



Completion Report

Project Number: 22023
Loan Number: 1357
October 2006

Indonesia: Gas Transmission and Distribution Project

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – rupiah (Rp)

		At Appraisal	At Project Completion
		March 1995	9 August 2005
Rp1.00	=	\$0.000452	\$0.0001016776
\$1.00	=	Rp2,213	Rp9,835

ABBREVIATIONS

ADB	–	Asian Development Bank
BDN	–	Batam distribution network
BER	–	bid evaluation report
EIA	–	environmental impact assessment
EIB	–	European Investment Bank
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
O&M	–	operation and maintenance
PCC	–	pipeline construction contract
PGN	–	Perusahaan Gas Negara (State Gas Corporation)
PMC	–	project management consultant
TA	–	technical assistance
TGI	–	Transportasi Gas Indonesia (Transportation Gas Indonesia)

WEIGHTS AND MEASURES

Btu	–	British thermal unit
MMCFD	–	million cubic feet per day

NOTES

- (i) The fiscal year (FY) of the Government ends on 31 March and that of the Perusahaan Gas Negara ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	Indonesia
2.	Loan Number	L1357-INO/TA2344-INO
3.	Project Title	Gas Transmission and Distribution Project
4.	Borrower	Republic of Indonesia
5.	Executing Agency	Perusahaan Gas Negara
6.	Amount of Loan	\$218 million
7.	Project Completion Report Number	PCR: INO 962

B. Loan Data

1.	Appraisal	
	– Date Started	15 August 1994
	– Date Completed	31 August 1994
2.	Loan Negotiations	
	– Date Started	9 March 1995
	– Date Completed	10 March 1995
3.	Date of Board Approval	8 June 1995
4.	Date of Loan Agreement	26 June 1995
5.	Date of Loan Effectiveness	
	– In Loan Agreement	25 September 1995
	– Actual	23 February 1996
	– Number of Extensions	2
6.	Closing Date	
	– In Loan Agreement	31 March 1999
	– Actual	9 August 2005
	– Number of Extensions	4
7.	Terms of Loan	
	– Interest Rate	Pool-based variable lending rate for dollar loans
	– Maturity (number of years)	20
	– Grace Period (number of years)	4
8.	Terms of Relending	
	– Interest Rate	Loan variable rate plus 0.5%
	– Maturity (number of years)	20
	– Grace Period (number of years)	4

9. Disbursements
a. Dates

Initial Disbursement	Final Disbursement	Time Interval
15 May 1996	9 August 2005	111 months
Effective Date	Original Closing Date	Time Interval
23 February 1996	31 March 1999	37 months

b. Amount (\$ million)

Category or Subloan	Original Allocation	Last Revised Allocation	Amount Canceled	Net Amount Available	Amount Disbursed	Undisbursed Balance
01 Civil Works	116.25	103.14	0.00	103.14	103.14	0.00
02A Line Pipe and Pipe Material	37.50	70.57	0.00	70.57	70.57	0.00
02B Telecom-munications and SCADA	2.00	0.10	0.00	0.10	0.10	0.00
02C Spare Parts	0.25	0.00	0.00	0.00	0.00	0.00
03 Training and Fellowships	0.85	0.70	0.00	0.70	0.70	0.00
04 Consulting Services	11.65	17.25	0.00	17.25	17.25	0.00
05 Prior TA Financing	0.15	0.15	0.00	0.15	0.15	0.00
06 Interest and Commitment Charge	23.00	23.00	0.00	23.00	23.00	0.00
07 Unallocated	26.35	0.18	0.00	0.00	0.00	0.18
08 Operation and Maintenance	0.00	2.93	0.00	2.93	2.93	0.00
Total	218.00	218.00	0.00	217.83	217.83	0.18

SCADA=supervisory control and data acquisition, TA=technical assistance.

10. Local Costs (Financed)	
- Amount (\$) million	\$55.53
- Percent of Local Costs	27.0%
- Percent of Total Cost	7.8%

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate		
	1995	2002	Actual
Foreign Exchange Cost	501.00	680.00	447.80
Local Currency Cost	89.00	112.00	235.64
Total	590.00	792.00	683.44

2. Financing Plan (\$ million)

Cost	Appraisal Estimate		Actual
	1995	2002	
Implementation Costs			
PGN Financed	74.50	301.01	214.11
ADB Financed	195.00	195.00	194.83
Japan Bank for International			
Cooperation Financed	195.00	105.36	104.72
European Investment Bank Financed	58.00	99.84	125.25
Total	522.50	701.21	638.91
IDC Costs			
State Gas Corporation Financed	44.50	66.99	21.53
ADB Financed	23.00	23.00	23.00
Total	67.50	89.99	44.53

ADB = Asian Development Bank, IDC = interest during construction, PGN = Perusahaan Gas Negara.

3. Cost Breakdown by Project Component (\$ Million)

Component	Appraisal (1995)			Appraisal (2002)			Actual		
	FX	LC	Total	FX	LC	Total	FX	LC	Total
A. Base Cost									
Land Acquisition	0.00	20.00	20.00	0.00	13.10	13.10	0.00	4.69	4.69
Civil Works									
a. Pipeline Construction	217.50	21.50	239.00	291.30	18.00	309.30	259.18	92.21	351.39
b. Operation Center and Facilities	0.00	0.00	0.00	0.00	9.00	9.00	0.00	2.80	2.80
c. Compressor Facilities	0.00	0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00
Equipment and Materials									
a. Pipeline Materials	90.00	2.50	92.50	121.90	14.50	136.40	106.29	14.60	120.89
b. Coating	50.00	0.00	50.00	39.10	5.60	44.70	27.17	3.98	31.15
c. Telecommunications, Supervisory Control and Data Acquisition	4.00	0.00	4.00	14.50	3.65	18.15	0.20	9.48	9.68
d. Compressor	0.00	0.00	0.00	50.00	0.00	50.00	0.00	44.32	44.32
e. Spare Parts and Other Equipment	0.50	0.20	0.70	0.00	11.80	11.80	0.00	15.35	15.35
Training and Fellowships	1.70	0.30	2.00	2.60	0.00	2.60	3.09	0.00	3.09
Consultancy Services	23.15	2.70	25.85	28.60	1.90	30.50	25.79	13.06	38.85
Perusahaan Gas Negara Project Management	0.00	4.50	4.50	0.00	21.30	21.30	0.00	8.20	8.20
Recovery of Technical Assistance Financing	0.15	0.00	0.15	0.15	0.00	0.15	0.15	0.00	0.15
Taxes and Duties	0.00	13.30	13.30	0.00	7.27	7.27	0.00	0.00	0.00
Preinvestment Studies	0.00	0.00	0.00	0.00	0.85	0.85	0.00	0.85	0.85
Operation, Maintenance, and Commissioning	0.00	0.00	0.00	6.40	0.00	6.40	2.93	4.57	7.50
Subtotal (A)	387.00	65.00	452.00	554.55	111.97	666.52	424.80	214.11	638.91

Component	Appraisal (1995)			Appraisal (2002)			Actual		
	FX	LC	Total	FX	LC	Total	FX	LC	Total
B. Contingencies									
Physical Contingency	38.70	6.50	45.20				0.00	0.00	0.00
Price Contingency	21.90	3.40	25.30				0.00	0.00	0.00
Subtotal (B)	60.60	9.90	70.50	34.80	0.00	34.80	0.00	0.00	0.00
C. Interest and Other Charges During Construction									
	53.40	14.10	67.50	90.80	0.00	90.80	23.00	21.53	44.53
Total (A+B+C)	501.00	89.00	590.00	680.15	111.97	792.12	447.80	235.64	683.44

FX = foreign exchange, LC = local currency.

4. Project Schedule

Item	Appraisal (1995)	Appraisal (2002)	Actual
1. Environmental Impact Assessment Study	Jan. 1994–May 1994		Jan. 1994–Jun. 1994
2. Project Management			
a. Preliminary Engineering/Route Survey	Jan. 1994–Sep. 1995		Jan. 1994–Sep. 1995
b. Land Acquisition	Jan. 1994–Oct. 1996		Jan. 1994–Oct. 1996
c. Shortlisting of Consultants	Apr. 1994–June 1994		Apr. 1994–June 1994
d. Recruitment of Consultants	Oct. 1994–Mar. 1995		Oct. 1994–Mar. 1995
e. Preparation of Bid Document for Long Lead Items	Nov. 1994–Mar. 1995		Aug. 1995–Jan. 1996
f. Project Management	Mar. 1995–Dec. 1998 ^a	Jan 1999–Dec 2003 ^b	Mar. 1995–Dec. 2004
3. Consultancy Services			
a. Mobilization of Consultants	Apr. 1995–May 1995		Aug. 1996–Sep. 1996
b. Definitive Design	Apr. 1995–Sep. 1995 ^a		Oct. 1996–Dec. 1996
c. Preliminary Engineering	May 1995–Aug. 1995 ^a		Dec. 1995–Nov. 1996
d. Prequalification and Selection of Construction Contractor	July 1995–Dec. 1995 ^a		Oct. 1995–Dec. 1996
e. Procurement	Jan. 1996–Dec. 1997		Jan. 1996–June 1998
f. Project Supervision	Jan. 1996–Sep. 1998 ^a		Jan. 1997–Sep. 1998
g. Postcommissioning Assistance	Oct. 1998–Dec. 1998 ^a		Oct. 1998–May 2005

Item	Appraisal (1995)	Appraisal (2002)	Actual
4. Pipeline Construction Contracts			
a. Mobilization of Consultant	June 1996–Sep. 1996		Jan. 1997–Feb. 1997
b. Detailed Engineering Design	June 1996–Sep. 1996		Jan. 1997–Sep. 1997
c. Main Pipeline Construction (Duri)	July 1996–Oct. 1997		Apr. 1997–June 1998
d. Spur Pipeline Construction (Batam)	June 1997–July 1998		Scope revised (see items h–n)
e. Distribution System (Batam)	Jan. 1998–June 1998	May 2002–Dec. 2002	Mar. 2004–Dec. 2004
f. Supervisory Control and Data Acquisition /Telecommunications	Sep. 1996–June 1997		Nov. 1997–Aug. 1998
g. Testing and Commissioning	Nov. 1997–Dec. 1997 ^a Aug. 1998–Sep. 1998 ^b	Dec. 2002–June 2003	July 1998–Sep. 1998 May 2003–Mar. 2004
h. Parallel line (Grissik–Sakernan: 136 km)		Sep. 2001–Nov. 2002 ^b	July 2002–Aug. 2003
i. Branch Line Onshore (Sakernan–Kuala Tungkal: 70 km)		July 2001–Nov. 2002 ^b	Feb. 2002–June 2003
j. Branch Line Offshore (Kuala Tungkal–Panaran: 215 km)		June 2001–Nov. 2002 ^b	July 2002–June 2003
k. Extension Line (Panaran–Pemping: 32 km)		Nov. 2001–Nov. 2002 ^b	Sep. 2002–Aug. 2003
l. Pemping–Abandoned Recovery Point: 13 km		Nov. 2001–Nov. 2002 ^b	Aug. 2002–May 2003
m. Abandoned Recovery Point–Border line: 4 km		Apr. 2002–Nov. 2002 ^b	June 2002–Apr. 2003
n. Gas Management System		Apr. 2002–Nov. 2002 ^b	July 2002–Sep. 2003
o. Third-Party Inspector		July 2001–Nov. 2002 ^b	Feb. 2002–Sep. 2003

km=kilometer

^a Duri.

^b Batam-Singapore.

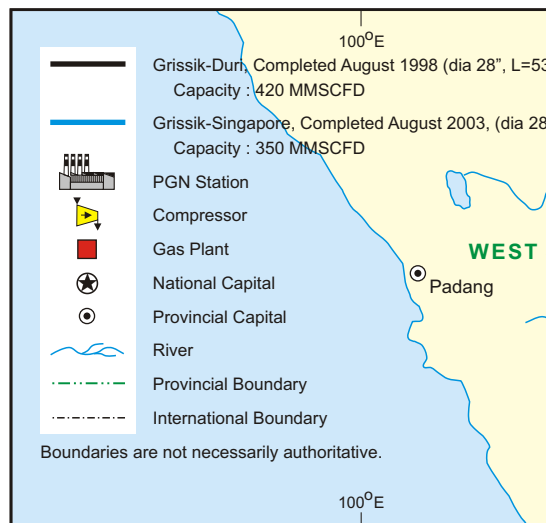
5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 1 January 1998 to 31 December 1998	Satisfactory	Satisfactory
From 1 January 1999 to 29 February 2004	Satisfactory	Partly Satisfactory
From 1 March 2004 to 31 March 2004	Satisfactory	Satisfactory
From 1 April 2004 to 31 August 2004	Satisfactory	Partly Satisfactory
From 1 September 2004 to 30 September 2005	Satisfactory	Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Fact-finding	16 Feb.–2 Mar. 1994	4	120	a, b, d, g
Appraisal	15–31 Aug. 1994	7	112	a, b, c, d, f, k, l
Review 1	17–18 Jan. 1995	2	6	a, f
Contract negotiations Mission	24–27 Jan. 1995	2	8	m, n
Country portfolio review mission	17 Oct. 1995	1	1	a
Special loan administration 1	14–16 Dec. 1995	3	9	k, m, o
Special loan administration 2	26–29 Mar. 1996	2	8	e, m
Review 2	9–14 Sept. 1996	1	6	m
Inception	29 Oct.–8 Nov. 1996	2	22	a, m
Consultation 1	16–18 Dec. 1996	1	3	a
Review 3	27 Jan.–5 Feb. 1997	2	20	a, m
Review 4	28 July–7 Aug. 1997	1	11	a,
Special loan administration 3	12–17 Sept. 1997	2	12	a, e
Special loan administration 4	17–25 Nov. 1997	3	27	a, b, m
Special loan administration 5	21–27 Jan. 1998	2	12	a, m
Special loan administration 6	25–28 Feb. 1998	1	4	a
Special loan administration 7	23–28 Mar. 1998	1	6	m
Special loan administration 8	16–20 May 1998	2	10	a, m
Special loan administration 9	21–27 Jun. 1998	1	7	a
Consultation 2	7–8 Aug. 1998	1	2	a
Review 5	13–16 Oct. 1998	2	8	a, k
Review 6	4–6 Nov. 1998	1	3	a
Review 7	27 Jan.–2 Feb. 1999	1	7	a
Review 8	2–6 May 1999	1	3	a
Environment mitigation case study	5–18 May 1999	3	42	f, g, k
Review 9	24 June–6 July 1999	1	13	a
Review 10	25–28 Oct. 1999	1	4	a
Review 11	18–28 Jan. 2000	1	11	a
Review 12	22–23 Sept. 2000	1	2	m
Review 13	22 Nov–7 Dec. 2000	12	78	a, b, c, d, f, 2g, h, l, o, p, t
Review 14	6–8 Aug. 2001	2	6	a, p
Consultation 3	24–30 Oct. 2001	7	46	a, c, h, l, p, q, r
Consultation 4	6–7 Dec. 2001	5	10	a, c, i, p, r
Consultation/review	25 Feb – 1 Mar. 2002	6	5	a, c, i, j, l, r
Follow-up/review	23–27 Sept. 2002	2	7	a, i
Review 15	16–20 June 2003	3	5	d, i, j
Review 16	24–30 Aug. 2004	3	15	d, k, s
Review 17	29 Nov – 3 Dec. 2004	2	10	d, s
Review 18	28 Feb – 9 Mar. 2005	2	20	d, s
Project Completion Review	3–7 July 2006	3	15	b, i, j

a - engineer, b - financial analyst, c - counsel, d - economist, e - procurement consultant or specialist, f - control officer, g - programs officer, h - environmental specialist, i - social development specialist, j - energy specialist, k - young professional, l - project operations/analyst, m - institutional analyst/staff consultant, n - cofinancing officer, o - project officer, p - consulting services specialist, q - manager, r - sector specialist, s - social and resettlement consultant, t - investment officer, u - Indonesia Resident Mission.



