

# 4. INDONESIA

## 4.1 Introduction

*Owing to increasing energy demand in Indonesia, growth in CO<sub>2</sub> emissions from energy sector between 2000 and 2010 is estimated to average 6.5% per year.*

Indonesia is the largest ASEAN (Association of South-East Asian Nations) country with 218 million people and rich natural resources (fossil fuels, forests and ocean resources). It is the fourth most populous country in the world and is a member of OPEC. The Indonesian economy has been gradually recovering since the Asian economic crisis in 1997, but it still remains weak with an annual growth rate of 5.1% (2004) which is inadequate to recover to the level prior to 1997. Indonesia currently has proven oil reserves of 4.7 billion barrels, down 13% since 1994. In 2003, crude oil production averaged 1.02 million barrels per day (bbl/d) as against its OPEC production quota of 1.22 million bbl/d. (EIA 2004).

Recently, Indonesia became a net oil importing country. Owing to the decline in oil production, the government intends to change the primary energy source for electricity from oil to domestic coal.

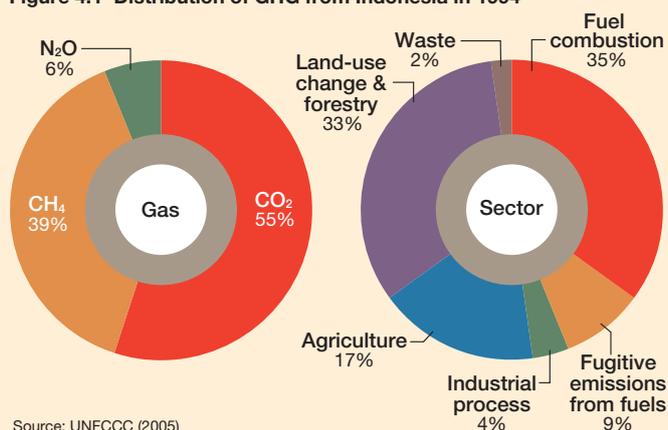
As a result of an increasing energy demand, the growth in CO<sub>2</sub> emissions from the energy sector between 2000 and 2010 is estimated to average 6.5% per year, greater than the primary energy growth rate of 6% per year. CO<sub>2</sub> emissions in 2010 are expected to double that of 2000 (Ministry of Energy and Mineral Resources (MEMR) and Center Energy Information (CEI) 2002). Indonesia has second largest forest area in the world, which functions as one of the world's main "carbon sinks". However, deforestation, due to wildfire and human activities associated with shifting cultivation, has become a serious problem both in terms of GHG emissions and air pollution.

**Table 4.1 Key statistics for Indonesia**

Population (2004)	217.6 million	
Annual Population Growth (2004)	1.35%	
GDP (Current US\$) (2004)	US\$ 257.6 billion	
GDP per capita (2004)		
Current US\$ (2004)	US\$1,184	
Purchasing Power Parity (2004)	US\$3,583	
GNI per capita (Atlas Method) (2004)		
Current US\$ (2004)	US\$1,140	
Purchasing Power Parity (2004)	US\$3,460	
Annual GDP growth (2004)	5.10%	
Energy demand (2002)	156 million Mtoe	
Per capita energy consumption (2002)	736.89 kgoe	
Per capita electricity consumption (2002)	411.01 kWh	
Energy mix (2002)	Oil	36%
	Combustible, renewable and waste	27%
	Gas	21%
	Coal	12%
	Geothermal	3%
	Hydro	1%
GHG Emissions (1994)	343 million MtCO <sub>2</sub> e	
GHG Emissions per capita (2000)	2.40 MtCO <sub>2</sub> e	
CO <sub>2</sub> Emissions (1994)	189 million MtCO <sub>2</sub>	
CO <sub>2</sub> Emissions per capita (2000)	1.31 MtCO <sub>2</sub>	
CO <sub>2</sub> Emissions per GDP (2000)	1.63 kg/US\$	
Forest area	57.95 % of Land	

Sources: UNFCCC (2005g), World Bank (2005), IEA (2005)

**Figure 4.1 Distribution of GHG from Indonesia in 1994**



Source: UNFCCC (2005)

