent</td>
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</table>

The project’s commitment to transparency and good governance takes shape in its innovative initiative regarding strict compliance with the anti-bribery and anticorruption policy that is designed on the basis of national and international anticorruption legislation.

The project sets high standards for its compliance with statutory requirements; control of environmental and social impacts; and protection of employees, contractors, and surrounding communities by following BP’s health, safety, security, and environment policy and operating policy to ensure consistent delivery of safe, reliable, and efficient operations.

The project’s partnership with local nongovernment organizations also provides effective oversight and advocacy to the local community, as well as the local government, to strive toward good governance in public services, revenue management, socioeconomic development, security, and human rights.

### 3. Overall private sector development Rating

Unsatisfactory, partly satisfactory, satisfactory, and excellent. The rating is not an arithmetic mean of the individual indicator ratings, and does not have fixed weights. Actual positive or negative impacts, future impacts, and risks to its realization need to be considered.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Excellent</td>
<td>Excellent</td>
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</table>

The project is considered excellent with its strong demonstration effect. It serves as a model in the industry by demonstrating new standards and practices for sustainable clean energy development which are followed by the government and industry. By providing key considerations, it also supports the government in addressing its challenge for sustainable oil and gas sector growth driven by the private sector.

The project has contributed to maintaining Indonesia’s key position in the global LNG market and to its economic growth. The host province (Papua Barat) has
The combined rating weighs future impact and risk to its sustainable realization.

Unsatisfactory, partly satisfactory, satisfactory, and excellent. The rating is not an arithmetic mean of the individual indicator ratings, and these have no fixed weights. It considers already manifest actual impact (positive or negative) and the potential for impact as well as risk to its realization.

Rating scale for risk: high, medium, modest, and low.

| had multiplier effects from this private sector initiative leading to tremendous economic growth and social development. |
| This was the largest foreign direct investment since the Asian financial crisis and demonstrated the resumption of private sector confidence in the country. |
ENVIRONMENTAL IMPACT

I. Project Overview

1. The Tangguh LNG Project is a liquefied natural gas (LNG) production and exporting operation implemented by BP Berau Ltd as the Operator. The project was classified as Environmental Category A based on the Environmental Policy (2002) of Asian Development Bank (ADB) and required an environmental impact assessment and summary environmental impact assessment. Both of these were based on the Tangguh Integrated AMDAL (environmental and social impact assessment) completed and approved by the Government of Indonesia in 2002. A comprehensive environmental management plan and environmental monitoring plan were also formulated and approved as part of the AMDAL process. An extended annual review mission was fielded to evaluate the implementation of these plans and degree of compliance with environmental safeguard-related covenants.

II. Review Findings

2. Compliance with environmental and social requirements. The project's environmental and social requirements were specified in the comprehensive AMDAL documents, in particular the environmental management and environmental monitoring plans. Moreover, environmental and social provisions are contained in the production-sharing contract parties agreements, and there are applicable environmental and social policies and safeguard requirements of the ADB tranche lender (ADB) and of Japan Bank for International Cooperation. GHD was engaged as the independent External Panel (EP I) to assist in the monitoring, reporting and advising on environmental and social aspects of the project for the first 3 years or during construction (2007–2010), while Mott MacDonald was recently appointed as the External Panel (EP II) for the operational period from 2011 to 2016. The safeguards aspects include (i) environment, health, and safety; (ii) involuntary resettlement; and (iii) indigenous peoples and integrated social program.

3. Based on EP I reports, the project exerted considerable effort to implement the requirements for environment, health, and safety aspects, such as ecology and waste management, during construction. These included minimizing the clearance area for planned facilities; protecting marine fauna species and fringing mangrove communities by adopting specific design and construction methods; and strictly implementing the waste management program and the comprehensive health, safety, and environment system implemented by the KJP consortium, which was the engineering, procurement, and construction contractor for the onshore facilities.

4. Succeeding EP I and EP II reports show there has been continuous improvement in the overall environmental management following completion of construction and commencement of the operational phase. These improvements include completion of the organic landfill, drainage maintenance, and environmental coaching to operational departments. A newly constructed produced-water treatment plant has been in full operation since 26 December 2011. The project is currently constructing a new long-term landfill to be used for both inert and organic waste to replace the current landfills that are forecast to be full in 2013–2014. Follow-up studies and

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1 GHD is a leading engineering, architecture, and environmental consulting company founded in 1928 with headquarters in Australia.
2 Mott MacDonald is a diverse management, engineering, and development consultancy delivering solutions for public and private clients worldwide. It was founded in 1989 with headquarters in the United Kingdom.
surveys required on flora and fauna, fisheries, sediment, and air emissions have also been carried out.

