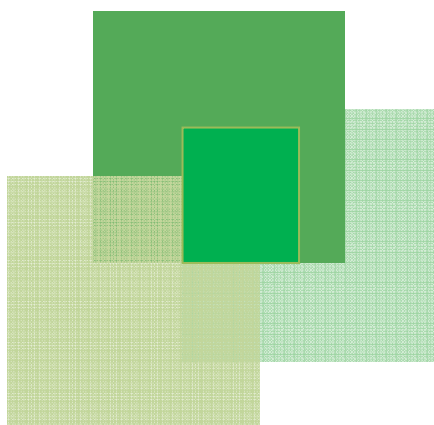




International
Labour
Office
Geneva



Skills for green jobs in Indonesia

Unedited background country study

Farida Zaituni
Arthur Ronald Samuel
Henriette Imelda
Olivia Tanujaya

ILO Skills and
Employability
Department

2010

Copyright © International Labour Organization 2010

First published 2010

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorization, on condition that the source is indicated. For rights of reproduction or translation, application should be made to ILO Publications (Rights and Permissions), International Labour Office, CH-1211 Geneva 22, Switzerland, or by email: pubdroit@ilo.org. The International Labour Office welcomes such applications.

Libraries, institutions and other users registered with reproduction rights organizations may make copies in accordance with the licences issued to them for this purpose. Visit <http://www.ifrro.org> to find the reproduction rights organization in your country.

ILO Cataloguing in Publication Data

Zaituni, Farida; Samuel, Arthur Ronald; Imelda, Henriette; Tanujaya, Olivia

Skills for green jobs in Indonesia : unedited background country study / Farida Zaituni, Arthur Ronald Samuel, Henriette Imelda, Olivia Tanujaya ; International Labour Office, Skills and Employability Department. - Geneva: ILO, 2010

1 v.

ISBN: 9789221239833 (web pdf)

International Labour Office; Skills and Employability Dept

skill / skill requirements / vocational training / training needs / green jobs / employment creation / climate change / environmental protection / Indonesia

13.02.2

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO publications and electronic products can be obtained through major booksellers or ILO local offices in many countries, or direct from ILO Publications, International Labour Office, CH-1211 Geneva 22, Switzerland. Catalogues or lists of new publications are available free of charge from the above address, or by email: pubvente@ilo.org

Visit our web site: <http://www.ilo.org/publns>

Foreword

The world finds itself in a slow recovery after the deepest recession since the Great Depression. The world is also coping with a host of environmental problems and the urgent need to reduce carbon emissions. A greener future also promises an enormous potential in a much needed employment growth. However, without suitable skills, this potential cannot be realized. Today, skills gaps are already recognized as a major bottleneck in a number of sectors, such as renewable energy, energy and resource efficiency, green building and retrofitting, environmental services, and green manufacturing. Training response measures are successful where they are coherent across policy domains, systemic and systematic, and targeted at disadvantaged groups. These training measures can only be effective if based on timely identification of skills needs. Effectiveness of training measures is decisive not only for the economic recovery but also for a longer-term sustainability agenda.

This report was produced in the framework of the project, ‘Skills for green jobs’. The project was implemented in cooperation between the International Labour Organization (ILO) and the European Centre for the Development of Vocational Training (Cedefop). The project identifies skills needed for greener economies with respect to structural shifts, and new, emerging and changing occupational profiles. The ‘Skills for green jobs’ study is embedded in the Green Jobs Initiative, a joint initiative of the United Nations Environment Programme (UNEP), the ILO, the International Employers Organization (IOE) and the International Trade Union Confederation (ITUC), to assess, analyze and promote the creation of decent jobs as a consequence of the needed environmental policies. The global study was jointly funded by the Skills and Employability Department of the ILO and the Green Jobs Initiative.

The following countries have been included in the study: the ILO covered Australia, Bangladesh, Brazil, China, Costa Rica, Egypt, India, Indonesia, the Republic of Korea, Mali, the Philippines, South Africa, Thailand, Uganda and the United States. In addition, Cedefop covered six European Union (EU) member States: Denmark, Estonia, France, Germany, Spain and the United Kingdom. The ILO global synthesis report,¹ which analyzes the situation in all 21 countries involved in the study, and the European synthesis report,² which covers the six EU countries, as well as all individual country reports, are available at: http://www.ilo.org/skills/what/projects/lang--en/WCMS_115959/index.htm (the ILO website) and <http://www.cedefop.europa.eu> (Cedefop website; look under *Skills Needs* theme). The unedited background country studies have been published in the electronic form in order to make them available quickly. The summaries are published as part of the synthesis reports.

The global project in the ILO was coordinated by the Skills and Employability Department and, in particular, benefited from comments and technical guidance by the team under the leadership of Olga Strietska-Ilina, Christine Hofmann, Mercedes Duran and Shinyoung Jeon. The ILO coordinating team would like to express great thanks to the authors of the report, Farida Zaituni, Arthur Ronald Samuel, Henriette Imelda and Olivia Tanujaya, for their background country research which contributed to the global study. Special thanks also go to the ILO regional and country field offices for the project support and the ILO colleagues who assisted research at national level.

Christine Evans-Klock
Director
Skills and Employability Department, ILO

¹ Strietska-Ilina, O.; Hofmann, C.; Duran Haro, M.; Jeon, S. (forthcoming 2010). *Skills for green jobs: A global view. Synthesis report based on 21 countries* (Geneva, ILO Skills and Employability Department).

² Cedefop. (forthcoming 2010). *Skills for green jobs: European synthesis report* (Luxembourg, Publications Office of the European Union).

Contents

Foreword.....	iii
Abstract.....	vii
Executive summary.....	ix
Abbreviations and acronyms.....	xiii
1. Introduction.....	1
1.1 Background.....	1
1.2 Methodologies.....	1
2. Policy context.....	2
2.1 Key challenges and priorities for the green economy.....	2
2.2 The response strategy.....	8
2.2.1 <i>General environmental strategy</i>	13
2.2.2 <i>Green response to the current economic crisis</i>	20
2.3 The skills development strategy in response to greening.....	21
3. Anticipation and provision of skills.....	23
3.1 Green structural change and (re)training needs.....	23
3.1.1 <i>Green restructuring and its impact on the labour market</i>	23
3.1.2 <i>Identification of (re)training needs</i>	25
3.1.3 <i>Skills response</i>	26
3.1.4 <i>Case studies of retraining</i>	26
3.2 New and changing skills needs.....	34
3.2.1 <i>New green collar occupations</i>	34
3.2.2 <i>Greening existing occupations</i>	36
3.2.3 <i>Identification of skill needs</i>	37
3.2.4 <i>Skills response</i>	37
3.2.5 <i>Case studies on new green collar occupations</i>	38
3.2.6 <i>Case studies on greening existing occupations</i>	45
4. Conclusions.....	48
4.1 Main 'greening' shifts in economies and labour markets.....	48
4.2 Skills implications and development.....	48
4.2.1 <i>Anticipation and identification of skill needs</i>	48
4.2.2 <i>Response policies and programmes</i>	48
4.2.3 <i>Effective delivery mechanisms</i>	48

5. Recommendations	49
5.1 Policy recommendations	49
5.2 Recommendations for education and training	50
5.3 Recommendations for further research and data collection	51
References and bibliography	53
Annex 1. List of key resource persons	55
Annex 2. Questionnaire	56

List of tables

Table 1. Economic growth of Indonesia by national expenses (per cent)	13
Table 2. Percentage of workers in Indonesia	25
Table 3. The main new sectors emerging as the result of greening economy	34
Table 4. New sectors which are moving towards greener practice as the result of greening economy	37
Table 5. Types of training at Indocement	40
Table 6. Positions at GBC Indonesia	47

List of figures

Figure 1. Projection of CO2 emissions scenario from energy sector up to 2025 by considering optimal mix energy scenarios (in million ton of CO2 emissions)	3
Figure 2. GHG emissions from LUCF sector (2000–2004)	4
Figure 3. CO2 emissions from energy sector (2000–2005)	5
Figure 4. Some APEC member countries energy production per capita	6
Figure 5. National GHG profile (2000–2005)	7
Figure 6. National Committee on Climate Change and Environment Structure	15
Figure 7. Indonesia's labour profile (2004–2009)	24
Figure 8. Astra's employees composition based on business divisions	27
Figure 9. Astra's employees composition based on educational background	28
Figure 10. The Astra Green Company Pyramid	29

Abstract³

Relevant skills for green jobs are the prerequisite to the transition to make a green economy occur. Today, skill gaps are already recognized as a major bottleneck in several sectors such as renewable energy, energy efficiency, buildings, manufacturing, agriculture and construction. The adoption and dissemination of clean technologies needs skills in its application, adaptation and maintenance. It is crucial for workers and entrepreneurs to rapidly adapt to changes in this regard, with consequences to environmental policies and/or climate change.

The objective of this study is to identify strategies related to skills development in Indonesia that may provide remedial measure of environmental degradation, climate change and global trends for green economies.

The study relied heavily on literature reviews for the majority of analysis, and in-depth interviews for several case studies presented in the study. The study concluded that many sectors are already affected by the movement towards greener economy. Some companies in these sectors, either affected by new environmental regulations or driven by profit or competitiveness motives, already have started to adjust to the new greening trend in the market. Skill development for qualified human resources and skilled personnel are crucially needed to achieve goals for green economies.

Farida Zaituni (lead)
Arthur Ronald Samuel
Henriette Imelda
Olivia Tanujaya

³ The report has been written as part of The Green Job Initiative - A joint initiative by the United Nations Environment Programme (UNEP), the International Labour Organization (ILO), the International Organization of Employers (IOE), and the International Trade Union Confederation (ITUC). The activities conducted and administered by the International Labour Organization (ILO) Headquarters in Geneva, as well as the Jakarta Office, was finalized on 1 December 2009. The authors are grateful for assistance from Raysa Rae.

Executive summary

Relevant skills for green jobs are the prerequisite to the transition to make a green economy occur. Today, skill gaps are already recognized as a major bottleneck in several sectors such as renewable energy, energy efficiency, buildings, manufacturing, agriculture and construction. It is crucial for workers and entrepreneurs to rapidly adapt to changes in this regard, with consequences to environmental policies or climate change. Skill development for qualified human resources and skilled personnel are crucially needed to achieve goals for green economies.

Indonesia, like the rest of the world, faces the challenges of climate change and environmental degradation, in which fossil fuel burning and changes in land use are the main sources of the challenges. Some significant impacts of climate change in Indonesia bring challenges to agriculture, air pollution, energy, shortage of clean water, etc.

The sectors which are most affected by climate change due to their high emissions of carbon dioxide (CO₂) and thus require mitigation efforts are:

1. Energy, with main challenges on:

- energy diversification;
- energy conservation;
- clean technology implementation.

2. Forestry, with main challenges on:

- mitigation on illegal logging;
- land and forest rehabilitation and conservation;
- restructuring of the forestry sector particularly of forest industries and accelerating the development of forest diversification in contributing to improve forest capacity in carbon sink enhancement;
- community empowerment for those who live in and surrounding the forests, their livelihood contribute for concern on climate change issues and adaptation capability with events related to climate.

3. Transportation, with main challenges on:

- promotion of cleaner fuel and cleaner technology;
- infrastructure improvement to provide more access to and from remote areas

In anticipating the greening economy from the provision of skills perspectives, there have been some changes also in the industries on their requirements of workers. For example, the ISO certificates - industries have given their workers training on ISOs, so they would understand how to apply ISO certificates and why to apply such certificates. Not only that, the birth of ISO also grew some ISO consultancy agencies that offer their services to industries. Therefore, it is obvious, that environmental issues have led industries and companies to restructure their organization (by adding new divisions, for instance) that automatically demanding new skills of workers. To cope with it, most of the study cases undertaken show that trainings are needed. The trainings can be done in two ways, in-house training (trainers are provided from the business itself) or trainings that are provided by other party. All trainings conducted are not always related to green issues. Usually, green issues training will be conducted in relation to Environment,

Health and Safety Department. But for other departments, other kinds of trainings most likely exist.

Considering the green jobs development in Indonesia, opportunities for new skills will surely increase due to the environmental issues that are developing rapidly these days. Especially that Indonesia is updating its policies by considering green issues. Indonesia's technology needs assessment has clearly addressed the needs to have trainings in order to increase workers' knowledge on, for instance, environmental sound technologies. A way to anticipate the opportunities will most likely be to improve basic skills of Indonesia's labour force such as higher level of formal education (high schools or vocational schools) and job trainings. In the case of on-the-job trainings, one must note that it is important to have a mechanism to evaluate and monitor the effectiveness of the training.

In general, government's policies on environment would improve with time and the introduced changes the government then would communicate to companies. The companies then would react to the changes, by communicating it to all levels in companies in form of trainings. Such case can be seen in the case study of Astra on retraining the existing workers to react on changes in government's policies. Green policies in Indonesia are not only considering companies; but also informal sectors such as agriculture and coastal group. The Sekolah Lapangan Iklim (Climate Field School) is one of the efforts of government to enable farmers adapt with climate change issues. Enabling farmers to 'read' the climate that they may know when to plant, will surely give them benefit and at the same time, preventing farmers from economy loss.

As the economy moves towards green production, new sectors emerge to answer the needs for green technology and green materials. These new sectors bring a new dimension to the labour market by adding new occupations or the new green collar occupations. Some sectors, such as environmental impact assessment consultancy or ISO 14000 consultancy, emerged because of new government regulations. Other sectors emerged because of business opportunities, such as energy efficiency or recycle sector.

Some sectors, such as retail, added green components due to market-driven factors, such as business competition. The increased public awareness on environmental issues encourages the retails sector to add green components in its products processing, to attract more consumers. Other sectors added green components because of application of greener standard by the government, such as retrofit and recycle of refrigerant.

The skill needs are mostly identified internally within the companies. Based on interviews conducted in the case studies, as the environmental issue is dynamic and progressive, skill needs is identified based on needs driven by changing in the market or in this case is the greening economy. Regarding the issue of skill improvement programmes, unfortunately, there is no systemic approach yet, conducted by neither by the government, academics nor non-governmental organizations to monitor the skills needed in the market that encourage regular updates to the companies. Current vocational school or vocational centers have not yet put focus on the green issues and opportunities resulted from the greening economy. However, some case studies showed that updates or capacity building were conducted by the companies themselves.

Several recommendation points are derived from the study, are as follows:

1. Creation a map of skills is a vital initial step as potential for skills upgrading. Government should develop with all stakeholders a strategy plan that supports and delivers the skill improvement for green sectors. The plan should be incorporated into these sectors development.

2. In order to increase number of green jobs and to green existing jobs, it is important to develop education and training systems for tools in developing competencies and skill qualifications for creations of green workers in future.
3. Provide sufficient resources and training of trainers (TOT), in government training centres which are responsible for capacity building so they can provide training in green sectors and their subsectors.
4. Pursue enhanced collaboration between ministries, as the task of providing necessary skills cannot be achieved by the Ministry of Labour alone.
5. Compiling a clear set of labour data on the green sectors.
6. While labour data is very limited on the new sector or new green collar jobs, it is recommended to conduct further studies to see the magnitude of these new green collar jobs in order to be able to develop strategic plans to build local capacities.
7. While this study can provide a general overview of several sectors, it is advisable to conduct follow up studies for specific sectors in order to be able to develop sector-specific strategic plan.

Abbreviations and acronyms

4C	Commitment, Compliance, Competence and Cleaner Production
6R	Refine, Reduce, Reuse, Recycle, Recovery, Retrieve energy
AFR	Alternative fuel raw material
ALGAS	Asia Least-cost Greenhouse Gas Abatement Strategy
APEC	Asia-Pacific Economic Cooperation
ATCS	Area Traffic Control System
BAU	Business-As-Usual
BPPT	Badan Pengkajian dan Penerapan Teknologi
CCS	Carbon capture and storage
CDM	Clean Development Mechanism
CDM EB	Clean Development Mechanism Executive Board
CELB	Center for Environmental Leadership in Business
CMIA	Carbon Markets and Investors Association
CO ₂	Carbon dioxide
CPEE	Cleaner Production and Energy Efficiency
DNA	Designated National Authority
E&P	Exploration and Production
ECRA	European Cement Research Academy
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment (AMDAL Analisa Mengenai Dampak Lingkungan)
EMS	Environmental Management Systems
ENSO	El Nino/Southern Oscillation
GBC	Green Building Council
GDP	Gross Domestic Product
GHG	Greenhouse gas
ICZM	Integrated coastal zone and marine management
IEA	International Energy Agency
ILO	International Labour Organization
IOE	International Organization of Employers
IPCC	Intergovernmental Panel on Climate Change
IPO	Initial public offering
ISBI	Indonesian Cement and Concrete Institute
ISO	International Standard for Organization

ITUC	International Trade Union Confederation
KLH	Kementrian Lingkungan Hidup (Ministry of Environment)
KPI	Key Performance Indicator
LUCF	Land Use Change and Forestry
LULUCF	Land Use, Land Use Change and Forestry
MPB	Mekanisme Pembangunan Bersih (CDM - Clean Development Mechanism)
MREP	Marine Resources Evaluation and Planning Programme
NGO	Non-governmental organization
PDF	Project Developer Forum
Permenlh	Peraturan Menteri Lingkungan Hidup (Minister of Environment Regulation)
PROPER	Program Penilaian Kinerja Perusahaan (Programme Assessment Rating Company Performance)
PT	Perseroan Terbatas
R&D	Research & Development
RAN	Rancangan Aksi Nasional (National Action Plan)
S1	Strata 1 degree
SHS	Solar Home System
SKKNI	Standar Kompetensi Kerja Nasional Indonesia (Indonesian National Work Competency)
SLI	Sekolah Lapang Iklim (Climate Field School)
SME	Small and Medium Entrepreneurs
SNI	Standar Nasional Indonesia (Indonesia's National Standard)
SRKLI	Standar an Registrasi Kompetensi Lingkungan Indonesia (Indonesian Standard and Registration for Environmental Competency)
TOT	Training of Trainers
UKL/UPL	Upaya Kelola Lingkungan/Upaya Pantau Lingkungan
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development

1. Introduction

1.1 Background

Technological change, globalization, ageing population and climate change will dramatically increase the pace of change in labour market and skill needs, for new and current jobs alike. The growing importance of sustainable development and the shift to a low-carbon economy will also require new skills and qualifications, offering great potential for creation of green jobs, but also implying structural changes and transformation of existing jobs.

The Green Job Initiative – a cooperative initiative by UNEP (United Nations Environment Programme), ILO (International Labour Organization), IOE (International Organization of Employers) and ITUC (International Trade Union Federation) - was launched to assess, analyze and promote the creation of decent employment opportunities as consequences of environmental policies.

