

Overview

Indonesia is an archipelagic country consists of 17,508 islands stretching from latitude of 06°08' N to 11°15' S, and longitude of 94°45' E to 141°05' E. As Indonesia is located at the equator, its climate is tropical and therefore Indonesia only has two seasons namely dry season (June-September) and rainy season (December-March). Meanwhile, in April to May and October to November the climate is in monsoon which is the transition from one type of climate to another.

► Socio-economic Background

Based on the national population census, which was held in 1990, Indonesia is inhabited by 179.4 million people; this means that in the period of 1980 to 1990, the annual population growth rate was 1.98%. In the last decade (1990-2000), the annual population growth rate was a bit smaller around 1.6%; this means that the population in the year 2000 was around 207 million. If the rate will still be the same, in the year 2030, the population in Indonesia is projected to be more than 300 million.

In the year 1997, Indonesia was hit by the Asian economic crisis which resulted in an increased number of poor people (almost 100 million people –which is about half of the population- living in poverty). Those people living in poverty have very limited, if any, access to any infrastructure and services, including energy. As the population is not distributed well throughout Indonesia where more than 50% live in Java with an area not more than 7% of the Indonesia's total land, the development was focused in this area. This has increased the disparity both economic and social.

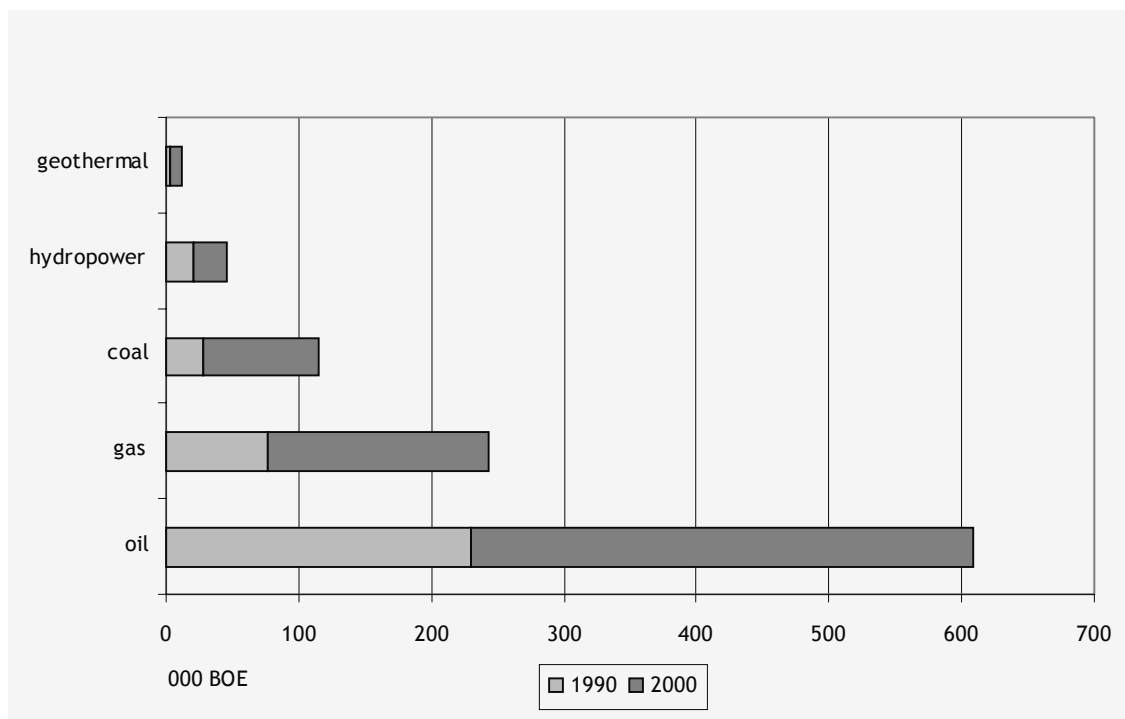
Recently, Indonesia's economic growth slowed modestly in 2001 in response to the global economic slowdown, which reduced demand for the country's exports. Indonesia's real gross domestic product (GDP) grew at a rate of 3.1% in 2001, down from 4.8% in 2000. Real GDP growth is forecast at 3.5% for 2002.¹

Indonesia is not an energy-efficient country. During the last three decades, the energy intensity to economy was ranging from 1.04 to 1.35 ², much higher compared to those of industrialised countries which were 0.55 to 0.65. The share of the energy sector to Indonesia export is also declining.