5. **Environmental management system.** The project started implementing its operating management system in 2011. That system is a global BP framework that defines a set of operating requirements to deliver safe, responsible, and reliable operating activity and enables continuous performance improvement. Under the operating management system, it is mandated that operating sites such as the project maintain external ISO 14:001 certification. The project’s environmental management system (EMS) is established based on ISO 14001:2004 and its environmental commitments are defined in the BP Asia Pacific Region Health, Safety, Security and Environment and Operating policy which states the following: (i) comply with applicable laws and regulations and any other requirements to which the company subscribes; (ii) continue to minimize the potential environmental and health impacts of operations by implementing sound environmental management and monitoring, such as reducing wastes and emissions and by using energy efficiently; and (iii) support sustainable development of communities through wise use of natural resources and protection of biodiversity. The scope of the project’s EMS covers the LNG plant operations, including all supporting units at the project site and Babo. In 2010, the project’s EMS was awarded an ISO 2001:2004 certification based on the first certification audit by Sucofindo International Certification Services. The certification is valid from 1 December 2010 to 30 November 2013. The project aims to sustain the EMS implementation, including to strive for continuous improvement of operations. Surveillance audits, internal audits, and management reviews will be conducted on a regular basis according to EMS requirements.

6. **Environmental impacts and mitigation.** Discussed below are significant environmental impacts based on the environmental management plans and environmental aspects identified through the project’s risk-ranking process as part of ISO 14001 requirements, including mitigation measures.

A. **Wastewater Discharge**

7. The project has five wastewater streams including for produced water, oily contaminated wastewater, chemically contaminated wastewater, brine reject from desalination, and domestic wastewater. These are treated separately prior to discharge into Bintuni Bay following standards stipulated in the AMDAL and based on the Ministry of Environment’s decree and World Bank standards. In 2009, the project started generating produced water with elevated levels of chemical oxygen demand and phenol. It mobilized a temporary treatment plant and sought approval from the Ministry of Environment to discharge treated produced water into Bintuni Bay based on loading factor to fulfill compliance wastewater discharge requirements until completion of the new produced-water treatment plant in December 2011.

B. **Air Emissions**

8. Air emissions generated by the LNG plant include combustion (flaring) and release (venting) of hydrocarbon converted into CO₂; combustion emissions from nonmoving engines such as gas turbines and diesel generator backup; combustion emissions from moving sources such as ships, aircraft, and vehicles; and fugitive emissions. The project’s greenhouse gas emissions are mainly generated from LNG plant operations, flaring, and fuel gas combustion. Air emissions are managed through selection of equipment, standard operating procedures, preventive maintenance, and monitoring to ensure emissions and ambient air parameters are within applicable standards. The project has been implementing flaring reduction since mid-2010. Actual flaring in 2011 of 9,222 million standard cubic feet (MMSCF) represents a 30%
reduction from the 2010 flaring volume. The project is continuing its efforts toward reducing the flaring volume in 2012 by a further 40% from 2011 flaring volume.

C. Potential Spills

9. The LNG plant is located within a biologically diverse and ecologically sensitive environment. Of particular ecological importance is the mangrove swamp fringing the shore of the Berau Bintuni Bay and estuarine areas. Bintuni Bay is a habitat to marine mammals, including protected species of dolphins, and is an important fishery area for the local community. If not responded to adequately and depending on location and volume, spills at the onshore facilities would have the potential to impact soil, groundwater, and surface water and could enter and impact the bay water and shoreline ecosystem. An offshore spill would have potential impacts upon the bay water quality, and thereby upon fish and marine biota including marine mammals and mangrove areas. To address this risk, specific emergency response procedures and an oil spill contingency plan are in place and are reviewed annually. The project is also actively taking part in sea spill response preparedness review with other production-sharing contractors and coordinated by BPMIGAS. Fate trajectory oil spill modeling has been completed to provide inputs to the development of the spill response plan.

D. Solid Waste and Hazardous Waste Generation

10. The project’s operations generate nonhazardous and hazardous wastes. Nonhazardous wastes are classified as organic waste, combustible waste, reusable waste, recyclable waste, and inert waste. Its solid waste management follows a “reduce, reuse and recycle” principle and implements strict waste segregation. Hazardous waste includes used oil, used oil filters, paint cans, spent catalysts, and contaminated soil, among others, and these are temporarily stored in an approved temporary hazardous waste storage area at site prior to shipment to a licensed hazardous waste treatment facility and disposal area.