Overcoming the global economic crisis is fully conditional on the availability of adequate skills, policies and capacities to prepare job opportunities for green economy requirements.

Relevant skills for green jobs are the prerequisite to the transition to make a green economy occur. Today, skill gaps are already recognized as a major bottleneck in several sectors such as renewable energy, energy efficiency, buildings, manufacturing, agriculture and construction. The adoption and dissemination of clean technologies requires skills in its application, adaptation and maintenance. It is crucial for workers and entrepreneurs to rapidly adapt to changes resulting from environmental policies or climate change.

The objective of this study is to identify the strategy related to skills development in Indonesia that may provide remedial measures to environmental degradation, climate change and global trends for green economies.

However, while conducting the study, there were several difficulties faced and research limitations that need to be taken into account. For some respondents, the Human Resources data which relates to the trainings, i.e. training needs, types of training, budget plan for training, etc. seems to be considered a strategic plan and information, which makes this confidential and cannot be disclosed to others. Meanwhile, for some respondents, this kind of data is not established yet and/or needs to be improved.

1.2 Methodologies

- Study on policies:
 - Policy context would rely heavily on literature and reports review methodology.
 - The Government of Indonesia has already identified challenges and priorities for the green economy as part of the national response to climate change adaptation and mitigation, which can be found in recent policy documents, such as the National Action Plan on Climate Change published by the Ministry of Environment in November 2007 and the *National Development Planning: Indonesia Responses to Climate Change* published by the National Planning Agency in July 2008 (BAPPENAS, 2008).
 - At the sectoral level, several Ministries such as the Ministry of Energy, Ministry of Finance, and Ministry of Forestry, have also developed policy responses in tackling the climate change problem and also dealing with the recent global economic crisis.

- Anticipation and provision of skills.

There are three components of the chapter: labour market trend assessment, skill need assessment and case studies. The labour trend assessment would be the baseline or portrait of the current condition. Skills need assessment would be a projection of what is needed in the greening economy. The skill assessment would distinguish between the following:

- new green occupations; and
- the greening of existing occupations.

Both assessments would be derived mainly from literature review, desk report review, in-depth interview with labour experts, company management representatives and/or Human Resources personnel, and also the case studies analysis.

The case studies would be based on empirical analysis of training needs assessment (illustrated by case studies) due to green structural changes based on the result of the baseline studies and as response to anticipated future employment. The case studies would also look at jobs in the new sectors emerged due to the transition to low carbon economies and also at evolving jobs due to greening economy

In-depth interview methodology would be the main tool for the case studies. Interviews were conducted with professionals whose skills are new skills or in needs of re-training or greening, policy makers in the targeted companies and/or Human Resources representatives and also when necessary with experts related to the case studies. For the complete list of respondents and resource-persons, see Annex 1.

2. Policy context

2.1 Key challenges and priorities for the green economy

Main challenges and priorities of Indonesia for mitigation and adaptation to climate change and environmental degradation

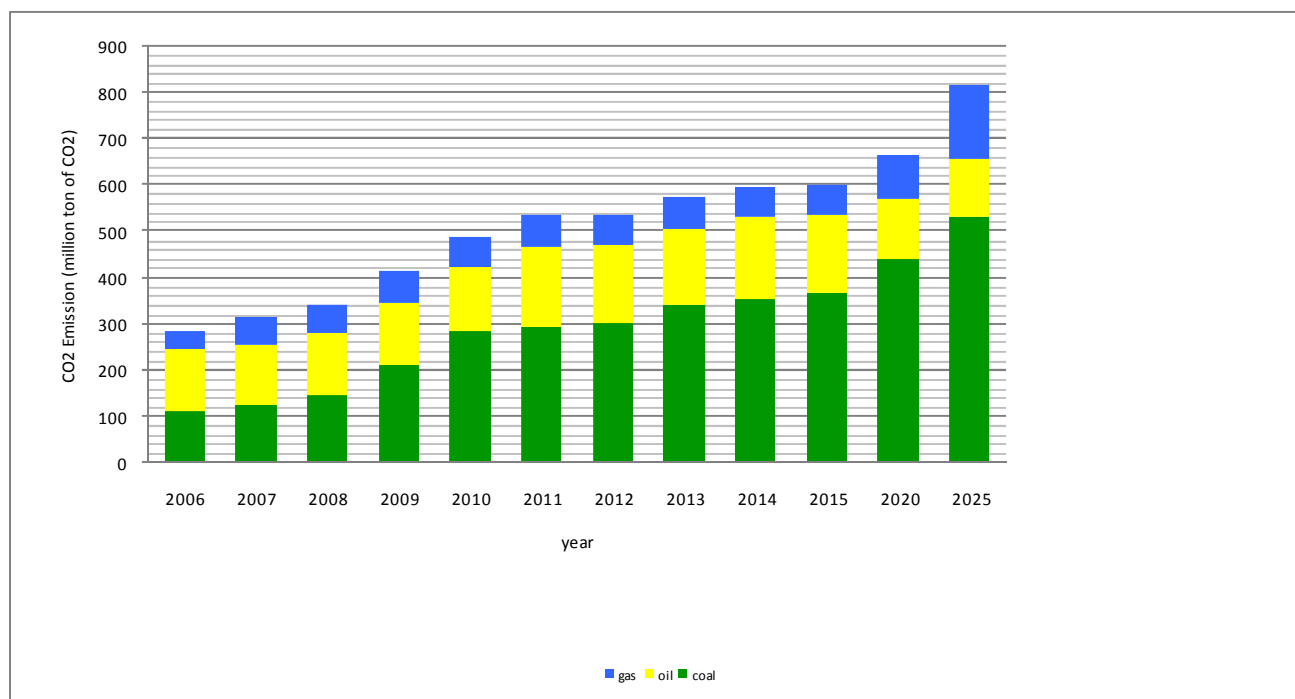
Indonesia like the rest of the world facing the challenges of climate change and environmental degradation, in which fossil fuel burning and changes on land use are some of the main sources of the challenges. Some significant impacts of climate change in Indonesia bring challenges to different fields such as agriculture, air pollution, energy, shortage of clean water, etc.

The sectors that affect climate change the most due to their high emissions of carbon dioxide and thus require mitigation efforts are as follows:

1. Energy

Energy sector in Indonesia contributed to 258.67 million ton of CO₂ emissions in 2003. In 2006, government released Presidential Decree No. 5 year 2006 regarding National Energy Policy. With the enforcement of the policy, it is expected there will be an increase in percentage of the use of renewable energies. The scenario of optimal mix energy predicted that if this policy is implemented, Indonesia would produce 816 million ton of CO₂ emissions by 2025 (or a drop by 10.5 per cent compared with the business as usual scenario). Thus if the optimal mix energy scenarios were combined with energy conservation and Carbon Capture and Storage (CCS) technology application, then the CO₂ emissions in 2025 expected to be reduced by 30 per cent (compared with business as usual scenario).

Figure 1. Projection of CO2 emissions scenario from energy sector up to 2025 by considering optimal mix energy scenarios (in million ton of CO2 emissions)



Source: Ministry of Energy and Mineral Resources

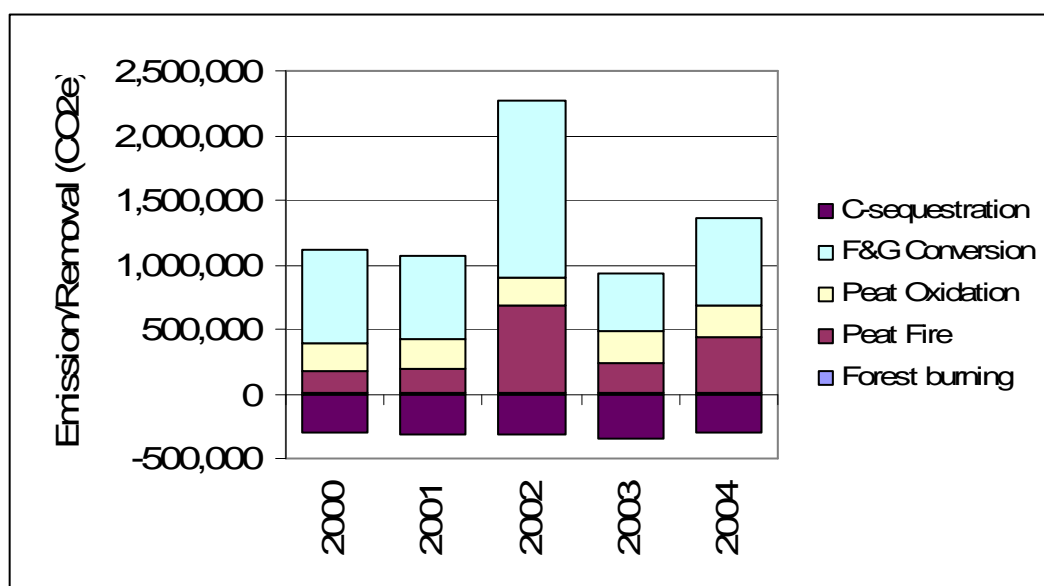
In order to support mitigation effort in the energy sector and to reach level of planned mix energy, the following considerations must be taken into account:

- energy diversification
- energy conservation
- clean technology implementation (such as CCS).

These efforts for mitigation in energy sector shall be a substantial element in creation of green economies. If Indonesia succeeds in conducting energy diversification, energy conservation and develops clean technology, it will help for greater efficiency in industry, power, manufacturing and other energy sectors which would allow allocation of more funding for education, social care, development in rural areas, and programme to improve public welfare.

2. Land use, land-use change and forestry (LULUCF)

Figure 2. GHG emissions from LUCF sector (2000–2004)



Source: Indonesia Second National Communication (SNC) (2009)

By category in the sector land-use change and forestry, the major sources of emissions are from forest burning and grassland conversion, followed by peat fires and peat oxidation. During the period 2005-2009, mitigation efforts in this sector focused on five priority policies

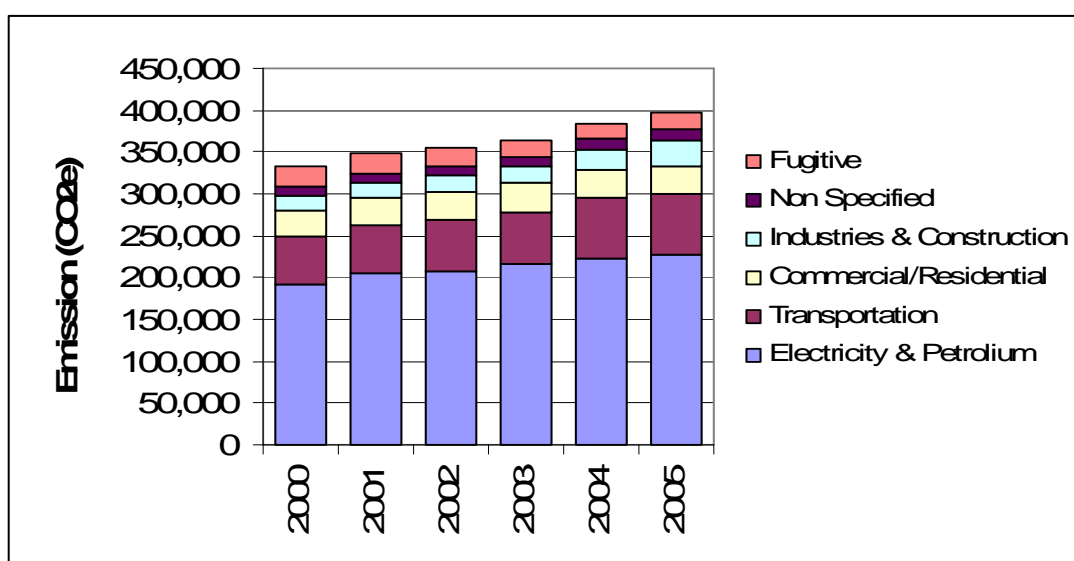
1. Mitigation on illegal logging, it will contribute to reduction of CO₂ emissions in the atmosphere.
2. Land and forest rehabilitation and conservation, will improve carbon sink enhancement capacity and protect forest carbon conservation. Forest conservation will also contribute to impermeability and capacity to cope with extreme climate.
3. Restructuring of the forestry sector particularly of forest industries and accelerating the development of forest diversification in contributing to improving forest capacity in carbon sink enhancement.
4. Community outreach for those who live in and surrounding the forests, their livelihood contribute for concern on climate change issues and adaptation capability with events related to climate.
5. Forest mapping, it will give accurate status and boundary of forest areas which will affect logging activities that eventually will contribute to reduction of carbon emissions.

Forest conservation will protect biodiversity and support local community for survival. Community outreach also will allow them to receive education on adoption toward environmental degradation and to utilize natural resources to support local economy.

3. Transportation

Emission of CO₂ from the energy sector was mainly from fuel combustion, while contribution of fugitive emission was almost negligible. From fuel combustion, the main source was from electricity, petroleum and gas refining (62 per cent) followed by transportation (18.2 per cent).

Figure 3. CO2 emissions from energy sector (2000–2005)



Source: Indonesia Second National Communication (SNC) 2009

The annual CO2 emission growth rate from fuel consumption in transportation has increased significantly. Therefore mitigation plan to have mass transportation with environmental friendly technology is very crucial to be developed particularly in urban areas to reduce the GHG emissions. In addition, urban cities need to have convenient pedestrian for walking and biking, which will encourage public communities to use less car and promoting healthier life. It is also needed considering to give incentives and enabling fiscal policy for any investor who are willing to produce electric car or hybrid car as one of solutions to reduce energy consumption in transport sector.

Promotion of biofuel in transportation sector should be maintained and improved. Local automotive industry needs to be supported in producing vehicles that are compatible with biofuel. Nonetheless, support facilities for biofuel gas stations must be provided by local government.

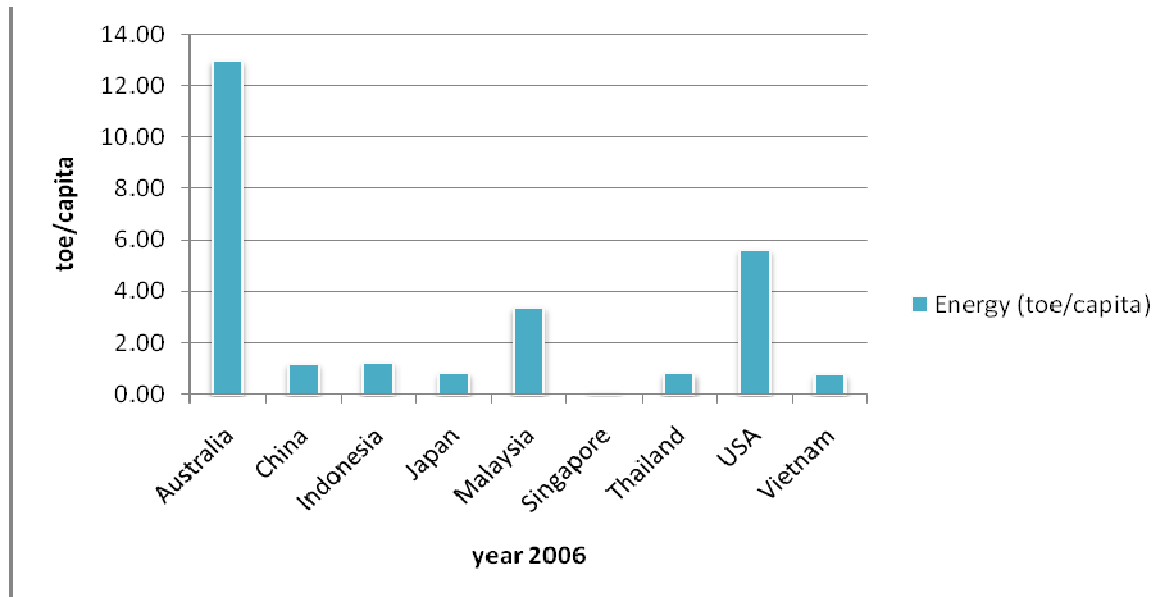
Implication of promotion towards incentives for biofuel and production of environmental friendly vehicles will attract investors, creating new employments and eventually bring additional income to the government.

Indonesia's green economy development

- a. Indonesia's numbers and trends on ecological footprint (data from Report of the Coordinator Ministry for Economic Affairs, 2009):
 - 0.9 global hectares/person
 - 0.4 global hectares remainder (if positive) global hectares/person.

b. Some APEC member countries energy production per capita (see Figure 4)

Figure 4. Some APEC member countries energy production per capita



Source: APEC (2006).

c. Indonesia's electricity consumption per capita and per GDP (<http://www.iea.org>, 2006):

- Electricity consumption / capita = 530 kWh/capita
- Electricity consumption / GDP = 0.53 kWh/US\$2,000

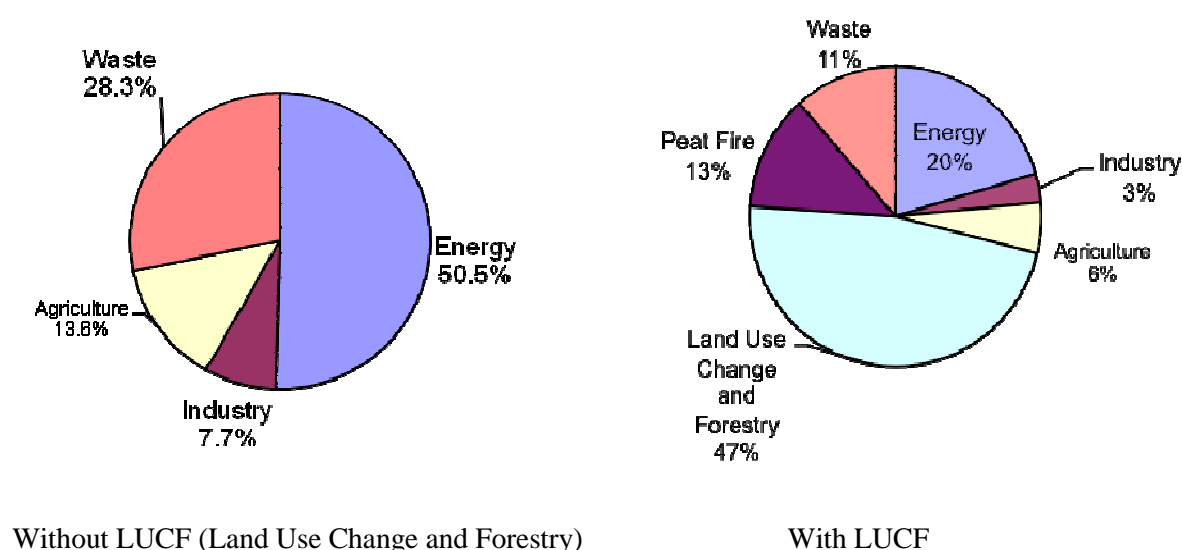
d. Indonesia's waste production per capita = 0.22 ton/capita/year in 2005

e. Indonesia's CO₂ per capita = 4.05 ton/capita (State Minister of Environment, 1999). Please note the CO₂ resulting from fuel combustion and fugitives, industrial processes, agriculture, land use change and forestry (LUCF), and waste/landfill.

f. Indonesia's rate of land degradation (Land Use, Land Use Change and Forestry, LULUCF) = 3,412,000 ha/year in 1997–2000

g. Indonesia's rate of deforestation (2000–2005) = 1.8 million ha/year (<http://www.greenpeace.org>, 2007).

