NATURAL GAS

Production

The GOI estimates Indonesian gas reserves at 170.3 trillion standard cubic feet (TSCF) or about 30,314 billion barrels of oil equivalent, of which 94.7 TSCF are proven and 75.6 TSCF are probable. Indonesia has increased its estimated reserves by 25 percent in the past two years from 1998's gas reserves estimate of 158.3 TSCF. Gas reserves are equivalent to three times Indonesia's oil reserves and can supply the country for 50 years at current production rates. Over 71 percent of natural gas reserves are located offshore, with the largest reserves found off Natuna Island (33.3 percent), East Kalimantan (30.2 percent), Irian Jaya (15.1 percent), Aceh (6.8 percent) and South Sumatra (6.4 percent). The discoveries by Arco, now BP, in the Wiriagar and Berau fields located offshore Irian Jaya represent some of Indonesia's most promising recent finds.

Natural gas production declined by 5.4 percent to 2.9 trillion cubic feet (TCF) in 2000 from 3.1 TCF in 1999. Natural gas producer rankings changed dramatically, with sharp increases for some and equally strong declines for others. TotalFinaElf, with its Tunu North and Peciko fields producing, increased its production by 23 percent to 841 billion cubic feet (BCF) so that its production was nearly double that of ExxonMobil and Vico, the number two and three producers respectively. ExxonMobil, once the largest gas producer in Indonesia, lowered production by nearly 42 percent to 459 BCF from its maturing Arun gas field in North Sumatra. Natural gas production from Vico's Badak field in East Kalimantan also declined slightly by 5.2 percent to 452 BCF. Unocal's production was essentially level at 166 BCF, a 2.1 percent increase from the previous year. TotalFinaElf, Vico, and Unocal are major suppliers of gas to the Bontang LNG plant in East Kalimantan. BP, the largest supplier of domestic gas after it acquired Arco, saw gas output from its fields offshore Java and Madura decline slightly by 1.8 percent to 293 BCF after an 80 percent increase from 1998's 166 BCF to 1999's 298 BCF. Conoco increased its production by 141 percent to 21 BCF, becoming Indonesia's 12th largest natural gas producer.

Natural Gas Production by Major Producers (MMSCF)

Producers	1998	1999	2000	% total
Total Ind.	604,447	684,565	841,419	29.0
Mobil Oil	921,865	794,299	458,929	15.8
Vico	456,954	477,368	452,456	15.6
Arco	165,937	298,327	293,034	10.1
Pertamina	270,330	259,132	285,692	9.8
Unocal	143,764	162,903	166,316	5.7
Gulf Res.	75,076	166,449	165,226	5.7
Others	340,479	225,306	238,230	8.3
Total	**2,978,852**	**3,068,349**	**2,901,302**	**100.0**

Source: MIGAS

Roughly 55 percent of Indonesia's natural gas was marketed as LNG or liquefied petro-leum gas (LPG) for export, 7.7 percent for elec-tricity, 7.4 percent for fertilizer and 2.2 percent for city gas. Less than six percent was flared.

A total of 18 wildcat and appraisal gas wells were drilled in 2000. Oil companies, however, do not actively explore for

gas in Indonesia, due to disincentives in the pricing for domestic gas. Rather, as the ratio of gas to oil accumulations is high in Indonesia, most gas fields have been discovered during oil exploration.

Piped Gas Exports Begin

Indonesia exported its first piped gas beginning in 2001, and concluded two more international export deals. The pipelines that are laid as part of these deals can further development of the Trans-ASEAN Gas Grid and stimulate further progress on Indonesia's domestic gas transmission system.

West Natuna to Singapore

Pertamina and Singapore's SembCorp Gas Pte Ltd celebrated the first delivery of natural gas on January 15, 2001, exactly one year after signing a gas sales agreement (GSA). The GSA provides for the supply of 325 million standard cubic feet per day (mmscfd) from Indonesia's West Natuna fields to Jurong Island, Singapore for a period of 22 years. SembGas has a take-or-pay requirement while Pertamina is obliged to invest in specified facilities whether or not it is economical to do so. Sales revenue is projected to reach US $8 billion over the contract term.