III. Conclusion

11. It was confirmed during the extended annual review mission that all activities and compliance requirements associated with the project are adequately met. There is day-to-day assurance of compliance with AMDAL, EMS, permit regulations, and requirements of stakeholders including BP and lenders for all operations of the project. Internal and external audits and monitoring are regularly performed, including audit by the Ministry of Environment and the independent External Panel. There is regular and transparent communication with other stakeholders, such as the government, nongovernment organizations, and surrounding communities. The project has demonstrated consistent actions to address compliance issues raised by the Ministry of Environment and the independent External Panel.
SOCIAL IMPACT

I. Project Overview

1. The Tangguh LNG Project is a liquefied natural gas (LNG) production and exporting operation implemented by BP Berau Ltd as the Operator. The project is located at the south shore of Bintuni Bay Regency of Papua Barat Province. The project is the largest private sector investment in Kabupaten Teluk Bintuni, a regency in Papua Barat which was formed in 2003 during the early stages of project development.

2. Construction of the LNG plant site required the acquisition of 3,266 hectares of land from several clans of the Simuri tribe, which held customary (adat) rights to the land, and physical relocation of 127 households (654 people) from the Tanah Merah community. Involuntary resettlement impacts of the project was considered significant and the project was classified as Involuntary Resettlement Category A based on previous ADB’s Involuntary Resettlement Policy (1995) and Operations Manual F2 on Involuntary Resettlement (2003). Resettlement was completed in mid-2004 and undertaken in accordance with the land acquisition and resettlement action plan (LARAP) which forms part of the Tangguh Integrated AMDAL (environmental and social impact assessment). The AMDAL LARAP was supplemented with an “Implementation LARAP” which addresses gaps identified in accordance with ADB’s Involuntary Resettlement Policy (1995).

3. The social assessment undertaken during project preparation had anticipated the following positive and negative social impacts to indigenous peoples communities in the Bintuni Bay area: (i) increased revenue flows to the provincial and national governments, (ii) direct and indirect employment and business opportunities for Papuan communities during the construction and operational phases of the project, (iii) benefits from various project-sponsored socioeconomic and environmental development programs, (iv) direct project impacts including environmental impacts and involuntary resettlement impacts, and (v) various potential adverse project and/or project-induced impacts. Impacts on indigenous peoples were considered significant, and the project was classified as Indigenous Peoples Category A. An integrated social program (ISP-1), which is the equivalent of an indigenous peoples development plan, was prepared following ADB’s Policy on Indigenous Peoples (1998) and relevant operations manual. An extended annual review mission was fielded to evaluate implementation of the LARAP and ISP and the degree of compliance with social safeguard-related covenants.

II. Review Findings

A. Compliance with Social Requirements

4. The project’s social requirements have been specified in the comprehensive AMDAL documents, in particular the environmental management plan and environmental monitoring plan; the LARAP and ISP-1; the environmental and social provisions contained in the production-sharing contract parties agreements; as well as applicable environmental and social policies and safeguard requirements of the ADB tranche lender (ADB) and of Japan Bank for International Cooperation. GHD was engaged as the External Panel (EP I) to assist in the monitoring, reporting, and advising on environmental and social safeguards aspects of the project for the first 3 years or during construction (2007–2010), while Mott MacDonald was
recently appointed as the External Panel (EP II) for the operational period from 2011 to 2016.\(^1\) During the course of implementing the LARAP and ISP-1, EP I identified several noncompliances. These were subsequently addressed and adequately dealt with by BP Berau. EP II has assessed that the project has complied with ADB’s Involuntary Resettlement Policy (1995) requirements. It has recommended the close-out of LARAP activities and continuation of other activities for resettlement-affected villages as part of the Integrated Social Program Phase 2 (ISP-2).