Figure 5. National GHG profile (2000–2005)



Source: Second National Communication (2009)

The National GHG Inventory was estimated using Tiers 1 and 2⁴ of the 2006 Intergovernmental Panel on Climate Change (IPCC) National Greenhouse Gas Inventories (IPCC, 2006). During the period 2000–05, total GHG emissions for the three main greenhouse gases (GHGs) (CO₂, CH₄, and N₂O) without LULUCF (LUCF and peat fires) reached 594.738 Gg CO₂eq. With the inclusion of LULUCF, total GHG emissions from Indonesia increased significantly to about 1,415,988 Gg CO₂eq

Without LUCF, the energy sector is the main source of GHG emitters in Indonesia (50.5 per cent) which results from electricity consumption, consumption for energy production, transportation, industry, commercial, and fugitive. However, with the inclusion of LUCF total volume of GHG emissions from Indonesia changes significantly with the LUCF sector becoming the biggest emitter 47 per cent compared to energy sector. Deforestation (59 per cent) is the main contributor to the sector LUCF in which during the period of 2000–2005 the rate was estimated at 1.8 million ha/year (Greenpeace, 2007) which impacting ecological footprint and biodiversity. With waste production reaching 0.22 ton/capita/year in 2005 (BPPT Indonesia's Needs Assessment, 2009), the emitted GHG emissions from waste sector contributing to 11 per cent if LUCF included. Most of GHG emissions from waste sector was produced from industrial waste water treatment and discharge (84 per cent), followed by waste from domestic activities: solid waste disposal (8 per cent) and domestic waste water treatment and discharge (7 per cent).

In summary the challenges for the green economy in Indonesia can be considered as follows:

1. LUCF sector, in which emission sources coming from 4 (four) categories: deforestation activities, peat oxidation (emissions from organic soils), peat fire, and forest burning.
2. Energy sector. Emissions of CO₂ in energy sector are coming from following categories: electricity and petroleum operations, transportation activity, commercial, industrial operations, and fugitive emissions.

⁴ Tier 1: Default Emission Factor Approach of the 2006 IPCC Reporting Guidelines;
Tier 2: Country Specific Emission Factor of the 2006 IPCC Reporting Guidelines

3. Agriculture sector. In agriculture sector the source of emissions are coming from following activities: rice cultivation, fertilization, biomass, and manure management.
4. Waste sector. Source of GHGs are coming from Industrial Waste Water Treatment and Discharge, Domestic Waste Water Treatment and Discharge, Open Burning Solid Waste, and Unmanage Waste Disposal Sites.

2.2 The response strategy

Indonesia is committed to participate actively in global actions regarding climate change and environmental degradation. Efforts to mitigate and to adapt require commitment and comprehensive action plan covering all sectors contributing to climate change and environmental degradation. The commitment must also be applied simultaneously with efforts to improve compliance, quality of life of people, environmental quality, consumption priorities for mitigation and adaptation measures. In this regard Indonesia has completed National Strategy Studies in November 2007 for energy and forestry sectors. Potential programmes to reduce emissions from oil and natural gas, forestry, transportation, solid waste, utilization of new and renewable energy have also been identified through a fairly comprehensive study.

Formulation of National Strategies and National Action Plans (RAN) to mitigation and adaptation aims to produce guidelines for all institutions in Indonesia in developing an integrated plan to mitigate and to adapt to the climate change and environmental degradation. It is very urgent to align related public policy and legal instruments and legislation of the regions, especially in the sectors of priority mitigation and adaptation development including energy user sectors (such as industry, transportation-- domestic and commercial) trade, forestry, agriculture, fishery/marine, mining and infrastructure.

Indonesia has made some efforts to implement conventions and protocols that are designed to reduce the adverse impact of climate change, including mitigation and adaptation, as follows:

A. Mitigation

1) Institutional development

- i. Established the National Commission for Clean Development Mechanism (Komnas MPB) under Ministry of Environment Decree No. 206 Year 2005 as the Designated National Authority (DNA) which issues national approval of proposed activities of CDM projects (Clean Development Mechanism) which already has met sustainable development criteria of CDM Executive Board. The nine members of the National Commission for CDM are headed by the Deputy Minister of Environment III. However, no skill development programme being planned while the National Adaptation Strategy being drafted.
- ii. Developing and strengthening the national committee for climate change to serve as the focal contact point for domestic and international climate change cooperation.
- iii. Strengthening government and non-government institutions that have strategic roles in climate change and environmental degradation mitigation and adaptation.
- iv. Developing a strategic mechanism on utilizing advanced and appropriate information system technologies regarding climate change and environmental protection.
- v. Enhancing cooperation with existing global, regional, and national governmental and non-governmental institutions on climate change and environmental protection.

2) Energy

- i. Monitoring of air pollution emissions for the industrial sector has been carried out by the Ministry of Environment through the PROPER programme (Programme

Assessment Rating Company Performance) and the transport sector through the blue-sky programme to test vehicle emissions.

- ii. Implementation of Programme Independent Energy Village, a programme of providing electrical energy such as conducted in Subang, West Java in Indonesia by utilizing water power. Until the year 2006, almost all cities / regencies in South Sulawesi to build more than 3,000 units solar power generation. This has been implemented and now is still going on.
- iii. Implementation of Cleaner Production Programme and Energy Efficiency (CPEE/Cleaner Production and Energy Efficiency) to industries which are energy intensive, such as cement, iron and steel, fertilizers, pulp and paper, textile, power generation, etc.
- iv. Provide acquisition / provision of relief duty of the import of clean technology equipment as stated in Article 26, Paragraph 1, item (d) of Law No. 17 of year 2006 concerning Amendment to Law No. 10 of year 1995 on Customs.
- v. Specify and ban the import of goods that are not environmental friendly.

3) Transportation

- i. Road pricing and area traffic control system (ATCS) for regularly congested areas which will allow road users to realize the value of public goods/services.
- ii. Control vehicle emission and promote use of clean fuels through providing incentives for car users who would like to convert their cars of better and cleaner fuel use.

4) Land Use, Land-Use Change and Forestry (LULUCF)

- i. Handling of forest fires
 - Government Regulation No. 4 year 2001 on the Control of Pollution Damage and Related Environment to the Forest and or Land.
 - Forest fire prevention efforts that include: monitoring with satellite, close monitoring of active forest companies, air quality monitoring, and social empowerment of local people in changing the pattern of land burning. This effort was done by increasing community participation and elevating community income (related to poverty alleviation programme) by sharecroppers in fire-prone areas, including provision of assistance through technical equipment for land clearing without burning, and guidance and training of farmers.
 - Prevention the occurrence of forest fires through better preparation, especially in areas prone to forest fires.
- ii. Issuance of Presidential Instruction No. 4 year 2005 on Eradication of Illegal Logging in Forest Area and Circulation throughout the territory of Indonesia. In this Presidential Directive, the President ordered 12 Ministries, the Attorney General, Head of Police of Republic of Indonesia, Chef of Indonesian National Army, and local government leaders to accelerate the eradication of illegal logging in Indonesian forest.
- iii. Improving forest policy and enforcement of regulations in forest management.
- iv. Improving technology and information transfer in order to speed-up adaptation, innovation and adoption.
- v. Strengthening research and development of sustainable forest management.
- vi. Review and revise present forest and forest law management policies to provide stronger and more accountable measures.

- vii. Managing flood-affected areas and measures to avoid recurrence of floods.
Management aims to avoid the emissions of methane gas from domestic garbage piling of flooded areas.

5) Agriculture

- i. Strengthening research, development, and dissemination of sustainable agriculture practices.
- ii. Supporting research and technology that will ensure that the agricultural sector can deal successfully with the various challenges in the future.
- iii. Staple food diversification by promotion of non-rice food sources.

6) Coastal resources

- i. Continue and develop the national marine resources evaluation and planning programme to include management issues and institutional support to assist the Provincial and District Environmental Agency to increase the level of community participation in the spatial planning process.
- ii. Continue the national surveying and mapping programme as well as develop the national geographic information system in which coastal areas and small islands of Indonesia are put as priority.
- iii. Management of integrated coastal area through Integrated Coastal Management is done through the planting of mangrove forests in North Java (Pemalang, Batang, Brebes, Pekalongan, Tegal), east coast of Sumatra, and several other provinces (Nanggroe Aceh Darussalam, North Sumatra). These programmes aim to empower communities, including potentials for women, to prevent damage to coastal plants that also function as carbon absorption facility. It is also to develop other economic potentials such as eco-tourism, making charcoal from coconut shell from the coastal region so energy sources are not using wood coming from mangroves.

7) Public health

- i. Health services project prior being executed should have Environmental Impact Assessment (EIA) in periodical basis and enforcement with attention to climate change impacts.
- ii. Promote emergency response system for sporadic climate change disaster.

8) Policies

- i. Follow the precautionary principles to mitigate climate change
- ii. Evaluate technology standards.
- iii. Continue cooperation in Research and Development (R&D) on climate change, environmental degradation and greening economic and policy with other countries.
- iv. Initiate R&D on new and renewable energy and to initiate South-South cooperation for the field R&D.
- v. Enhance technology cooperation.
- vi. Identify voluntary measures that may be committed at the global levels.

The top priorities in the mitigation plan is not limited to energy conservation, energy efficiency, renewable energy research and development, improved agricultural practices, enhanced forest and land management policies, reduction of local air pollution, better waste management particularly in urban areas, close monitoring of marine vessels and offshore platforms to prevent pollution to the sea, and oblige all projects that may impact the environment

to undertake Environmental Impact Assessment (EIA) Study which has to be approved by the government prior start-up of operations.

- 1) Programme measures in dealing with mitigation on environmental degradation shall cover:
 - a. All industries and companies who operate in Indonesia that may be causing environmental impact should conduct EIA and must obtain approval from the government of the assessment prior commencing their operations.
 - b. Industries should be obliged to participate in PROPER (Programme Assessment Rating Company Performance), an auditing programme conducted by Ministry of Environment to ensure that the industries are operating in environmentally prudent manner.
 - c. Ministry of Environment should require companies to apply for environmental permit for any activities related to disposal of hazardous waste, discharge to sea, transportation of hazardous waste, land use, land use change, discharge to air and any other activities that may have potential to pollute the soil. This requirement is aimed as a tool to control companies' environmental performances and to monitor their activities.
- 2) Policy measures to deal with research and development in mitigation attempt will cover:
 - a. Cooperation in research and development with other countries on climate change sciences, environmental technologies, economics and policy.
 - b. Initiation research and development on new and renewable energy.
 - c. Initiation of South–South cooperation for research and development to mitigate climate change and environmental degradation.

B. Adaptation

- 1) Institutional development
 - i. The National Adaptation Strategy, launched in 2007, to serve as part of the commitment of stakeholders in implementing adaptation to climate change and environmental degradation. In the preparation process of the document, efforts were also made to include concerns of the staffs involved in the process in each government agency/department. However, there is no skill development programme mentioned in the Strategy.
 - ii. Developing a strategic mechanism on utilizing advanced and appropriate information system technologies regarding climate change and environmental protection.
 - iii. Enhancing cooperation with existing global, regional, and national governmental and non-governmental institutions on climate change and environmental protection.
 - iv. Enhancing cooperation with existing global, regional, and national governmental and non-governmental institutions on climate change and environmental protection.
- 2) Energy
 - i. Encourage and promote adoption of energy conservation and efficiency by adopting techniques such as public campaigns, while at the same time using economic incentives to further promote energy efficiency products and energy conservation practices.
 - ii. Promote clean and efficient energy use for industry and commercial sectors. Various technologies, for example, clean production, is available to help the industry and commercial sectors become more efficient. Such technologies will be promoted by government.
 - iii. Restructure the price for various energy sources according to the emissions and externalities that the energy source emits.

3) Transportation

- i. Promote use of public transportation by increasing the capacity and comfort of the public transportation system in Indonesia. Also, a shift in the transportation policy towards use of electric trains.

4) Land Use, Land-Use Change and Forestry (LULUCF)

- i. Replenish the forests in the rural areas and replant trees in the urban areas.
- ii. Promote low impact logging practices.

5) Coastal resources

- i. Management of coral reefs using transplant as was done in the waters of Sabang in Aceh Nanggroe Darussalam. Coral transplantation is transplant or cutting of live coral colonies to remove and plant or move to another place, with the goal to accelerating the regeneration of damaged coral reefs.
- ii. Waves breaking tool is used to reduce water erosion on the coast as it is done at Tana Lot, Bali.
- iii. Prepare long term adaptation strategy for the possibilities of sea-level rise due to climate change in the various coastal areas.

6) Agriculture

- i. Improving technology and information transfer to farmers in order to speed adaptation, innovation and adoption.
- ii. Improve water management in rice production.
- iii. Promote improved agricultural practices that emit least amount of GHGs.
- iv. Regionalization of agricultural research and development.

7) Public health

- i. Promote use of environmentally-friendly fuels and healthy transportation system.
- ii. Promote healthy environmental housing.

8) Policies

- a. Policy measures in dealing with adaptation to climate change will cover:
 - i. Formulate the Clean Development Mechanism (CDM) to cover insurance policy for adaptation measures.
 - ii. Under CDM, link the insurance mechanism with the level of global mitigation efforts.
- b. Programme measures in dealing with adaption to environmental management will cover:
 - i. Provide incentives for investment in clean production that will reduce wastes.
 - ii. Encourage through public campaign adoption to reduce, reuse and recycle wastes in collaboration with provincial and district local governments who have access to the grassroots.
 - iii. Promote eco-labeling of customer goods that are environmentally friendly and may not harm environment during its disposal process.
 - iv. Promote consolidated waste management in local sector by cooperating with provincial and district government.

9) Biodiversity

Programmes in place for protection of biodiversity:

- i. Capacity building for people and community in biodiversity management.
- ii. Development of natural resource, technology and local wisdom/value.
- iii. Improvement of conservation, and biodiversity rehabilitation of *degraded sites*
- iv. Improvement of institutions and governance.
- v. Improvement of capacity for conflict resolution.

10) Community outreach

A campaign programme to educate public on issues related to climate change and environmental degradation will be formulated, designed and launched. A committee will be formed to formulate the best strategy for outreach, consisting of NGOs (non-governmental organizations), the consumer organizations, and the media.

2.2.1 General environmental strategy

Developing countries like Indonesia put great emphasis in rapid economic growth to develop their economies. Indonesia's economic growth since monetary and financial crisis in 1997/1998 has accelerated particularly during the period 2004-2008. This acceleration was supported by balance in economic growth with investment in various sectors meanwhile public consumption remained high. Indonesia's income per capita has increased during 2004-2008 and more than doubled in 2008 to US\$2,523. Export escalated and grew significantly in 2004-2005, while Indonesia's export commodity prices augmented on the international market. But Indonesia's export and investment activities declined in 2009 due to global economic crisis (Table 1).

Table 1. Economic growth of Indonesia by national expenses (per cent)

	2005	2006	2007	2008	2009 (Q1)
Gross Domestic Product (GDP)	5.7	5.5	6.3	6.1	4.4
Household consumption	4.0	3.2	5.0	5.3	5.8
Government consumption	6.6	9.6	3.9	10.4	19.3
Investment	10.9	2.6	9.4	11.7	3.5
Export	16.6	9.4	8.5	9.5	-19.1
Import	17.8	8.6	9.0	10.0	-24.1

Source: BPS (2009).

The PROPER System

The government has many programmes for greening the economy, but none are really broadly implemented to any great degree, however data on implementation was not available for this study. Several programmes in Ministry of Environment include soft loans for environmental management investments, Indonesia Clean Production Centre and the PROPER company classification system based on Law No. 23 of 1997. These loan programmes were already in place before the crisis as part to protect the environment and promoting sustainable development.

The PROPER system is voluntary and only about 6 per cent of Indonesian companies participate in this system. The objective of PROPER is to promote industrial compliance with statutory regulations of pollution control, to facilitate and enforce adoption contributing to 'clean technology' and industry participation in mitigating climate change and environmental degradation with a good environmental management system. The system criteria uses a color-code rating: black, red, blue, green and gold, in which gold is for excellent performance and

black for poor performance. The green and gold rating is only awarded to industry which makes efforts towards sustainable development such as reduction of GHG, energy efficiency, energy conservation programme, waste minimization, waste recycle (reduce, reuse, recover), water conservation, corporate social responsibility programme and certification of environmental management system. However, the classification while being a shade of green in PROPER system is not fully aligned with the demand of the new green economy. Both the Ministry of Forestry and Ministry of Agriculture are focused on increasing production but information was difficult to get from Ministry's staff which probably indicates that not much progress has been made on the green economy front.

Communication and coordination is lacking among and between central government agencies, and there is evidence of some competition between regional and central government units. Central government authorities sometimes override well designed green regional government plans and dictate less environmentally friendly solutions. This is particularly true in cases where central government has authority over other parts of the programme e.g. national transportation system.