**Table 4.2 GHG emission trends and projections in energy sector in Indonesia (1995-2025)**

	1995	2005	2015	2025
CO <sub>2</sub> (Gg)	215,730	245,890	391,680	672,310
CH <sub>4</sub> (Gg)	2,399.9	2,700.3	2,714.9	2,753.7
N <sub>2</sub> O (Gg)	5.7	6.7	9.1	12.9

Source: MEMR/CEI (2002)

Of all GHGs, CO<sub>2</sub> (55.0%) and CH<sub>4</sub> (39.1%) dominate. Main sectors contributing to GHG emissions include fuel combustion and fugitive emissions from fuel (44%), and forest and agriculture (50%) (Fig. 4.1). In the energy sector, GHG emissions are projected to increase rapidly between 1995 and 2025. For example, CO<sub>2</sub> is projected to increase by more than three times by 2025 (Table. 4.2).

## 4.2 Major Domestic Climate Policies and International Contributions

Table 4.3 Selected domestic policies and measures for climate change

	Issue	Policies and Measures	Remarks
M I T I G A T I O N	Energy efficiency improvement	<ul style="list-style-type: none"> <li>• Reduction of fuel subsidies and fuel price restructuring</li> <li>• Methane recovery from landfill</li> </ul>	
	Promotion of renewable energy	<ul style="list-style-type: none"> <li>• Development of geothermal and hydro power</li> <li>• Off-grid renewable power (solar, micro hydro, etc) development in rural areas</li> </ul>	Electricity Law was rejected by the Constitutional Court.
	Transportation	<ul style="list-style-type: none"> <li>• Integration of public transport system in urban area</li> <li>• Registration for vehicle emission control and use of clean fuel</li> </ul>	Clean air policy
	Carbon sequestration	<ul style="list-style-type: none"> <li>• Prevention of illegal logging</li> <li>• Community-based forest management</li> </ul>	Most of forests are managed by local governments.
	Other initiatives	<ul style="list-style-type: none"> <li>• Improvement of irrigation system on rice field</li> </ul>	
A D A P T A T I O N	Natural resources management	<ul style="list-style-type: none"> <li>• Soil and water conservation measures</li> <li>• Water management Structure Adjustment Programme (WatSAL)</li> <li>• Integration of water management in irrigation, municipal water supply and drainage system</li> </ul>	
	Infrastructure management	<ul style="list-style-type: none"> <li>• Coastal rehabilitation</li> <li>• Upgrade of ports</li> <li>• Flood control system</li> </ul>	Some measures are supported by ODA.
	Other initiatives	<ul style="list-style-type: none"> <li>• Preparation of early warning system for coastal disasters</li> <li>• Food diversification</li> </ul>	

Sources: UNFCCC (2005g), Government of Indonesia (2005)

### 4.2.1 Mitigation policies

In developing policies to combat climate change, Indonesia identified three basic principles: (1) the response strategy cannot be separated from long-term national development strategy (2) the principle of equity and justice must guide the process of anticipating and assessing impact, and (3) net GHG emissions must be reduced without hampering the national development objectives.

Policies in the energy sector, for example, primarily target intensification, diversification and the conservation of energy sources.

Likewise, as methane emissions in the agriculture sector are mainly due to inefficient practices, such as over-irrigation, misuse of fertilisers and poor livestock feeding practices, the focus is to promote improved practices, including water and fertiliser management in paddy fields. In the case of the forestry sector, Indonesia undertook policies such as the prevention of forest fires, the promotion of low impact and sustainable logging, reforestation of damaged forests and development of parks and urban forest.

**Indonesia identified three basic principles to deal with climate change depending on its national circumstances.**

#### **4.2.2 Adaptation initiatives**

Whether intended or not, Indonesia has taken adaptation measures in several sectors, including water resource management, agriculture, coastal defence, damage control for extreme weather events and health care. However, these measures and policies need to be reinforced further to cope with the future impacts of climate change.

#### **4.2.3 International contributions**

Indonesia ratified UNFCCC in August 1994 and the Kyoto Protocol in December 2004. Indonesia hosts the Secretariat of ASEAN Climate Change Initiative which aims to promote information exchange and sharing among government officers and experts of member countries. The Secretariat is currently exploring how to internalise post-2012 issues in formulating ASEAN Climate Initiative. Indonesia is also planning to host MOP3 in 2007. Indonesia's involvement in international negotiations has been limited so far, but, it is expected to take an important role in future.

