

Energy Security and Climate Change: An Indonesian Perspective

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Abstract

Dampak negatif perubahan iklim telah menimbulkan berbagai masalah bagi Indonesia yang sangat rentan terhadap perubahan global. Alasan utama perubahan iklim adalah kegiatan manusia sejak era industrialisasi yang meliputi penggunaan bahan bakar fosil, penebangan hutan dan pertanian. Emisi gas rumah kaca dari penggunaan bahan bakar fosil merupakan 70% dari total emisi karbondioksida, metan, dan dinitrooksida. Tulisan ini membahas perubahan iklim di Indonesia, hal yang perlu dilakukan untuk menanggulangnya, serta peran Indonesia dalam kebijakan perubahan iklim global. Pembahasannya mencakup ketahanan energi, serta penanggulangan dampak ekonomi dan lingkungan hidup.

Kata kunci: perubahan iklim, ketahanan energi, mitigasi, lingkungan

Introduction

Climate change is considered one of the most serious threats to sustainable development, with adverse effects expected on the environment, human health, food security, economic activity, natural resources and physical infrastructure.

Climate is generally defined as average weather, and as such, climate change and weather are intertwined. Observations can show that there

have been changes in weather, and it is the statistics of changes in weather over time that identify climate change.¹

¹ IPCC, 2007: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

According to the Intergovernmental Panel on Climate Change (IPCC), the effects of climate change have already been observed, and scientific findings indicate that precautionary and prompt action is necessary.

The average temperature of the earth's surface has risen by 0.74 degrees C since the late 1800s. It is expected to increase by another 1.8° C to 4° C by the year 2100. Furthermore, computer models that predict more frequent extreme weather events are in line with the recent severe storms, floods and droughts.²

The principal reason for global warming is hundreds of years of industrialization, encompassing the burning of fossil fuels, the cutting of forests, and the practice of certain farming methods. Green house gases occur naturally, but increasing quantities have pushed the global temperature to high levels and altering the climate.

Specifically, the global dependence on fossil fuels has led to the release of over 1100 GtCO₂ into the atmosphere since the mid-19th century. Currently, energy-related green house gases emissions, mainly from fossil fuel

combustion for heat supply, electricity generation and transport, account for around 70% of total emissions, which include carbon dioxide, methane and some traces of nitrous oxide.³

Higher temperatures cause the ocean volume to expand, and melting glaciers and ice caps add more water. Thus, the average sea level rose by 10 to 20 cm during the 20th century, and an additional increase of 18 to 59 cm is expected by the year 2100. With such conditions, the sea could overflow the heavily populated coastlines, cause the disappearance of some nations entirely, pollute freshwater supplies for billions of people, and provoke mass migrations.

Agricultural yields are expected to drop in most tropical and sub-tropical regions – and in temperate regions, too, if the temperature increase is more than a few degrees C. These changes could cause, at a minimum, disruptions in land use and food supply. And the range of diseases such as malaria may expand.⁴

² UNFCCC, *Feeling the Heat*. http://unfccc.int/essential_background/feeling_the_heat/items/2917.php, accessed 25 January 2008

³ IPCC, 2007: *Climate Change 2007: Mitigation. Contribution Of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA., 253.

⁴ UNFCCC. *Feeling the Heat*

As the majority of greenhouse gas emissions are energy-related, a central challenge to achieving stabilization will be to reconcile the projected growth in energy demand and the eventual need to reduce emissions. The task of environmental protection, however, can and must complement the task of socio-economic development, and the alleviation of poverty.

This paper attempts to describe the gist of climate change issues in Indonesia, actions needed to prevent the most severe impacts, and the country's role in global climate change policy. This discussion will cover the importance to ensure energy security, the ability to maintain global influence and the avoidance of economic and environmental damage.

Climate Change Disasters

Based on the occurrence of disasters recorded in OFDA/CRED International Disaster Database, the ten biggest disaster events in Indonesia over the period 1907 to 2007 occurred after 1990—most of these disasters were weather-related, particularly flooding, drought, forest fires and the increase of endemic diseases. These show that weather-related disasters have been occurring in increased frequency and intensity.