The gas will be delivered from three production blocks –- the South Natuna Sea Block B, operated by Conoco Indonesia Inc Ltd; the Kakap Block, operated by Gulf Indonesia Resources; and Natuna Sea Block A, operated by Premier Oil Natuna Sea Limited. The three production sharing contractors (PSC's) and their non-operating co-venturers act as the West Natuna Group (WNG). WNG invested US $1.5 billion to construct the West Natuna Transportation System, a 656-kilometer underwater pipeline system with six distinct parts and one of the longest underwater pipelines in the world. The pipeline has a current capacity of 700 million standard cubic feet per day with the capacity to expand to one billion standard cubic feet per day with additional gas compression.

South Sumatra to Singapore

Indonesia and Singapore concluded another gas sales agreement February 12, 2001 in which Pertamina committed to supply natural gas to Gas Supply Pte Ltd., a Singapore Power subsidiary, via a 500-kilometer pipeline that must be operational in 30 months. Under the terms of the 20-year contract, Pertamina will start selling gas to Singapore in mid-2003 at 150 million cubic feet per day (mmcfd) stepping up to 350 mmcfd by 2009. At current prices, the project will generate US $9 billion dollars in gas sales revenue over its 20-year life, while sales of associated condensate and liquefied petroleum gas (LPG) could bring in another US $4 billion. The gas will be supplied from three fields in South Sumatra -- the Jabung Block operated by Devon Energy Jabung Ltd., a subsidiary of Oklahoma-based Devon Energy Corporation, and the Corridor and South Jambi B Blocks, both operated by Gulf Resources. Talisman is partnered with Gulf in the Corridor Block and Devon is partner in the South Jambi B Block, while Amerada Hess and Kerr-McGee are partnered with Devon in the Jabung Block.

Pertamina and Petronas Sign Agreement

Pertamina President Baihaki Hakim signed a contract on March 28, 2001 with his Malaysian counterpart, state oil and gas company Petronas President Mohammad Hassan Marican, to deliver natural gas from the Block B PSC in the West Natuna sea to Malaysia. Under the deal, Pertamina will supply Petronas with a total of 1.5 trillion cubic feet (TCF) of natural gas over a 20-year period, generating approximately US $4 billion in gas sales revenue for the South Natuna Block B PSC operated by Conoco Indonesia Inc Ltd. Associated condensate, liquefied petroleum gas (LPG), and crude oil will bring another estimated $4 billion.

A subsea pipeline will deliver gas to the Petronas Carigali Duyong offshore gas facility by August 2002 at a rate of 100 million cubic feet per day, ramping up to a full volume of 250 mmcfd by 2007. Conoco Indonesia (40 percent), Japanese firm Inpex (35 percent), and Texaco (25 percent) are partnered in the Block B production sharing contract. Conoco and its partners will spend US $2.5 billion to develop Block B further by constructing major production platforms; a 96-kilometer subsea pipeline; a floating production, storage, and offtake (FPSO) vessel (LPG facility); and a floating storage and offtake vessel (FSO). (Note: South Natuna Block B has another 0.8 TCF of uncommitted gas reserves available for further exploitation in addition to the Petronas and SembCorp sales.)

On August 20, 2001, Conoco awarded engineering, procurement, construction, and installation contracts worth US $744 million for the FPSO unit and two wellhead platforms for the Belanak field. The $587 million FPSO contract went to PT Brown and Root Indonesia, and another $157 million dollar contract to PT J. Ray McDermott's yard in Batam to build the wellhead platforms, pipelines, and oil offloading buoy. McDermott's Batam yard, a Brown and Root subcontractor, will also be fabricating the FPSO topside facilites. When completed, the Belanak field will have two wellhead platforms, 38 wells, a floating storage and offloading unit for LPG, a gas export pipeline, and intrafield pipelines in addition to the FPSO unit. Belanak has approximately 550 billion cubic feet of gas and 100 million barrels of oil, condensate, and LPG. A company spokesman earlier said Conoco had finished construction of the moveable offshore gas production unit (MOGPU), "Hang Tuah," part of the West Natuna Transporation System that would process and deliver gas to Singapore.