Adaptation and mitigation strategy

Indonesia's general environmental strategy on adaptation and mitigation to climate change and environmental degradation as well as the greening the economy:

a. Key strategy

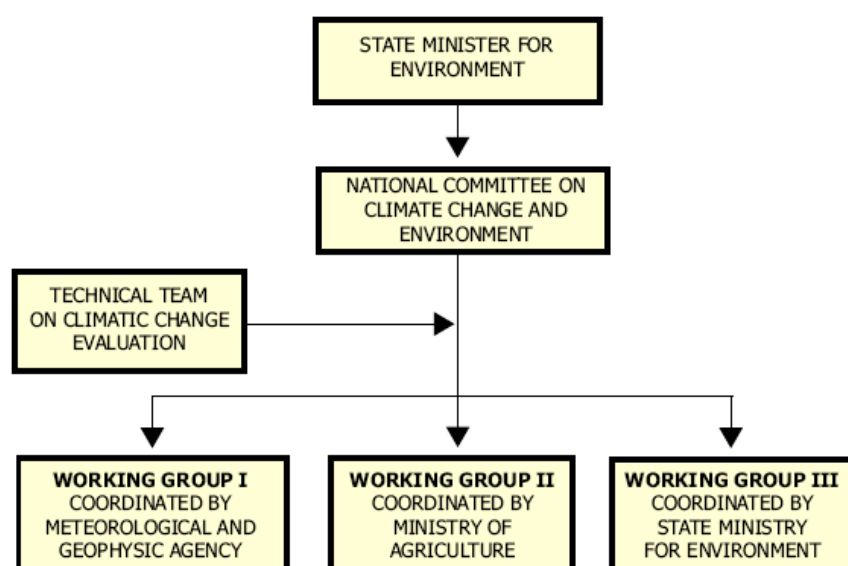
In developing policies to combat global warming and environmental degradation, the Government of Indonesia (State Ministry of Environment, 1999) has identified 3 (three) principles as the foundation in developing national response strategy to address in adaptation and mitigation as well as promoting green economy.

1. the response strategy cannot be separated from the long-term national development strategy, which must take into account environmentally sound sustainable development;
2. the principles of equity and justice must guide the process of anticipating and assessing impacts; and
3. action plans must be taken to adapt to and mitigate the climate change, ensure environmental protection and promote sustainable development in green economy without hampering the national development objectives.

The National Committee on Climate Change and Environment

Initially to anticipate and deal with issues related to climate change and environment, Indonesia has established a National Committee on Climate Change and Environment in 1992. The National Committee was formed through Minister of Environment Degree Kep-35/MENKLH/8/1992. The committee was divided into three working groups, where each working group had specific responsibilities and sub-committees (Figure 6).

Figure 6. National Committee on Climate Change and Environment Structure



National Council on Climate Change

Subsequently, the President of Republic Indonesia formed National Council on Climate Change on 4 July 2008 through Presidential Decree No. 46 year 2008, considering the vulnerability of Indonesia that prone to climate change and environmental degradation from the climate and to improve coordination on control over climate change. The National Council of Climate Change is chaired by the President himself, Vice chaired by the Coordinating Minister of Economy and Coordinating Minister of People's Welfare, and the members include 16 cabinet members with Mr. Rachmat Witoelar the ex-State Minister of Environment as the Executive Chairman. The Council comprises 6 (six) working groups of government officials to deal with issues of adaptation, mitigation, technology transfer, finance, forestry and post-Kyoto aims.

Though one of the mandates of this Council is to create climate change strategy, particularly in mitigation and adaptation, the Council has not developed any. Until today, the role of the Council is more of facilitating the government in climate change issues.

b. Policy measures

The Government of Indonesia has taken policy measures in sectors considered as key challenges in climate change and environmental degradation.

1. Energy

Policy measures on energy sector will cover: gradual removal of energy market distortions, promotion the use and development of renewable energy, encouragement of public adoption of energy efficiency, the use of clean and efficient energy for industry and commercial sectors, and restructure the price for various energy sources. Based on the GHG inventory, the priorities in the energy sector will focus on improving the efficiency and efficacy of energy utilization through regulations. This utilization will look at the three sub-sectors of the energy sector: power generation, commercial and residential, and industry. In principle, these efficiency improvements are based on measures aimed at both the supply and demand side of the energy market. One of the evidence for efficiency improvement is by looking at number of awarded company being rated as Green in PROPER system. PROPER green rating awarded for

businesses/activities that have performed environmental management effort and achieved better result set forth in regulation requirements including reduction of GHG, energy efficiency, energy conservation and waste recycle (reduce, reuse, recover). The PROPER assessment result in 2004-2005 and 2006-2007 shows the number of company participation increased up to 10 per cent from period 2004-2005 to 2006-2007 (from 466 to 516 participating companies). This includes raise of Green ratings from 23 to 46 companies in 2006-2007.

As an action plan in the energy sector, the Government of Indonesia has considered the following action plans:

i. Phase out fuel and electricity subsidies

In the past, the policy of subsidizing fuel and electricity appropriated to help national economic growth and sustain inflation. As a result, it also generated economic distortion in the energy market. Hence, the government has decided to gradually correct market distortions by adjusting administered price of fuel with the aim to remove the subsidies for both fuel and electricity eventually.

ii. Promote use of renewable energy

The government also realizes the country's potential on the development of renewable energy resources, which are economically sound, technically feasible, socially acceptable and do not harm the environment. The government through Presidential Regulation No. 5 Year 2006 on National Energy Policy in which the projected contribution of new and renewable energy in 2025 of the national primary energy mix is estimated at 17 per cent, consisting of 5 per cent biofuel, 5 per cent geothermal power, biomass, nuclear, hydro, and wind, and also liquefied coal at 2 per cent. (*Ministry of Energy and Mineral Resources News Archives, Monday, 25 August 2008 www.esdm.go.id/news-archives/general/49-general/1963-indonesias-renewable-energy-pontential.html and Presidential Degree No. 5 Year 2006 regarding The National Energy Policy*)

The government is committed to promote and develop renewable energy as an alternative source to fossil fuel. This commitment is implemented by following measures:

1. provide incentives for imports and use of renewable energy technologies.
2. encourage research and development of local renewable energy technologies.
3. encourage use of renewable energy through public campaigns,
4. integration between renewable energy technologies with the existing power grids.
5. encourage and increase private sector involvement in power generation with a priority promotion to renewable energy.
6. As incentives on promotional use of renewable energy may result in the implications of creation of new jobs that may be considered as green jobs since it will assist efforts tackling climate change and promoting green sustainable energy.

iii. Promote adoption of energy conservation and efficiency

In addition to supplying new and cleaner energy through the renewables, measures must also be put in place to ensure efficient use of energy. The

government committed to promote energy conservation and efficiency with measures as follow:

1. Provide incentives for investment in energy efficient products.
2. Introduce a scheme to assist private sector investment in energy efficiency appliances in the form of tax incentives and soft loans.
3. Public information and assistance package to help companies in acquiring energy efficiency appliances. Unfortunately, currently there is no skill development mechanism being specifically develop for companies. A skill development plan particularly related to energy efficiency need to be include as suggestion for the government in promoting energy conservation and efficiency programme.
4. Public promotion to adopt energy conservation and efficiency through well-researched public campaign.
5. Energy labeling and standardization system for appliances entering the energy market which will help customer to choose the most energy efficient products.

iv. Promote clean and efficient energy for industry and commercial sectors

Development of cleaner and more efficient industrial and commercial sector is a significant investment for Indonesian environment. Therefore the government intends to promote clean and efficient energy use for the industry and commercial sector.

1. Encourage the use of natural gas as a source of energy for the industry.
2. Energy audit for industry and commercial sectors to ensure the efficiency of energy usage.
3. Tax incentives for commercial building owners complied with an energy-conservation standard for buildings.
4. Promote efficiency (e.g. clean production) in the industry and help the industry to develop such technology in their individual plants.

v. Restructuring the price of energy

It is recommended that energy prices need to be restructured gradually to enable the prices to reflect the actual cost of energy by taking environmental cost into account and to distribute energy use evenly across time.

1. Restructure tariff and tax scheme for fuel and energy sources to account for its emissions.
2. Restructure the electricity tariff scheme.

2. Transportation

Transportation sector poses additional problems of air pollution in general and of transportation in particular. The government has initiated programme to control air pollution aiming to retain the quality of the ambient air. In principle, the measure for the transportation sector focuses on:

1. alleviating the burden of traffic by increasing the capacity of the public transportation and encouraging the use of public transportation, and
2. internalizing the cost of emission through levies and incentives.

Promoting the use of public transportation

Promoting and supporting public transportation will help reduce the congestion, and in turn will reduce the amount of fuel wasted during the many long waits in traffic jams. There are two approaches to tackle wasted fuels in transportation, i.e. diversification of energy source and efficient energy use.

- a. Increasing the quality of public transportation conveniently so public will reduce their private car use and switch to public armada.
- b. Shifting focus of the transportation development policy towards use of electric train.
- c. Road pricing in order to reduce traffic on certain congested area during peak hours.
- d. Controlling vehicle emissions.
- e. Promoting conversion to clean fuels.

3. Agriculture

Agriculture is one the key sectors in Indonesia's economy. However traditional farming faces high competition from commercial industry, in addition to decreasing availability of lands. Animal husbandry also moves closer to the market in urban areas. Based on economic and environmental considerations, there will be great opportunities for improved management. Therefore, to cater the basic needs of the people and reducing emission, the government decided to implement the following policy measures: improving technology and information transfer to speed adaptation, innovation and adoption; strengthening research, development, and dissemination of sustainable agriculture practices; and supporting research and technology which ensure that the agriculture sector can deal successfully with the various challenges in the future.

1. Promotion of improved agricultural practices through public campaign and development of public information network for agricultural technology.
2. Improvement of water management in rice cultivation.
3. Regionalization of agricultural research and development.
4. Development of national renewable resources database and analytical tools.
5. Food diversification.
 - a. Promote food diversification through public campaigns.
 - b. Support research on appropriate staple foods for local conditions.

4. Forestry

Indonesia's huge tropical forests absorb a great amount of CO₂. The growth of Indonesia's forest provides a sink that sequesters CO₂ at the rate of 686,790 Gg annually. However, deforestation and degradation of forestry and land use change contributes the highest amount of CO₂ emission compared to other sectors. It accounts for 42.5 per cent of the total baseline emission of GHG in Indonesia (State Minister of Environment, 1999).

The problem of GHG from the forestry sector is more than just a problem of land use change. Forest fires are another thorn in the flesh of emission mitigation in Indonesia. In principle, the mitigation and adoption policies on forestry will focus on

protecting present forests from rent seeking behaviors through a stronger regulatory framework, preventing the occurrence of forest fires by better awareness and preparation, replenishing degraded forests and replanting trees in urban areas.

1. Implement performance bonds and reduce land conversion targets to environmentally sustainable level.
2. Provide a stronger regulatory framework in dealing with issues of land clearing and irresponsible logging including implementation regulations for the new environmental law.
3. Strengthen the requirements for companies to have Environmental Impact Assessment prior starting operations.
4. Prevent the occurrence of forest fires.
5. Support research and development of fast growing high quality forest trees.
6. Promotion of low impact logging.
7. Reforestation of damaged forests and development of parks and urban forest.

5. Waste

Waste, if it is not handled thoroughly, will create health and other environmental hazards. Therefore, waste is important to tackle.

1. Integrated waste management
 - a. Revise the blueprint design of an integrated waste management scheme. The new scheme will incorporate new development in urban areas and will also apply alternative waste disposal methods.
 - b. Disseminate information through local channels of the appropriate waste disposal.
 - c. Mandatory waste management scheme for newly-built real estates.

2. Waste minimization in industry

Waste minimization aims to introduce more efficient technologies and approaches to industrial practices. It will reduce excessive use of resources, conserve the environment, and reduce pollution. The efforts towards waste minimization have been initiated previously. Currently the government will emphasize promoting these efforts by providing regulatory framework to support waste minimization.

3. Encourage further research for industry-specific waste minimization technologies, especially for small and medium scale industries.
4. Promote waste minimization through public campaign, and eventually through regulations and incentives.

6. Coastal resources

- a. Prepare and develop a long term monitoring and adaptation plan for the possibilities of sea level rise due to climate change and sea quality degradation in various coastal areas.
- b. Development of a long-term monitoring infrastructure of sea level rise.

- c. Continue the national base mapping programme and national geographic information infrastructure.
- d. Prepare long-term strategy for coastal areas.

Necessary steps must be prepared to anticipate the possibilities of sea level rise and sea quality degradation in various coastal areas in Indonesia.

- i. Conduct thorough and comprehensive studies of the characteristics of the various coastal areas and the various impacts of climate change to these areas.
- ii. Prepare one of the three adaptation strategies – retreat, accommodate, and protect – appropriate to deal with the problems of specific coastal areas
- e. Promoting an integrated coastal zone and marine management (ICZM).
 - i. Continue and develop the national marine resources evaluation and planning programme (MREP).
 - ii. Promote the coral reef rehabilitation planning and management
 - iii. Mangrove rehabilitation and management programme.
 - iv. Continue promoting and strengthening water resources management.

7. Public health

Climate change, air emissions, forest degradation, changes on sea quality and water pollution has direct and indirect impacts on the status of public health. Several diseases have been associated with environmental pollutions, while others have indirectly caused health problems such as nutritional related diseases due to changes in food intake and production patterns.

1. Promotion of the use of environmentally-friendly fuels and healthy transportation systems. Provision of healthy public transportation by using cleaner fuels and cleaner vehicle conditions will help healthier public transportation.
2. Promotion of environmentally-healthy housing.
3. Preparation of Environmental Impact Assessment and its implementation with attention to climate change impacts for all major development projects, including health services.
4. Promotion of emergency response system for sporadic climate change disasters.
5. Establishment of a relevant government agency to handle issues related to natural disasters which may cause climate change and environmental pollution. This agency will establish a standard operating procedure, which will be responsive and capable to cope with disaster phenomenon.

2.2.2 Green response to the current economic crisis

In recent years, a key issue for Indonesia has been the less attractive investment climate for the country's economy, which has resulted in insufficient investment to meet fast growing domestic demand. Indonesia's trade of energy commodities remains crucial for Indonesian economy but the importance of energy as an export revenue earner has declined. Factors such as

declining output of Indonesia's maturing oil and gas fields, the limited investments constraining the replacement rate of the reserves, and the continuing strong domestic demand for fossil fuel has resulted in a reversal of Indonesia's energy export and import trade. However, Indonesia's coal energy resources are extensive next to oil and natural gas reserves. In addition, Indonesia's potential for energy efficiency improvement is large. Investment in the field of energy conservation and efficiency will be highly cost-effective, particularly when energy price subsidies are wound back (OECD/IEA, 2008).

The government realizes the need of private sector investment to achieve its energy development goals, to meet national energy demand as part of to increase investment in field of energy, therefore the Government released the Energy Blue Print 2005-2025 to promote private investment as one of core strategies with following measures:

- Applying both fiscal and non-fiscal economic incentives, particularly for the supply of energy for domestic needs, for the development of new and renewable energy sources and increasing energy efficiency.
- Providing economic incentives for new investments to develop energy infrastructure.
- Developing energy infrastructure, and
- Developing domestic market for alternative energy sources, especially biofuel.

Nonetheless, as enhancement for investment in Indonesia, the government passed Law No. 25 year 2007 which intended to address expressed concerns of investors over lack of legal certainty, difficulties of negotiating and enforcing contracts, arbitration and award judgment, and perceived unequal treatment of domestic versus foreign companies. The 2007 investment law also requires investors to give priority to Indonesian labour and providing the authority for Government of Indonesia to issue a range of incentives to both domestic and foreign investors including exemptions of tax, import duties and value added tax for energy conservation, energy efficiency, renewable energy, and clean production, exemptions or reductions from land and building taxes for industry or building owner which conserve the energy, accelerated asset amortization and depreciation for project related to tackling climate change and promoting sustainable development (OECD/IEA, 2008).

2.3 The skills development strategy in response to greening

The vision of sustainable economy and green jobs would provide enforcement to coherent, strong and stable policy and leadership of government. The needs to create policy framework and attainment lie in the field of energy efficiency and sustainable energy. Progress in key sectors like transport, manufacturing, retail, agriculture and recycling are slow. A transformation and speed to take opportunities is required to take deliberate steps. Visible and potential opportunities may be termed as 'low hanging fruit'. It is an effective opportunity and low cost measure that should be taken immediately. However, the low hanging fruit cannot be seized without creation of a conducive policy framework and sustained increase of investment in green sector.

The biggest institutional roadblocks that hamper skills development for a transition to green economies:

- The majority of engineers are unaware of materials, designs and construction techniques available towards energy efficiency; therefore we are unable to imply these environmental friendly technologies into design. Without qualified human resources and skilled personnel, an available green technology and resources for green investment cannot be used or cannot deliver the expected environmental benefits and economic returns. An emphasis through capacity building, and training on high end of skills and education maybe the right answer to develop what may be termed as 'green collar workers' in future.

- Coordination activities across government institutions in adaptation and mitigation plays a crucial role for implementation by assisting the incremental building of actions plan and avoiding activity duplication. Being able to demonstrate effective coordination is generally necessary to develop an integrated national programme. Indonesia need to improve the coordination among its government agencies to develop road-mapping and action plans of the national action for adaptation and mitigation of climate change and environmental degradation as well as promoting green economy. The coordination should be established with clear role and responsibilities, with regularly scheduled meetings of experts and government officials to coordinate activities, to monitor action plans, to update status and transparency for industry and the public. On 4 July 2008, the President of the Republic Indonesia have formed an inter-ministerial national council for climate change which is responsible to coordinate control over climate change and to strengthen the position of Indonesia in international forum on climate change. This National Council for Climate Change is one of government coordination mechanisms and serves as an instrument in tackling climate change (*Presidential Degree No. 46 Year 2008*).
- Public funding for research and development in Indonesia towards clean and green technology appears to be robust and growing. However, Indonesia's private sector sponsors this research and technology development mainly on occasional basis and does not engage in longer term commitment. Consequently, it is increasingly important to involve the private sector in planning national research and development plan to ensure appropriate technology development and uptake. Unfortunately, access to funding is very limited and yet no data is available to confirm the amount of public funding, private sector and foreign aid moneys that are spent in research and development in Indonesia (OECD/IEA, 2008). Therefore, the government needs to have a transparent scheme on the use of these funding to public as well as focusing funding for research and development in clean production, energy efficiency, energy conservation, coastal resources, forestry, human resources capacity building and waste management. As a response of changes on policy measures, new skill needs will arise to adjust to the new policy. The current skills available in the labour markets might no longer match demand regarding policy response to environmental degradation and climate change. Qualified skilled workers are needed in order to be able to use available technology and resources, delivering the expected policy measures, economic returns and environmental benefits. Government needs an instrument to forecast skill needs including feedback mechanism to ensure the skill needed information translated into training systems, so the training itself can be offered accordingly (Cedefop, 2009).

Technical capacity building and managerial training has been given to authorities at national and local government, public based industries and university candidates. However, the training systems developed by the agency should be promoted to other government institutions, privately owned industries and public. Training sustainability is essential as response strategy to skill for green jobs, it should be embedded in education system and training at all level to promote clean production and consumption.

The Government of Indonesia does not have a detailed skill development strategy regarding green jobs. However, there have been initiatives in the Ministries as response to the demand for skills needed in new emerging environmental sectors. Their effort is to set up a competency standard regarding for specific profession in climate change and environmental degradation related sector such as: auditors, engineers, validators and expert in green house gases and energy field.