In general, global climate change models forecast that all of the Indo-

nesian region will face an increase of temperature (though at a lower rate than the subtropical region). Furthermore, in the Indonesian region south of the equator (such as Java and Bali) the beginning of the rainy season will retreat and the intensity of rainfall during the rainy season will increase; during the dry season the rainfall will decrease. Therefore the risk of flood and drought will increase.

The opposite is projected to occur for rainfall patterns north of equator. Sea levels are also changing. Research conducted in various locations in Indonesia shows that the sea level has risen 8 mm per year. If greenhouse gas emissions are not reduced, then it is expected that the sea level could rise 60 cm by the year 2070.⁵

During the period of 2003-2005 there were 1,429 disasters that occurred in Indonesia, 53.3% of these were related to hydro-meteorology. Flooding was the most frequent (34%), followed by landslide (16%).⁶

The United Nations Office for the Coordination of Humanitarian Affairs report indicates that Indonesia is one of the countries vulnerable to climate-change related disasters.

⁵ Republic of Indonesia, 2007, *National Action Plan Addressing Climate Change*, State Ministry of Environment, Jakarta, Indonesia, 4

⁶ Republic of Indonesia, 2007, *National Action Plan*, 4

The increase of sea surface temperature, particularly during the 1997 El Niño, has caused serious problems to coral reef ecosystems. Wetlands International reports that the 1997 El Niño destroyed about 18% of the coral reef ecosystem in Southeast Asia. Coral bleaching occurred in many places such as East Sumatra, Java, Bali and Lombok. In the Seribu islands about 90–95% of coral reefs at the depth of 25 m have experienced coral bleaching.⁷

In Indonesia, the increase of rainfall above normal level occur particularly during La Niña years (wet years). Dengue fever cases also increase significantly during these periods. The incidence of dengue fever in several big cities in Java has increased consistently, based on the 1992 to 2005 data gathered.

According to the Department of Marine Affairs and Fisheries, in just two years (2005-2007), Indonesia had lost 24 small islands: three in Nanggroe Aceh Darussalam, three in North Sumatra, three in Papua, five in Riau Islands, two in west Java, one in South Sulawesi, and seven in the region of Seribu Islands, Jakarta. Most of these islands were lost due to erosion, further worsened by commercial

mining activity.⁸

The diverse ecosystems in Indonesia influence the cultural characteristics of the community. Highland and lowland communities have different cultures, for example. These features are closely related to geographic and ecological characteristics. The fundamental changes to the micro climate pattern and the water availability will influence the social system and the patterns of interaction of the local community. The anticipation of climate change in various Indonesian regions should therefore become an important consideration in every step of the adaptation to and mitigation of climate change.

The Energy Predicament

Energy plays a vital role in our society, underpinning all areas of economic activity. The economic impact of supply disruptions can therefore be high and wide-ranging. This creates an incentive for governments to ensure that secure and reliable energy sources are readily available. A country's energy security policy refers to measures taken to minimize the risks of supply disruptions below a certain tolerable

⁷ Republic of Indonesia, *National Action Plan*, 5

⁸ Republic of Indonesia, 2007, *National Action Plan*, 6

level. Such measures ensure that a supply of energy is readily available and affordable to meet domestic demand. This therefore involves a quantity and a price parameter. But it also involves a time parameter: a sudden price hike will have very different effects on both society and the economy than a long-term price increase.⁹

Energy security may also be termed as that which ensures the availability of energy at all times in various forms, in sufficient quantities, and at affordable prices, without unacceptable or irreversible impacts on the environment. Naturally, these conditions must prevail over the long term if energy is to contribute to sustainable development. Energy security rests on two principles - using less energy to provide needed services, and having access to technologies that provide a diverse supply of reliable, affordable and environmentally sound energy.

Indonesian energy consumption has grown rapidly since 1970. In the period between 1970 and 2003, the growth of final energy consumption in Indonesia reached 7% p.a., while

the growth of global energy consumption was only 2% p.a. At that time energy conservation in Indonesia was not yet optimal and the development of renewable energy was still limited. Indonesian energy policy up to 2003 still placed fossil fuel as main energy source with 95% of the total energy, with renewable energy at only 5%.