### **4.3 Assessment of the Current Climate Regime from the Indonesian Perspective**

Nearly all participants recognised that the current climate regime characterized by the UNFCCC and its Kyoto Protocol as a first step to meet the challenge of climate change. They underscored, however, that several challenges remain with respect to restructuring of the climate regime in terms of modifications to market-based mechanisms, technology transfer process, and financial commitments by developed countries.

### **4.4 Major Concerns on the Future Climate Regime**

#### **4.4.1 Developmental and economic concerns**

The UNDP ranks Indonesia at a level of "medium human development", ranking 110 on the list of 183 countries (UNDP 2005a). Developmental issues, such as poverty alleviation are, therefore, the most important while environmental issues have not been a priority issue so far. However, various domestic actors have now begun to recognise the seriousness of climate change. The national mid-term development plan, for example, perceives climate change as one of major threats facing Indonesia. Participants noted that actions against climate change must be taken within the framework of sustainable development.

Indonesia is concerned about its energy security as it has now become a net oil-importer. Further, nearly 50% of its population does not have access to modern energy services. Indonesia is well endowed with renewable energy potential, especially geothermal energy, and has been pursuing the maximum use of renewable energy, but several obstacles, such as the high cost of technology, must be overcome to make renewable energy more competitive against fossil fuels. Inadequate attention to the issues of energy security and development in discussions on the future climate regime was noted as a major concern by Indonesian participants.

*The national mid-term development plan of Indonesia refers to climate change as one of major threats facing Indonesia.*

#### 4.4.2 Equity concerns

As in other countries, there are two types of equity concerns in Indonesia; domestic and international equity. As noted earlier, nearly 50% of the population live under the poverty line and are the most vulnerable to climate change even though their contribution to climate change is negligible. Participants noted that designing and implementing an equitable national development policy that adequately considers climate change concerns is a big challenge.

In terms of international equity, Indonesian participants noted that the principle of equal but differentiated responsibility should continue to be the basis of the future climate regime. Indonesia accounts for 1.9% of global GHG emissions and 3.7% of world's population. Indonesia's per capita carbon emissions grew significantly between 1980 and 2001, rising from 0.16 metric tons to 0.41 metric tons per person. Despite such rapid growth, per capita carbon emissions were still significantly lower than in industrialised countries or even in other Asian countries, such as the Republic of Korea (2.55), Taiwan (3.18), and Thailand (0.77). Indonesian participants were highly concerned about such wide differences and felt that a staged approach (principles similar to those of the multi-stage approach proposed by Berk and den Elzen 2001) would be appropriate for the participation of developing countries in the future climate regime.

*Indonesian stakeholders asserted that the principle of equal but differentiated responsibility should continue to be the basis of future climate regime.*

#### 4.4.3 Technology development and transfer-related concerns

There was a consensus that technology plays a key role in realising a low-carbon society in the future. Potential benefits of technology transfer were widely recognised, even though there was aspiration for self-reliance on technology development. Participants expressed dissatisfaction with the current pace of technology transfer under the current climate regime. Indeed, Indonesia ranks 102nd among 162 countries in technology diffusion and 60th among 72 countries in the Technology Achievement Index (UNDP 2001). Following the Asian economic crisis in 1997, opportunities for technology transfer to Indonesia considerably decreased with the decline of the foreign direct investment (FDI) and trade (Fig. 4.2), as the spill-over of technologies to developing countries usually occurs through trade and/or FDI (Thee 2001). Another measure to look at the impacts of technology transfer is energy intensity. Indonesia's energy consumption per dollar of GDP increased significantly during the 1980s and 1990s. In 1980, Indonesia consumed



Source: Investment Coordinating Board (BKPM) 2005.

5,760 Btu per \$1995-PPP. In 2001, however, energy intensity rose to 8,250 thousand Btu per \$1995-PPP. Inappropriate factory operations and poor maintenance of technical equipment due to the lack of a budget and technical capacity may have contributed to this. As Indonesia's energy intensity is fairly low compared with other Asian nations (EIA 2004), additional efforts to transfer climate-friendly technologies and capacity-building for appropriate operations and maintenance are necessary.