I. PROJECT DESCRIPTION

1. In 1995, the Indonesian economy was growing at over 6% per year, and energy demand was increasing even faster. Domestic use of oil was growing rapidly and reducing the surplus available for export. It was predicted that by the turn of the century, Indonesia would become a net oil importer. The Project was developed to increase domestic use of natural gas by expanding the gas supply infrastructure to enable gas to replace oil and to increase the share of gas in the country's commercial energy consumption. The rationale for increasing the use of natural gas was its significantly lower economic costs than those of alternative fuels, particularly in oil production,¹ power generation, and industrial use. At appraisal, the economic costs of producing and delivering nonexportable gas to bulk buyers was significantly lower than the net back value of gas. The Project was designed to demonstrate the economic and financial viability of developing nonexportable natural gas reserves. Due to the financial and economic crisis in Southeast Asia in the late 1990s, the Project was delayed and a major change in scope was required in 2002.

2. The original objective of the Project was to support the Government's program of increasing the exportable surplus of petroleum by substituting oil-based domestic energy consumption with natural gas. This objective was to be achieved by (i) accelerating the use of natural gas as a substitute for petroleum products to help increase oil exports, to improve the efficiency of energy use, and to reduce pollution; (ii) integrating gas utilization plans and operations to achieve economies of scale in the development and operation of gas transmission infrastructure; (iii) formulating development policies conducive to private sector participation in the gas industry; (iv) establishing a supportive regulatory framework for the gas industry; and (v) undertaking institutional strengthening for efficient operation of the gas transmission and distribution networks. The physical components of the original Project design were construction of (i) the Grissik–Duri pipeline, (ii) the Sakernan–Batam pipeline, and (iii) the gas distribution network in Batam.

3. The primary objective of the Project at appraisal—to support the Government's plans to develop the domestic gas market—was still valid in 2002, but the 1998 financial and economic crisis had reduced domestic energy demand. The Grissik–Duri transmission system was completed and commissioned in October 1998, but construction of the Batam pipeline did not commence as originally envisaged due to the recessionary conditions brought about by the Asian financial crisis. Implementation of the Batam-related components of the Project was, therefore, held back with Asian Development Bank (ADB) concurrence pending the firming up of an alternative gas market.

4. In 1999, substantial additional gas resources were discovered in Sumatra, which led to the identification of a major market in Singapore, mainly for power generation. The Project's scope was revised to extend the Batam pipeline to Singapore and expand its capacity. The loan closing date was extended to enable the Perusahaan Gas Negara (State Gas Corporation) to complete construction of the Project with the revised scope. This extension and financing was conditional on the signing of the necessary gas transportation and gas purchase and sale agreements and on securing the necessary supplementary financing.

¹ Twenty percent of the crude oil produced in Duri was being used for oil field production.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

5. The chronology of major events in processing and implementing the Project is in Appendix 1.

A. Relevance of Design and Formulation

6. The Project was part of the Government's overall strategy for development of the energy sector and a priority project for increasing gas supply capacity. A greater share of natural gas in the domestic energy mix was targeted to increase foreign exchange earnings from the export of petroleum goods. The Project's scope was revised in 2002 to extend the Batam pipeline to Singapore. This expansion directly increased foreign exchange earnings through the export of natural gas and enhanced regional cooperation by developing a regional gas trade. The Project was consistent with ADB's country operational strategy, which supported the promotion of efficient, equitable, and environmentally sustainable growth.² Changes made during Project implementation not only allowed achievement of the original objectives, but also improved regional trade in natural gas and further increased Indonesia's export earnings.

7. The Project provided ADB with an opportunity to engage in a dialogue with the Government to establish appropriate policies for promoting domestic gas development. The Project also enabled increased trade in and use of natural gas in the region, which has major environmental benefits. The Project demonstrated a model public-private sector partnership that promoted efficient operation and transparent access to gas transmission infrastructure. Technical assistance (TA) under the Project established a gas regulatory framework for Indonesia (paras. 26–28).

8. The project design was based on a feasibility study financed by ADB, which included a comprehensive evaluation to establish the optimum size and configuration of the onshore and offshore transmission systems based on demand projections in the project area.³ Capital and operating costs were determined taking into account terrain, soil features, river crossings, and offshore routing. The selected systems were based on least-cost planning for gas transmission and distribution bearing in mind gas availability, consumer locations, and projected demand.

9. The Sumatra region is rich in gas resources. The anchor load for the Grissik–Duri gas pipeline was to supply the fuel required for generating steam for Caltex Pacific Indonesia to operate an enhanced oil recovery petroleum development plan in the Duri oil fields. Without the gas supply, 20 percent of the oil was used to produce steam, but with the supply of gas, this oil could be exported. In addition, demand for gas for power generation and pulp and paper mills in the region is sizable. The originally planned pipeline to Batam was to meet industrial and commercial demand in the Jambi region and the growing demand in Batam in line with the ongoing industrialization program and the development of Batam Island as an export processing zone. Because of the financial crisis, demand in Batam and Jambi did not grow as expected; however, demand for power generation in Singapore was substantial. As a result the pipeline capacity was expanded and the line was extended to meet the new and additional demand in Singapore along with the lower demand in Batam. The National Oil and Gas Company (the Government's representative in oil and gas production sharing contracts) had dedicated 1.5

² ADB. 1994. *Indonesia: Country Operational Strategy*. Manila.

³ ADB. 1993. *Technical Assistance to the Republic of Indonesia for Gas Utilization Project*. Manila (TA 1906–INO, for \$400,000, approved on 30 June 1993).

trillion cubic feet of proven reserves and 2.0 trillion cubic feet of potential reserves for the Project.

B. Project Outputs

10. The main objective of the original Project, which had a gas transportation capacity of 390.0 million cubic feet per day (MMCFD), was to utilize natural gas resources developed by the private sector in Grissik in South Sumatra for secondary oil recovery in Duri in Central Sumatra and for industries on Batam Island. In 1994, the Corridor Block oil fields were operated by Asamera Overseas, Ltd. and is currently operated by ConocoPhillips Indonesia. The other gas field operator in Jambi is PetroChina. The original scope at appraisal comprised the following main outputs (Appendix 2):

- (i) a 540-kilometer (km), 28-inch diameter, onshore gas transmission pipeline between Grissik and Duri;
- (ii) a 280-km, 20-inch, gas transmission pipeline between Sakernan (on the Grissik–Duri pipeline about 135 km downstream from Grissik) and Batam Island (about 200 km of this pipeline to be offshore);
- (iii) a gas distribution network at Batam, other ancillary facilities;
- (iv) financial advisory services for PGN to restructure its ownership through participation by strategic investors;
- (v) supply and construction of ancillary and offsite equipment and facilities consisting of cathodic protection, gas terminal stations, metering stations, civil works, telecommunications, and supervisory control and data acquisition systems;
- (vi) consultancy and management services for design engineering, procurement, construction supervision, and project management, including commissioning and pre-operational assistance; and
- (vii) institutional strengthening and human resource development.

11. By 1999, the discovery of significant additional gas resources and the identification of an alternative market in Singapore, mainly for power generation, established the rationale for extending the Sakernan–Batam transmission line to Singapore. It was estimated that by 2003, 150.0 MMCFD of gas would be supplied to Singapore, increasing to 350.0 MMCFD by 2008. The Government requested ADB to revise the scope of the Project and financing and implementation arrangements.

12. The revised Project involves the following major changes to the original project scope:

- (i) increasing the size of the Sakernan–Batam pipeline to meet Singapore's demand for natural gas until 2023, while catering to a much reduced demand level of 30.0 MMCFD in Batam (compared with the 80.0 MMCFD estimated at appraisal);
- (ii) looping the Grissik–Duri pipeline from Grissik to Sakernan by constructing a second parallel line to augment supply to meet the increased demand in Duri and Singapore;
- (iii) extending the Sakernan–Batam pipeline to Pemping at the Singapore border; and
- (iv) constructing compressor stations at suitable locations along the Grissik–Sakernan–Duri pipeline to maintain a sufficient gas supply to meet the projected demand.

13. The Project had a long implementation period as a result of the radical changes in the economy. Before the onset of the financial and economic crisis, the Grissik–Duri transmission line had been completed and was operating. PGN met all conditions required for the major

change in scope and all components under the revised scope were achieved. PGN was able to complete the pipeline to Pemping, and gas supplies to Singapore commenced in August 2003 in line with the gas transport agreement. Completion of the Batam distribution network was delayed. Actual demand in Batam exceeded the lower demand estimated during the approval of the major change in scope because of economic recovery. PGN made changes in the project design for the Batam distribution network to meet the higher demand.

C. Project Costs

14. The total project cost at appraisal in 1995 was estimated at \$590.0 million equivalent, of which \$501.0 million, or 84.9%, was estimated to be the foreign exchange cost and \$89.0 million, or 15.1%, was the local currency cost. This was to be financed by loans of \$218.0 million from ADB, \$195.0 million from the Japan Bank for International Cooperation, and \$58.0 million equivalent from the European Investment Bank (EIB).

15. The actual cost was \$683.44 million, with a foreign exchange cost of \$447.80 million, or 65.5%, and a local currency cost of \$235.64 million, or 34.5%. The variation in the project cost was due to modifications to the original scope, including the increase in the size of Sakernan–Batam pipeline, the addition of the loopline and the extension line to Singapore, and the construction of an additional compressor station. Details of actual costs are shown in Appendix 3. ADB financed 32% (\$217.83) of the project cost, EIB financed 18% (\$125.25 million), and the Japan Bank for International Cooperation financed 15% (\$104.72 million). The balance was financed by PGN from its own resources, contributions from the strategic investors, and other sources. The financing plan is given in Appendix 4.

D. Disbursements

16. ADB approved a \$218.0 million loan from its ordinary capital resources on 26 June 1995. Disbursement under the ADB loan began in May 1996 with an initial payment of \$2.21 million for the project management consultant (PMC) contract. The last disbursement was made on 9 August 2005, and the loan was closed with a total disbursement of \$217.83 million. Disbursements were made mainly through reimbursement and direct payment. Appendix 5 shows annual disbursements under the loan. Disbursements did not follow the original schedule as determined at appraisal because of the 1998 financial and economic crisis. ADB, PGN, and the Government took corrective action and designed a change in the project scope. As a result, the Project disbursed over 99.9 percent of the loan amount.

E. Project Schedule

17. The original Project was scheduled to commence in April 1995 and be completed in November 1998; however, the Project had not been fully implemented as of the end of October 1998, and only the pipeline from Grissik to Duri and its associated infrastructure, including testing the gas-in commencement, had been completed. Due to the impact of the Asian financial crisis on the Indonesian economy, domestic energy demand declined, particularly in Batam, placing the viability of the pipeline to Batam in question.

18. The revised Project was to commence in January 2001 and be completed in June 2003. The Government signed a gas transportation agreement and a gas sales agreement for gas transportation and supply to Singapore in 2003. The Grissik–Singapore pipeline was completed on 4 August 2004 and gas-in commencement was on 10 September 2003.

19. Implementation of the Batam distribution network was delayed due to design changes. After the financial crisis in 1998, gas demand in Batam Island fell significantly and the design was changed to accommodate this lower demand. The engineering, procurement and construction contract for the Batam distribution network was signed on 18 February 2004. However, when construction commenced, demand was higher than that estimated at reappraisal in 2001. As a result, the pipe diameter was increased in some sections to accommodate the higher demand. The mechanical work was completed on 18 January 2005.

20. Consequent to the changes in the project implementation schedule, the ADB loan was extended four times. The original loan closing date was 31 March 1999 and the actual closing date was 9 August 2005. The actual and projected implementation schedule is shown in Appendix 6.

F. Implementation Arrangements

21. In 1995 PGN, then a wholly state-owned gas transmission and distribution company, was the executing agency for the Project. In May 1996 it was converted from a public corporation to a limited liability company known as Perusahaan Gas Negara by virtue of Government Regulation number 37 of 1994. These changes were in compliance with Schedule 6 of the Loan Agreement. In late 2003, PGN became a publicly listed enterprise and its shares are traded on the Jakarta Stock Exchange and the Surabaya Stock Exchange. The Government has divested about 39% of its shares in PGN.

22. PGN had the overall responsibility for implementation of the Project. A Project Implementation Unit was established in PGN for this purpose. The unit was headed by a project coordination manager who was assisted by qualified technical, accounting, and administrative staff. The unit was responsible for technical and administrative control of the Project and its proper execution, including (i) conceptual design; (ii) procurement of the long lead items for the project; (iii) liaison with ADB on all technical and financial matters; (iv) recording and reporting on actual progress, work programs, and problems (if any); (v) submission of all procurement and other related documents for ADB approval; and (vi) supervision of implementation and management. PGN was assisted by PMCs financed by the Project.