Most of the increased energy demand is met using coal, the most greenhouse gas intensive fuel, and oil products for transport. By contrast, the use of gas (which has relatively low emissions) has stagnated since the financial crisis, and growth in renewable energies, such as geothermal, has been slow.

The trends is due to the fact that Indonesia has plentiful coal reserves that are easily accessible, and this is the cheapest fuel for electric power generation and a number of heavy industries. Gas is more profitable to export into booming markets in East Asia than it is when sold domestically. Investment in renewable energy is still limited due to high up-front expenditure and long payback periods.¹⁰

⁹ Blyth, William and Nicolas Lefèvre., 2004, *Energy Security and Climate Change Policy Interactions, An Assessment Framework*, IEA Information Paper, Paris, International Energy Agency, 13

¹⁰ Jotzo, Frank. Bali Climate Conference. Rich Countries should Pay Big Bucks to Reduce Emissions in the Developing World. *Inside Indonesia* 90: Oct-Dec 2007. <http://insideindonesia.org/content/view/1007/47>. Accessed 5 February 2008.

More coal expansion has been planned. The government's current answer to the looming electricity supply crisis is an 'acceleration program' for expansion of base-load capacity through coal-fired power plants. The plan is to install 10,000 MW of new coal-fired generating capacity by 2009/10 (existing on-grid capacity is around 23,000 MW), using low-grade coal. Although this plan will create more high-carbon infrastructure, in the interest of development Indonesia will implement the plan and safeguard it through environmental policies and measures.

As Indonesia's fossil fuel emissions account for a very small amount compared to the world's total emission; there are large opportunities to apply a lower-carbon style of living. They include: more efficient, energy-saving equipment; greater use of gas rather than oil or coal; expansion of renewable energy sources like geothermal and hydropower and, lately, large-scale biofuels production.¹¹

The concern of energy security is felt by governments and the public in Europe, in China, in India, in Japan, in United States and many other places around the world. The situation of every country is different but there is a common sense of insecurity. There are several fundamental causes

¹¹ Jotzo, Frank, *Inside Indonesia*

of the current sense of insecurity:¹²

- 1) The belief that resources are about to run out. There are opinions that oil is about to peak and that an inexorable growth in demand, particular from Asia, is going to create first a shortage, then a panic.
- 2) The concern that the resources which remain to be developed, particularly of oil and gas, are concentrated in areas which are closed to investment and held by countries who could use their market power against others in times of conflict and tension.
- 3) The growing concern about the credibility of the industry which has the task of meeting energy needs. There is the question whether the industry can be trusted to play its part and to do what is necessary in the interests of all citizens.
- 4) The growing concern about the impact of growing hydrocarbon consumption on the levels of carbon in the atmosphere and the sustainability of the world's climate.

¹² Browne, Lord, *Energy Security and Climate Change*, Speech delivered at the Columbia Business School, New York 17 November 2006, <http://www.bp.com/genericarticle.do?categoryId=98&contentId=7025859>, Accessed 8 February 2008.

National Action Plan

As a response to the existing climate change, which is expected to continue in the future, a National Action Plan has been developed by Indonesia to focus on mitigation and adaptation efforts. In essence, the mitigation is an effort to prevent the worsening of climate change, while adaptation is a technique to adjust the way of life and its means toward climate change. The activities of climate change mitigation and adaptation require strong enforcement of law and regulation, good governance, public awareness and intensive education.

The National Action Plan is aimed at guiding various institutions in carrying out a coordinated and integrated effort to tackle climate change. Climate change and its impacts are complex and dynamic problems. The National Action Plan will be continuously evaluated and improved periodically by various stakeholders.