#### 4.4.4 Market-based mechanism-related concerns

One of the main concerns for Indonesia is how to receive financial assistance to implement mitigation and adaptation measures along with development programmes. The CDM is recognised as one of tools to receive finance. However, most participants in our consultations agreed that CDM implementation in Indonesia is far from satisfactory, as not even a single project was registered by the CDM-EB as of November 2005, although there were twenty-six candidate projects identified by National Strategy Study. In general, the complexity of CDM procedures and modalities, in particular, financial and investment additionality, was considered a major barrier for CDM implementation. Participants noted that such a concept does not necessarily fit into the on-going implementation of national or local policy.

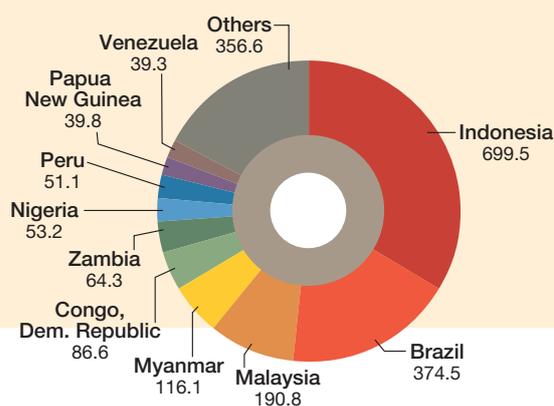
Some participants were concerned that the baseline setting for sector-based CDM is technically more challenging than for project-based CDM if and when sector-based CDM is approved in the future regime. Further, it was felt that the financing of sector-based CDM is more complicated than project-based CDM.

Participants noted that securing underlying finance for CDM projects is a major challenge in Indonesia. Unilateral CDM projects also face an investment problem in Indonesia since it is still difficult to convince the business sector to invest. The use of ODA to support the CDM was vehemently opposed by participants, as they feared that such a practice would divert resources from other developmental activities, such as health and education.

Participants were also concerned about the current rules of the CDM on the LULUCF with regard to ineligibility of deforestation avoidance for the CDM. They argued that the LULUCF contributes to one quarter of the world's CO<sub>2</sub> emissions (Fig. 4.3), that reduction

of emissions through avoidance of deforestation could partly solve the climate change, and that deforestation avoidance should be made eligible for the CDM.

Figure 4.3 GHG emissions from LULUCF in 2000 (MtC)



Source: World Resources Institute, 2005

**CDM implementation in Indonesia is far from satisfactory. Complexity of CDM procedures and modalities was considered a major barrier for CDM implementation.**

#### 4.4.5 Adaptation-related concerns

Participants noted that Indonesia would face serious problems in adaptation, given the fact that it has a large number of islands and extensive coastal regions which are projected to be adversely affected by rising sea levels associated with climate change. They were concerned that progress in adaptation both at the domestic and the international levels is inadequate. In particular, there were concerns about the amount of funds and their actual functions, since contributions to the Special Climate Change Fund (SCCF) and the LDC Fund have been very limited and the slow progress in CDM implementation made the Adaptation Fund nearly meaningless so far. Participants noted that guidelines for utilising adaptation funds were complicated and that it was unclear what types of adaptation activities could be financed with the Adaptation Fund.

### 4.5 Priorities for Restructuring the Climate Regime

Indonesian participants identified six elements for strengthening the climate regime beyond 2012, and noted that Indonesia would greatly benefit from such changes. They include the extension of the Kyoto Protocol, staged participation of developing countries, technology development, the inclusion of LULUCF, an explicit framework for adaptation and framing the climate agreement in developmental terms. The elements are discussed under separate headings that reflect Indonesia's concerns.

#### 4.5.1 Development and equity

The extension of the Kyoto Protocol is considered the first priority for discussions on the future climate regime. As the current regime is considered a good starting point for the reduction of GHG emissions worldwide, and such action is ultimately beneficial for developing countries, such as Indonesia, most participants agreed that the rejection of the Kyoto Protocol beyond 2012 would disappoint developing countries and it would become difficult to convince them to be involved in a future climate regime. They argued for more credible fixed targets for Annex I countries and the continuation of flexibility mechanisms, especially the CDM.

Insofar as the participation of developing countries in the future climate regime is concerned, Indonesian participants felt that staged participation on the basis of criteria for differentiation, such as equity, would be crucial. They also stressed that the new climate regime and its components must be framed in developmental terms in order to receive the wider attention of, and participation by, developing countries. Such a framework is considered to be beneficial to Indonesia, as climate change has significant implications for its sustainable development.