23. In compliance with Schedule 6, para. 2, of the Loan Agreement, PGN has formed Transportation Gas Indonesia (Transportasi Gas Indonesia or TGI), a subsidiary limited liability company, to hold all tangible and intangible assets and liabilities relating to all facilities financed under the Grissik–Duri and Grissik–Singapore pipeline project. PGN has a 59.75% interest in this company, while the other 40.25% equity was sold to the Transasia Pipeline Company, a joint venture company owned by Malaysia's Petronas (Petroliam Nasional Berhad), ConocoPhillips, the Singapore Petroleum Company, and Talisman Energy Incorporated (Transasia).

G. Conditions and Covenants

24. All loan covenants have been complied with except the submission of progress reports for 1999 and of PGN's project completion report. The progress reports were not submitted due to the lack of significant progress on the Project and the discussions on the optimal strategy to be adopted to salvage the second part of the Project following the onset of the Asian financial crisis.

25. Appendix 7 shows the status of compliance with conditions and covenants. The covenants were realistic and those initially laid down in the Loan Agreement have not been modified, suspended, or waived.

H. Related Technical Assistance

26. ADB provided TA to the Government for a study to design an effective regulatory system for the gas sector in Indonesia.⁴ The TA included undertaking a detailed examination of current and future network development; identifying regulatory system objectives; reviewing international best practices; and developing detailed recommendations on the system required, the appropriate institutional arrangements, and an implementation plan.

27. ADB's TA completion report rated the TA as highly successful. The principal recommendations of the TA to establish a regulatory framework were the following:

- (i) A wholesale competitive model for the gas industry should be established, where production sharing contract contractors would sell gas to bulk consumers at freely negotiated prices.
- (ii) Gas prices charged by distribution companies should also be freely negotiated and subsidies, if any, should be directly from the Government budget. Gas prices to smaller consumers should be subject to ceiling price control.
- (iii) Ownership of different activities (production, transmission, distribution, and trading) should not be restricted, provided that separate and transparent accounts are maintained for each activity.
- (iv) Gas transmission services can be provided by any qualified company and should be on the basis of negotiated contracts with regulated tariffs and with third-party access to spare transmission capacity. For vertically integrated companies, gas transmission activity should be undertaken by a separate subsidiary with separate management.
- (v) Economic regulation should be undertaken by an energy regulatory body outside the Ministry of Energy and Mineral Resources. This body should be responsible for, among other things, the downstream and midstream activities of the gas industry.

28. The TA reviewed the existing regulatory arrangements and identified changes that would remove barriers to growth in the gas sector. The Government recognized the importance of the recommendations and requested further assistance with implementing them.⁵ The new Oil and Gas Law signed by the president on 23 November 2001 included the establishment of an implementing body for upstream operations and a regulatory body for downstream operations in the oil and gas industry.

I. Consultant Recruitment and Procurement

29. The Project required PMCs. PGN recruited the PMCs and they commenced operations in August 1995. The financial advisory consultant was recruited to assist in evaluating the Project as an investment opportunity and in conducting international bidding to select strategic

⁴ ADB. 1995. *Technical Assistance to the Republic of Indonesia for a Study to Establish a Gas Regulatory Framework in Indonesia*. Manila (TA 2344-INO, for \$ 450,000, approved on 8 June 1995); ADB. 2003. *Technical Assistance Completion Report on a Study to Establish a Gas Regulatory Framework in Indonesia*. Manila.

⁵ ADB. 1997. *Technical Assistance to the Republic of Indonesia for Implementing a Regulatory Framework for the Gas Industry*. Manila (TA 2933-INO, approved on December 1997).

partner for the Project. All ADB-financed consultants were recruited following the *Guidelines on the Use of Consultants*.

30. All procurement of goods and services was in accordance with ADB's *Guidelines for Procurement*, including all contract packages that were financed by EIB. PGN conducted international competitive bidding to expand the choices available and to give all prospective bidders a fair and equal opportunity to bid on goods and works. As required by ADB, draft bidding documents, evaluation worksheets, bid evaluation reports, and proposed awards of contracts were subject to prior review and approval by ADB (or by EIB if financed by EIB). For civil works contracts, PGN prequalified bidders to ensure that only technically and financially capable firms would be invited to submit bids.

31. The procurement packages funded by ADB covered (i) line pipe for the Grissik–Duri, Sakernan–Kuala Tungkal, and Kuala Tungkal–Panaran sections; (ii) pipeline construction for the Grissik–Duri, Sakernan–Kuala Tungkal, and Kuala Tungkal–Panaran sections; (iii) supervisory control and data acquisition for the Grissik–Duri section; (iv) PMCs and financial advisory and gas sales consultants; (v) operation and maintenance (O&M) for the Grissik–Duri section; and (vi) engineering, procurement and construction for the distribution network in Batam Island (Appendix 8 provides a summary of ADB-financed contracts).

32. Other contract packages that were fully financed by PGN, such as procurement of spare parts, tree cutting for the Sakernan–Kuala Tungkal section, legal services, and third-party inspection, were procured through local competitive bidding.

33. The bid for procuring line pipe for the Sakernan–Batam section completed in February 1998 was cancelled and a new bid was issued because (i) the technical specifications of the line pipe had to be revised as a result of the design review following the gas supply agreement with Singapore; and (ii) the original bid had been issued about 2 years before and a number of bidders had withdrawn from the process. The same circumstances applied to the prequalification of pipeline contractors for the Sakernan–Batam section. The prequalification done on 20 November 1995 was cancelled because of (i) the increase in the size of the pipeline from 20 inches in diameter to 28 inches in diameter to accommodate the additional gas flow to supply Singapore; and (ii) the change in the status of previous applicants given the long time lag since prequalification.

J. Performance of Consultants, Contractors, and Suppliers

34. The performance of all consultants is rated as satisfactory. The consultant for financial advisory services performed professionally in advising PGN in relation to obtaining a strategic investor. The PMCs performed their task in accordance with their terms of reference. They had good coordination with PGN in preparing bidding documents, undertaking engineering design, and supervising contractors' works. In addition, the PMCs also carried out the feasibility study for the Grissik–Singapore pipeline and assisted PGN with land acquisition for the Grissik–Duri section. The consultant for gas sales negotiation performed satisfactorily and according to the contract. The performance of the legal consultant who provided assistance with contract arrangements for the Grissik–Singapore pipeline was also rated as satisfactory. The coordination between the legal consultant and the PMCs during contract arrangements and preparation of amendments was smooth. The third-party inspection consultants also coordinated well with other consultants and contractors during construction and their performance was satisfactory.

35. Of the total of eight construction contracts, the performance of five was satisfactory and of three was partly satisfactory. Contractors for the Grissik–Duri, Sakernan–Kuala Tungkal, Kuala Tungkal–Panaran, Pemping–Abandoned Recovery Point and Abandoned Recovery Point–Singapore border sections completed their work on schedule and their performance is rated as satisfactory. The completion of the Grissik–Sakernan and Panaran–Pemping sections was delayed. The quality of works provided by the contractor for the Panaran–Pemping section was not satisfactory and required a change of subcontractor. For the Batam distribution network contract, the performance of the contractor during the first 6 months was unsatisfactory. There were delays in the procurement of materials and equipment. Due to a change in design to accommodate higher than estimated demand, the pipeline diameter was changed from 20 inches to 28 inches for certain sections of the network. The contractor had limited experience in the construction of 28-inch diameter pipes, which resulted in slow progress. However, this was improved by providing an additional construction team and intensive supervision by the PMCs and PGN.

36. The performance of suppliers is rated as partly satisfactory. The quality of pipes and coating procured was in accordance with contract requirements, though there were some delays in the delivery of pipes to the coater and of coated pipes to sites. These delays did not affect the overall schedule.

K. Performance of the Borrower and the Executing Agency

37. The performance of the Borrower (the Government) was highly satisfactory. It met all assurances given at appraisal. In particular, a regulatory framework for the gas sector was introduced; gas transportation agreements and gas supply agreements were finalized as required; PGN was converted to a limited liability company; and a subsidiary company with 40% private participation was established and the Project assets were transferred to this company, which was then responsible for the O&M of the Project facilities. The Government also met the onlending requirements of the Project.

38. PGN's performance as the executing agency has been highly satisfactory. PGN has met all assurances and conditions of the loan, exceeding minimum requirements in some cases. For example, it was able to obtain a strategic investor for 40% of the shares in the subsidiary company even though the minimum requirement was for 25 percent. PGN successfully sourced counterpart financing despite the onset of the Asian financial crisis. Assessment of PGN's capacity and capabilities at appraisal was accurate and PGN executed and implemented the Project in a professional manner.

L. Performance of the Asian Development Bank

39. ADB responded in a timely and adequate manner to the Project's requirements. Reviews of tender documents and of subsequent bid evaluation reports were processed appropriately. Project progress was reviewed at least twice a year and withdrawal applications were processed promptly. ADB also helped PGN manage the loan through comprehensive reviews during and after the 1998 financial crisis. ADB provided timely advice in several areas, including procurement, technical issues, project management, and loan administration. Given the long time span of the Project, ADB adjusted cost savings in some categories to finance cost escalation in others, thereby ensuring almost 100% disbursement of the loan. ADB's performance is rated as highly satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

40. The design of the Project was satisfactory and met the main project rationale of supporting the Government's policy objectives in relation to improving the gas supply infrastructure and releasing oil for exports. Changes made following the Asian crisis were timely and adequate and improved the Project's design relevance in line with economic developments in the region. The revised project scope expanded the deliverables to include revenue generation for the country through the export of natural gas. This enhanced the Project's scope and its original goals were achieved effectively. The Project also contributed to the development of the Southeast Asian regional gas grid. The Project is considered to be highly relevant.

B. Effectiveness in Achieving Outcome

41. The Project is rated as highly effective. It achieved the Project outcome as defined at inception of developing the energy sector and increasing the gas supply infrastructure. The Project exceeded its original objectives, achieving increased revenue from gas exports and contributing to the development of the regional gas grid. The Project was delayed by 7 years beyond its original completion date due to the stagnation of economic activity following the Asian financial crisis and the consequent decline in energy and gas demand. However, this delay proved to be beneficial for the Project, as additional gas reserves were discovered in the country and the Project could tap new international markets. The pipeline design could be revised to accommodate transportation of greater gas volumes. The original Project had identified the benefits to be the use of nonexportable natural gas for power generation, for industrial use, and as a substitute for crude oil. The Project achieved these benefits, but was also successful in exporting the indigenous gas and raising additional revenue. The Project reduced pollution in Singapore, thereby reducing regional and global pollution. Furthermore, the Project supports interregional trade and cooperation.

42. The Project required the restructuring of PGN and its conversion from a state corporation to a limited liability company and the subsequent formation of a subsidiary company with a minimum equity of 25% from a strategic investor or investors for the O&M of the facilities erected under the original Project. The conversion of PGN to a limited liability company was completed in 1996. A subsidiary transmission company that would build, own, and operate the transmission system comprising the Grissik–Duri pipeline completed in 1998 and the Grissik–Sakernan–Batam–Singapore pipelines with a minimum of 25% shareholding by a strategic investor were conditions for the disbursement of ADB's loan after the Asian financial crisis. In October 2001, the Government approved PGN's proposal to privatize up to 40% of the subsidiary company's equity and TGI was incorporated in February 2002. Appointments to senior management positions and the transfer of assets and liabilities from PGN to TGI were completed in March 2002. This was the first step in introducing private participation and in bringing about better corporate governance structures in state-owned enterprises. In December 2003, PGN issued an initial public offering, and at present is only 61% owned by the Government. TGI has successfully demonstrated stable profitable business supported by reputable sellers and buyers with long-term contracts. TGI's revenue is derived from tariffs for gas deliveries through the Duri and Singapore pipelines, and the company has generated positive net profits since its inception in 2002.

43. All three components of the Project (the Grissik–Duri pipeline, the Grissik–Singapore pipeline, and the Batam distribution network) are operating satisfactorily. The Grissik–Duri

pipeline is transporting 300.0 MMCFD of gas, which exceeds the appraisal estimate of 200.0 MMCFD.

C. Efficiency in Achieving Outcome

44. The Project is rated as efficient. The main economic benefits of the Project as envisaged at appraisal were derived from the replacement of oil and oil products by natural gas, thereby increasing the amount of oil available for export and increasing export earnings. Other benefits were lower levels of pollution, in particular, lower net sulfur and carbon dioxide emissions. The Project has achieved these benefits and more, as it has enhanced export earnings through the export of natural gas. There was a significant delay in Project completion, but this was due to external factors that led to the suspension of part of the Project. Nonetheless, the Project has achieved its original and revised objectives efficiently. At appraisal, gas sales were estimated at 2,075 trillion British thermal units (Btu), whereas revised estimates were 5,383 trillion Btu.

45. The economic internal rate of return (EIRR) was estimated at 20% in the appraisal document and 26.31% for the revised Project scope appraisal. A modified methodology is used to determine the EIRR at project completion that differs from the one used at appraisal. In the reevaluation at project completion, the benefits are valued at the replacement cost of crude oil for consumption in Duri, at the replacement cost of diesel for industries in Batam Island, and at the contracted price of gas for sales to Singapore. In the midterm economic evaluation in 2001, with oil prices at \$30 per barrel, the EIRR was estimated to be 50.9%. The current methodology uses a 2006 price of \$60 per barrel. The Project EIRR as estimated on completion is 55.6% (Appendix 9). It can be concluded that the Project has efficiently achieved its objectives. The analysis does not include actual net, positive environmental benefits, which exceed appraisal estimates, as the volume of gas transported by the Project is greater than estimated.

46. The financial reevaluation of the Project was done on an incremental and after tax basis using gas sales data from PGN and TGI. The major assumptions used in the financial reevaluation and the calculation of the financial internal rate of return (FIRR) are shown in Appendix 10. The reevaluated FIRR is estimated at 29.4%, which is higher than the FIRR calculated at the appraisal stage (13.6%) and the revised Project scope stage (14.5%). The higher FIRR for the Project resulted from a higher volume of gas sales compared with that assumed at appraisal. This increased gas sales volume is attributed to the expansion to Singapore market.

D. Preliminary Assessment of Sustainability

47. The Project is likely sustainable. Natural gas is competitively priced compared with oil and oil products and is likely to remain so. Caltex in Duri, Singapore Power in Singapore, and PGN in Batam are creditworthy off-takers, and the gas field operators have competitive gas sales agreements with them. Demand for natural gas exceeds the capacity of the Project, ensuring a secure market for the Project. The Project has gas transportation contracts with the gas field operators (ConocoPhillips and PetroChina), and the contracted transportation prices ensure the sustainability of the Project as demonstrated by the financial and economic analyses. The operator of the pipeline, TGI, is considering installing a compressor on the Grissik–Singapore section to increase the pipeline's capacity, which will further improve the Project's sustainability.