Other Gas Projects and Discoveries

Peciko Gas Field

In April 2000, the Government officially inaugurated the operation of the first stage of the Peciko gas field development project, located offshore East Kalimantan. Developed over ten years with a US$560 million investment. the Peciko gas field entered the production stage in December 1999. TotalFinaElf Indonesie is now the largest gas supplier for LNG/LPG plants and has

supplanted ExxonMobil as Indonesia's largest gas producer.

Gas reserves at Peciko field combined with even larger reserves at the nearby Tunu field to bring certified proven commercial gas reserves in the Mahakam block to 24.4 TCF, an increase of 19.5 TCF or around 3.5 billion barrels of oil equivalent. TotalFinaElf, with 50 percent interest, is the operator under a PSC in partnership with Inpex of Japan. Production at Peciko started at a rate of around 100 million MMSCF/D in 1999 and exceeded 250 MMSCF/D in 2000. Peciko field increased TotalFinaElf's daily production to more than 840 MMSCF/D in 2000. At that time the company supplied 728 MMSCF/D the Bontang LNG plant's requirements.

Phase IV of TotalFinaElf's Tunu Development Project, which produces and delivers gas to the eighth gas liquefaction train (train "H") at Bontang, was completed in mid-1998.

Tangguh

BP's largest project in Indonesia is Tangguh, a world-class LNG project in Papua with proven natural gas reserves of 14.4 TCF and additional probable reserves of 3.9 TCF. Pertamina announced in July 2001 that it had given the Tangguh marketing lead to BP, a break from a tradition in which Pertamina did the marketing for Indonesia's two other LNG plants. This acknowledged BP's advantages in making a key sale to supply LNG to China. In March 2001, the China National Offshore Oil Corporation (CNOOC) announced that it would enter final negotiations to provide BP with a 30% stake in a planned US $600 million LNG receiving terminal in Guangdong province. Completion of the project will enable the Chinese to purchase some 3 million tons of LNG per year starting around 2005. BP is sticking with its schedule to finish the Tangguh LNG plant by the fourth quarter of 2005.

LNG plants have traditionally been developed as a complete package from production to sale, dubbed "trains." BP is breaking new ground with the Tangguh project, expressing a willingness to start construction on the plant even before all of its output has been sold. BP also announced on August 17, 2000 that it had placed an order for construction of two LNG ships with South Korea's Samsung Heavy Industries, with options to purchase a further three vessels. LNG ships in the past have only been built to support a specific LNG plant's output.

BP now has a stake in all three PSC blocks that will supply natural gas to the project: Wiriagar, Berau, and Muturi. BP announced July 6, 2001 that it had bought out the Muturi Block shares of Cairns Ltd, a subsidiary of Malaysia's Genting Berhad, for a lump sum of US $107 million and a deferred share of future profits from the Tangguh project. BP now has 45% in the Muturi Block with UK-based BG Exploration and Production holding 50% and Nissho Iwai the remaining 5%. BP (80%) and Kanematsu (20%) jointly own Wiriagar. BP owns another 48% stake in Berau, with Nippon Oil (17.1%) Kanematsu (12%), and Mitsubishi (22.9%) owning the rest. (Mitsubishi purchased its shares from Occidental Petroleum in July for US $480 million. According

to press reports, the purchase increased Mitsubishi's natural gas and crude oil reserves by a third.)

Timor Sea

Tokyo-based Inpex announced on December 8, 2000 that its Abadi-1 exploration well in the Timor Sea Masela Block flowed natural gas and condensate at a rate of 25 million cubic feet per day of natural gas and 260 barrels per day of condensate. This was the first such Indonesian discovery in the Timor Sea. Inpex acquired a 100% stake of the Masela block from Indonesia's state-run Pertamina in November 1998, and started test drilling from October 2000. Inpex said it would continue to evaluate data from the field to determine economic viability of commercial production.

While Inpex is an operator only in the Masela block, it has a substantial stake in Indonesia's oil and gas production. In East Kalimantan, Inpex has 50 percent of the Unocal-operated Attaka oil field and the TotalFinaElf-operated Peciko field, and shares in other fields supplying gas to the Bontang LNG plant. It has a 17.5 percent stake in the South Natuna Sea Block B Project, and holdings in the Offshore Northwest Java block and Offshore Southeast Sumatra block. Inpex is also a shareholder in ZOCA 91-12 and 91-01 in the Timor Gap Zone of Cooperation A through an Australian subsidiary.