3. Anticipation and provision of skills

3.1 Green structural change and (re)training needs

Environmental issue has become more vital in the last decades. Considering such issues, there have been some changes also in the industries on their requirements of the workers. Take an example, the ISO certificates. Industries have given their workers training on ISOs, so they would understand how to apply ISO certificates and why to apply such certificates. Not only that, the birth of ISO also grew some ISO consultancy agencies that offer their services for industries. Therefore, it is obvious, that environmental issues have led industries and companies to restructure their organization (by adding new division, for instance) that automatically demanding new skills workers. To cope with it, most of the study cases show that trainings are needed. The trainings can be done in two ways, in-house training (trainers are provided from the business itself) or trainings that are provided by other party. All trainings conducted are not always related to green issues. Usually, green issues training will be conducted related to Environment, Health and Safety departments. But for other departments, other kinds of trainings most likely exist.

The World Business Council for Sustainable Development (WBCSD), which has strong relationship with big companies in Indonesia – such as Astra, Medco, Indocement and many others - offers the following pragmatic reasons why business should consider investing in sustainable ecosystems:

- create new revenue streams by introducing innovative products and services;
- reduce dependence on increasingly scarce raw materials or fragile services through the introduction of substitutes or the use of alternative abundant or renewable resources;
- mitigate rising costs caused by scarcity of raw materials;
- create new markets for certified, fair trade, organically grown or environmentally friendly products;
- develop new businesses such as water-quality trading, wetland banking, mitigation credit trading, threatened species banking, or pollution prevention, capture, treatment and reuse; and
- strengthen businesses' license to operate.

Some businesses in Indonesia do aware the above issues, especially the second point, when the companies are trying to reduce their dependence on increasingly scarce raw material or fragile services by changing it to other alternatives that are more sustainable. This will be shown in the case of Indocement and also Agro Petromat (case studies in section 3.2); which means, investing in a sustainable ecosystem will also contribute to the development of green jobs in Indonesia.

Therefore, to anticipate the future where green business will expand identification and preparation are needed, especially in the human resources aspect.

3.1.1 Green restructuring and its impact on the labour market

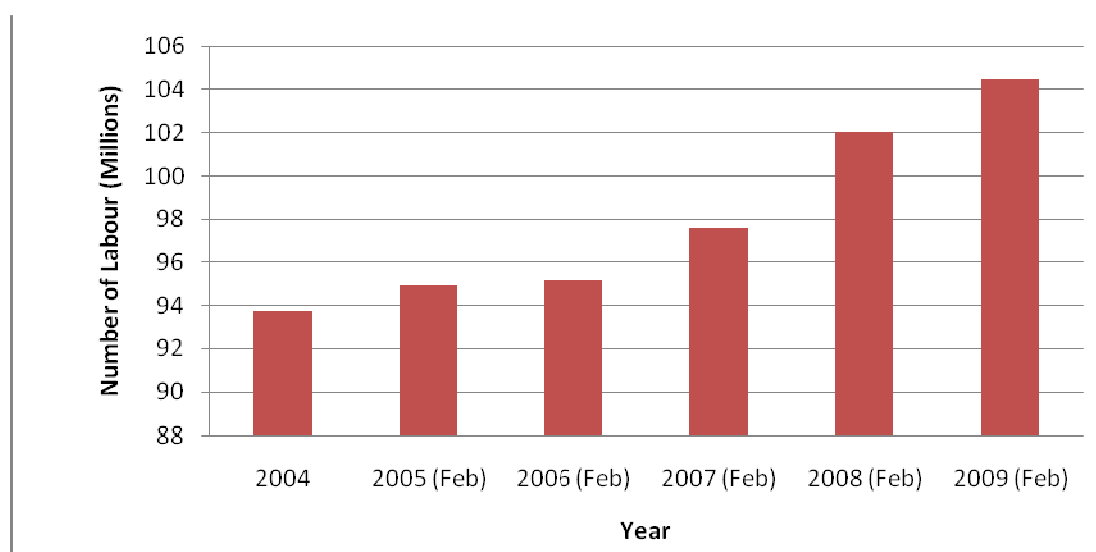
According to *National Development Planning: Indonesia Responses to Climate Change* (BAPPENAS, 2008), energy becomes one of several priorities for mitigation of climate change in Indonesia. This is due to Indonesia's heavily reliance on fossil-based fuel such as oil, coal and gas that are major contributors to GHG emissions. Therefore, Indonesia's development strategy will emphasize energy sector with activities such as energy efficiency, renewable energy boosting to reduce Indonesia's reliance on fossil fuel. Ministry of Energy and Mineral Resources

data in 2007, states that Indonesia usage of oil reached 54 per cent, coal 14 per cent and gas 29 per cent; these three are major contributors to GHG emissions. Recent study of Indonesia's total CO₂ emission indicates that the annual emissions in the energy sector accounts for about 9 per cent of the country's total emission. It is hoped that applying energy efficiency and boosting renewable energy will reduce Indonesia's annual emission significantly. In accordance to the fact, Presidential Decree No. 5 /2005 on National Energy Policy contains Indonesia's target of energy mix by 2025; oil based energy < 20 per cent, natural gas based energy > 30 per cent, coal based energy, not included liquefied coal > 33 per cent, biofuels > 5 per cent, geothermal > 5 per cent, other new and renewable energy > 5 per cent and liquefied coal > 2 per cent.

In order to achieve the mix energy target, it can be predicted that there will be more workers in the area of non-fossil fuel energy.

Unfortunately, there is no national labour profile data that shows the changes of workers in the area that can be considered as green since the law has entered into force. For instance: no data available on total number of workers in the green building are, automotive and others. National labour profile data in Indonesia covers the total number of workers in Indonesia only. A database system to identify the number of workers, who are working on green jobs, is needed to be built.

Figure 7. Indonesia's labour profile (2004-2009)



Source: BPS <http://www.bps.go.id/>

Table 2. Percentage of workers in Indonesia

No.	Main jobs	2004	2005 (Feb)	2006 (Feb)	2007 (Feb)	2008 (Feb)	2009 (Feb)
1	Agriculture, Forestry and Fisheries	43.33	44.04	44.47	43.66	41.83	41.18
2	Mining and Drilling	1.10	0.85	1.00	1.05	1.04	1.09
3	Manufacture Industries	11.81	12.27	12.16	12.39	12.19	12.07
4	Electricity, Gas and Water	0.24	0.20	0.22	0.25	0.20	0.20
5	Buildings	4.84	4.65	4.60	4.51	4.64	4.41
6	Hotel Commercial, Restaurants and Hotel	20.40	19.90	19.50	19.91	20.27	20.90
7	Transportation, Storage and Communications	5.85	5.85	5.74	5.71	5.89	5.69
8	Financial, Insurance, Property, Land and Company Services	1.20	1.10	1.21	1.28	1.41	1.42
9	Public, Social and Individual Services	11.22	11.14	11.11	11.23	12.52	13.03

It is obvious that to respond to any regulations which are related to the environmental aspects, there will be some adjustment inside the company; mostly workers. In response to the adjustment, most likely people at management level have to identify what positions exist, what will be needed and prepare job descriptions for these. The identification of positions will lead to several options:

- internal recruitment, by retraining existing workers to achieve certain level of knowledge and skills; and
- open recruitment, by opening recruitment for new workers with specific criteria.

Options chosen would depend on internal policies of the company.

In this section, several case studies have shown that though there were changes in the number of workers due to the green issues, no jobs became obsolete. What resulted was the increasing knowledge of workers on green issues. As for some workers (especially those dealing with technical issues in particular operation unit), skills were improved; such as how to do monitoring of emissions and domestic waste management.

3.1.2 Identification of (re)training needs

When it comes to national level priorities, labour issues are more for provision of jobs itself to fit Indonesia's human resources. Indonesia's Economic Performance Report 2009 has mentioned about Indonesia's challenges in managing labour issues in Indonesia. The fact that some companies laid off their workers due to bankruptcy or companies' efficiency policies has reduced labour force and thus increased the unemployed numbers. This has made the competition in gaining jobs tighter than ever. Those who have lower education background (preliminary school graduates or even lower) prefer to work in the informal sectors rather than the formal ones. Moreover, Indonesian workers who work in the informal sectors have moved to other countries which have better attractiveness than those in Indonesia. Therefore, to achieve its sustainable development state, Indonesia is being challenged to improve its formal sectors workers, not only to improve its formal sectors attractiveness, but also to improve Indonesia's workers' quality. This can be done through trainings programmes that are suitable with existing trends with adequate format that fits the trainees' educational background.

Considering green jobs development in Indonesia, opportunities for new skills will surely increase due to environment issues that are developing rapidly these days and because Indonesia

is updating its policies by considering green issues. Indonesia's technology needs assessment has clearly addressed the needs to have trainings in order to increase workers' knowledge on, for instance, environmentally sound technologies. In the Indonesia's Technology Needs Assessment, it is also mentioned that Indonesia will need people who are able to conduct trainings for trainers and also expertise in mitigation and adaptation technologies; in mitigation, energy, industry, transportation, agriculture, forest, waste and marine sectors.⁵ This shows that in the future, Indonesia will need more workers to be able to cope with green issues.

A way to anticipate the opportunities will most likely be to improve Indonesia's labour on basic skills, such as higher level of formal education (high schools or vocational schools) and also in communication skills. To achieve these, some methodology can be used, such as conducting job training for the workers.

3.1.3 Skills response

As mentioned above, whenever certain company chose to do retraining of some workers, a mechanism to evaluate and monitor the effectiveness of the training shall be done. No common evaluation method is available; all will depend on the company itself.

In Indonesia, there are some environmental conditions that have to be met by each company. Due to that, Indonesia needs to have a mechanism to ensure that the emission or waste from factories, domestic activities (office buildings) will meet certain conditions that pollution can be prevented. There are some mechanisms to help companies to apply it, such as UKL/UPL documents, PROPER and ISO certificates.

In general, government's policies on environment would improve with time and the introduced changes the government then would communicate to companies. The companies then would react to the changes, by communicating it to all levels in companies in form of trainings. Such case can be seen in the case study of Astra on retraining the existing workers to react on changes in government's policies.

Green policies in Indonesia are not only considering companies; but also informal sectors such as agriculture and for coastal group. The Sekolah Lapangan Iklim (Climate Field School) is one of the efforts of government to enable farmers adapt with climate change issues. Enabling farmers to 'read' the climate that they may know when to plant, will surely give them benefit and at the same time, preventing farmers from economy loss.

3.1.4 Case studies of retraining

This study also involves some interviews with a number of candidates who are known because of their activities to apply green issues, both at large and small scale. The number of candidates became shorter due to their availability to be interviewed. In the interviews, a template of questionnaire was used (see Annex 2). The questionnaire consists of basic questions to the candidates on internal green perspective within the organization and also the need of workers due to the green perspective they adopt. But a one-time interview is not enough to know about labour policies in Indonesia (both in companies, government or even NGOs), even in one company. Interviews with other employees within the company may give further help to the study.

There need to be other methods to clearly understand the labour profile in Indonesia, its shifting trend, most needed skills and trainings along with the most suitable method in conducting trainings, etc. Focus discussion groups are needed, together with expert discussions

⁵ Indonesia's Technology Needs Assessment only covers the climate change mitigation technology.

and also discussions with the government. The methods mentioned could not be undertaken due to limited time and other sources available. Therefore, further study is highly recommended.

Nevertheless, the result of interviews that had been undertaken can be a good initial insight of labour situation in several companies in Indonesia.

3.1.4.1 Astra International: Establishing Astra Green Company

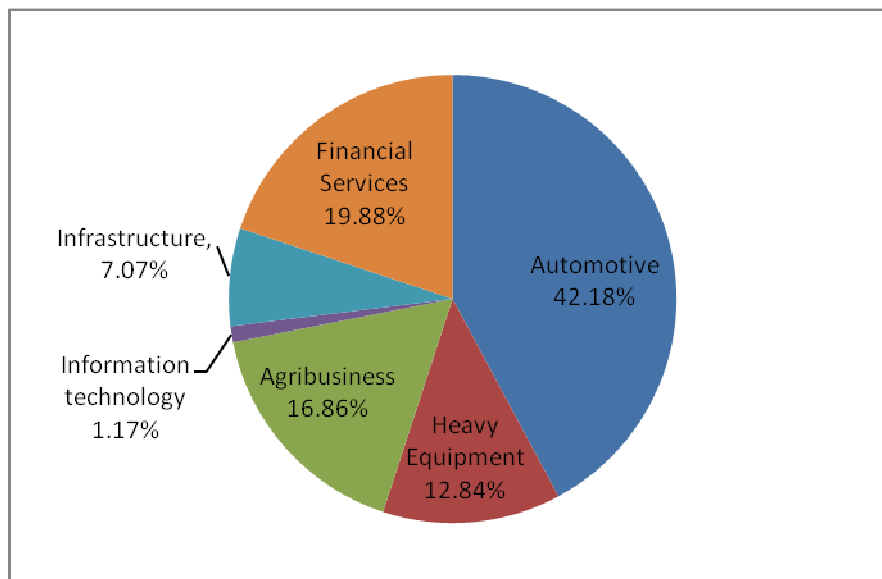
PT Astra International, Tbk (“Astra”) began as a trading company in Indonesia and has widened its scope of business and investments over the years. From its inception in 1957, Astra founders created milestones for excellence and have chosen to engage in business that creates added value for the nation and society, utilizing available resources to grow and prosper together with its surrounding environment. Its Corporate Philosophy, the Catur dharma (four Ideal Obligations) consists of pledges which have strongly influenced management to make every effort to avoid generating negative stakeholder impacts.

Today, Astra is a public company⁶ with six business divisions:

- automotive
- financial services
- heavy equipment, mining and energy
- agribusiness
- information technology
- infrastructure and logistic value chain.

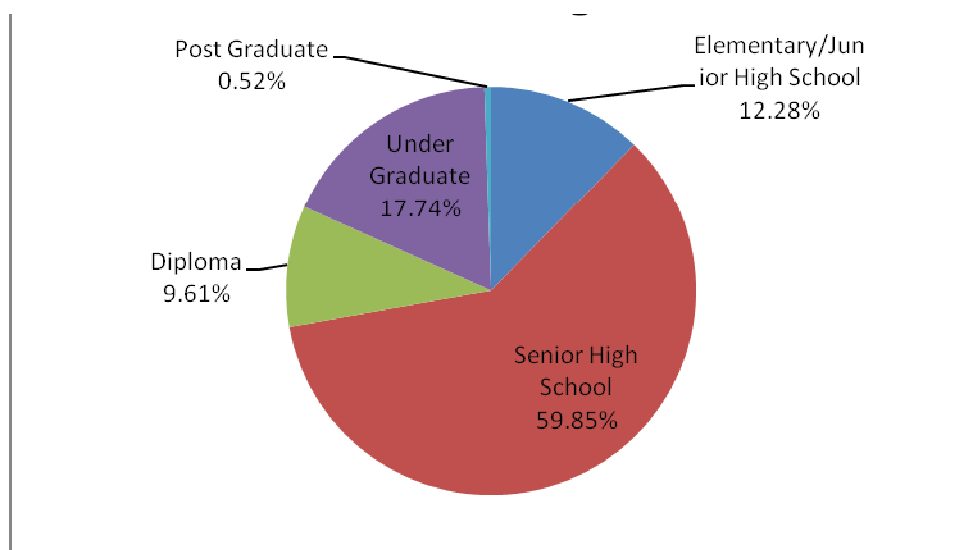
Covering Indonesia in these six businesses, Astra now owns around 170-180 companies in form of PT (Perseroan Terbatas). With such numbers, Astra employs around 117,000 people with various education backgrounds.

Figure 8. Astra's employees composition based on business divisions



⁶ Public company means that a company that has issued securities through an initial public offering (IPO) and is traded on at least one stock exchange or in the over the counter market (<http://www.investopedia.com>)

Figure 9. Astra's employees composition based on educational background⁷



Source: ASTRA International Tbk

Along with its development, in 1980s, Astra formed its first Environment, Health and Safety (EHS) Committees focused on awareness of fire and loss prevention. By the end of 1980s, as regulations on the environment were introduced, Astra saw the need of means to monitor waste and initiated an Environmental laboratory which has supported affiliated companies in measuring wastewater usage. Therefore, Astra opened recruitment in that year and conducted proper trainings to empower their employees (both the new and the old ones).

The introduction of EHS management in the 1990s created the need to refocus on the approach of managing the company, as reactive programmes had not helped management build a sustainable business. A pro-active approach became more appropriate and was in accordance with Astra's Total Quality Control System in use at the time.

Proactive initiatives have been translated into a 4C approach: Commitment, Compliance, Competence and Cleaner Production, which provide a foundation for Astra Green Company assessment criteria. The 4C approach was utilized from 1995 to 1999, and monitored results gave way to the birth of a new philosophy: the Astra Green Company. The EHS Corporate Policy of 2000 signified the creation of the Astra Green Company and involved four distinct pillars: Green Strategy, Green Processes, Green Products and Green Employees. These four pillars can be described as follows:⁸

a. Green Strategy

Green Strategy means that Astra is committed to provide environmental, health and safety protection and development at management level, consistently. The implementation of this EHS Management System complies with international standards such as ISO 14001 and OHSAS 18001.

⁷ The term 'Diploma' in the diagram referring to two years of study in college or in university.

⁸ Taken from: <http://bmw.astra.co.id/responsibilities/astra.asp>

b. Green Process

Green Process takes into consideration environmentally friendly and safe production processes and services which have the least negative impact on workers and the environment. These require not only the establishment of agreed core processes, but also support from sub-contractors and suppliers to comply with the rules, regulations and standards which Astra upholds.

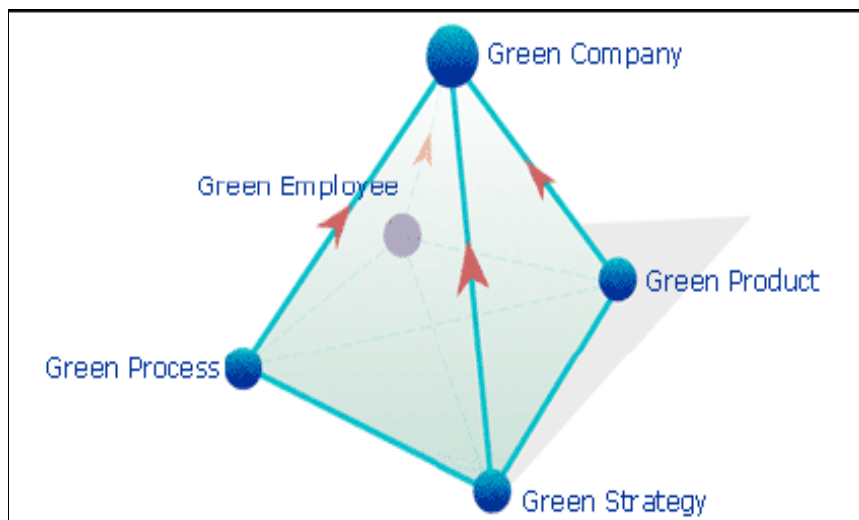
c. Green Product

Green Product ensures that both products and services are safe and friendly to the environment.

d. Green Employee

A Green Employee is a member of an organization which practices sound EHS management. At Astra, all employees from executive management to production line level are equipped with the proper knowledge and training to ensure a green attitude. Green Employees are, therefore, regarded as the most important of the Green Company's four pillars, contributing to the foundation and strength of the other three.