E. Impact

48. Natural gas is one of the cleanest fossil fuels and replaces oil and coal. This has several environmental benefits, including improved energy efficiency during combustion and the concomitant reduced emissions of greenhouse gases and of pollutant loads that have harmful effects on human health. The reduction in emissions at appraisal was estimated at 5,000 tons per year for sulfur dioxide and 300,000 tons per year for carbon dioxide. Actual emissions reductions exceed the appraisal estimates, as gas volumes are greater. At appraisal, gas sales were estimated at 2,075 trillion Btu, whereas revised estimates are 5,383 trillion Btu.

49. The environmental classification of the original Project was category A, and a summary environmental impact assessment (EIA) was circulated to the Board on 8 August 1994 prior to approval of the original ADB loan. A revised EIA for the modifications of the original Sakernan–Batam pipeline and an EIA for the Batam–Singapore segment of the pipeline were approved by the State Environmental Analysis (Mengenai Dampak Lingkungan) Commission on 3 December 2000. A revised summary EIA was circulated prior to the major change in scope in April 2000. PGN developed and implemented an environmental management and monitoring program consistent with the environmental impacts identified by the commission. All significant impacts had adequate associated mitigation provisions that were implemented and were verified by the ADB environmental specialist.

50. In the revised scope of work, the original pipe diameter of 20 inches between Sakernan and Batam was enlarged to 28 inches to accommodate the additional gas supply to Singapore. The trench width and right-of-way did not change much, as the increase was marginal. All the impacts were included in the original summary EIA. The additional environmental impacts due to the change in scope were limited to the 28-inch pipeline from Batam to the Singapore border.

51. The pipeline was constructed in a small section of southern Batam Island comprising four subdistricts and six villages. Land use impacts resulting from construction activities temporarily affected private property. Potential impacts included noise, dust, storage, and spillage of construction wastes and materials. For the distribution network on Batam Island, pipeline-road crossings were constructed by boring underground to avoid disrupting traffic. Mangrove habitat directly impacted by the pipeline was minimized to narrow strips along the interface of land and water on the five affected islands. Mangrove trees have been replanted and the vegetative cover is almost 50 percent of what it was before the Project.

52. Most of the land acquisition was done during the first phase of the Project with the exception of land and right-of-way required on Batam Island. Land acquisition and compensation payments for land and trees for the Sakernan–Kuala Tungkal sector were completed in 1998. The pipeline crosses the provinces of South Sumatera, Jambi, and Riau and Batam Island. Total area acquired by PGN in the first phase was 2,201 hectares, including the area for the Sakernan–Kuala Tungkal section. In the second phase, land acquisition for the Sakernan–Batam section was 40 hectares, acquired from individual farmers or fishers during 2001–2002.

53. Major items of compensation included payments for land, trees, crops, fish traps, and fish losses. PGN consulted with landowners and local communities during the environmental impact assessment process. Discussions with the local community during review missions suggested that awareness about the Project and about the rights of affected persons was adequate. There were some complaints about the initial land acquisition related to the land price. These were discussed with community leaders and representatives in the affected areas and

compensation agreements between the parties concerned were reached. The revised Project entailed the acquisition of an additional 10.5 hectares of land from individual farmers or fishers, and much of this land was of low economic value. Compensation was based on the size of large fish traps and on their temporary or permanent nature.

54. During operations, the right-of-way along the pipeline route is vulnerable to soil erosion, flooding, and encroachment. TGI has addressed these problems by replanting along the right-of-way, building culverts, collaborating with local governments, and engaging local communities through community development programs. TGI has also increased the number of field offices to decrease the response time in accessing affected segments of the pipeline. TGI invests adequately in maintenance along the right-of-way and had invested \$760,000 in 2004 and \$835,000 in 2005. In 2005, TGI invested \$222,106 in community development programs.

55. As part of its corporate social responsibility and to ensure smooth operations, PGN and TGI contribute to community development funds for communities in the vicinity of the pipeline. PGN and TGI are obligated to conduct community development programs that must be periodically reported to the Local Environmental Bureau (Badan Pengendalian Dampak Lingkungan Hidup). The community development program involves grants that are to be used for social development and are given to village fund committees. Generally, the funds are used to construct or restore public facilities for education or for economic and religious activities. In turn, local communities assist in protecting the company's assets.

56. The Project had positive social impacts on local communities. These included employment generation during the project cycle and for O&M of the right-of-way, improved communication with markets, and better equipped schools and clinics. The availability of gas and of gas-based electricity will lead to the expansion of existing industrial and commercial units and the establishment of new ones. In the long term, this will increase demand and the need for labor, leading to significant local-level employment generation.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

57. The Project is considered highly successful based on a review of its relevance, effectiveness, efficiency, and sustainability.⁶ The revised Project outputs exceeded the outcome conceived at appraisal. The Project was delayed significantly, but this was due to exogenous factors beyond the control of the Project, PGN, and the Government, and could not have been anticipated when the Project was designed. The redesign was timely and effective, and resulted in the Project overachieving its objectives. Despite the delay caused by the Asian financial crisis, the Project achieved its main objective of enhancing the gas transmission network and increasing the domestic consumption of natural gas. The Project generated revenues by releasing oil for export that was previously consumed domestically and earning additional national revenues through the export of natural gas. The Project contributed significantly to gas sector reforms in the country, as demonstrated by the corporatization of PGN, the partial privatization of PGN, the implementation of new oil and gas laws, the ending of the monopoly of the state-owned oil and gas company, and the establishment of the downstream gas regulator.

⁶ The Project is highly relevant, highly effective, efficient, and most likely to be sustainable, making it overall a highly successful project.

B. Lessons

58. The Project introduced a unique method for introducing private equity into a previously state-owned operation. The clear corporate governance structure and transparency in PGN's subsidiary company was cited as a model by the private sector minority shareholders.

59. Land acquisition and right-of-way disputes are often a source of project delays. PGN managed social and environmental issues efficiently to minimize any such delays. The delay in Project completion was caused by entirely external factors, primarily the financial and economic situation in Indonesia in late 1997 and 1998.

C. Recommendations

60. The following paragraphs describe Project-related and general recommendations that may benefit new projects or be generally applicable to ADB practices in the future.

1. Project Related

61. **Future Monitoring.** The Project has developed an open access pipeline that is expected to lead to competition, growth, and market development in the sector. Any noncompliance with the open access system can be monitored through complaints filed by other gas operators to the gas regulator. The effectiveness of the regulatory mechanism can be reviewed in the action taken by the regulator.

62. **Covenants.** All covenants in the loan were complied with and helped to improve sector performance in the country and introduce transparency and stronger governance in PGN. PGN, the executing agency has notable future expansion plans. ADB extended a new loan to PGN without a sovereign guarantee in 2006. Given the future plans of PGN and the higher ADB exposure, the loan covenants for the Project should be maintained in their existing form.

63. **Further Action or Follow-Up.** The Project contributes to an important segment of the Southeast Asian regional gas grid. Likely follow-up action would be to further develop the regional gas grid.

64. **Additional Assistance.** The Project's sustainability will improve with a growing gas market. ADB should consider supporting proposals to extend the pipeline from Duri to Medan, thereby increasing the customer base for the Grissik–Duri segment and further expanding the gas supply infrastructure.

65. **Timing of the Project Performance Evaluation Report.** This can be undertaken at any time. To date all components of the Project have been operating for at least 1 year and the Grissik–Duri pipeline has been in operation for 8 years.

2. General

66. **Good Governance.** The Project design and the process for introducing a strategic investor were instrumental in the success of the Project. The transparent and good governance structure adopted ensures the confidence of the minority shareholders and enables the Project to operate successfully. The Project is a viable and a model public-private partnership.

67. **Implementation Schedule.** Most infrastructure projects are plagued by land acquisition and right-of-way problems that lead to time overruns. Adequate planning for these issues, as done in the Project, ensured that contracts were completed on time.

CHRONOLOGY OF EVENTS

Date	Event
A. Project Processing	
16 February–2 March 1994	Fact-Finding Mission
15–31 August 1994	Appraisal Mission
9–10 March 1995	Loan negotiation
8 June 1995	Loan approval
26 June 1995	Loan signing
23 February 1996	Loan effectiveness
B. General	
15 May 1996	First disbursement of \$177,125 for interest during construction
11–13 June 1997	The Asian Development Bank (ADB) and the State Gas Corporation (Perusahaan Gas Negara or PGN) held discussions on the proposed change in project scope to include the operations and maintenance (O&M) contract and the procurement of O&M services.
22 July 1997	ADB approved a proposed major change in project scope to include an O&M contract.
20 August 1997	ADB approved reallocation of loan proceeds for inclusion of approved O&M contract.
3 February 1999	ADB received PGN's request for extension of the loan closing date from 31 March 1999 to 31 December 2001.
31 March 1999	ADB approved extension of the loan closing date from 31 March 1999 to 30 September 1999.
13 August 1999	PGN's request for reallocation of loan proceeds received.
16 September 1999	PGN's request for a second extension of the loan closing date from 30 September 1999 to 31 December 2002 to allow implementation of the remaining project components received.
30 September 1999	ADB approved the second extension of the loan closing date from 30 September 1999 to 31 December 2002. ADB concurred with the extension with one of the conditions being that PGN would arrange the necessary supplementary financing. Reallocation of loan proceeds was also approved to finance the remaining components under the loan.
26 October 2000	The Government requested ADB to explore the possibility of supplementary financing for the Project from the capital market using the guarantee under the Asian Currency Crisis Support Facility.
10 November 2000	Memorandum prepared seeking management's approval to initiate the processing of supplementary financing for the project using the Asian Currency Crisis Support Facility guarantee. This involved a detailed reappraisal of the financial and economic viability of the Project with the revised scope.

Date	Event
15 November 2000	The vice president approved the memorandum of 10 November 2000
22 November–7 December 2000	Reappraisal Mission fielded to assess the possibility of commercial financing under ADB's partial credit guarantee scheme for a major change in scope. PGN was advised of the need for a counter guarantee by the Government or for the Government to raise the necessary funds with ADB support to be onlent to PGN
20 February 2001	Follow-up letter received from the Government requesting ADB to provide additional funds through a direct loan or commercial cofinancing under the partial credit guarantee for completing the financed project with its revised scope.
29 March 2001	Interdepartmental meeting held to discuss ADB's intervention and to advise PGN to explore other financing options.
18 May 2001	Memorandum circulated informing management of the outcome of the discussions and proposing that Board approval for the major change in scope be sought.
29 May 1991	PGN requested to amend its financial advisory services contract under the loan to provide continued advice and service in relation to strategic investment.
14 June 2001	Management approved PGN's request to utilize a portion of the uncommitted ADB funds for financing the additional cost of financial advisory services with a minor change in scope
23 August 2001	Received a follow-up letter in relation to PGN's request of 29 May 2001.
31 August 2001	Approval of minor changes for the financial advisory contract, for the use of surplus loan funds, and for the reallocation of loan proceeds.
22 October 2001	Management approved staff recommendation to seek Board approval on no-objection basis for the major change in scope. In approving this, management instructed that Board circulation of the proposal would be conditional upon receipt of a resettlement plan.
24 January 2002	The President approved circulation of the paper to the Board on the major change in scope relating to the expansion and extension of the Project from Batam to Singapore and the extension of the loan closing date to 31 December 2003.
2 May 2002	Approved and circulated the Board paper on the request by the Borrower for a change in project scope.
11 June 2002	Advised PGN on the approval of the major change in scope and the extension of the loan closing date to 31 December 2003.
24 December 2002	The Government requested an extension of the loan closing date to 15 June 2004 following a European Investment Bank extension up to 14 June 2004.

Date	Event
C. Procurement	
I: Civil Works—Pipeline Construction	
Package A: Grissik–Duri Trunk Line (Procurement Contract Summary Sheet [PCSS] 0004)	
2 January 1996	Bid documents (commercial aspects) received.
2 January 1996	Bid documents circulated for Project Coordination and Procurement Division and Office of the General Counsel comments.
11 June 1996	PGN submitted a list of contractors for prequalification for the two pipeline construction contracts (PCCs), package A, the Grissik–Duri pipeline, and package B, the spur pipeline to Batam Island.
5 July 1996	Procurement Committee Meeting held for shortlisting prequalified contractors for the two PCCs.
8 July 1996	ADB approved the shortlist of prequalified contractors for the two PCCs.
17 July 1996	PGN issued notification of eligibility to bid—invitation to bid for package A.
8 November 1996	Bid evaluation report (BER) received.
22 November 1996	ADB approved the BER and the recommendation to award the contract to the lowest evaluated bidder.
9 January 1997	Signed contract for package A received.
14 January 1997	ADB approved the signed contract.
16 February 1998	ADB approved contract amendment no. 2 to change local currency into foreign currency.
20 April 1998	ADB approved a change in its foreign exchange/local currency breakdown to alleviate the negative impact of the currency turmoil in Indonesia.
14 January 1999	ADB approved contract amendment no. 3 to increase the dollar portion of the contract financed by ADB.
Package B: Batam Spur Line, PCC (Offshore) Kuala Tungkal–Panaran (PCSS 0021)	
2 November 1999	Prequalification of contractors received.
29 November 1999	ADB commented on the prequalification.
2 January 2001	Bid document for PCC (Offshore) received.
24 January 2001	ADB's comments on bid documents sent to PGN.
2 February 2001	PGN's response on bid documents received.
5 and 12 March 2001	Further responses from PGN received.
5 April 2001	ADB's comments sent to PGN.
16 April 2001	PGN's response received.
4 June 2001	ADB's comments sent to PGN

Date	Event
26 November 2001	Amendments of bid document received.
1 April 2002	ADB received the BER.
3 May 2002	ADB approved the BER for PCC (Offshore) Kuala Tungkal–Panaran and recommended awarding the contract to the Hyundai Heavy Industries Company, Ltd.
Package B: Batam Spur Line (Onshore) Sakernan–Kuala Tungkal (PCSS 0020)	
8 July 1996	ADB approved prequalification of firms for the PCCs.
8 March 2000	ADB commented on the PCCs.
22 March 2000	PGN's response received.
6 June 2000	ADB provided further comments.
24 January 2001	ADB commented on the draft invitations for prequalification and on the evaluation worksheet.
31 January 2001	PGN's response received.
15 March 2001	Draft invitation for prequalification received.
16 March 2001	ADB approved the issuance of the invitation for prequalification.
21 March 2001	ADB received a revised prequalification document.
25 April 2001	Specific notice published.
20 August 2001	Evaluation report of prequalification for the branch line onshore PCC received.
5 September 2001	Bid document received.
24 September 2001	ADB commented on the bid document.
25 September 2001	ADB approved the prequalification of contractors for construction of the onshore section of the Batam spur line.
29 October 2001	Revised bid document received.
7 November 2001	ADB provided further comments on the bid document.
26 November 2001	PGN's response received.
8 March 2002	BER received.
17 April 2002	ADB approved the BER and the recommendation to award the contract for the branch line onshore (Sakernan–Kuala Tungkal) to the Nacap-Thiess Joint Venture.
24 June 2002	Signed contract received.
Batam Distribution Network Engineering, Procurement and Construction (PCSS 0023)	
4 July 2002	Prequalification documents for the Batam distribution network (BDN) received.
29 July 2002	ADB's comments on the prequalification documents sent to PGN.
16 August 2002	ADB received the revised prequalification documents.
30 August 2002	ADB's comments on the revised prequalification documents sent to PGN.
6 September 2002	Revised prequalification documents, including evaluation worksheets, received.