As stated in the National Action Plan, the Mitigation and Adaptation Efforts in the Indonesian Energy sector are illustrated by the following policies and measures:¹³

- Act NO. 17/2006 concerning the change on Act No.10/1055 regard-

ing Custom Regulations that Give Free or Reduced Import Tax for Clean Technology Equipment

- Act No.30/2007 Concerning Energy
- Presidential Instruction No. 10/2005 concerning Energy Saving
- Presidential Instruction No. 1/2006 concerning Supply and Application of Biofuel as Alternative Fuel.
- Presidential regulation No. 5/2006 concerning National Energy Policy
- Department of Energy and Mineral Resource Ministerial Regulation No. 1122K/30/MEM/2002 regarding Small Scale Power Plant using Renewable Energy
- Department of Energy and Mineral Resource Ministerial Regulation No. 0002/2004 regarding the Policy on Renewable Energy Development and Energy Conservation (green energy development)
- Department of Energy and Mineral Resource Ministerial Regulation No. 0031/2005 concerning Guidance for the Implementation of Energy Saving.
- Department of Energy and Mineral Resource Ministerial Regulation No. 002/2006 regarding Medium Scale Power Plant with Renewable Energy.
- Monitoring of Air Pollution emission from the industry sector that has been conducted by State Ministry of Environment through

¹³ Republic of Indonesia, *National Action Plan*, 21.

Company Performance Evaluation Program (PROPER) and transportation sector through the Blue Sky program on motor vehicle emission testing.

- Rural Energy Self Sufficient Program for electric energy sources by using hydro power. Until 2006, almost all cities/districts in South Sulawesi have built more than 3000 units of solar energy power plant.
- Implementation of Cleaner Production Program and Energy Efficiency for energy intensive industries such as cement, steel, fertilizer, pulp and paper, textile, power plant etc.
- Regulate and Ban the import of environmentally unfriendly goods.
- State Ministry of Environment Minister Regulation No.7/2007 regarding static source emission standards for boilers.

Mitigation and Adaptation in Energy Sector

The purpose of mitigation is to reduce the emission rate of Green House Gases to a level that could be tolerated. Carbon dioxide gas is the largest component in the current global emission composition. Under the international convention, Indonesia is not yet obligated to reduce its green house gases emission;

however, because the country is vulnerable to climate change, it would necessary to conduct mitigation in the energy sector and LULUCF.

To measure the effectiveness of the implementation of various mitigation activities, the capacity building and the availability of institutional systems for conducting green house gas inventory must be examined. In addition, to support the mitigation efforts in the energy sector, and to achieve the optimal energy mix as planned, three main items must be accomplished:

- Energy diversification;
- Energy conservation; and
- Implementation of clean technology (such as Carbon Capture and Storage-CCS).

Considering the statements given above, there are solutions that should immediately be adopted as policies and measures in the energy sector, among others:¹⁴

1) Energy Diversification

- (a) Mapping the research and development of new and renewable energies that are appropriate with the Indonesian characteristic
- (b) Giving incentives to the development and utilization of new energy and renewable energy.

¹⁴ Republic of Indonesia, *National Action Plan*, 39

- (c) Encouraging more reasonable prices (commodities, technology and fuel) by calculating and including the social and environmental costs (internalizing the external cost) in the production and/or the selling price of that product and technology.
 - (d) Increasing the local role in renewable energy development.
 - (e) Encouraging the economic growth based on low pollution energy growth by increasing the new energy and renewable energy utilization, with gradual eradication of fossil fuel subsidies.
 - (f) Conducting decentralized energy systems.
 - (g) Building more infrastructures for low emission technology.
- 2) Energy Conservation
- (a) Dissemination of Information about energy conservation to the energy consumers.
 - (b) Incentive and disincentive through financial mechanisms
 - (c) Regulation to implement energy conservation to all user sectors and implementation of energy saving standards
 - (d) Reduce energy intensity, among other ways with the implementation of carbon labeling in the production of in-

dustry.

- (e) Utilize science and technology to develop light weight, functional, efficient and quality products.
- (f) Formulate and implement energy-saving building standards.

The implementation of the above programs will demand the participation of developed countries; the developing countries will need assistance in novel energy technology, as well as in financial matters. This may be achieved through programs such as the Clean Development Mechanism.