**B. Social Impacts and Mitigation**

5. **Land acquisition and resettlement.** The project has designed and developed a world-class resettlement site with the Tanah Merah and host community participating in housing design, village planning, and construction. In addition to the people from Tanah Merah, 124 households from two host communities, Onar and Saengga, benefitted through renovation of housing and infrastructure by the project. The resettlement sites (Tanah Merah Baru and Onar Baru) and the host community (Saengga) were provided with complete facilities including schools, community-and-women’s centers, places of worship, power and water supply. All were assessed to be of high standards in terms of design and quality of construction. However, the management and future operations of the water and electricity systems was a challenge due to the high costs of maintenance. This is being resolved through a rural electrification program being implemented by the state electricity utility, Perusahaan Listrik Negara. Rainwater collection systems have been installed in the community to improve the water supply system. The project has recognized *hak ulayat* rights, compensated for their losses, and also recognized *adat* traditions. Negotiations with resettled communities were formalized with signed agreements covering access to social and cultural sites. Land titles were issued to households in Tanah Merah Baru and Saengga. Following the achievement of independent village status for Onar and continuing cooperation by the Agofa clan and local government, BP Berau will continue to facilitate the provision of land title certificates to Onar Baru relocatees.

6. The project has also implemented a benefits-sharing mechanism that goes beyond a one-off compensation payment to offer revenue streams to those clans losing resources. An endowment trust was provided to such clans through the Dimaga Foundation. Interest from the trust fund was used by the resource-losing clans initially for consumption and later on to provide scholarships to deserving students and in some cases as capital to start small businesses.

7. When BP Berau’s Community Relation Program Unit (a team of more than 50 people based in Tanah Merah village, Babo Base Camp, and in Jakarta) started implementing the LARAP, they faced a very low base of knowledge and experience in the resettlement-affected communities. With technical inputs from partner organizations, good progress was made in developing practical expertise in agriculture, cooperatives, microcredit, and small enterprises; as well as in boosting skills in a range of such areas as literacy, numeracy, computers, household economic management, boat and motor repair, and post-harvest processing for men and women. A survey by University Gadjah Mada in 2009 found that the annual average household income of residents in Tanah Merah had increased from Rp15 million in 2002 to Rp34 million in 2009, and in Saengga from Rp18 million to Rp31 million.\(^2\) In Onar, however, it was observed in 2009 that annual incomes of the Onar Baru people relocated from Tanah Merah Baru has not

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\(^1\) GHD is a leading engineering, architecture, and environmental consulting company founded in 1928 with headquarters in Australia. Mott MacDonald is a diverse management, engineering, and development consultancy delivering solutions for public and private clients worldwide. It was founded in 1989 with headquarters in the United Kingdom.

increased significantly compared to Tanah Merah Baru. Following the resettlement completion audit recommendations of the external panel (EP I) in 2010, BP Berau has increased its efforts to diversify and enhance the livelihood options in Onar. A follow-up survey in 2011 shows that incomes in Onar had increased from Rp24 million in 2002 to Rp27 million in 2011. BP Berau continues to implement livelihood programs at Onar as part of ISP-2.

8. **Integrated social program.** The population of Bintuni Bay is heterogeneous and made up of 38 ethnic groups. Among these ethnic groups are seven groups considered as indigenous, namely the Irarutu, Kuri, Moskona, Sebyar, Simuri, Soub, and Wamesa. They are spread out in different villages in the Bintuni Bay District. In the affected area, there are two main ethnic groups that are acknowledged as indigenous people, the Sebyar and Simuri. ISP-1 aimed to inform and promote participation of local indigenous peoples in project preparation and implementation; deliver benefits to the local indigenous people; and, safeguard them from adverse project impacts. With a budget of more than $58 million, BP Berau implemented the following programs in directly affected villages: governance and revenue management; civil society strengthening; Bird’s Head business empowerment; management of workforce recruitment and industrial affairs; mitigation of in-migration and adverse induced impacts; government and civil society in Bintuni Bay Regency; integrated community-based security program; health, basic education, vocational training, women’s empowerment, microfinance and microenterprise development and community development through community action planning.

9. Villages at the north shore of Bintuni Bay are also provided funds for community projects through the *Yayasan Pembangunan Teluk Bintuni* (Bintuni Bay Development Foundation), which was constituted in 2009 based on a memorandum of understanding between the project and Teluk Bintuni Regency. *Yayasan Pembangunan Teluk Bintuni* supported the local government on infrastructure development in areas such as education, health, and sanitation, as well as economic and livelihood activities. From 2011 until June 2012, the foundation built 19 public facilities (e.g., a jetty, village hall, rainwater harvest, walkway), 15 education facilities (including classrooms, libraries, books, school equipment, and furniture), and 10 health facilities (e.g., public toilets).