Date	Event
30 September 2002	ADB approved the revised prequalification documents, including evaluation worksheets.
3 March 2003	ADB received the prequalification evaluation report.
24 April 2003	ADB approved the prequalification evaluation report.
10 June 2003	Bid documents for the BDN received.
18 July 2003	ADB approved the bid documents subject to PGN incorporating ADB's comments.
22 September 2003	Bid evaluation worksheet and revised bid documents received.
23 September 2003	ADB approved the issuance of bid documents.
13 October 2003	ADB's comments on the bid evaluation worksheet sent to PGN.
10 November 2003	Revised bid evaluation worksheet received.
11 November 2003	ADB approved the revised bid evaluation worksheet.
10 December 2003	BER received.
14 January 2004	ADB received PGN's request for additional scope for the BDN.
3 February 2004	ADB approved the BER and PGN to award the contract to PT Winatek Widita.
11 February 2004	ADB responded to PGN's request for additional scope.
26 February 2004	Signed contract received.
5 March 2004	ADB approved the signed contract.
29 March 2004	PGN requested for additional cost of engineering, procurement and construction contractor for the BDN due to change in pipe diameter and price escalation of pipes received.
5 April 2004	Variation orders nos. 30-001 to 30-002 received.
15 April 2004	ADB approved request for additional cost and variation orders nos. 30-001 to 30-002.
10 May 2004	Amendments no. 1 and 2 received.
19 May 2004	ADB approved amendments nos. 1 and 2.
30 September 2004	Variation order nos. 30-003 to 30-005 received.
5 November 2004	ADB approved variation orders nos. 30-003 to 30-005.
1 April 2005	Variation orders nos. 30-006 to 30-015 and request for extension of contract completion date from 22 January 2005 to 22 April 2005 received.
7 April 2005	ADB approved the extension of the completion date. ADB responded to PGN's request for variations.
12 May 2005	ADB approved variation orders nos. 30-006 to 30-015.
IIA: Line Pipe and Pipe Materials	
Package A: Trunk Line 28-Inch Line Pipe for Grissik-Duri Branch Line (PCSS 0003)	
22 September 1995	Received draft tender documents for line pipe.
5 October 1995	ADB's comments on draft tender documents sent to PGN.
27 October 1995	Received revised tender documents incorporating ADB's comments.

Date	Event
6 December 1995	Revised bid documents received.
2 January 1996	ADB approved bid documents.
8 January 1996	Invitation to bid published in some Jakarta newspapers.
12 January 1996	Received the final bid documents being issued.
19 February 1996	Received PGN's request to amend the bidding documents to split the 28-inch supply into two packages.
28 February 1996	ADB responds to PGN's request for revision of tender documents.
11 March 1996	Received PGN's request for amendment 1, extending the closing date for the submission of the bids from 12 March 1996 to 26 March 1996.
3 April 1996	Received bid clarification no. 4 and amendments nos. 2 and 3 with regard to extension of the bid closing date to 3 April 1996 then to 12 April 1996.
2 July 1996	BER received.
14 August 1996	ADB approved the BER and the recommendation to award the contract to the second-lowest-priced but lowest evaluated substantially responsive bidder.
7 October 1996	Contract signed.
14 October 1996	Received copy of signed contract.
Package B: Batam Spur Line (Onshore) Sakernan– Kuala Tungkal (PCSS 0019)	
10 June 1997	ADB received draft bid documents.
30 October 1997	ADB commented on draft bid documents.
9 December 1997	ADB received PGN's proposal to increase the diameter of the line pipe.
12 December 1997	ADB responded.
9 February 1998	Invitation to bid was advertised in two local newspapers.
27 April 1998	Extension of deadline for bid submission received by ADB.
2 March 1999	Third extension of bid period received.
30 April 1999	ADB's comments on the BER sent to PGN.
19 May 1999	PGN's response received.
26 May 1999	ADB sent further comments to PGN.
14 February 2000	ADB received bid documents for line pipe supply.
16 March 2001	ADB approved the issuance of the tender documents.
25 April 2001	Specific notice published.
25 June 2001	Evaluation worksheet for bidding of line pipe supply (onshore) received.
21 July 2001	ADB approved the evaluation worksheet.
29 October 2001	Extension of bid validity period and bid security received.
7 November 2001	ADB's comments on the BER sent to PGN.
22 November 2001	Revised BER received.
4 December 2001	ADB approved the BER to award the contract for the supply of onshore transmission pipeline to Hicom Petro-Pipes SDN BHD.
15 February 2002	Signed contract received.

Date	Event
Package B: Batam Spur Line (Offshore) Kuala Tungkal–Panaran (PCSS 0022)	
2 November 1999	PGN's request for approval of the procurement of line pipe supply received.
29 November 1999	ADB's comments on procurement of line pipe supply sent to PGN.
2 January 2001	Bid documents received.
24 January 2001	ADB's comments on bid documents sent to PGN.
31 January 2001	PGN's response received.
5 April 2001	ADB sent further comments to PGN.
16 April 2001	PGN's response received.
25 April 2001	Specific notice published in local newspaper.
20 September 2001	Evaluation worksheet for bid evaluation of line pipe supply received.
1 October 2001	ADB approved the evaluation worksheet.
1 April 2002	BER for line pipe supply received.
3 May 2002	ADB approved the BER to award the contract to Daewoo International Corporation–PT Southeast Asia Pipe -SeAH joint operation.
19 August 2002	ADB received signed contract.
IIB: Telecommunications and Supervisory Control and Data Acquisition (PCSS 0010)	
15 May 1998	Bid document received.
19 May 1998	ADB's comments on bid documents sent to PGN.
28 May 1998	PGN's response received.
29 May 1998	ADB approved that the contract be funded by ADB.
1 July 1998	Evaluation report of very small aperture terminal system contractor received.
8 December 1998	Signed contract and request for amendment of the contract received.
30 April 1999	ADB approved the contract amendment.
III: Training and Fellowships (PCSS 7-9, 11-12, 17-18, 8801)	
9 December 1977	Received PGN's Proposed Human Resources Development Program
10 December 1977	ADB's fax sent to PGN advising to finalize training program (including the training institution selected, and agreed "training" charges).

Date	Event
13 April 1998	Received PGN's proposed operation and maintenance (O&M) training in Australia for ADB's approval.
16 April 1998	ADB's no objection letter sent to PGN.
4 May 1998	Received signed contract for O&M training.
27 May 1998	Received PGN's proposed program training for Upper Echelon PGN staff.
1 June 1998	ADB's no objection letter on the proposed training for Upper Echelon sent to PGN.
13 July 1998	ADB's no objection to implement the training program sent to PGN.
21 August 1998	PGN's proposal for O&M Training II and III received.
26 August 1998	ADB's no objection letter on the implementation of O&M Training II and III sent to PGN.
4 September 1998	Received signed contract for Training II and III in Australia.
14 September 1998	Received from PGN proposal for training program in France.
1 October 1998	ADB's no objection to the implementation of training program in France sent to PGN.
3 October 1998	Received signed contract for training in France (Distribution)
9 October 1998	Received PGN's training proposal in Japan.
23 October 1998	ADB's approval on the implementation of training program in Japan sent to PGN.
23 October 1998	Received PGN's training proposal in France (Transmission)
26 October 1998	ADB approved the implementation of training program in France (Transmission).
11 July 1999	Received proposal for training program in Norway.
13 August 1999	Received PGN's proposal for training program in USA for aerodynamic performance of centrifugal compressor courses.
25 August 1999	ADB's no objection to implement training program in USA sent to PGN.
IV: Consulting Services	
PMC (PCSS 0001)	
20 April 1994	ADB approved advance action for the recruitment of project management consultants (PMCs).
9 September 1994	Technical evaluation report of four PMC proposals received.
26 October 1994	Revised technical evaluation of PMCs received.
14 December 1994	Another revised technical evaluation of PMCs received.
12 January 1995	ADB approved PGN's request for contract negotiations with first-ranked consultant, the Tripatra-Gulf Interstate consortium.
23 May 2005	ADB advised of the contract negotiations, which were held 24 January 1995–2 February 2005.
24 July 2005	Received draft negotiated contract.
4 September 1995	Comments on the draft negotiated PMC contract sent to PGN.

Date	Event
19 October 1995	Signed contract received.
7 December 1995	ADB approved signed contract.
24 January 1996	Request for PMC contract amendment no. 1 received.
19 February 1996	ADB's response to PMC amendment sent to PGN.
9 May 1996	Signed PMC contract amendment received.
26 October 1998	Request for PMC service extension (amendment no.2) received.
24 November 1998	ADB's response to PMC service extension sent to PGN.
31 December 1998	Contract variation for amendment no. 3 to PMC contract received.
14 January 1999	ADB approved amendment no. 3 to PMC contract.
5 April 1999	Request for extension of PMC contract received.
30 April 1999	ADB approved PMC contract extension and award of the contract for the provision of very small aperture terminal services.
Financial Adviser	
(PCSS 0002)	
14 July 1995	ADB approved the shortlist of firms.
12 January 1996	Technical evaluation of financial advisory services received.
6 March 1996	ADB approved PGN's request for contract negotiations with the first-ranked firm, N.M. Rothschild & Sons.
22 August 1996	ADB approved contract for financial advisory services.
24 September 1996	Signed contract received.
21 October 1996	Inception report received.
14 February 1997	Report evaluating the prequalified bidders received.
30 May 2001	Draft side letter amending Rothchild's consulting contract received.
5 September 2001	ADB approved minor changes to the financial advisory contract.
Gas Sales Negotiations	
Expert (PCSS 0005)	
11 March 1996	Terms of reference for three legal experts received.
1 April 1996	ADB approved the recruitment of Dennis C. Stickley as legal expert.
17 January 1997	Request for the amendment of Stickley's contract received.
20 January 1997	ADB approved the extension of consulting services by Stickley.

Date	Event
VIII: Operations and Maintenance (O&M) Contract (PCSS 0006, 13-16)	
24 July 1997	ADB forwarded list of prequalified firms to PGN.
28 July 1997	PGN reconfirmed the list of prequalified firms.
8 August 1997	Draft bidding documents received.
27 August 1997	ADB commented on draft bid documents.
29 August 1997	ADB approved the reallocation of loan proceeds to cover the financing of O&M.
4 February 1998	BER received.
2 March 1998	ADB approved the BER to award the contract to Nova Gas International.
20 April 1998	Signed contract received.
13 January 1999	Request for amendment of O&M contract received.
15 January 1999	ADB's response to the amendment sent to PGN.
9 February 1999	ADB approved the O&M contract amendment by increasing the contract price.

PROJECT OUTPUTS

Appraisal 1995	Appraisal 2002	Actual
Onshore transmission pipeline, Grissik–Duri, 28 inches, 540 kilometers (km)		Completed as planned at 1995 appraisal
Onshore/offshore transmission pipeline, Sakernan–Batam, 20 inches, 280 km (80 km onshore, 200 km offshore)	<p>Sakernan–Batam pipeline, 28 inches, 280 km</p> <p>Parallel pipeline looping the Grissik–Duri pipeline from Grissik to Sakernan, 28 inches, 35 km</p> <p>Extension of the Sakernan–Batam pipeline to Pemping (Singapore border), 28 inches, 58 km</p>	<p>Completed as planned at 2002 appraisal</p> <p>Completed as planned at 2002 appraisal</p> <p>Completed as planned at 2002 appraisal</p>
Gas distribution network at Batam and other ancillary facilities (capacity: 80 million cubic feet per day)	Gas distribution network at Batam and other ancillary facilities (capacity: 30 million cubic feet per day)	Completed as planned at 2002 appraisal
Staff training on gas pipeline operation and maintenance, gas distribution, submarine pipelines, and centrifugal compressors		Completed as planned at 1995 appraisal
Project management consultancy	Extended	Completed as planned at 1995 and 2002 appraisals
Financial advisory services for restructuring and for participation by strategic investors		Completed as planned at 1995 appraisal
Operation and maintenance contract for the Grissik–Duri transmission system		Completed as planned at 1995 appraisal
	Compressor stations on the Grissik–Sakernan–Duri pipeline	Completed as planned at 2002 appraisal

Sources: Asian Development Bank, Perusahaan Gas Negara.