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#### 4.5.2 Technology transfer and capacity-building issues

Participants agreed that the development and deployment of climate-friendly technologies should be undertaken by developed countries more proactively than before, and that new provisions to facilitate transfer and localisation of technologies must be created. In this connection, the implementation of the Bali Strategic Plan for Technology Support and Capacity Building (UNEP 2005), which was developed pursuant to decision SS. VII/1 of 15 February 2002 of the UNEP Governing Council, was considered

crucial. Another idea was to create markets and incentives for new technologies in developing countries. It was also suggested that the private sector should be encouraged to facilitate technology transfer since most of technology transfer takes place with trade and/or FDI. Participants also noted the need for the creation of additional provisions in the new regime to facilitate South-South technology transfer.

***Participants strongly recommended streamlining of the CDM procedures in the future regime.***

#### **4.5.3 Market-based mechanisms and LULUCF**

Given the slow progress of CDM implementation in Indonesia, participants strongly recommended streamlining of the CDM procedures in the future regime through the relaxation of additionality, restructuring of administration at the CDM-EB, inclusion of sector-based or policy-based CDM, and making projects for avoidance of deforestation eligible for CDM. Most of these suggestions were already publicised internationally (Ott et al., 2004). Despite concerns on complexity of the baseline setting for sector-based CDM, some participants felt that it is a good option to promote the participation of developing countries in the future regime. In order to alleviate the concerns of potential diversion of ODA away from developmental activities, participants noted that a new special fund under ODA to support CDM could be created.

Since deforestation contributes to nearly 30% of world's GHG emissions, participants suggested the creation of a separate forum or an optional protocol to address deforestation. In addition, options for including LULUCF activities in the future climate regime must be explored (Joannieu Research 2005; Murdiyarto and Herawati 2005). Some participants supported the idea of creating a Forest Rehabilitation Fund proposed by Papua New Guinea at the seminar of governmental experts held in May 2005. The fund could be used for crediting measures to reduce GHG emissions from deforestation.

#### **4.5.4 Adaptation**

Considering the slow progress in implementing adaptation policies both domestically and internationally, participants recommended that future regime discussions must focus on optimal ways to support adaptation in developing countries. Many participants recognised the need for mainstreaming adaptation concerns in developmental policy. As ODA covers several sectors (agriculture, water resources, health, coastal resource management) that are directly impacted by climate change, participants recommended integration of adaptation concerns in ODA policies and programmes by developed countries (Bratasida and Sari 2005).

***Participants proposed the formulation of an insurance scheme along the lines of a scheme developed by the International Maritime Organisation (IMO) to cover oil spills.***

The need for improving the clarity of guidelines for using various adaptation funds was emphasised. Response to the creation of a separate protocol for the adaptation in the future climate regime was muted. Many participants felt that the creation of such a protocol would consume a lot of time and resources. Instead, they suggested that bilateral discussions among governments could be more effective. Some participants proposed the formulation of an insurance scheme along the lines of a scheme developed by the International Maritime Organisation (IMO) to cover oil spills. The proposed scheme is tied to the compliance system, i.e., those countries that fail to meet the Kyoto targets have to contribute to the insurance fund.

## 4.6 Epilogue

Indonesia is strongly concerned about development issues like energy security, forest conservation, and poverty alleviation. Such concerns force policy-makers to focus primarily on ways to maximise economic development. However, as economic development is tightly linked with GHG emissions, it is important that Indonesian policy-makers address climate issues within the framework of sustainable development through measures such as energy efficiency improvement. As most participants agreed that the CDM is an innovative mechanism that can promote sustainable development while reducing GHG emissions, Indonesian policy-makers should take steps to facilitate the CDM by streamlining procedures domestically and by proposing various ways to strengthen the CDM in both current and future climate regime. As LULUCF is another key to linking development issues and climate concerns in Indonesia, negotiators and policy-makers should identify new ways by which future climate regime discussions can address concerns on LULUCF more thoroughly than before. Likewise, as several regions and communities of Indonesia are extremely vulnerable to impacts of climate change, it is important to raise the policy profile of adaptation both nationally and internationally. As a host of the Secretariat of the ASEAN Climate Change Initiative, we can be optimistic that Indonesian policy-makers and negotiators will actively contribute to finding solutions to the problems associated with climate change.

*It is important that Indonesian policy-makers address climate issues within the framework of sustainable development through measures such as energy efficiency improvement.*