The International Energy Agency (IEA) analysis shows that a different outcome is possible when exploiting the immediate benefits of energy efficiency and deployment of known technologies. The past two G8 Summits have endorsed 16 IEA concrete recommendations covering all energy end-uses, such as buildings (40% of OECD energy use), transport (using 60% of world oil) and lighting. These initiatives alone could, if implemented globally, save 5.7 Gigatonnes of CO₂ by 2030 - nearly a quarter of what needed to be accomplished globally "The triple-win potential of energy efficiency - higher economic performance, higher energy security and less climate change - according to the IEA, leads to three recommendations:

*implement, implement, implement.*¹⁵

The success of implementing an adaptation agenda is determined by the nature of the adaptation framework whether it is classified into what is called an "adaptive reaction" (guided by the appearance of more modern changes on a climatic or a non climatic/social), or "anticipative adaptation" (based on a forecast of a critical limit from changes by the two variables mentioned above that can still be endured by a social ecological ability and local public institutions). It is important to also consider the possibilities of encoring a competitive distortion while in use of public resources that includes space for mitigation to one side with a demand for adaptation.

A national development with an adaptation agenda toward climate change will create a resilient development system for facing the present climate variability and anticipate the future impact of climate change. The Indonesian climate change adaptation agenda will be focused on the sectors

most vulnerable to climate change, namely: water resource, agriculture, fisheries, coastal and marine, infrastructure and settlement, health and forestry.

Indonesia and Global Climate Policy

The international political response to climate change began with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. The UNFCCC sets out a framework for action aimed at stabilizing atmospheric concentrations of greenhouse gases to avoid "dangerous anthropogenic interference" with the climate system. Controlled gases include methane, nitrous oxide and, in particular, carbon dioxide. The UNFCCC entered into force on 21 March 1994.

In December 1997, a Protocol to the UNFCCC that commits developed countries and countries in transition to a market economy to achieve quantified emission reduction targets was agreed. These countries, known under the UNFCCC as Annex I parties, agreed to reduce their overall emissions of six greenhouse gases by an average of 5% below 1990 levels between 2008-2012 (the first commitment period), with specific targets varying from country to

¹⁵ Tanaka, Nabuo, *Improving Energy Efficiency and Overcoming Challenges in the Power and Transport Sectors*, International Energy Agency Presentation at the Major Economies Meeting on Energy Security and Climate Change, Honolulu, 30-31 January 2008.

country. The Kyoto Protocol also established three flexible mechanisms to assist Annex I parties in meeting their national targets cost-effectively: an emissions trading system; joint implementation (JI) of emission reduction projects between Annex I parties; and the Clean Development Mechanism (CDM), which allows for emission reduction projects to be implemented in non-Annex I parties (developing countries). The Kyoto Protocol entered into force on 16 February 2005.¹⁶

Indonesia ratified the Convention in 1994, followed by the ratification of the Protocol in 2004.

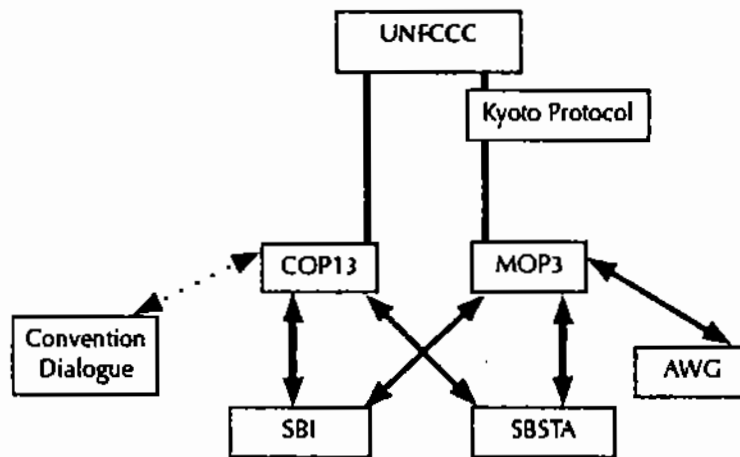
Each year, a Conference of Parties (COP) to the UNFCCC assesses progress in implementing the Convention and negotiates next steps. The Conference of the Parties serving as the Meeting of Parties (COP/MOP) to the Kyoto Protocol takes place at the same time, as do meetings of the UNFCCC's two subsidiary bodies.