10. Prior to the project, public health and literacy levels in directly affected villages were low and the economy in Bintuni Bay area was dominated by subsistence and heavily dependent on nature. ISP-1 invested heavily in capacity and competency building for many stakeholders, such as local government officials, fishermen, teachers, health workers, women, and youth. Investments were also made into public infrastructure and facilities, community centers, housing, schools, health posts, jetty docks, and livelihood workshops. This development not only improved physical assets at local levels to allow better access for local people but also improved literacy through the schools and education programs, improved health conditions in the communities, enhanced the skills of farmers and fishermen, created alternate employment, improved household incomes, promoted women’s role in the local economy, gave indigenous peoples more influence in local development through people-driven public policies and programs, and contributed to public services.

11. The project implemented ISP-1 in collaboration with international and local civil society organizations. ISP-1 also contributed to the development of many community-based

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3 BP’s partners in implementing the social program are as follow: education and research (British Council, Airlangga University, University of Papua Manokwari); community health (Media Cipta Citra, Anak Sehat Papua Foundation); livelihood restoration and business empowerment (Bina Swadaya, Andalan Unggul Bird Head); consultation, civil society organization strengthening and governance (Lembaga Penelitian, Pengkajian dan Pengembangan Bantuan Hukum/LP3BH, Center of Population Study of University of Gajah Mada, Indonesia Popular Governance Institute).
organizations and participatory mechanisms in villages. Several cooperatives, self-help groups, producers’ associations, and women’s groups are present and serve the villagers. Through the civil society organizations’ capacity strengthening program, BP and Lembaga Penelitian, Pengkajian dan Pengembangan Bantuan Hukum (LP3BH),4 established a nongovernment agency forum, developed a joint nongovernment agency website; conducted comprehensive training on transparency, public budget awareness, and human rights; and provided grants for training and certification of advocates.

12. The project’s presence and ISP implementation have accelerated economic development in the area through capacity development; institution strengthening; infrastructure development; and improved access to economic resources such as markets, know-how, finance, and information. Much still needs to be done, however, to improve the well-being of villages in the project areas as well to address poverty at local community level, and particularly among indigenous people and other vulnerable groups such as women and children. Hence, following completion of ISP1 implementation, BP Berau developed the second phase (ISP-2) for the period 2011–2015. ISP-2 consists of five programs, namely, (i) governance program, (ii) communication and external affairs program, (iii) community health program, (iv) education and training program, and (v) livelihoods improvement program.5 These programs are well underway, and reports show significant achievements in all areas. This was verified by the extended annual review mission during a site visit and village interviews.

III. Conclusion

13. The “Implementation LARAP” embodies international best practices and has set a high standard by seeking to go beyond restoration to “achieve ‘resettlement with development’ and thereby ensure that resettled households achieve better livelihoods than they would have if resettlement had not taken place,” and “to secure standards of living higher than those attained prior to project entry.”6 The project has met this objective, as evidenced by the improved socioeconomic and living conditions, improved land tenure status, and increased income levels in Onar Baru and Tanah Merah Baru. In Onar Baru, however, the project still needs to facilitate the land titles for the resettled households.

14. The project utilized innovative approaches to achieve sustainable community development. It was designed and implemented with the participation of the community; in partnerships with relevant civil society organizations at national, regional, and community levels; in consultations with relevant stakeholders; and while practicing corporate social responsibility. ISP-1 implementation was marked by several achievements that are summarized in several studies commissioned by BP Berau and the external monitoring reports prepared by the independent External Panel. These studies and reports document significant improvement in livelihoods, health, and education status of local people; improvements of public infrastructure in

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4 LP3BH is an umbrella organization supporting 30 civil society organizations across West Papua. It signed a memorandum of understanding with a goal to ensure that the concerns of relevant stakeholders and constituents were addressed in relation to LNG development and operation.

5 In education, for example, the number of students and teachers who benefitted from basic education programs has increased from 1,133 in 2003 to 2,128 in 2011, and the student passing rate in Bintuni has substantially increased (elementary passing rate moved from 93% in 2009 to 99.6% in 2011; high school from 80% to 96%, and senior high from 66% to 93%). In terms of community health, malaria prevalence decreased from 23% in 2003 to 0.4% in 2011, whereas the case fatality rate due to diarrhea decreased from 6.3% in 2008 to 1% in 2011. The livelihoods program has evolved and success stories were found in some villages such as Onar Lama, Tanah Merah, Taroy, and Tofoi.

the villages; stronger roles of women in families and communities; better functioning and managed local government; and development of trust among key stakeholders. These findings were validated in the field by the extended annual review mission and the independent External Panel. In conclusion, the project has benefited the indigenous peoples in the project area and has satisfactorily met ADB's Indigenous Peoples Policy requirements.