PROJECT COST ESTIMATES

(\$ million)

Components	Appraisal (1995)			Appraisal (2002)			Actual		
	Foreign Exchange	Local Cost	Total	Foreign Exchange	Local Cost	Total	Foreign Exchange	Local Cost	Total
A. Base Cost									
1. Land Acquisition	0.00	20.00	20.00	0.00	13.10	13.10	0.00	4.69	4.69
2. Civil Works									
a. Pipeline Construction	217.50	21.50	239.00	291.30	18.00	309.30	259.18	92.21	351.39
b. Operation Center and Facilities	0.00	0.00	0.00	0.00	9.00	9.00	0.00	2.80	2.80
c. Compressor Facilities	0.00	0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00
3. Equipment and Materials									
a. Line Pipes and Pipe Materials	90.00	2.50	92.50	121.90	14.50	136.40	106.29	14.60	120.89
b. Pipeline Coating and Wrapping	50.00	0.00	50.00	39.10	5.60	44.70	27.17	3.98	31.15
c. Telecommunication, and Supervisory Control and Data Acquisition	4.00	0.00	4.00	14.50	3.65	18.15	0.20	9.48	9.68
d. Compressor	0.00	0.00	0.00	50.00	0.00	50.00	0.00	44.32	44.32
e. Spare Parts and Other Equipment	0.50	0.20	0.70	0.00	11.80	11.80	0.00	15.35	15.35
4. Training and Fellowship	1.70	0.30	2.00	2.60	0.00	2.60	3.09	0.00	3.09
5. Consultancy Services	23.15	2.70	25.85	28.60	1.90	30.50	25.79	13.06	38.85
6. Perusahaan Gas Negara Project Management	0.00	4.50	4.50	0.00	21.30	21.30	0.00	8.20	8.20
7. Recovery of Technical Assistance Financing	0.15	0.00	0.15	0.15	0.00	0.15	0.15	0.00	0.15
8. Taxes and Duties	0.00	13.30	13.30	0.00	7.27	7.27	0.00	0.00	0.00
9. Pre-investment Studies	0.00	0.00	0.00	0.00	0.85	0.85	0.00	0.85	0.85
10. Operation, Maintenance and Commissioning	0.00	0.00	0.00	6.40	0.00	6.40	2.93	4.57	7.50
Subtotal (A)	387.00	65.00	452.00	554.55	111.97	666.52	424.80	214.11	638.91
B. Contingencies									
1. Physical Contingency	38.70	6.50	45.20				0.00	0.00	0.00
2. Price Contingency	21.90	3.40	25.30				0.00	0.00	0.00
Subtotal (B)	60.60	9.90	70.50	34.80	0.00	34.80	0.00	0.00	0.00
C. Interest and Other Charges During Construction	53.40	14.10	67.50	90.80	0.00	90.80	23.00	21.53	44.53
Total (A+B+C)	501.00	89.00	590.00	680.15	111.97	792.12	447.80	235.64	683.44

Sources: Asian Development Bank and Perusahaan Gas Negara.

FINANCING PLAN
(\$ million)

Item	Appraisal								Actual			
	1995				2002 Revised							
	Foreign Exchange	Local Currency	Total Cost	%	Foreign Exchange	Local Currency	Total Cost	%	Foreign Exchange	Local Currency	Total Cost	%
ADB	218.00		218.00	37	218.00	0.00	218.00	28	217.83	0.00	217.83	32
EIB	58.00		58.00	10	101.00	0.00	101.00	13	125.25	0.00	125.25	18
JBIC	195.00		195.00	33	105.00	0.00	105.00	13	104.72	0.00	104.72	15
PGN	30.00	89.00	119.00	20	156.00	112.00	268.00	34	0.00	235.64	235.64	35
Strategic Investors					100.00	0.00	100.00	13				
Total	501.00	89.00	590.00	100	680.00	112.00	792.00	100	447.80	235.64	683.44	100

ADB=Asian Development Bank, EIB=European Investment Bank, JBIC=Japan Bank for International Cooperation, PGN=Perusahaan Gas Negara.

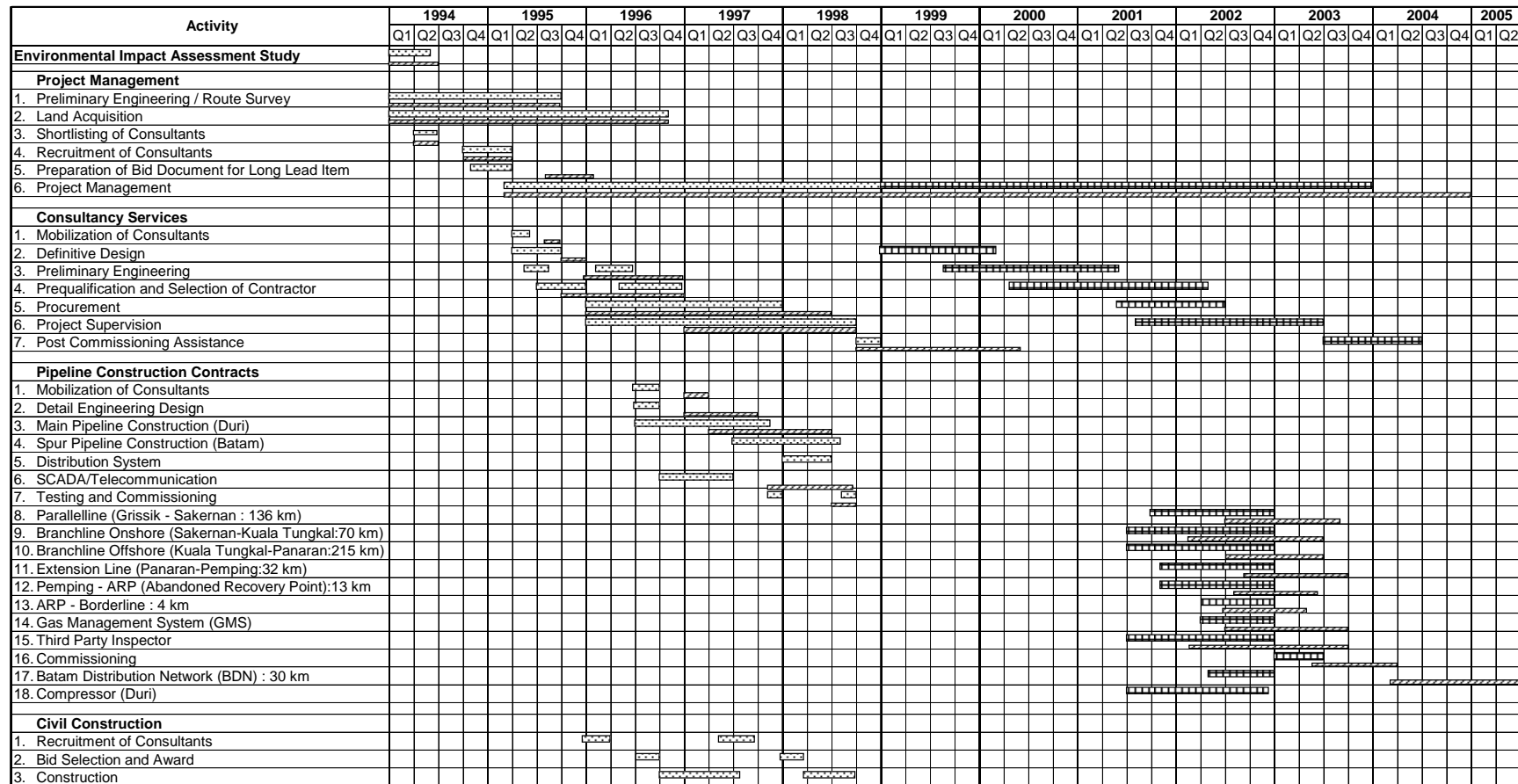
Sources: Asian Development Bank.

ACTUAL DISBURSEMENTS, 1996–2005

Year	Quarter	Amount Disbursed	Annual Total	Cumulative Total
1996	II	0.18		0.18
	III	3.19		3.37
	IV	8.01	11.38	11.38
1997	I	6.00		17.38
	II	26.31		43.69
	III	10.63		54.31
	IV	6.13	49.07	60.45
1998	I	8.50		68.94
	II	13.59		82.53
	III	9.80		92.33
	IV	9.69	41.57	102.02
1999	I	10.44		112.46
	II	4.44		116.90
	III	0.81		117.71
	IV	5.73	21.42	123.44
2000	I	0.14		123.57
	II	4.12		127.70
	III	0.12		127.81
	IV	2.75	7.13	130.57
2001	I	0.24		130.80
	II	0.18		130.98
	III	0.00		130.98
	IV	0.00	0.42	130.98
2002	I	0.00		130.98
	II	0.00		130.98
	III	0.00		130.98
	IV	3.80	3.80	134.79
2003	I	6.91		141.70
	II	46.18		187.87
	III	6.10		193.98
	IV	9.13	68.32	203.11
2004	I	0.90		204.00
	II	0.96		204.96
	III	2.75		207.71
	IV	6.25	10.86	213.97
2005	I	0.00		213.97
	II	1.36		215.33
	III	2.50	3.86	217.83

Source: Asian Development Bank.

IMPLEMENTATION SCHEDULE



Legend:

Civil Construction [Pattern: Dotted] Duri/Batam [Pattern: Dotted] Revised Plan (Singapore-Duri-Batam) [Pattern: Dotted] Actual Implementation [Pattern: Dotted]

Q1=first quarter, Q2=second quarter, Q3=third quarter, Q4=fourth quarter, SCADA=supervisory control and data acquisition.

STATUS OF COMPLIANCE WITH LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
A. General Implementation Arrangements 1. The Project shall be implemented by PGN. The Project Implementation Unit (PIU) within PGN shall be responsible for the overall implementation of the Project; shall be headed by a full time Project Manager and be assisted by an adequate number of qualified technical, accounting and administrative staff.	Loan Agreement, Schedule 6.1	Complied with.
2. PGN shall enter in a strategic partnership with the formation of a subsidiary company with a minimum equity of 25-40 percent from a strategic investor for the operation and maintenance of the facilities after commissioning.	Loan Agreement, Schedule 6.2	Complied with. Project delayed due to the Asian financial crisis. Subsidiary company formed in 2002 following Board approval of a major change in scope on 30 May 2002.
3. The Borrower shall ensure that the legal status of PGN shall be converted from a Perum to a Persero prior to 30 June 1995.	Loan Agreement, Schedule 6.3	Complied with. Presidential Decree no. 37/1994 dated 6 December 1994.
4. The Borrower shall ensure that PGN, prior to commissioning of the Project, shall strengthen its management to meet the changing business environment and the expanded operation of the company. Such strengthening shall be carried out in consultation with the Bank, taking into consideration the recommendations of the consultants engaged under the Project.	Loan Agreement, Schedule 6.4	Complied with.
B. Specific Implementation Aspects 1. PGN will ensure that environmental protection controls and safety devices are included in the design of the Project facilities and will be designed and installed in accordance with acceptable industry standards and practices.	Loan Agreement, Schedule 6.5	Complied with.
2. PGN will take the necessary measures to implement the environmental action plan and the associated monitoring activities outlined in the EIA report and will annually provide the Bank with a copy of the report on the mitigating measures taken as outlined in the EIA.	Loan Agreement, Schedule 6.6	Complied with.
Gas Regulatory Framework 3. The Borrower shall ensure that an appropriate gas regulatory framework be	Loan Agreement, Schedule 6.7	Complied with.

Covenant	Reference in Loan Agreement	Status of Compliance
introduced prior to the commissioning of the Project to promote the efficient development, allocation and utilization of natural gas.		
Gas Pricing 4. The producer price of gas in relation to the Project shall be linked to the Duri crude oil price. The effective product net back price for gas will therefore be equivalent to the price of Duri crude oil less the transmission tariff. PGN's transmission and distribution tariffs shall be based on the economic cost of investments made. This procedure shall ensure that the gas prices reflect the market prices throughout the life of the Project.	Loan Agreement, Schedule 6.8	Complied with.
Land Acquisition 5. The Borrower shall ensure that PGN shall take such action as is necessary to acquire, prior to the scheduled start of civil works, all land, rights to land and other property rights required for the construction and/or establishment of the Project facilities.	Loan Agreement, Schedule 6.10	Complied with.
Gas Sale, Transportation and Purchase Agreement 6. The Borrower shall ensure that PGN, prior to 31 December 1995, enters into agreements with Pertamina [the National Oil and Gas Company], one for the transport of natural gas from Grissik to Duri and another agreement for bulk purchase of natural gas. The Borrower shall further ensure that the gas sales agreement between Pertamina and Caltex Pacific Indonesia has been entered into prior to December 1995.	Loan Agreement, Schedule 6.11	Complied with.
Gas Reserves 7. The Borrower shall ensure that in addition to proven reserves of 1.5 trillion cubic feet (TCF) on the Corridor Block, the potential reserves of 2.0 TCF in the Project area shall be dedicated to PGN for the exclusive use of the consumers in the Project area.	Loan Agreement, Schedule 6.12	Complied with.

Covenant	Reference in Loan Agreement	Status of Compliance
<p>Mid-term Review</p> <p>8. Prior to 31 December 1997, the Borrower and PGN shall, in consultation with the Bank, carry out a comprehensive mid-term review of the implementation of the Project. This review shall include: (i) assessment of Project implementation; (ii) review of the organizational structure of PGN and training of staff; and (iii) assessment of constraints and formulation of measures to address impediments in connection with the Project implementation.</p>	<p>Loan Agreement, Schedule 6.13</p>	<p>Complied with.</p>
<p>C. Financial, Accounting, and Related Matters</p> <p>1. The Borrower shall ensure that external financing in amounts and on terms and conditions satisfactory to the Bank be obtained in a timely manner consistent with the Project implementation schedule.</p>	<p>Loan Agreement, Schedule 6.9</p>	<p>Complied with.</p>
<p>D. Particular Covenants</p> <p>The Borrower</p> <p>1. The Borrower shall cause PGN to carry out the Project with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental and public utility practices.</p>	<p>Loan Agreement, Article IV, Section 4.01, a</p>	<p>Complied with.</p>
<p>2. The Borrower shall make available to PGN, promptly as needed, the funds, facilities, services, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.</p>	<p>Loan Agreement, Article IV, Section 4.02</p>	<p>Complied with.</p>
<p>3. The Borrower shall ensure that the activities of its departments and agencies with respect to the carrying out of the Project and operation of the Project facilities are conducted and coordinated in accordance with sound administrative policies and procedures.</p>	<p>Loan Agreement, Article IV, Section 4.03</p>	<p>Complied with.</p>
<p>4. The Borrower shall furnish, or cause to be furnished, to the Bank all such reports and information as the Bank shall reasonably request concerning</p> <p>(i) the Loan, and the expenditure of the proceeds and maintenance of the service thereof;</p>	<p>Loan Agreement, Article IV, Section 4.04</p>	<p>Complied with.</p>

Covenant	Reference in Loan Agreement	Status of Compliance
(ii) the goods and services and other items of expenditure financed out of the proceeds of the Loan; (iii) the Project; (iv) the administration, operations and financial condition of PGN; (v) financial and economic conditions in the territory of the Borrower and the international balance-of-payments position of the Borrower; and (vi) any other matters relating to the purposes of the Loan.		
5. The Borrower shall enable the Bank's representatives to inspect the Project, the goods financed out of the proceeds of the Loan, and any relevant records and documents.	Loan Agreement, Article IV, Section 4.05	Complied with.
6. The Borrower shall take all action that shall be necessary on its part to enable PGN to perform its obligations under the Project Agreement.	Loan Agreement, Article IV, Section 4.06	Complied with.
7. (a) The Borrower shall exercise its rights under the Subsidiary Loan Agreement in such a manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Loan. (b) No rights or obligations under the Subsidiary Loan Agreement shall be assigned, amended, abrogated or waived without the prior concurrence of the Bank.	Loan Agreement, Article IV, Section 4.07	Complied with.
8. (a) It is the mutual intention of the Borrower and the Bank that no other external debt owed a creditor other than the Bank shall have any priority over the Loan by way of a lien on the assets of the Borrower. To that end, the Borrower undertakes (i) that, except as the Bank may otherwise agree, if any lien shall be created on any assets of the Borrower as security for any external debt, such lien will <u>ipso facto</u> equally and ratably secure the payment of the principal of, and interest and other charges on, the Loan; and (ii) that the Borrower, in creating or permitting the creation of any such lien, will make express provision to that effect. (b) The provisions of paragraph (a) of this Section shall not apply to (i) any lien created on property, at the time of purchase thereof, solely as security for payment of the purchase price of such property; or (ii) any lien arising from a debt maturing not more than one year after its date. (c) The term "assets of the Borrower" as used in	Loan Agreement, Article IV, Section 4.08	Complied with.