¹ URL: <http://www.eia.doe.gov/emeu/cabs/indonesia.html>

² Directorate General of Oil and Gas, Ministry of Energy and Mineral Resources. *Mining and Energy Yearbook of Indonesia*. Jakarta, 1998

► Energy Background



source: <http://www.dilpe.go.id/statistik>

Figure 1. Primary Energy Consumption in Indonesia

Oil sector

The current proven oil reserve in Indonesia is around 5 billion barrels. This number represents a 14% decline in proven reserves since 1994. The decline can be explained as crude oil production had ranged between 1.3 and 1.4 million barrels per day (bbl/d) during the last decade of 20th century. In the year 2001, Indonesian crude oil production averaged about 1.22 million bbl/d, which is lower than the rate in 1990-2000. The decrease in 2001 was due mainly to the natural decline of aging oil fields.

The national oil production during the 1990s was relatively flat as smaller fields have helped compensate for declines at many of the country's mature oil fields. In order to meet its goal of increasing production, Indonesia has signed new oil exploration contracts, which are nine new production sharing contracts (PSCs) as well as its plans to offer 17 new blocks in 2002.

To optimise the oil sector development in Indonesia, the liberalisation of downstream oil and gas sector has been under discussion for several years. The new bill on oil and gas sector was passed in October 2001. The bill will remove the monopoly of Pertamina's on upstream oil development within two years, while its monopoly on the distribution side is to be terminated within four years.

The role of Pertamina in awarding and supervising the PSCs will be taken over by the Ministry of Mines and Energy. Subsidies for domestic petroleum products consumption have been reduced to decrease the government's budget deficit and restrain increases in

domestic consumption. There is one concern of foreign oil companies, which is the granting of a limited authority to regional governments to tax oil companies' profits.

For the downstream side, Indonesia has eight refineries with total capacity of 992,745 bbl/d. A new refinery is now under consideration to be built in South Sulawesi as an export-oriented refinery.

Natural Gas

The proven reserves of natural gas in Indonesia is 92.5 trillion cubic feet (Tcf) which is located mostly in North Sumatra, East Kalimantan, offshore Java, Papua and Natuna. Indonesia is the world's largest exporter of liquefied natural gas (LNG), yet it still relies on oil to supply about 60% of its primary energy demand and around three-quarters of its final energy demand. There has been effort to shift towards using natural gas resources, yet the infrastructure for distribution still is not extensive.

Coal

Similar to oil and gas reserves, Indonesia has 5.75 billion short tons of recoverable coal reserves. Of those reserves 85% is lignite and 15% is anthracite. Roughly two-thirds of the coal reserves is in Sumatra and the rest are in Kalimantan, West Java, and Sulawesi. The export of coal in 1999 was 59.2 million short tons (Mmst), or about 83% of total coal production. The major destinations of these exports are Japan, South Korea, and Taiwan. In the next five years, Indonesia plans to double its coal production. These exports are destined for East Asia and India. The new capacity will come primarily from private mines.

Domestically, coal is being used for power generation and industry. There was an effort to utilize more coal as briquette for households use, but no significant positive progress until now. The share of coal in the primary energy-mix in Indonesia is ranging from 20 to 25% in the last twenty years, while its share in the final energy-mix is less than 10% mostly in industries.³

Renewable energy

In the last few years, renewable energy became more popular in the energy sector development in Indonesia. There are two basic reasons for this, one is the economic condition that is not improving yet and the other is the environmental issue. Indonesia has abundant resources of renewable energy, yet only around 6% that has been developed and utilised. Table 2 (next page) shows the situation of the renewable energy sector in Indonesia.

³ <http://www.djpe.go.id/statistik>

Table 2. Renewable Energy Potential and Utilisation in Indonesia

Type of resources	Potential (MW)	Installed Capacity (MW)	Share of Installed Capacity (%)	Share of RE being Utilised
Geothermal	20,000	812	69.2	4.06
Microhydro	459	54	4.6	11.76
Solar Radiation	4.5 kWh/m ² /day	5	0.42	
Wind Energy	448	0.5	0.05	
Biomass	50,000	302	25.73	0.6

Source: Sumiarso, L. Government Policy on New and Renewable Energy in Indonesia. August 2001.