Figure 10. The Astra Green Company Pyramid



Source: ASTRA International Tbk

Astra management believes that business as a Green Company ultimately generates solutions to EHS challenges, as well as being a friendly interface with the environment and community.

Astra currently pays more attention to the environmental aspects of all their business divisions. They are continually updating themselves with international and national policies regarding to environmental issues. Whenever new trends emerged, Astra is always prepared to accommodate the trends for the coming year. In 2009, there are some targets that need to be achieved regarding the environment, health and safety; those are:

- Achieving “Green Level” based on Astra Green Company policy⁹

⁹ Astra Green Company is actually a company standard that has been adjusted with the latest improvements in the policy level, both the national policy and the international policy.

- Reducing the use of energy and other natural resources
- Reducing green house gases and the use of ozone depleting substances
- Cleaner production (6R) for waste and emission management
- Investigating workplace incident with an accurate follow up action Zero Workplace Incident
- Certifying EHS System
- Implementing EHS Management system within all suppliers' corporations

Obviously, in achieving the above targets, the need to have workers with specific skills appears both in the plants and in also in the business development centre. For instance, specific skills are mostly needed at plants for wastewater treatment units both for operational purposes and also for machine reparation. As for the business development centre, Astra admitted, people with special skills are highly needed; such as skills to construct business strategy for business development. At this stage, there are two options: to open recruitment or to undergo rotation of some workers. The latter is most likely a method that Astra will chose for operational works. Independently which option Astra decides on, whether opening new recruitment or rotation and mutation, training sessions to close the gap between the current skills with the expected skills will be held for all workers.

Astra International has a method to identify which trainings are needed by its companies. Because Astra International has to conduct trainings for all of its companies covering six business sectors, Astra will conduct meetings with people in charge of each company throughout Indonesia; the method is usually in form of focus group discussions. In search for the training needs, Astra has an Account Officer who will collect all inputs from Astra's six business sectors. The Account Officer will discuss the needs of trainings of each business sector. Based on the discussions, Account Officer would report the findings to Astra International which then will undergo further process before decision is made to eventually conduct certain trainings for all business sectors.

After completed training, each company has the responsibility to do monitoring and evaluation of trainees they have sent to a particular training. It is each company's obligations to know whether the trainees are able to apply their knowledge and skills to support Astra. Usually, Astra would have some internal projects that are related to the trainings given. By involving the trainees into the projects, monitoring and evaluation over the trainees' performance can be done. Based on the monitoring and evaluation, a training then can be justified its effectiveness. Samples of internal projects conducted were not exposed by the respondent.

One interesting training that Astra held for their employees is the one dealing with environmental policies. Since environmental issues both at national and international level are growing rapidly, Astra has to keep an update on the policies which later will be shared with the all Astra companies in form of trainings. For instance, Astra held trainings on PROPER which belongs to Indonesia's Ministry of Environment (Kementrian Lingkungan Hidup, KLH). The objective of the training itself is to raise the awareness of Astra's employees about the policy and how to conduct certain activities that are covered in the policy.

In improving management, there are some documents called UPL /UKL which consist of the required parameters to be satisfied for domestic waste. To be able to meet the parameters, Astra needs to conduct trainings that will empower all staff related to the waste management of the buildings.

The scope of the trainings is not always to develop skills, but also to increase the staffs' knowledge on environment. Astra admitted that to do procurement, for instance the waste water technology, the related staffs should understand what kind of technology they are dealing with.

Otherwise, they will find difficulties to understand what message the vendors are trying to convey.

According to Astra International, on average, trainees could reach up to 40 people per batch with different trainers depending on the subjects. Some trainings are conducted within Astra International (internal trainers), but there are some trainings with guest speakers. Employee training and development uses a variety of methods and approaches, including learning competence development through activities outside the class room such as on the job training, secondment, work rotation and job change. Since there was limited time to conduct the study, detailed information about labour profile in the company could not be accessed, due to internal policies of Astra. Moreover, the data collection method that was used was only a one-time interview with Astra. To know more details about Astra's labour intake mechanism, more interviews need to be done. Therefore, further study and communication with Astra should be conducted.

3.1.4.2 Climate field school for farmer

It cannot be denied that agriculture is the most impacted sector by climate change. Season irregularity, shorter rainy season but higher precipitation, longer dry season, and increased population of pest are threats to the sector. With labour force in agriculture, forestry and fishery comprising 40 per cent of the total labour force (Central Bureau Statistic - Suskernas, 2008), it is crucial to prepare the sector to adapt to climate change impacts. Without necessary improvements, in terms of human capacity or technology, the sector will not be able to manage the risks entailed to climate change impacts.

As part of its larger strategy in dealing with climate change impacts, the Ministry of Agriculture started an initiative to increase the adaptive capacity of farmers to climate change impacts. Although there is no major employment shift in the sector, the study case was categorized under green structural change and retraining needs because the initiative can be regarded as an effort to restructuring the sector in order to be able to manage the climate change risks by increasing the adaptive skills of farmers. Prior to climate change problems, the sector employment has experienced shift due to industrialization and urbanization. With the expected climate change impacts, the employment might be shifted as well.

The initiative was named Climate Field School for Farmers or Sekolah Lapang Iklim (SLI). In 2002, the SLI started in one district, namely Kabupaten Indramayu. But now, the SLI has reached more than a hundred districts spread out in Indonesia, with tens, even hundreds, of farmers per district. The Ministry has targeted to continue and increase the implementation in more districts to reach all districts in Indonesia. The funding comes from the Ministry budget and local government budget.

At present, the use of climate forecast information is minimal. At Indramayu, a district that is vulnerable to El Niño/Southern Oscillation (ENSO) events, farmers are always suffering from drought and flood whenever El Niño and La Niña occur. Some of the reasons are that farmers have difficulty in understanding climate forecast information that contains probability, and there is no effective dissemination system of climate forecast information to the farmers. Farmers are also not aware of the economic value of climate forecast information. As a consequence, the level of farmers' adoption to climate forecast information is minimal and they have no capacity to tailor their cropping strategy to climate forecasts. To increase farmers' adoption to climate forecast information, their knowledge of climate and its application should be improved (Boer, 2006).

A similar initiative was also supported by the Indonesian Meteorology Office since 2007-2008. In 2009, it was decided to integrate these climate field schools by having cooperation

between the Ministry and the Meteorology office. The first step in this cooperation was to develop integrated curriculum.

The SLI used the available networks already existing in the Ministry of Agriculture for other issues, such as water saving (field school for water saving or Sekolah Lapang Hemat Air) and pest control (field school for pest control or Sekolah Lapang Pemberantasan Hama Tanaman). The networks connect the Ministry's employees and farmers. These Ministry employees are called field instructors and pest monitoring officers, whose tasks are to work on the ground to assist the farmers directly in terms of knowledge transfer and capacity building. Prior to 2002-2003, the knowledge did not cover climate information.

The SLI was aimed mainly at increasing the farmers' capacity to be able to interpret climate and weather data (historical and forecast) and use the data in their decision making process in order to achieve better yield result. In SLI, the existing field instructors and pest monitoring officers are the teachers or trainers. These trainers were given sessions of Training of Trainer (TOT) at national level and provincial level. Later in the field, they modify the training material into local customs or characters, and use it for training the farmers.

The SLI is conducted generally once a year in twelve sessions for the farmers before the beginning of planting season before the rainy season. So far, there have been around 500 units of SLI during its implementation between 2003-2008, with 20-25 farmers for each SLI.

Below are the training modules:

1. Basic Module 1

To learn the dynamics of Indonesian climate, climate components observation and climate forecast.

Consists of a learning contract and nine modules:

- a. Learning contract
- b. Module 1: Introduction
- c. Module 2: Understanding the weather and climate components
- d. Module 3: Knowing the measurement tools for weather and climate components, and how to do data calibration
- e. Module 4: Understanding rain development process
- f. Module 5: Understand seasonal forecast terms
- g. Module 6: Understand the term "forecast skill" (uncertainty of climate forecast)
- h. Module 7: Understand "false rain"
- i. Module 8: Understand the linkage between El Nino Southern Oscillation (ENSO) phenomena and the beginning of rainy season
- j. Module 9: Field trip to climatology station

2. Basic Module 2

To learn: 1) the identification of climate problems and risk management through climate information utilization; and 2) climate information utilization to manage climate risk.

Consists of a learning contract and seven modules:

- a. Learning contract
- b. Module 1: Introduction
- c. Module 2: ENSO information utilization to develop planting strategy in dry land
- d. Module 3: ENSO information utilization to develop planting strategy on irrigated field
- e. Module 4: Learning the land water balance and the benefits to estimate irrigation water need and calculate the flood probability
- f. Module 5: Conducting economic valuation on seasonal/climate forecast information
- g. Module 6: Understand flood and drought control and monitoring programme
- h. Module 7: Field day

The monitoring and evaluation of the result of the SLI conducted by the trainers in the field is done on regular basis. The farmers and other stakeholders, such as the local Agricultural officers, the trainers, were asked to fill in questionnaires as part of monitoring and evaluation activities. Below are the questions in the questionnaire for farmers:

- Do you feel that the school is useful?
- If yes, please explain in what ways the school is useful for you.
- Do you feel that lately the climate conditions really affect your crops?
- Do you feel that lately the climate conditions is the main factor of your crop failure? If yes, do you think that after joining SLI you are more capable in anticipating the climate events?
- If yes, what did you do to anticipate such events?
- From which sources, you get the technology to anticipate the events? (The Local Agricultural Office, trainers, your farmer colleagues, or others?)
- Do you use climate forecast information in anticipating the events?
- If yes, where do you get such information? (The trainers, radio, or the local meteorology office, or others?)

From the monitoring document,¹⁰ the results vary between sites, such as:

- To some farmers, the SLI is a very important forum to learn about the rainfall level, the beginning of planting season, and other weather/climate variables. However, one of the constraint is the lack of access to more sophisticated weather/climate measurement tools.
- Due to knowledge from SLI and continuous climate observation, some farmers were able to have a better control on their plans and this led to better crop yields.
- Some farmers felt that due to SLI, they now have more capacity in planning the planting. Unreliability climate was considered as one of the factors of crop failures.
- However, some farmers felt that some of their SLI trainers and the local officials did not have sufficient knowledge and capacity. Thus, the SLI implementation was not effective and not sustainable.

¹⁰ See the project website for further details The summary of the monitoring and evaluation can be found in http://www.indonesiaapncapable.com/download/2008-2009/publication/Monitoring_dan_Evaluasi_SLI-1.xls

3.2 New and changing skills needs

3.2.1 New green collar occupations

As the economy moves towards green production, new sectors emerging to answer the needs for green technology and green materials. These new sectors bring a new dimension to the labour market by adding new occupations or the new green collar occupations.

Below table provides indication of the main new sectors emerging as the result of greening economy. The classification of the environmental services sector was taken from the SRKLI¹¹ list. The company scale relatively relates to the level of technology and capital investment involved in the sector. For sectors with relatively more sophisticated technology and higher capital investment involved, the larger companies are expected to dominate the market. The location relates to where the material or input and consumer are located. For example, geothermal power plants are mostly located in the rural areas because the steam source is located close to volcanic area. The ownership factor is also relatively related to the technology factor.

Table 3. The main new sectors emerging as the result of greening economy

Company scale		Location		Ownership		New occupations	
Sector	Large	SMEs	Rural	Urban	National		Joint venture/ Multi-national
Renewable energy							
Geothermal	√		√		√		Geothermal engineer Electrician
Big hydro	√		√		√		Hydro engineer Electrician
Small or micro hydro		√	√		√		Hydro engineer Electrician
Solar panel retailer		√		√	√		Electrician
Wind power	√			√	√	√	Wind engineer Electrician
Biogas	√	√	√	√	√		Biogas engineer Electrician
Municipal waste	√	√		√	√		Waste engineer
Biofuel	√	√	√		√		Biomass/waste engineer
Carbon Consultants	√	√		√	√	√	Carbon accounting expert Financial analyst for carbon projects

¹¹ SRKLI (Standar dan Registrasi Kompetensi Lingkungan Indonesia) or Indonesian Standard and Registration for Environmental Competency is a standard showing the minimum competency required for certain professions in environmental services sector

Sector	Company scale		Location		Ownership		New occupations
	Large	SMEs	Rural	Urban	National	Joint venture/ Multi-national	
Environmental services							
Environmental Impact Assessment	√	√		√	√		Environmental officer
Recycle	√	√		√	√	√	Waste collector Recycle officer (engineer when heavy recycling machinery is used)
ISO 14000 consultant	√	√		√	√	√	Environmental officer
Environmental laboratory	√	√	√	√	√	√	Physicist/ Biologist/ Engineer/ Chemist, etc
Environmental quality monitoring	√	√		√	√	√	Environmental expert
Maintenance	√	√		√	√		Environmental officer
Environmental training and education	√	√		√	√		Educator, Psychologist
Water and liquid waste management	√	√	√	√	√	√	Waste expert
Hazardous and toxic waste management	√	√	√	√	√	√	Waste expert
Noise management	√	√	√	√	√	√	Noise expert Monitoring officer
Air pollution management	√	√		√	√	√	Air quality expert Monitoring officer
ISO 14000 certification bodies	√	√		√	√	√	ISO 14000 expert

These new sectors, such as alternative energies and environmental services, emerged due to several factors, i.e. technological change and new regulations at global or national or even local level. In Indonesia, all these factors have influenced the development of new green collar occupations. For example, the national regulation on Environmental Impact Assessment (EIA)/AMDAL led to the development of EIA/AMDAL consultants. Same case applied to ISO 14,000 consultants, vehicle emission controller, and industrial waste management sectors. However, some sectors emerged purely because of business opportunities, such as recycling industry, as there is no legal requirement for individual consumer to manage their waste.

Technological changes or invention and its availability at competitive prices in the domestic market are other factors that encourage new green collar jobs. Currently, more and more solar panel retailers operate in Indonesia and this has lead to the new occupation of solar panel

electrician. The same has happened to other alternative energies, such as geothermal and wind power. It is also important to note that in some cases, the new sector/occupation development derived from combination of both technology and regulation factors. The availability of new technology and innovation in renewable energy and government programmes on renewable energy promotion both have led to renewable energy development in Indonesia that eventually created new occupations related to the sector.

In the case of two case studies presented in section 3.2.5, the development of new green jobs is a combination of both technology and regulation factors. The Petromat case showed that the availability of solar cooker technology is the main driving factor of its project implementation, while the existence of carbon trading demand at global level is another contributing factor. The carbon consultant case showed that new regulations, even at the global level, might lead to new business opportunities and eventually more new jobs.

These new sectors are not yet a familiar research topic. There is no data collection specifically related to green jobs. There is no public data available for the jobs' record in a very specific sector. For example, in order to quantify the employment in geothermal sector, survey of every geothermal power producers is the only way to get the numbers.

The same problem is valid on the demand-side. There is no public data available on vacancies from these new sectors. Thus, in order to analyze which new jobs have the highest demand in the country or where these new jobs is concentrated, a comprehensive survey must be conducted in these new sectors.

Regarding education level for new green collar occupations, again there is no public statistics available to be the basis for understanding the issue in more details. However, from the study case or interviews conducted with respondents, it can be concluded that necessary education background is varies from one company to another. One company has strict education criteria in hiring new employees, while others not (see study cases in 3.2.5).

3.2.2 Greening existing occupations

Some sectors, such as retail, added green components due to market-driven factors, such as business competition. The increased public awareness on environmental issues encourages the retails sector to add green components in its products processing, to attract more consumers. Other sectors added green components because of application of greener standard by the government, such as retrofit and recycle of refrigerant.

Below table provides indication of which new sectors are moving towards greener practice as the result of greening economy. The company scale relatively relates to the level of technology and capital investment involved in greening the sector. For sectors with relatively more sophisticated technology and higher capital investment involved, the large companies are expected to dominate the market. The location relates to where the material or input and consumers are located. The ownership factor is also relatively related to the technology factor.

Table 4. New sectors which are moving towards greener practice as the result of greening economy

	Company scale		Location		Ownership		Greening Occupations
	Large	SMEs	Rural	Urban	National	Joint venture/ Multi-national	
Forestry							
Sustainable plantation	√		√		√	√	Planter/harvester Plantation manager
Degraded land rehabilitation	√	√	√		√		Land user (farmer, plantation owner, forester)
Research and assessment on environment-friendly technology	√		√	√	√	√	All related occupations
Retrofit and recycle of refrigerant	√	√		√	√	√	Technician

3.2.3 Identification of skill needs

The skill needs are mostly identified internally within the companies. Based on interviews conducted in the case studies, as the environmental issue is dynamic and progressive, skill needs are identified based on the needs driven by changing in the market or in this case in the greening economy. The method differs from one company to another. In carbon consultants for example, the skill needs is identified whenever there is update to regulations on carbon trading. New requirements induced by changes in market or regulations, either at international or national level, would create new adjustments to the applicable sectors. In order to conduct the necessary adjustments, sometimes modifications in the labour skill in those sectors is needed.

At national level, unfortunately, there is no systemic approach yet, conducted by the government, academics or non-governmental organizations (NGOs) to monitor the skills needs in the market that encourages regular updates for the companies. Some case studies showed that updates or capacity building were conducted by the companies themselves.

In order to be able to response quickly to the changing market, a better institutional arrangement and cooperation is needed between stakeholders. Private sector is still playing the leading role in skill needs identification and fulfillment.

3.2.4 Skills response

As the green sector just recently started to develop in Indonesia, green skills response followed the same path. The structured formal green skills response is not fully implemented in all green sectors. There is no formal evaluation of the effectiveness of the response developed formally, neither from policy and planning side nor from end-users side.