The Subsidiary Body for Science and Technology Advice (SBSTA) and Subsidiary Body for Implementation (SBI) each have specific mandates and report to the COP and COP/MOP. The SBI considers issues relating to the implementation of the Convention and its Protocol, such as national communications of greenhouse gas emissions, funding and capacity building. The SBSTA addresses scientific, technological and methodological matters, such as technology transfer, impacts, vulnerability and adaptation to climate change, and methodological issues associated with emissions, such as preparing emissions inventories and addressing land use, land use change and forestry (LULUCF).¹⁷

From time to time, special working groups are established to address particular issues. The Ad Hoc Working Group (AWG) on Further Commitments for Annex I Parties under the Kyoto Protocol, which is currently constituted, is one such example:

¹⁶ International Institute for Sustainable Development, Summary of the Thirteenth, Conference of Parties to the UN Framework Convention on Climate Change and Third Meeting of Parties to the Kyoto Protocol: 3-15 December 2007, New York, *Earth Negotiations Bulletin*, Vol. 12 No. 354, 18 December 2007, 2.

¹⁷ Shanahan, Mike, *A Journalist's Guide to the Bali Climate Conference*, An IIED Briefing, London, International Institute for Environment and Development, December 2007, 2.



Source: Shanahan, Mike, *A Journalist's Guide to the Bali Climate Conference*, An IIED Briefing, London, International Institute for Environment and Development, December 2007,2.

In December 2007 Indonesia hosted The 13th Conference of Parties to the UN Framework Convention on Climate Change (COP 13) and the 3rd Meeting of Parties

to the Kyoto Protocol (CMP 3) that took place in Bali. The meetings were some of the most important to date, as negotiators discussed the successor to the Kyoto Protocol, whose first commitment period expires in 2012.

The events in Bali drew over 10,800 participants, including more than 3500 government officials, 5800 representatives of UN bodies and agencies, intergovernmental organizations and non-governmental organizations, and nearly 1500 accredited members of the media.

Meetings resulted in the adoption of 15 COP decisions and 13 COP/MOP decisions and the approval of a number of conclusions by the subsidiary bodies. These outcomes covered a wide range of topics, including finalizing the *Adaptation Fund under the Protocol*, a decision on *reducing emissions from deforestation in developing countries*, and outcomes on technology transfer, capacity building, the Kyoto Protocol's flexible mechanisms, the adverse effects of combating climate change, national communications, *financial and administrative matters*, and various methodological issues.¹⁸

¹⁸ International Institute for Sustainable Development, *Earth Negotiations Bulletin*, 1.

The main focus in Bali, however, was on long-term cooperation and the post-2012 period, when the Kyoto Protocol's first commitment period expires. These decisions provide guidance and direction for a series of meetings over the next two years in Europe under both the Convention and Protocol, with the aim of concluding a comprehensive framework for the post-2012 period at COP 15 and CMP 5 in Copenhagen, Denmark, in 2009.

Troika and European Union (EU) Package

As it is very difficult to reach agreement on a new climate change agreement, which can take over in 2012 it is important that countries aim for a shared vision and look to the road to Copenhagen as a coherent process. By pooling the efforts in a so-called Troika, three countries—Indonesia, Poland and Denmark who are host of COP13/CMP3, COP14/CMP4 and COP15/CMP5 respectively—to create considerable progress in the international climate change negotiations leading up to the important conference in Copenhagen, 2009.