Expanding Future Production

Indonesia has significant gas reserves but much of the gas is non-exportable. There is also a geographical mismatch between location of gas reserves and energy demand location. In addition to geographical constraints, other disincentives to developing Indonesia's gas resources include unattractive fiscal terms, long project lead time, and the lack of incentives to explore and exploit gas reserves. To address these problems, the GOI should follow through on a past commitment to accelerate the time it takes to discover and produce gas by instituting direct buyer/seller negotiations and by reducing red tape. The GOI has also proposed a reduction of its share in gas production sharing contracts.

With more competitive fiscal terms and a market-based pricing system, there would be an incentive to exploit more of Indonesia's natural gas reserves. Four key areas have been identified by the private sector to increase gas development in Indonesia:

- increase incentives to find and produce natural gas;
- promote private investment and ownership, as well as stability and cost recovery for those firms that invest in major gas facilities;
- encourage multi-buyer and multi-seller gas marketing; and
- establish incentives for domestic gas usage.

Domestic Gas Usage

The World Bank and the Asian Development Bank (ADB) have urged Indonesia to adopt a pricing regime more conducive to providing companies with an incentive to find and produce gas. If gas were able to

compete on price with alternative energy forms in the market place, the full value and potential of Indonesia's gas reserves would be realized. Without pricing changes, the domestic gas market is constrained by the economic terms for development, which do not provide exploration incentives, and producers are offered few incentives to develop gas fields too small to support LNG but large enough for domestic gas supplies. A second, major constraint is the absence of a predictable basis for forecasting the future value of gas, such as an indexed price formula. A final constraint has been the subsidy provided for alternative fuels.

Under the current system for determining gas prices, price in supply contracts is reached through negotiations on a field-by-field basis between Pertamina and individual producers after the discovery of the gas field. Prices are fixed for a designated supply for the duration of the contract. Hence, the producer price for gas is different for each PSC. Consumer prices are set on a cost-plus basis.

Domestic Gas Pricing
(Per MMBTU)

I. FUEL	
1. Fertilizer Plant	$1.00 – 2.00
2. Steel Industry	$2.00
3. Electricity	$2.45 - 3.00
4. Cement Industry	$2.70 - 3.00
5. Paper Industry	$1.30
6. Refinery	$1.49
7. Plywood	$0.97
8. City Gas	Rp 2,500 - 4,150
II. FEEDSTOCK	
1. Fertilizer	$1.00 – 2.00
2. Steel Industries	$0.65
3. Methanol Plant	$1.42 – 2.00

Electricity Projects

Electric power plants, mainly operated by state electricity company Perusahaan Listrik Negara (PLN) Persero, are the largest consumers of domestic gas. A large percentage of industrial users, however, continue to rely on GOI-subsidized diesel fuel for electricity supply. Introduction of a market mechanism for setting prices and allocating supply would encourage greater use of gas, especially for electricity generation.

In September 1997, as part of the effort to reduce budgetary outlays and contain the current account deficit, the GOI released Presidential Decree (PD) No. 39 listing projects being undertaken by or in conjunction with state-owned entities, including state electricity company PLN. The projects were divided into three categories: continued, postponed or under review. Under PD 39, the GOI postponed or placed under review 16 of the 26 independent power producer (IPP) private power projects. Of the ten power projects allowed to continue, only one gas-fired project, PT Energi Sengkang, was allowed to move forward.

PT Energi Sengkang (U.S. El Paso International, Australian Energy Equity and PT Trihasra Sarana Jaya Purnama) constructed a 135 megawatt combined-cycle gas plant in South Sulawesi which is currently generating power into PLN's South Sulawesi grid. Five other combined-cycle gas projects remain postponed -- Palembang Timur in South Sumatra; Pasuruan in East Java; Samarinda in East Kalimantan; Serpong in West Java; and Batakan in East Kalimantan.