Covenant	Reference in Loan Agreement	Status of Compliance
Paragraph (a) of this Section includes assets of any administrative subdivision or any agency of the Borrower and assets of any agency of any such administrative subdivision, including Bank Indonesia and any other institution performing the functions of a central bank for the Borrower.		
The Executing Agency 1. (a) PGN shall carry out the Project with due diligence and efficiency , and in conformity with sound administrative, financial, engineering, environmental and public utility practices. (b) In the carrying out of the Project and operation of the Project facilities, PGN shall perform all obligations set forth in Schedule 6 to the Loan Agreement to the extent that they are applicable to PGN and all obligations set forth in the Schedule to this Project Agreement.	Project Agreement, Article II, Section 2.01	Complied with.
2. PGN shall make available, promptly as needed, the funds, facilities, services, equipment, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.	Project Agreement, Article II Section 2.02	Complied with.
3. (a) In the carrying out of the Project, PGN shall employ competent and qualified consultants and contractors, acceptable to the Bank, to an extent and upon terms and conditions satisfactory to the Bank. (b) Except as the Bank may otherwise agree, all goods and services to be financed out of the proceeds of the Loan shall be procured in accordance with the provisions of Schedule 4 and Schedule 5 to the Loan Agreement. The Bank may refuse to finance a contract where goods or services have not been procured under procedures substantially in accordance with those agreed between the Borrower and the Bank or where the terms and conditions of the contract are not satisfactory to the Bank.	Project Agreement, Article II, Section 2.03	Complied with.
4. PGN shall carry out the Project in accordance with plans, design standards, specifications, work schedules and construction methods acceptable to the Bank. PGN shall furnish, or caused to be furnished, to the Bank, promptly after their preparation, such plans, design standards, specifications and work schedules, and any material modifications subsequently made therein, in such detail as the Bank shall reasonably request.	Project Agreement, Article II, Section 2.04	Complied with.

Covenant	Reference in Loan Agreement	Status of Compliance
<p>5. (a) PGN shall take out and maintain with responsible insurers, or make other arrangements satisfactory to the Bank for, insurance of the Project facilities to such extent and against such risks and in such amounts as shall be consistent with sound practice.</p> <p>(b) Without limiting the generality of the foregoing, PGN undertakes to insure, or cause to be insured, the goods to be imported for the Project and to be financed out of the proceeds of the Loan against hazards incident to the acquisition, transportation and delivery thereof to the place of use or installation, and for such insurance any indemnity shall be payable in a currency freely usable to replace or repair such goods.</p>	Project Agreement, Article II, Section 2.05	Complied with.
<p>6. PGN shall maintain, or cause to be maintained, records and accounts adequate to identify the goods and services and other items of expenditure financed out of the proceeds of the Loan, to disclose the use thereof in the Project, to record the progress of the Project (including the cost thereof) and to reflect, in accordance with consistently maintained sound accounting principles, its operations and financial condition.</p>	Project Agreement, Article II, Section 2.06	Complied with.
<p>7. (a) The Bank and PGN shall cooperate fully to ensure that the purposes of the Loan will be accomplished.</p> <p>(b) PGN shall promptly inform the Bank of any condition which interferes with, or threatens to interfere with, the progress of the Project, the performance of its obligations under this Project Agreement or the Subsidiary Loan Agreement, or the accomplishment of the purposes of the Loan.</p> <p>(c) The Bank and PGN shall from time to time, at the request of either party, exchange views through their representatives with regard to any matters relating to the Project, PGN and the Loan.</p>	Project Agreement, Article II, Section 2.07	Complied with.
<p>8. (a) PGN shall furnish to the Bank all such reports and information as the Bank shall reasonably request concerning (i) the Loan and the expenditure of the proceeds thereof; (ii) the goods and services and other items of expenditure financed out of such proceeds; (iii) the Project; (iv) the administration, operations and financial condition of PGN; and (v) any other matters relating to the purposes of the</p>	Project Agreement, Article II, Section 2.08	Generally complied with. Progress reports were not submitted for 1999.

Covenant	Reference in Loan Agreement	Status of Compliance
<p>Loan.</p> <p>(b) Without limiting the generality of the foregoing, PGN shall furnish to the Bank quarterly reports on the execution of the Project and on the operation and management of the Project facilities. Such reports shall be submitted in such form and in such detail and within such a period as the Bank shall reasonably request, and shall indicate, among other things, progress made and problems encountered during the quarter under review, steps taken or proposed to be taken to remedy these problems, and the proposed program of activities and expected progress during the following quarter.</p> <p>(c) Promptly after physical completion of the Project, but in any event not later than three (3) months thereafter or such later date as the Bank may agree for this purpose, PGN shall prepare and furnish to the Bank a report, in such form and in such detail as the Bank shall reasonably request, on the execution and initial operation of the Project, including its cost, the performance by PGN of its obligations under this Project Agreement and the accomplishment of the purposes of the Loan.</p>		
<p>9. (a) PGN shall (i) maintain separate accounts for the Project and for its overall operations; (ii) have such accounts and related financial statements (balance sheet, statement of income and expenses, and related statements) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualifications, experience and terms of reference are acceptable to the Bank; and (iii) furnish to the Bank, promptly after their preparation but in any event not later than nine (9) months after the close of the fiscal year to which they relate, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including the auditors' opinion on the use of the Loan proceeds and compliance with the covenants of the Loan Agreement), all in the English language. PGN shall furnish to the Bank such further information concerning such accounts and financial statements and the audit thereof as the Bank shall from time to time reasonably request.</p> <p>(b) In addition to annual audited financial statements referred to in paragraph (a) of this Section, PGN shall furnish to the Bank within three (3) months after the end of each fiscal</p>	<p>Project Agreement, Article II, Section 2.09</p>	<p>Complied with.</p>

Covenant	Reference in Loan Agreement	Status of Compliance
<p>year, investment plans and financial projections of its operations (including income statements, balance sheets and cash flow statements) for the ensuing five (5) years.</p> <p>(c) PGN shall enable the Bank, upon the Bank's request, to comment upon the investment plans and to discuss PGN's financial statements and its financial affairs from time to time with PGN's auditors. PGN shall authorize and require any representative of such auditors to participate in any such discussions requested by the Bank, provided that any such discussion shall be conducted only in the presence of an authorized officer of PGN unless PGN shall otherwise agree.</p>		
<p>10. PGN shall enable the Bank's representatives to inspect the Project, the goods financed out of the proceeds of the Loan, all other plants, sites, works, properties and equipment of PGN, and any relevant records and documents.</p>	<p>Project Agreement, Article II, Section 2.10</p>	<p>Complied with.</p>
<p>11. (a) PGN shall, promptly as required, take all action within its powers to maintain its corporate existence, to carry on its operations, and to acquire, maintain and renew all rights, properties, powers, privileges and franchises which are necessary in the carrying out of the Project or in the conduct of its business.</p> <p>(b) PGN shall at all times conduct its business in accordance with sound administrative, financial, environmental and public utility practices, and under the supervision of competent and experienced management and personnel.</p> <p>(c) PGN shall at all times operate and maintain its plants, equipment and other property, and from time to time, promptly as needed, make all necessary repairs and renewals thereof, all in accordance with sound administrative, financial, engineering, environmental, public utility, and maintenance and operational practices.</p>	<p>Project Agreement, Article II, Section 2.11</p>	<p>Complied with.</p>
<p>12. Except as the Bank may otherwise agree, PGN shall not sell, lease or otherwise dispose of any of its assets which shall be required for the efficient carrying on of its operations or the disposal of which may prejudice its ability to perform satisfactorily any of its obligations under this Project Agreement.</p>	<p>Project Agreement, Article II, Section 2.12</p>	<p>Complied with.</p>
<p>13. Except as the Bank may otherwise agree, PGN shall apply the proceeds of the Loan to the</p>	<p>Project Agreement, Article II, Section</p>	<p>Complied with.</p>

Covenant	Reference in Loan Agreement	Status of Compliance
financing of expenditures on the Project in accordance with the provisions of the Loan Agreement and this Project Agreement, and shall ensure that all goods and services financed out of such proceeds are used exclusively in the carrying out of the Project.	2.13	
14. Except as the Bank may otherwise agree, PGN shall duly perform all its obligations under the subsidiary Loan Agreement, and shall not take, or concur in, any action which would have the effect of assigning, amending, abrogating or waiving any rights or obligations of the parties under the Subsidiary Loan Agreement.	Project Agreement, Article II, Section 2.14	Complied with.
15. PGN shall promptly notify the Bank of any proposal to amend, suspend or repeal any provision of the Governing Laws which may affect the implementation of the Project and shall afford the Bank an adequate opportunity to comment on such proposal prior to taking any action thereon.	Project Agreement, Article II, Section 2.15	Complied with.
16. PGN shall inform the Bank about any proposed change in its tariff rates sufficiently in advance to allow the Bank an adequate opportunity to comment thereon.	Project Agreement, Article II, Section 2.16	Complied with.
17. Except as the Bank shall otherwise agree, PGN shall not incur any debt, other than for money borrowed for financing the Project, unless a reasonable forecast of the revenues and expenditures of PGN shows that the projected net revenues of PGN for each fiscal year during the term of the debt to be incurred shall be at least 1.3 times the projected debt-service requirement in such year on all of PGN's debts, including the debt to be incurred.	Project Agreement, Article II, Section 2.17	Complied with.
18. (a) Except as the Bank shall otherwise agree, PGN shall not incur any debt, if after the incurrence of such debt the ratio of debt to equity shall be greater than 70 to 30.	Project Agreement, Article II, Section 2.18	Complied with

EIA = environmental impact assessment, PGN = Perusahaan Gas Negara (State Gas Corporation).

SUMMARY OF CONTRACTS FINANCED BY THE ASIAN DEVELOPMENT BANK

Contract No./ Category	PCSS No.	Contract Details Description	\$ Equivalent	Mode of Procurement
01	0004	Civil works – pipeline construction Package A – Grissik–Duri pipeline	59.291	ICB
	0021	Package B – Batam spur line (offshore) Kuala Tungkal–Panaran	23.540	ICB
	0020	Package B – Batam spur line (onshore) Sakernan–Kuala Tungkal	14.654	ICB
	0023	Batam distribution network engineering, procurement and construction	5.655	ICB
02A	0003	Line pipe and pipe materials Package A – trunk line, 28-inch line pipe for the Grissik–Duri branch line	35.741	ICB
	0019	Package B – Batam spur line (onshore) Sakernan–Kuala Tungkal	6.085	ICB
	0022	Package B – Batam spur line (offshore) Kuala Tungkal–Panaran	28.741	ICB
02B	0010	Telecommunications and supervisory control and data acquisition Gas management system	0.095	LCB
02C		Materials and equipment – spare parts and other equipment	Transferred to PGN's financing as shown in the revised project cost	
	0013	Corrosion equipment and instrumentation		
	0014	Tools		
	0015	Two-wheel drive vehicle		
	0016	Four-wheel drive vehicle		
03	0007	Training and fellowships O&M training for PGN staff	0.089	DP
	0008	O&M training for PGN staff (module II)	0.103	DP
	0009	Training in gas distribution at Gas de France (GDF)	0.108	DP
	0011	Training in gas distribution, financial administration	0.112	DP
	0012	Training in O&M of gas pipeline (module III)	0.097	DP
	8801	Workshop on gas sales contract negotiation	0.003	DP
	0017	Training in submarine pipeline in Norway	0.100	Other
	0018	Training on aerodynamic performance of centrifugal compressor at Solar Turbines, United States	0.084	Other
04	0001	Consulting services Project management consultants	15.676	ICB
	0002	Financial adviser	1.525	ICB
	0005	Gas sales negotiations expert	0.045	DP
08	0006	O&M contract	2.934	ICB

DP=direct purchase, ICB=international competitive bidding, LCB=local competitive bidding, O&M=operation and maintenance, PCSS=procurement contract summary sheet, PGN=Perusahaan Gas Negara.

Source: Asian Development Bank.

ECONOMIC ANALYSIS OF THE PROJECT

A. General

1. The revised economic evaluation of the Project was carried out on an incremental basis. The Project costs include (i) the pipeline from Grissik to Singapore, (ii) the off-take line to Batam and the distribution system, (iii) the earlier completed Grissik–Duri pipeline, and (iv) the value of natural gas. The methodology was modified from that used at appraisal, as information on all production sharing contract operations related to the provision of additional gas for the revised Project were not available. The capital and operating cost estimates were obtained from the State Gas Corporation (Perusahaan Gas Negara) and the economic costs were calculated from the financial costs, excluding all taxes and duties.

2. The benefits are from the additional export of Duri crude oil resulting from the use of natural gas instead of oil, the replacement of diesel by natural gas on Batam Island, and the export of natural gas to Singapore. The natural gas price negotiated for sale to Singapore reflects international values, as users of the gas will be competing in a power market that is fully deregulated, with a number of power generators having different input energy sources competing in relation to power sales. All prices and values have been expressed in constant 1995 prices. The expected economic life of each component of the Project is 20 years except for compressors, for which a 10-year economic life with overhauling every 30,000 hours has been considered. No salvage value is considered at the end of the economic life. All benefits and costs have been expressed in US dollars as most transactions are in US dollars.