Just recently the EU has agreed on a Climate Action and Renewable Energy Package. It is a bundle of legislative proposals intended to fight global warming and limit the increased

dependence of the European Union on imported energy. The package addresses renewable energies, including biofuels; how the overall EU greenhouse gas target will be shared between Member States; a revision of the EU Emissions Trading Scheme, and a directive proposal on how to implement carbon capture and storage at power generation plants.¹⁹

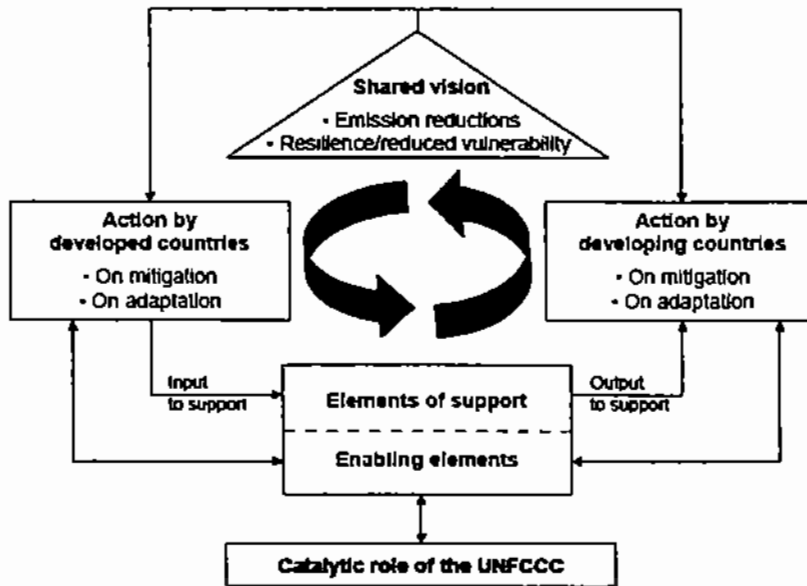
The way forward

According to Yvo de Boer, the Executive Secretary of UNFCCC, a truly effective long-term climate change strategy must be comprehensive. To face the climate change challenge, there is a need for a radical change in the world's economic future. But this clearly involves changes that carry plenty of opportunity.

It is a fact that the most vulnerable communities in the poorest countries — those who have contributed nothing to climate change— will be worst affected by its impacts.

The following chart sets out, in a simplified form, the major elements of a future agreement that are to be negotiated:

¹⁹ European Environment Agency, *Climate Action And Renewable Energy Package, A Major Step Forward*, <http://www.eea.europa.eu/highlights/energy-package>, Accessed 5 February 2008



Source: deBoer, Yvo. *The Bali Roadmap and the Way Forward*. Presentation at the Major Economies Meeting on Energy Security and Climate Change, Honolulu, 30-31 January 2008.

Discussion

Effective enhanced action to reduce emissions of greenhouse gases, or removing carbon dioxide from the atmosphere is central to the successful response to climate change.

According to the IPCC's Fourth Assessment Report, global emissions would need to peak within 10 to 15 years; if greenhouse gases concentrations are to be stabilized at levels not much higher than the current ones by the end of the twenty-first century, they would need to be reduced to well below half of what they were in 2000 no later than 2050,

The choice of development paths impacts the future fundamentally, as the investment decisions made today will commit the global community to a certain greenhouse gases emission path for decades to come. The challenge is to 'green' energy investment and economic growth in order not to lock economies into unsustainable paths for the next 30 to 50 years.

In the long-term we can only slow, stop and reverse greenhouse gas emissions if both developed and developing countries get into the act.

Considering that the developed countries are so far ahead of their

developing counterparts, and in the light of the principle of "common but differentiated responsibility and respective capability", it is only logical that developed countries should continue taking the lead in significantly reducing carbon emissions. Developing countries, on the other hand, should participate voluntarily in reducing their national greenhouse gas emissions according to their national circumstances.²⁰

Efforts to control climate change cannot be separated from economic development and poverty alleviation. People that have met their economic needs will be better placed to protect the environment. Because of this a development strategy that focuses on economic growth (*pro-growth*), poverty alleviation (*pro-poor*), and employment opportunities (*pro-job*), combined with environmental protection (*pro-environment*) creates the basis for sustainable development.

There is no single nation today that can solve climate change problem alone. Our planet in peril, the predicament that we are all in, must be coped with by all nations. □

²⁰ Witoelar, Rachmat, *Carbon Planning - Balancing Energy Security and Climate Change*, Keynote Speech at the International Investment Summit, Responding to the Energy Challenges, Jakarta, 5-7 November 2007.

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