Based on discussion with officials from the Ministry of Labour, the government has started to initiate discussions on green jobs. In response to the demand for skills needed in new emerging green sectors, such as environmental services, the Ministry of Environment in cooperation with

the Ministry of Labour, started an initiative called environmental competency in 2009. There are three systems for the competency standards, which are:¹²

1. SNI (Standar Nasional Indonesia) or Indonesian National Standard is a standard for products showing that the production process has met the national standard requirements.
2. SKKNI (Standar Kompetensi Kerja Nasional Indonesia) or Indonesian National Work Competency is a standard showing the minimum competency required for certain professions.
3. SRKLI (Standar dan Registrasi Kompetensi Lingkungan Indonesia) or Indonesian Standard and Registration for Environmental Competency is a standard showing the minimum competency required for certain professions specifically in environmental services sector.

The latter standard was strengthened by several Minister of Environment decisions (Permenlh) such as:

- Permenlh No. 06/2006 on general standardization guideline on personnel and institutional competency of environmental services,
- Permenlh No. 02/2007 on competency for retrofit and recycle technician, including refrigerant workshops,
- Permenlh No. 11/2008 on competency for AMDAL documents writers included the consultant firm providing the service;
- Permenlh No. 06/2009 on competency for environmental laboratory;
- Permenlh No. 03/2009 on competency for water pollution management.

Currently, the Ministry is continuing this effort by setting up the competency standard for professions not yet covered by existing decisions, such as GHGs emission validators and verifiers, motorized vehicle emission accountant, and environmental auditor.

Beyond the government initiatives, the companies are conducting on the job training to increase and maintain the capacity of its employees.

3.2.5 Case studies on new green collar occupations

3.2.5.1 PT Petromat Agrotech (PT PA): Enhancing renewable energy development in Indonesia

Petromat Agrotech is a company started operations in 1985 in the area of renewable energy, especially for Solar Home System (SHS). In 2006, PT Petromat Agrotech conducted the Clean Development Mechanism (CDM) project as an authorized distributor and integrator for Solar Cooker Project in Aceh, Indonesia. The project is recognized as Indonesia's first registered CDM project in the United Nations Framework Convention on Climate Change (UNFCCC). Petromat Agrotech employs ten people, among them are three women who are working in the area of marketing and administrative.

Its role in the Solar Cooker CDM project in Aceh, aside from being suppliers and trainers for the users, Petromat Agrotech was also the mediator between Germany (donor) and the people in Aceh. They also were responsible to train local people on how to use the given Solar Cooker.

The existence of Petromat Agrotech gave new opportunities of green jobs to develop, especially the Technical Staffs, who are usually placed in the field. The trainings not only

¹² Further information, see <http://www.kompetensilingkungan.menlh.go.id>

covered the knowledge of renewable energy, mostly related to solar energy, but also on how to become a good trainer for people in the field (site). The trainers are usually using in-house training, but there are also some training for which PT PA sent their workers.

Since the line business of PT Petromat Agrotech is mostly equipment distribution, therefore, PT PA needs to have many trainers in the field, simply to train people who are going to use particular equipment. Thus, PT PA is always looking for energy technique's specialists in the field.

The specialist will not only supervise people on how to use their equipment, but the other role is to identify other possibility that can be explored by PT PA. For instance, in Aceh, PT PA was not only contributed in Solar Cooker project; but PT PA, through its energy technique's specialist, also look for possibility to enhance the use of other renewable energy use; Solar Home System to name one.

In conclusion, Petromat Agritech does have an understanding on green jobs. However, the simple technology of solar cooker is not familiar yet among the users. It really needs a big promotion to introduce it, as a simple, low cost, environmentally friendly technology. In consequence, Petromat Agritech tried to incorporate their understanding on green jobs by promoting, retraining people involved in order to achieve its goals as a company that provides renewable energy for people's daily use.

3.2.5.2 Indocement: Applying alternative fuel for cement production

PT Indocement Tunggal Prakarsa Tbk. is one of Indonesia's major producers of quality cement and specialty cement products. The company was established in 1985 and has integrated cement operations with a total annual designed production capacity of 17.1 million tons of cement. Today, the Indocement business focuses on the production and distribution of cement, ready-mix and aggregates. Having 12 plants in Indonesia, by December 2008, Indocement employed 6,179 personnel. Indocement believes that green jobs include all activities that significantly contribute to preserve or restore environmental quality. The definition reflects that Indocement has the knowledge of green issues that lead them to their environmental goals. Indocement's strategy regarding environmental issues covers four areas, namely, biodiversity, using waste as a resource, protecting the climate and also to reduce other environmental impacts by 2020. These goals of Indocement have made them realize that they need to adjust their workers in order to achieve it.

In May 2006, Indocement had conducted a CDM activity by reducing their CO₂ emission through the use of alternative fuels in clinker burning. The project aims at introducing alternative fuels to substitute fossil fuels, predominantly coal at that time, which was consumed during clinker burning at Indocement's production plants. Indocement then utilized biomass and other alternative fuel types such as rice husks, saw dust, plastics, paper, textiles, used tires, waste oil, industrial liquid and solid waste.

In applying the above CDM project, there are some changes in Indocement regarding their workers. There are systems and equipments which are installed mainly to include alternative fuel storage, waste transportation and collection system, fuel feeding and burning system. Equipment needs depend on types of alternative fuels usage; for instance, if the alternative fuel is tyre then it should be treated differently with the alternative fuel if it is textiles. This prompted Indocement to establish a new unit called Alternative Fuel and Raw Material Unit. New unit means that new skills and knowledge are needed. Therefore, to accommodate new installations and its operation, Indocement's workers needed to be improved.

To accommodate it, Indocement identified its need of workers. There were several positions for offer:

- Direct workers: Alternative Fuel and Raw Material Technical Manager, Senior Environment and Compliance Officer, Lab Analyst, Pre-treatment, CDM Monitoring Officer.
- Indirect workers: Waste transporter, Waste collector, Waste platform, Laboratory.

Though the mentioned positions were filled, Indocement still had to undertake trainings to enrich their workers' knowledge and skills regarding to the new unit. Trainings included hazardous waste handling, co-processing (hazardous waste utilization in cement kiln), dioxin/furan and heavy metal emission monitoring and Environmental Management System (EMS) ISO 14001; all conducted to run the new unit.

Recalling their skills needs for future development, the gap between the existing positions and the desired positions were filled with in house training and on the job training; this is how they identified their needs to undertake the trainings. In some cases, Indocement also has received some assistance to implement a green job strategy, such as from DP Solution¹³ on CDM.

Participants who are joining the trainings, will then be evaluated through their competency evaluation and performance appraisal. While the effectiveness of the training itself will be evaluated through company's goals evaluation.

Indocement has given training to almost 650 people in various fields (Table 5) with some of the trainings on specific issues given by outsourced experts. Trainings undergone were also to equip Indocement's workers in the Alternative Fuel unit.

Table 5. Types of training at Indocement

Types of training	Number of participants (within the Company)	Trainer
Hazardous waste handling	540	European Cement Research Academy (ECRA)
Co-processing (hazardous waste utilization in cement kiln)	50	Co-processing guideline in kiln cement by Indonesian Cement and Concrete Institute (ISBI)
Dioxin/Furan and Heavy Metal Emission Monitoring	55	AFR (Alternative Fuel Raw Material) Technical Manager

Indocement has recognized that there are new collar occupations that needed to exist, especially due to environmental considerations, regulations or mitigation or adaptation strategies on climate change. Indocement has identified the need of alternative fuel and raw material technical manager along with senior environment and compliance officer. The identified positions are filled by new recruitment, since there were no suitable workers who could fit to the positions.

Based on the job descriptions identified, Indocement finally set qualifications criteria to fill the positions. Each position would need specific background of studies, personal skills and others related to equality of gender. For instance, when Indocement opened vacancy for Senior Environment, the skills qualifications were attached. The requested skills qualifications demanded that a person who ought to fill the position have to be an expert on hazardous waste characteristic, process and government regulations and also expert on environmental aspect. The mentioned qualifications will be sharpen by trainings that are listed in Table 5 above.

¹³ DP Solution is a carbon consultant.

In conclusion, Indocement does have an understanding of green jobs. In consequence, Indocement tried to incorporate their understanding of green jobs by recruiting and retraining workers who are involved in order to achieve the Company's goals. However, since Indocement was only replying the questionnaire, there was no further information about how does formal education and training conducted was communicated.

3.2.5.3 Carbon consultant

Since Indonesia ratified the Kyoto Protocol¹⁴ in 2004, Indonesia is eligible to participate in the carbon market under the Protocol through the CDM. The CDM is basically a trading of certificates of emission reductions credits between a developing and an industrialized country (or the targeted countries under the Kyoto Protocol), where the credits are resulted from a project implemented in developing country.

In order to be acknowledged as a CDM project, the project must satisfy certain modalities and procedures, set by international and national standard. At international level, a project must follow the CDM project cycle and pass certain tests proving that the project indeed reduces emissions compared to the common business-as-usual practices. At national level, the project must be able to contribute significantly to the national sustainable development according to the national standard.

To develop such a project, the project owner must assess the carbon potential of the project, prepare the necessary documentations, and follow the modalities and procedures set by international and national regulation. Considering that the process is complex and challenging, carbon consultants are often hired to assist project owners as the companies who own the project sometimes do not have the specialized capacity to perform the tasks.

Carbon consultancy is a new sector in Indonesia. However, the sector is quickly growing as the demand is high due to high emission reductions potential in Indonesia. Since a few years, several carbon consultant firms operate in Indonesia. In 2005, there was only one company, while in 2009 there are around twenty. Many of those firms are joint ventures or branch offices with headquarters based abroad.

In a carbon consultant firm, generally there are three task divisions: origination, qualification and evaluation. The main task of origination is basically marketing or looking for clients. The main task of qualification is to provide services for carbon project preparation or project design documentation development, walking the project through the CDM project cycle, and getting the necessary approvals. The main task of evaluation is to conduct monitoring of the project implementation/operation process and to walk the project through the verification and certificates issuance process.

In order to focus to a specific occupation, this case study will only look at the worker in the qualification division. There are two respondents as the information sources for this case study and the methodology used is in-depth interview. The first respondent was Ms. Rizka Sari from Camco Global, while the second one was Ms. Susy Simarankir from Asia Carbon.

The tasks of the qualification team is to conduct due diligence, to prepare the additionality argument (or proving that the project is not a Business-As-Usual (BAU) case and the emission

¹⁴ The Kyoto Protocol is an international agreement developed under the UNFCCC in 1997 that entered into force in 2005. The main objective of the Protocol is to reduce green house gases emissions of the industrialized countries at 5 per cent below 1990 levels by 2008-2012. The emission reduction targets can be undertaken individually or jointly with other countries through three flexibility mechanisms, which are Emission Trading, Joint Implementation and CDM.

reduction potential is valid and verifiable) and project design documentation and processing until the project is regarded as a CDM project.

In order to undertake these tasks, a combination of technical and financial skill is needed. Technical skill here refers to capacity to perform the calculation of emission reduction potential of the project using eligible methods defined by the international CDM-governing body, which is called the CDM Executive Board (CDM EB). While, financial skill refers to capacity to undertake financial analysis of the project showing that the project is not a BAU case.

Usually when a person hired to do the job, the company will provide an internal training to ensure that the person has a thorough understanding of CDM knowledge. And along the way, to keep the knowledge up to date, trainings are also conducted whenever there is a new decision on methodologies by the CDM EB. Unfortunately, insights on the material of trainings were considered as confidential information by the companies and thus were not available for the study.

Performance evaluation is conducted through a Key Performance Indicator (KPI), submitted every three months, in which the employee submitted a target checklist. The KPI can be used as a basis to further analyze whether certain skill training is needed in order to improve the employee's performance. The KPI was decided by the employer.

Based on the respondent's experience, most of the time, the low performance of KPI was due to external factors, such as delays caused by slow work progress by third parties or changing regulations.

Although the carbon calculation is a new field, unfortunately, there is no capacity building assistance provided by the government or international agencies to increase and develop the skill within the country.

In terms of business or professional association, there is a Project Developer Forum (PDF) at global level, where carbon consultant firms from around the world can share their experiences with each other and gather forces to improve the CDM-related policies. Another similar institution also exists and called the Carbon Market Investor Association (CMIA) with objective to sustain CDM market through a better dialogue between the carbon investors and the countries' delegates.

When asked what is still needed to improve the carbon consultant firm services, the respondents mentioned that so far the skills problem can be managed by following the updates on the CDM EB and when necessary provide trainings to improve the skill. The main challenges lie in the work pace of the third parties, i.e. the validators and the designated national authorities. The third parties skill gaps are not discussed in this study case as it is outside the boundary of carbon consultants.

3.2.5.4 Community-based ecotourism

Deforestation is one of major environmental challenges faced by Indonesia. The massive cutting of forest trees not only destruct the ecological function of the forest, but also disturb the ecosystem and the living things dependant on it, including the humans, who in most cases is partly the responsible to the problem. At larger scale, deforestation is one of major global GHG emission sources and this makes solution to deforestation a necessity to mitigate climate change.

The problem in forestry sector in Indonesia is very complicated. One needs to use holistic and inter-disciplinary approach to look at the problem and come up with solution. Community-based ecotourism is considered as one alternative ways to keep the forest conserved and bring incomes to the locals at the same time. The case study will look at what are the necessary skills

for a community to be able to develop a community-based ecotourism. Instead of looking at a specific occupation in a ecotourism operation entity, a broader approach is applied.

This case is based on interview with Ari Suhandi, the director of Indecon Foundation. Indecon foundation is a local non-governmental organization that focuses on community based eco-tourism. Started in 1995, Indecon was initiated by Conservation International Indonesia, The Institute for Indonesia Tourism Studies and Bina Swadaya Tours. Indecon found that ecotourism is a comprehensive tool to conserve biodiversity and to involve local communities and organization in a participatory way to derive maximum benefits in a sustainable way. Indecon believe that ecotourism has a potential to improve the quality of the environment, cultural values, local community prosperity and quality of human relation in general. Since 1995, Indecon have facilitated various ecotourism sites development for ecotourism stakeholders in Indonesia, mainly by conducting research on the ecotourism potential and later training the stakeholders to develop and provide ecotourism services.

In setting up community-based ecotourism, the local communities first must have a strong bond internally or have a good organizational skill. After the institutional arrangement was set up, then the communities must be able to comprehend the knowledge of environmental and ecological sustainability and tourism business and later combine the two concepts. There are four aspects that need to be considered in developing a community-based ecotourism site:

1. product development,
2. capacity building on organizational or institutional strengthening,
3. internal policy that influences the site and outside the site, and
4. financial – micro finance including the benefit distribution between communities' members.

Following those four aspects, Indecon has five focuses in its activities:

1. Research and planning

Indecon is actively conducting research to find a simple solution in creating models of ecotourism development. The organization also conducts ecotourism assessment to support government policies, followed by facilitating an integrated planning development by all stakeholders to strengthen implementation. Indecon is actively involved in national ecotourism development consolidation forum supported by the State Ministry of Culture and Tourism; participated in the establishment of Regional Ecotourism Development Guidelines supported by the Department of Internal Affairs; participated in the establishment of Ecotourism Development Guidelines in Conservation Area with the National Impact Assessment Institution in cooperation with the Nature Tourism and Environmental Services Directorate, Department of Forestry.

2. Capacity building

Improving technical capacity is one of the key success factors in achieving a sustainable ecotourism management. Empowerment will not only be enhanced at local community level, but more importantly at the level of tourism developer, manager and decision maker. Indecon is building the capacities of ecotourism planning and management by facilitating information access, providing human resources development through training and provide opportunity for internship.

3. Destination development

Facilitating regional and local partners to develop their area to become ecotourism destination is one of Indecon's priorities. Indecon's role in destination development is

creating models for ecotourism development which is appropriate for and can accommodate nature conservation, cultural heritage and community participation. Some examples include Indecon's assistance in the development of Community-based Ecotourism in Togean Islands, Central Sulawesi; Conservation Education-based Ecotourism in Gunung Gede Pangrango National Park and Community-based Ecotourism in Gunung Halimun National Park, West Java; Ecotourism Development in Betung Kerihun National Park, West Kalimantan; Community-based Ecotourism Development in Tangkahan, North Sumatra; and Community based Ecotourism in Menoreh and Borobudur, Magelang District - Central Java.

4. Marketing

Indecon is taking the opportunity to promote ecotourism products, in the form of books, newsletter, policy papers and ecotourism packages. As marketing is one of the biggest obstacles in community based ecotourism development in Indonesia, Indecon has also coordinated marketing efforts and supported marketing through its international networking.

5. Monitoring and evaluation

To guarantee visitor satisfaction, local economic growth, natural resources protection, positive cultural exchange, heritage preservation, and community involvement in ecotourism Indecon has developed guidelines for monitoring and evaluation for ecotourism destination as part of its responsibility to minimize negative impact. For instance, Indecon has assisted Alami Foundation in developing visitor management and monitoring system in Bodogol Conservation Education Center in Gunung Gede Pangrango National Park. The organization has also been involved in assessing environmental programmes implemented by a number of hotels in Bali, a project that was initiated by Bali Fokus and supported by Center for Environmental Leadership in Business (CELBI) Conservation International.

Improving technical capacity is one of the key success factors in achieving a sound and sustainable ecotourism management. Empowerment will not only be enhanced at local community level, but more importantly at the level of tourism developer, programme manager and decision maker. The increase of both human resources and organization capacity (including skill and knowledge) is one of Indecon's priorities.

A series of trainings were conducted by Indecon. Some of the training activities are:

- **Ecotourism Training for Trainers.** A ten day training to strengthen ecotourism planning, development and monitoring.
- **Ecotourism Perspective Training.** A four day basic ecotourism training, to increase ecotourism knowledge.
- **Ecotourism Development and Marketing.** A three day basic ecotourism planning and development combined with field visit.
- **Ecotourism Interpretation Training.** A two day training to increase the interpretation knowledge and skill.
- **Ecotourism Guide Training.** A four day training to develop guide skill and knowledge.
- **Ecotourism Field Practice Training.** A seven day training in ecotourism theory and its implementation in the Field, especially for community based participation issues, business and interpretation.

Those trainings provided by Indecon and funded by several donor agencies or government. The skills missing are identified in the beginning stage of the cooperation when Indecon conducted assessment on what are the potential and the weakness of the targeted communities.

One of Indecon's sites is Tangkahan village in Gunung Leuser national park, Aceh province. In Indonesia national parks are managed by the national park office under the Ministry of Forestry. Indecon initiated collaborative management between the community of Tangkahan village and Leuser national park so that the community will collaborate with the park management to protect the park. Before the collaboration existed, many villagers worked as illegal loggers encroaching the forest within the park boundaries. With the collaboration, the community was directed to provide eco-tourism services in the national park. While the park management is still held by the national park office, the eco-tourism activities are conducted by the communities. Villagers were given training to be the eco-guides. Not only are the guides able to show exotic places and flora and fauna living in the park, but the guides also taught to practice eco-sustainable behaviors and transfer the knowledge to the tourists as well.