B. Economic Benefits and Costs

3. The major benefit of the revised Project is that the gas transported through the Grissik–Duri pipeline saves about 436 million barrels of oil that can be sold in the international market. Oil has been valued at actual prices until 2006, and a long-term price of \$60 per barrel (in 2006 prices, deflated to 1995 dollars) has been used in the analysis. Even though oil prices are likely to be higher than \$60 per barrel, the price spike is unlikely to continue, therefore the price assumed tends to be conservative. The economic assessment done at the time the major change in Project scope was approved calculated all the energy economic values using World Bank crude oil projections, which average \$15 per barrel in constant 2001 dollars over the 20-year project life. Calculations were also made for \$30 per barrel, which reflects approximate crude oil price levels in 2001.

4. The Grissik–Singapore pipeline will export 2.50 trillion cubic feet of gas to Singapore and about 0.32 trillion cubic feet of gas will be consumed in Batam in lieu of imported oil distillates. The 28-inch pipeline system from Grissik to Singapore and the upstream gas supply system were redesigned to meet the contracted Singapore gas quantities and up to 30.0 million cubic feet per day (MMCFD) for Batam. The contracts require the line to deliver up to 115% of average daily contract quantity, and the design is believed to be able to accommodate this flow rate. Compressors have been added on the Grissik–Duri line to increase capacity, and compressors are planned to be installed on the Grissik–Singapore pipeline as well to increase capacity by about 150.0 MMCFD. The increased capacity and cost of compressors has not been included in this analysis. The Batam distribution network's capacity during construction was expanded from the planned 30.0 MMCFD. This expanded capacity has been included in the economic analysis.

5. Gas sold to Singapore was valued at the contract price in the gas sale and purchase agreement and is related on a heating value basis to the daily Singapore high-sulfur fuel oil price plus an escalation factor.

6. The economic capital cost of each project component has been calculated on the basis of the financial cost after deducting duties and all taxes on equipment and contracts. The economic analysis done at appraisal and before the approval of the major change in scope estimates the costs of the upstream portion, which includes well drilling, pipeline gathering, gas processing plants, and compressors. Production sharing contract costs incurred prior to 2001 and investments related directly to supplying gas for the Project have been included as part of the production sharing contract investment, as the capacity created by these investments would be used by the Project. In this revised analysis, an update on the upstream costs was not available and the volume of gas to be transported by the Project had changed. Therefore the price charged by the gas field operators was taken to estimate the value of gas sold. This is a reasonable assumption, as gas is priced for full cost recovery. The reserves depletion premium is likely to be small given Indonesia's gas reserves, which are expected to last about 35 years, when coal will probably be the alternative fuel, which results in a negligible depletion premium. In addition, recent technological changes have led to considerable success in finding gas in Perusahaan Gas Negara supply area, which is probably decreasing the marginal cost of the gas supply. These assumptions for increased gas availability are also supported by the two new pipelines that are being constructed to transport gas from South Sumatra to West Java.

C. Cost-Benefit Analysis

7. The cost-benefit analysis of the Project is shown in Table A9. The economic internal rate of return (EIRR) is 55.6%, compared with an EIRR of 26.3% at \$15 per barrel to 50.9% at \$30 per barrel in the midterm appraisal of the Project in y prior to the approval of the major change in scope. The Project is economically viable and justifiable, as its EIRR is higher than that at appraisal.

Table A9: Economic Cost-Benefit Analysis, 1996–2024

Year	Gas Sales (Btu million)				Benefits (\$ million)				Costs (\$ million)				(\$ million)
	Duri	Batam	Singapore	Total	Duri	Batam	Singapore	Total	Gas	Investment	O&M	Total	Net Benefits
1996	0	0	0	0	0	0	0	0	0	19	0	19	(19.2)
1997	0	0	0	0	0	0	0	0	0	111	0	111	(111.5)
1998	0	0	0	0	0	0	0	0	0	88	0	88	(87.7)
1999	12	0	0	12	40	0	0	40	29	34	13	76	(36.3)
2000	106	0	0	106	526	0	0	526	248	12	13	273	253.2
2001	103	0	0	103	424	0	0	424	243	2	13	257	166.7
2002	99	0	0	99	441	0	0	441	233	67	13	313	128.2
2003	108	0	8	115	520	0	30	550	271	255	13	539	10.6
2004	112	6	38	155	702	52	151	905	365	17	23	406	499.1
2005	117	10	48	175	963	90	191	1,245	411	13	23	447	797.3
2006	125	11	84	221	1,029	104	337	1,470	519	0	23	542	928.3
2007	156	14	103	273	1,279	131	413	1,822	641	0	23	665	1,157.5
2008	156	17	115	288	1,279	157	461	1,897	676	0	23	700	1,197.2
2009	156	17	123	296	1,279	157	493	1,929	695	0	23	718	1,210.6
2010	147	17	124	288	1,207	157	495	1,859	676	0	23	699	1,160.4
2011	147	17	114	277	1,207	157	455	1,819	652	0	23	675	1,143.6
2012	147	17	115	279	1,207	157	462	1,826	656	0	23	680	1,146.2
2013	147	17	134	297	1,207	157	534	1,899	699	0	23	722	1,176.5
2014	147	17	133	297	1,207	157	532	1,896	697	0	23	720	1,175.4
2015	147	17	133	296	1,207	157	531	1,895	697	0	23	720	1,175.0
2016	147	17	133	296	1,207	157	531	1,895	697	0	23	720	1,174.6
2017	147	17	133	297	1,207	157	533	1,897	698	0	23	721	1,176.0
2018	147	17	135	299	1,207	157	541	1,906	703	0	23	726	1,179.4
2019	0	17	135	152	0	157	541	699	357	0	11	368	330.9
2020	0	17	135	152	0	157	541	699	357	0	11	368	330.9
2021	0	17	135	152	0	157	541	699	357	0	11	368	330.9
2022	0	17	135	152	0	157	541	699	357	0	11	368	330.9
2023	0	17	135	152	0	157	541	699	357	0	11	368	330.9
2024	0	17	135	152	0	157	541	699	357	0	11	368	330.9
Total				5,383				32,331				13,745	18,586.6
												EIRR	55.6%

Btu=British thermal unit, O&M=operation and maintenance.

Source: Asian Development Bank.

FINANCIAL ANALYSIS OF THE PROJECT

A. General

1. The financial evaluation of the Project has been carried out on an incremental and after income tax basis. The Project has three components and revenue sources: (i) the Grissik–Duri pipeline, (ii) the Grissik–Singapore pipeline, and (iii) the Batam distribution network. In the calculation of financial evaluation, it is assumed that the operating life of pipelines is 20 years with no salvage value. One standard cubic foot of natural gas is equivalent to 1,000 British thermal units (Btu) of heating value.

B. Capital Cost

2. The capital cost of the Project is \$683.4 million (Table A10.1). The Grissik–Duri pipeline accounts for 38% of the total project cost, the Grissik–Singapore pipeline for 61%, and the Batam distribution network for 1%.

Table A10.1: Capital Cost by Project Component
(\$ million)

Item	Amount	Percentage of Total Costs
Grissik–Duri Pipeline	261.9	38
Grissik–Singapore Pipeline	415.8	61
Batam Distribution Network	5.6	1
Total	683.4	100

Source: Perusahaan Gas Negara.

C. Sales Revenues

3. Sales prices are as follows:

- (i) transmission sales to Duri—\$0.57 per million Btu,
- (ii) transmission sales to Singapore—\$0.69 per million Btu, and
- (iii) distribution sales in Batam—\$2.80 to \$6.70 per million Btu.

4. The projected transmission and distribution volume of natural gas is shown in Table A10.2. The projection is based on the current contract with the gas sellers and excludes additional future contracts.

Table A10.2: Gas Sales Volume, 2006–2010
(billion cubic feet)

Item	2006	2007	2008	2009	2010
Transmission					
Grissik–Duri	133.6	125.2	122.1	101.1	83.0
Grissik–Singapore	84.3	103.2	115.2	142.7	146.7
Distribution					
Batam	9.5	18.2	29.3	29.3	29.3

Source: Transportasi Gas Indonesia and Perusahaan Gas Negara.

D. Operating Cost

5. The variable cost of natural gas is \$4.00 per million Btu in 2006 and an estimated \$6.7 per million Btu in 2020. The fixed costs are given in Table A10.3.

Table A10.3: Fixed Costs
(\$ million)

Item	Amount
Pipeline	
Operation and Maintenance	20.5
Tools	1.1
Transportation	1.0
Compressors	
Operation and Maintenance	0.5
Overhaul (every 4 years)	0.4

Source: Perusahaan Gas Negara.

E. Weighted Average Cost of Capital

6. As a proxy for the financial opportunity cost of capital, the weighted average cost of capital for the Project is calculated at 4.7% (Table A10.4). The cost of capital for Transportasi Gas Indonesia (Transportation Gas Indonesia) is estimated by employing a capital asset pricing model. The risk-free rate is 5.4%, the expected equity risk premium in the United States is 4.8%, the expected equity risk premium in Indonesia is 7.5%; the market beta of the peer industry is estimated at 1.3; and the equity cost of capital is 21.0%.

Table A10.4: Weighted Average Cost of Capital

Item	Financing Component				Total
	ADB	JBIC	EIB	TGI	
A. Amount (\$ million)	217.8	104.7	125.3	235.6	683.4
B. Weighting (%)	31.9	17.3	18.3	32.5	100.0
C. Nominal cost of funds (%)	6.0	3.0	6.0	21.0	
D. Tax rate (%)	0.0	0.0	0.0	30.0	
E. Tax-adjusted nominal cost (%)	6.0	3.0	6.0	14.7	
F. Inflation Rate (%)	1.6	0.6	1.6	7.8	
G. Real Cost (%)	4.3	2.3	4.3	6.4	
H. Weighted component of WACC (%)	1.4	0.4	0.8	2.1	4.7
Weighted Average Cost of Capital	4.7				

ADB=Asian Development Bank, EIB=European Investment Bank, JBIC=Japan Bank for International Cooperation, TGI = Transportasi Gas Indonesia, WACC = weighted average cost of capital.
Source: Asian Development Bank estimates.

F. Financial Internal Rate of Return

7. The financial internal rate of return for the Project is estimated at 29.4% (Table A10.5). Under the current assumptions, the Project is considered financially viable, because the financial internal rate of return exceeds the weighted average cost of capital.

Table A10.5: Financial Internal Rate of Return
(\$ million)

Year	Sales Volume (BCF)			Price (\$/MMBTU)			Total Revenue	Operating Costs			Operating Cash	Income Tax	Capital Costs	Net Cash Flow
	Trans mission Duri	Trans mission SPR	Distribution Batam	Trans mission Duri	Trans mission SPR	Distribution Sales Batam		Fixed Cost	Purchase Price (\$/MMBTU)	Variable Cost				
1996													(21.3)	(21.3)
1997													(123.0)	(123.0)
1998													(96.1)	(96.1)
1999	12.0			0.44			5.3	11.5			(6.2)	(1.9)	(36.3)	(40.6)
2000	106.0			0.44			46.6	23.0			23.6	7.1	(12.0)	4.5
2001	103.0			0.44			45.3	23.0			22.3	6.7	(2.4)	13.2
2002	91.9			0.57	0.69		52.4	23.0			29.3	8.8	(74.4)	(53.9)
2003	118.1	25.4		0.57	0.69		84.8	23.0			61.8	18.5	(283.9)	(240.6)
2004	120.5	36.9		0.57	0.69		94.2	23.0			71.2	21.3	(19.0)	30.8
2005	131.7	59.5	5.9	0.57	0.69	2.80	132.8	23.0	2.42	14.4	95.4	28.6	(14.9)	51.8
2006	133.6	84.3	9.5	0.57	0.69	4.00	172.3	23.0	2.55	24.2	125.0	37.5	(0.1)	87.5
2007	125.2	103.2	18.2	0.57	0.69	4.20	219.2	23.0	2.72	49.6	146.5	44.0		102.6
2008	122.1	115.2	29.3	0.57	0.69	5.10	298.7	23.0	3.02	88.6	187.1	56.1		131.0
2009	101.1	142.7	29.3	0.57	0.69	5.20	308.6	23.0	3.11	91.2	194.4	58.3		136.1
2010	83.0	146.7	29.3	0.57	0.69	5.40	307.0	23.0	3.21	94.2	189.8	56.9		132.8
2011	71.2	139.7	29.3	0.57	0.69	5.50	298.3	23.0	3.26	95.6	179.6	53.9		125.7
2012	66.2	141.5	29.3	0.57	0.69	5.60	299.6	23.0	3.28	96.2	180.4	54.1		126.3
2013	61.3	159.6	36.5	0.57	0.69	5.80	356.7	23.0	3.38	123.3	210.3	63.1		147.2
2014	46.2	168.6	36.5	0.57	0.69	5.80	354.3	23.0	3.41	124.4	206.9	62.1		144.8
2015	43.0	168.6	36.5	0.57	0.69	6.00	359.7	23.0	4.19	152.9	183.8	55.1		128.6
2016	40.5	168.3	36.5	0.57	0.69	6.10	361.8	23.0	4.22	154.0	184.8	55.4		129.3
2017	36.0	168.3	36.5	0.57	0.69	6.10	359.2	23.0	4.25	155.1	181.1	54.3		126.8
2018	34.6	168.9	36.5	0.57	0.69	6.20	362.4	23.0	4.28	156.2	183.2	55.0		128.3
2019	32.9	171.0	36.5	0.57	0.69	6.30	366.5	23.0	4.31	157.3	186.3	55.9		130.4
2020	31.7	134.2	22.2	0.57	0.69	6.70	259.3	23.0	4.43	98.2	138.0	41.4		96.6
2021	31.1	132.8	22.2	0.57	0.69	6.70	257.9	23.0	4.43	98.2	136.7	41.0		95.7
2022		132.0	22.2	0.57	0.69	6.70	239.7	23.0	4.43	98.2	118.4	35.5		82.9
2023		131.4	22.2	0.57	0.69	6.70	239.2	23.0	4.43	98.2	118.0	35.4		82.6
FIRR 29.4%														

BCF=billion cubic feet, FIRR=financial internal rate of return, MMBTU=million British thermal unit, SPR=Singapore.
Source: Asian Development Bank estimates.