The very limited utilisation is heavily influenced by the discouraging environment especially financial mechanism such as subsidy for fossil fuels and luxury tax applied for imported renewable energy equipments. However, there are also several community-based renewable energy programs –the micro hydro based- that have been successfully implemented and even able to sell the generated electricity to PT. PLN (Persero), the national electricity company. However, the utilisation of renewable energy resources for non-electricity generation is still very limited.

Electricity generation

Up to the year 2000, total installed capacity in Indonesia is 39.5 GW of which 56% (20.76 GW) owned by PT. PLN (Persero). About three-quarter of this installed capacity is located in the region of Jawa-Bali with total area less than 10% of Indonesia. Almost 84% of generators in Indonesia are based on fossil fuels, namely coal, oil and gas. Hydropower –macro scale that uses dam- contributes 14% to the system and geothermal –the only resources considered as renewable- contributes only 2%.⁴

Around 59% of households in the island of Jawa are connected to the national electricity grid. This number is much smaller for the rest of the country that is 36%. In national level, number of households connected to the national grid is 58%. This is also the case for rural households, only less than 67.5% has been connected.⁵

⁴ PT. PLN (Persero). *Statistik PLN 2000*.

⁵ *ibid*

► **Climate Change and Environmental Background**

Indonesia has ratified the UNFCCC in the year 1996, Indonesia has even signed the Kyoto Protocol, yet its ratification is another big question. In general, the air pollution level in the urban area is already at alarming levels and this mainly comes from the transportation sector.

Energy consumption in transportation sector has increased as much as 8% annually, and this resulted in an increase of even higher number for hydrocarbon (HC), nitrogen oxides (NOx) and carbon monoxides (CO). Other sectors also contribute in a modest amount of air pollutants.

During the last decades, the development activities in Indonesia have changed the Indonesia's status from net sink of greenhouse gases to net emitter of greenhouse gases. The major reasons for this are the increased of energy use, and the land-use changes such as deforestation. Table 3 (next page) describes the total emission by sector and gas in 1994.

Table 3. Indonesia's GHGs inventory, 1994

Sources and Sinks Categories	Uptake (Gg)	Emission (Gg)		
	CO ₂	CO ₂	CH ₄	N ₂ O
I. Energy (Fuel Combustion and Fugitive)		373,608.71	2,395.73	5.72
FUEL COMBUSTION		170,016.31	357.56	5.72
1. Energy and transformation industries		50,702.24	0.77	0.28
2. Industry		50,014.38	2.29	0.23
3. Transportation		47,047.16	7.49	0.44
4. Small combustion in residential and commercial		22,252.5	347.01	4.77
FUGITIVE FUEL EMISSIONS		203,592.40	2,038.17	
1. Solid Fuels		17,814.20	20.40	
2. Oil and Natural Gas		185,778.20	2,017.77	
II. Industrial Processes		19,120.00	0.51	0.01
III. Agriculture			3,243.84	52.86
1. Livestock			947.21	0.00
2. Rice field			2,280.90	
3. Agricultural soil				52.34
4. Prescribed burning savanna				
5. Agricultural residues			15.73	0.52
IV. Land Use Change and Forestry	403,846.00	559,471.00	367.00	2.52
1. Forest and other woody biomass stock changes	334,239.00	198,994.00		
2. Forest Conversion		303,237.00		
3. Abandoned Land	69,607.00			
4. Forest Fire		57,240.00		
V. Waste/Landfill			402.00	
Total	403,846.00	952,199.71	6,409.08	61.11

Source: Indonesia: First National Communication to UNFCCC (1999)

In general, energy plays a big role in the greenhouse gases emissions in Indonesia though it is smaller than the activities related to land use changes. As party to the UNFCCC, Indonesia realises its role in the "common but differentiated responsibilities". This can be seen in some voluntary actions being undertaken, such as activities implemented jointly (AIJ) for renewable energy as well as some energy efficiency measures which are not directly aiming to reduce GHGs. Currently, some projects are being prepared to be CDM-able projects –projects that can be recognized as clean development mechanism projects.