In a related development, Arco (now BP) and Pertamina signed a Memorandum of Understanding on June 26, 1999 with PGN to supply 80-115 MMSCF/D of natural gas to PLN's 2X505 MW combined-cycle power plant at Tambak Lorok in Central Java. The gas will be supplied from BP's Kepondang Muriah gas field in Central Java, which has recoverable natural gas reserves of 600 BSCF over the life of the project. BP agreed to supply the gas for 15 years starting in 2003 when PLN will have converted the Tambak Lorok plant from diesel fuel to natural gas. BP will invest US $400 million in the construction of a 205-kilometer underwater gas transmission pipeline. On July 12, 2001 PLN and Pertamina signed a technical supply agreement for 160 billion SCF/day natural gas from the field.

Integrated Transmission System

The South Sumatra pipeline is part of a state gas company Perusahaan Gas Negara (PGN) plan for an integrated gas transmission pipeline system, known as the Integrated Transmission System (ITS). The ITS is scheduled (in four parts) to eventually link the islands of Sumatra, Java and Kalimantan via a 3,588-kilometer integrated gas pipeline. Reputed to be Southeast Asia's longest, the pipeline is being partially funded by the World Bank, ADB and other institutions. Scheduled to be completed in 2010, PGN's network will flow 2.2 BCFD of natural gas.

PART ONE: GRISSIK/DURI PIPELINE: With a total cost of US $231.7 million, phase one became operational in October 1998. The 544kilometer Grissik/Duri gas transmission pipeline transports 310 MMSCF/D of natural gas from Gulf Indonesia Resources' fields in South Sumatra, known as the "Corridor Block." The project will supply Caltex's Duri Steam Flood Project in Central Sumatra for 15 years. Gulf Indonesia Resources is the gas producer, Caltex is the gas buyer and PGN is the owner of the pipeline network. A consortium of five companies led by Mannesmann of Germany completed the construction work. In March 1998, Nova Gas International Ltd. (NGI), a Canadian company, signed a two-year working contract valued at US $2.26 million with PGN. The contract covers gas pipeline operation and maintenance and related services for the Grissik-Duri gas transmission pipeline.

The Grissik/Duri pipeline project is the first part of a 850-kilometer gas transmission pipeline to link South Sumatra to Singapore. Phase two, which covers the 330-kilometer Sakernan (Jambi) to Singapore leg by way of Batam Island is described at the beginning of this chapter. Phase three, the 150-kilometer looping line from Grissik to Sakernan, is projected to cost close to $100 million.

PROJECT II: SOUTH SUMATRA–WEST JAVA PIPELINE: The first phase is the 174-kilometer West Java distribution pipeline; the second is the 370-kilometer Pagardewa (South Sumatra) to Cilegon (West Java); and the third is the 180-kilometer pipeline from Gulf Indonesia Resources' contract area in South Sumatra to Pagardewa.

The press reported that Pertamina and PGN signed a heads of agreement on

September 13, 2001 for the supply of natural gas from South Sumatra to the industrial area of West Java, with the first delivery of gas expected in the first quarter of 2005. Under the agreement, Pertamina committed to invest US $500 million to develop its 22 gas fields in Prabamulih, which have a potential to produce 50 MMCFD from a gas reserve of 3.8 TCF. In return, PGN will construct a 640-kilometer gas pipeline to deliver the gas to consumers in West Java.

PROJECT III: EAST KALIMANTAN-JAVA: The most ambitious of the four projects, the 1,100-kilometer East Kalimantan-Java pipeline includes: phase one, the 600-kilometer Samarinda (Bontang)-Balikpapan-Banjarmasin (South Kalimantan) pipeline; and phase two, the 500-kilometer Banjarmasin-Surabaya (East Java) pipeline. The project will transport about 700 MMSCF/D of natural gas. PGN plans to begin the project in 2005.

PROJECT IV: EAST/WEST AVA: This project consists of two phases, the 292-kilometer Cirebon (West Java) to Semarang (Central Java) pipeline and the 388-kilometer Semarang to Surabaya link. The project will transport about 700 MMSCF/D of natural gas and is projected for implementation in the 2004-2007 timeframe.