In Tangkahan case, not only the illegal loggers were given awareness to protect their ecosystem, but also were given an alternative income mean to support their livelihood. Of course, the income as eco-guide hardly competes with selling illegal woods, but when one incorporates the external cost of ecosystem degradation and personal safety, then being a farmer plus eco-guide is a good option. The illegal logging activities not only harms their environment, but also personal safety and often leads to social unrest among villagers.

3.2.6 Case studies on greening existing occupations

3.2.6.1 Medco Energy: Adjusting company with renewable energy (Geothermal)

MedcoEnergy is an Indonesia-based group of integrated companies, engaged in the energy sector with focus on Oil and Gas E&P, Power Generation and Downstream Industries. The group is committed to supporting the Government's strategy to meet the nation's future energy needs in a responsible way. Currently, there are three big business division in Medco; Oil and Gas Exploration and Production, Power Generation and Downstream Industries. Today, MedcoEnergy employs around 2,100 workers within MedcoEnergy International and its subsidiaries.

For Medco Group, 'Green jobs' would emerge in the area of renewable energy and energy efficiency. In the Medco Group itself, green jobs are likely to appear in activities related to geothermal, ethanol and fuel switching activities from fossil fuel to non-fossil fuel.

One of Medco Group's strategies is to participate in the second 10,000 MW power project (of Indonesia's Government) by developing some renewable energy and energy efficiency projects. The Group has established the Ethanol division in order to anticipate the sustainable development in the power and industrial sectors. The activity includes provision of raw material for producing methanol in collaboration with local farmers.

Having the mentioned strategies, Medco has prepared a to-do-list that will be done to accomplish the mentioned strategies. Medco has identified two categories of workers that it will hire for this issue. Medco planned to have direct workers and indirect workers. Direct workers will be those who have the capacity and capability to be employed inside Medco, such as Environment and Compliance manager and staff for the environmental division. But, Medco needs farmers and field supervisors as indirect workers. Identifying and gathering all workers will be just the beginning of the journey to achieve the real goal. These workers will need to have trainings to increase their capacity. Two examples of trainings that are undertaken by Medco are hazardous waste handling and Environmental Management Systems (EMS) ISO 14001. MedcoEnergy is basically working together with local institutions to train the farmers.

Along its path to achieve its goals, Medco is now going for renewable energy, especially those related to geothermal, ethanol and energy efficiency divisions. In geothermal unit, Medco then opened a vacancy for Geothermal Plant and Operation Manager. Opening the mentioned

positions is actually a way for Medco greening the company itself. But, to green the labour, Medco has conducted several trainings that were needed. These positions are hoped to fill the gap between current skills and the new ones required in Medco.

The first time Medco opened the vacancy, the desired skills they were looking for to attach to Medco were expertise in geothermal, while the existed skills at the time were not suitable. This is due to before MedcoEnergy decided to expand to the area of renewable energy, the existing knowledge of energy was still around the oil and gas issues. Therefore, some changes or additional knowledge on how to operate renewable energy, how to explore it and also how to manage it, became important; and an expert must be hired to work on it. The available human resources' options were to have staffs' rotation and mutation, or to recruit new workers which have the closest qualifications.

In collecting the data, a questionnaire was used. Since Medco only replied in writing the questionnaire without having an interview, there was not much information to be elaborated in this report. The unshared information is related with Medco's internal policies.

3.2.6.2 Green Building Council (GBC) Indonesia: Enforcing green building development in Jakarta

Peoples' daily operation in buildings contributes to GHG production in significant amount; some due to the use of energy. From the total energy consumption of Indonesia in 2006 of 8,353.8 million BOE, residential consumers amounted to 36 per cent. Through energy management (changing light-bulbs, replacing hydrocarbon refrigerant, for example) in household and commercial buildings, according to Technology Needs Assessment of Indonesia, the country has an energy conservation potential from 10 to 30 per cent. Therefore, building's management and design has the potential to reduce GHG production. Building's management and design can also contribute not only in terms of carbon emissions, but also to waste management in a building.

GBC Indonesia is a non-profit organization that is trying to raise the awareness in people's working environment, using the term of "Green Building" in the planning stage, development and also maintenance of a building. The council itself believes that the term "Green Building" applies mainly in the building management side; such as the energy use, domestic waste management, etc. Of course, in the efforts of mainstreaming the Green Building, GBC definitely will need additional knowledge from what they are having currently. One of GBC's output is a guideline on green building (can be seen in <http://www.gbcindonesia.org>). The guideline can also be used by other people for building consideration.

Since Jakarta is already compacted with buildings, the other way to establish green building concept in Jakarta is through retrofitting. Currently, GBC is working on Jakarta's city hall, but not yet finished.

To have a workforce with full knowledge of 'Green Building' and could support the development of Green Building in Indonesia, there are some trainings to undergo about the Green Building issue in GBC. The trainings that are considered important to undergo cover capacity building to have a good foundation on green issues, mainly environment, for each employees of GBC. Then, external trainings would be conducted to improve and broaden capabilities about green rating systems and certification tools. These trainings are usually undertaken in other countries or by inviting guest lectures by experts who have experience in implementing green concept in certain countries.

Not only are the external but internal trainings also conducted. The form of the internal trainings are more like a group discussion about members' experiences from different background, monthly gathering with regular changes of themes with one of them giving

presentation to harmonize and build up some issues, especially those related to sustainable site, energy and atmosphere, water efficiency, indoor environment quality, and material resources. GBC has vision to develop sustainable building in Indonesia regarding to the Green Building implementation with respect to market value aspect and at the same time will try to increase the awareness on environment by changing working pattern in all aspect (planning, development and maintaining a building). In respond to that, GBC made some interesting strategies; one of it will be to create green certification tools for both new construction and existing buildings. The green tools called Greenship Rating System. The tools are a set of voluntary performance standards for the sustainable design, upgrades and operation of buildings. The tools also provides sustainable guidelines for building operations, periodic upgrades of building systems, minor space use changes and building processes.

In Green Building works, to achieve 'Green' standard, building owners do not necessarily need to procure new equipments to install. Because basically, the issue of being 'green' involve the change of mind set including community behavior, lifestyle on how to make a positive impact to earth and also to have a concept in resource management. If there has to be changes in the equipment or appliances, it would cover the change of inefficient lamps and office facilities with higher efficiency with various investments started from the lowest one.

GBC also hopes that in the future almost all parts of the organization will become greener in the environment. Several positions in the council can be seen below:

Table 6. Positions at GBC Indonesia

Position	Location	Education background	Skills needed
Head of Environment Panel	Office based	S1 (Strata 1) degree with background of environment or communication study	-Having the ability more in motivating and to encourage others in developing workable ideas and also in the resources management
Head of Green Champion Activities	Office based		
Energy Manager	Field based	S1 degree with background in any of the following: -Environment -Architect -Mechanical engineering -Electrical engineering	-Having excellent interpersonal and communication skills to team projects -Motivated, self-reliant, capable and able to get the job done efficiently in the least possible time
Operation Manager	Field based	-Chemical engineering -Civil Engineering	

Source: Questionnaire to GBC

Take for an example an Energy Manager in GBC. The previous skills they have were simply about how to install equipment without considering the energy usage. But in the GBC, Energy Manager has to have additional skill about how to manage all appliances in such a way, that the energy usage will be more efficient.

According to GBC, in terms of tasks, there is no big difference between the new ones (with green policy included) and the currently standing ones, because the idea of Green Building adopted is not necessarily having new building per se, but it is more about changing the existing lifestyle or building management style.

This probably will be different in other countries. But then again, since Green Building in Jakarta is still an initiative, no case study on green building in Jakarta is available yet.

All information in this section is based on questionnaire that was sent. To have further insight on Green Building Development in Jakarta, further study is recommended with more data collection to be conducted; such as focus group discussion, interviews with other workers in GBC and other methods that are suitable.

4. Conclusions

4.1 Main ‘greening’ shifts in economies and labour markets

Due to environmental issues development in these days, there are efforts from various companies and organizations to anticipate the issues. As can be seen from the case studies above, several sectors are affected by the development of environmental issues; not only they have to conduct trainings to improve their staffs, but there are also some occupations emerging as new jobs which will create new employment.

But apparently Indonesia’s government has not yet listed how green issues will be affecting the labour markets in Indonesia. Further study needs to be conducted regarding this and also data collection on workers in each sector in specific activities. For instance, how many people working in the oil and gas industry; and comparing it to how many people working in the area of renewable energy issue.

4.2 Skills implications and development

4.2.1 Anticipation and identification of skill needs

1. There are several options to anticipate skills needed due to green issues. Depending on the positions, some institutions can decide to do rotation followed by equipping process (through trainings). But there are positions, mostly related to technical aspects, where companies decide to do new recruitment; especially if the companies will apply new technology.
2. Skill development for qualified human resources and skilled personnel are crucially needed to achieve goals for green economies.

4.2.2 Response policies and programmes

1. For general environmental issues, there are several certificates and documents that can justify the ‘Greenness’ of a company, namely ISO certificates. Along with time, it is believed that ISO certificates coverage related to environmental issues will continually be developing. Therefore, companies that already applied the standard will surely follow its development. As consequence, companies’ staffs will be trained accordingly to any development policies.
2. As a result of the *National Development Planning: Indonesia Responses to Climate Change* by Indonesia’s National Planning Agency (BAPPENAS, 2008), there are several primary sectors for Indonesia due to climate change issues. In the climate change mitigation, energy and forestry sectors are the priorities; while in the climate change adaptation, agriculture and coastal sectors are the priorities. Therefore, the Government of Indonesia needs to have strategies to adjust all workers.
3. Coordination is critical for success since without coordination Indonesian policy makers will not achieve a consensus or agreement for an integrated national plan in tackling climate change and environmental degradation.

4.2.3 Effective delivery mechanisms

From several case studies conducted, it can be concluded that there are many ways to improve workers’ skills; workshop, job training, group discussion sessions are among the

methods. But the most suitable method to improve workers' skills will highly depend on the nature of work or positions offered and participants' educational background.

It can be concluded as well that until today, there is no linkages between private sector and education and training world, especially about the green issues. However, it is important to note here that data is very limited, with some of respondents did not share their internal and confidential data on human resources.

5. Recommendations

5.1 Policy recommendations

1. In order to promote the development of green economy in the energy sector, Indonesia should maintain an attractive atmosphere for investment for its energy sector by considering the reduction of energy subsidy as an instrument to promote energy independence. The Government of Indonesia should have a clear, transparent policy on energy which promotes an independency and consistently is in balanced interest of people within the supply industry in a liberalized market. An independent body should monitor the policy implementation in terms of transparency, accountability and high responsibility to people of Indonesia, therefore society and industry have a strong desire to feel confidence in government's policy and shall promote investment in energy sector.
2. In order to implement National Action Plan (RAN), it needs a magnitude of scale and achievement of action plan by monitoring and measurement of new performance and a shorter chain-control to be able to overcome the fragmentation functions of sectors currently working. Series of actions that are spatially integrated should be strongly encouraged to change type, methods, and investment modalities as well as supply chain and funding aid to restore environmental degradation and social-ecological damage in the entire Indonesian archipelago.
3. Inter ministries coordination also needs to be strengthened between the Ministry of Labour and the implementation sectors, such as Ministry of Energy, Ministry of Forestry, Ministry of Environment and other ministries. The coordination will ensure that the policy will accentuate into real implementation at the ground level achieving the real objective which is to build and improve Indonesian labour skills in meeting the greening economy.
4. Cooperation must also be encouraged between the central government and the local governments. Having vocational training centers at provincial or district level will help distributing workforce to other areas.
5. Eliminating fossil fuel subsidies will promote more efficient investment climate, increase real income for promoting green economy and at the same time lead to better allocation of resources.
6. Promoting the use of renewable energy through providing incentives to stimulate investment into renewable energy. Thus a campaign to improve public awareness and care should be launched so that they will not appreciate the use of non-renewable energy and eventually public start opting to use energy alternatives as action to mitigate climate change and moving towards green economy.
7. Promoting the adoption of energy conservation and energy efficiency which can be achieved by providing incentives for investment in energy efficiency products and efforts for energy conservation. Thus a public information campaign to improve public care so they will consider product and goods that are labeled as energy saver or energy efficient while purchasing.

It is recommended that energy price be restructured gradually to enable the price to reflect the actual cost of energy by taking environmental cost into account and to distribute energy

use evenly across time. The restructuring include tariff and tax scheme for fuel, electricity tariff, and energy sources for accounting of its emissions.

8. In order to support mitigation effort in the energy sector and to reach level of planned mix energy, the following considerations must be taken into account by the government:
 - Energy diversification
 - Energy conservation
 - Clean technology implementation (such as CCS)
9. Promotion of biofuel in transportation sector should be maintained and improved. Local automotive industry needs to be supported in producing vehicles that are compatible with biofuel. Nonetheless, support facilities for biofuel gas stations must be provided by local government.
10. From the impact of climate change and environmental degradation as well as the insufficient government policies on rural development, community-based industries (Small and Medium Enterprise (SME)) need to adapt by their own in order to survive which leads them to change occupational profiles towards green. However, they may require skill to be greener and sustain. Therefore initiation to green restructuring also need to taken consideration of community based industries, as they are one of contributors in moving towards green economies.
11. The term of determination of skill for green jobs need to be properly defined to be aligned with specific country capacity needs in building green economies.
12. Indonesia needs to look the holistic coherence between skills development policies and environmental policies to allow promotion of skills for green job.
13. The government should allow conducive policy environment allowing an active Union Workers that can accommodate and addressing needs and problems from employers and the labors to government that will allow identification of needs for green restructuring.
14. Identify country level on labour market information to map level of existing skills in various sectors and identify training needs to move towards green economy. In addition labour market information can also draw relations in situation between macro-economic and labour market.

5.2 Recommendations for education and training

1. Creation a map of skills is a vital initial step as potential for skills upgrading. Assessment of the potential of green jobs and monitoring of such jobs would constitute ideal basis for measures and for adaptation of national vocational training and education systems over the medium term. This skill development would be expected to tie with policies and investments.
2. Government should develop with all energy efficiency and conservation stakeholders a capacity building plan that supports and delivers energy efficiency and conservation plans and strategies. Monitor and review the efficacy of the plan and update as required.
3. Compiling a clear set of national energy research and development and training funding data, including universities and the private sector where possible, to allow for improved assessment of cost-effectiveness of activities.
4. Provide addition support to the Agency for Education and Training of Ministry of Energy and Mineral Resources and to the Ministry Research Centre, so as to enable these institutions to make the transition from traditional fossil resources to clean energy technology, including energy efficiency and conservation.
5. In order to increase number of green jobs and to green existing jobs, it is important to develop education and training systems for tools in developing competencies and skill qualifications for creations of green workers in future.

6. Provide sufficient resources and training of the trainers, in government training centres which are responsible for capacity building so they can provide training in biofuels, energy efficiency, energy conservation, clean coal, wind power, hydro power, solar energy and other energy priorities.
7. Pursue enhanced international collaboration opportunities to benefit on technology development in renewable energy, energy efficiency and energy conservation.

5.3 Recommendations for further research and data collection

1. While labour data is very limited on the new sector or new green collar jobs, it is recommended to conduct further study to see the magnitude of these new green collar jobs in order to be able to develop strategic plan to build local capacities.
2. While this study can provide general overview on several sectors, it is advised to conduct follow up study for specific sectors in order to be able to develop sector-specific strategic plan.
3. The following study should be able to address country's benefit from skills for green job and impact to development.

References and bibliography

- Agency for the Assessment and Application of Technology (BPPT). 2009. *Indonesia's technology needs assessment on climate change mitigation* (Jakarta).
- APEC Secretariat. 2006. *Energy statistic* (Singapore).
- Astra International Tbk. 2008. *Annual report* (Jakarta).
- Astra International Tbk. 2008. *Sustainability report* (Jakarta).
- Boer, R.; Subbiah, A.R.; Tamkani, K.; Hardjanto, H.; Alimoeso, S. 2006. *Institutionalizing climate information applications: Indonesian case*. Bogor Agricultural University (Bogor, Indonesia).
- Central Statistics Bureau (Biro Pusat Statistik. 2008. *National Labour Statistic (Susketnas)*. <http://www.bps.go.id/>
- Coordinating Ministry of the Economic Affairs of the Republic of Indonesia for Economic Performance. 2009. *Economic performance: 2004-2009* (Jakarta).
- Dhewanthi, L. (ed.). 2009. *Taking benefits from climate change regime: Opportunities for green jobs in Indonesia* (Jakarta).
- European Center for the Development of Vocational Training (Cedefop). 2009. *Future skill needs for the green economy* (Luxembourg).
- GEO e.d. (<http://geodata.grid.unep.ch/results.php>)
- Green Economy. 2009. *Big opportunity for Indonesia - Green jobs: The benefits of going green* (Jakarta).
- Green Jobs. 2009. *Strategies for green jobs: Outcomes of the Indonesian's Group*.
- GTZ (German Technical Co-operation Agency). 2009. *Climate change: Indonesia's technology needs assessment on climate change mitigation*.
- International Energy Agency (IEA). (<http://www.iea.org/Textbase/country/index.asp>)
- International Labour Organization (ILO). 2009. *Green jobs: Green jobs in Indonesia* (Indonesia).
- Indonesia University (PEUI – Pengkajian Energi Universitas Indonesia). 2002 and 2006. *Indonesia Energy Outlook and Statistics* (Jakarta).
- IPCC (Intergovernmental Panel on Climate Change). 2006. *2006 IPCC guidelines for national greenhouse gas inventories*, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston, H.S.; Buendia L.; Miwa K.; Ngara T.; Tanabe, K. (eds). (IGES, Japan).
- Labour Department of Ministry of Manpower and Transmigration of the Republic of Indonesia (<http://www.nakertrans.go.id/>)

- Medco Energy. 2008. *Annual report 2008*.
- Medco Energy. 2008. *Sustainability report 2008*.
- OECD/IEA (Organisation for Economic Development/International Energy Agency). 2008. *Energy policy review of Indonesia* (Paris).
- National Planning and Development Agency (BAPPENAS). 2008. *National Development Planning: Indonesia responses to climate change* (Jakarta).
- Schmidt, S. 2009. *The benefits of going green*.
- State Ministry of Environment. 2009. *Final Draft of Second National Communication under the United Nations Framework Convention on Climate Change (UNFCCC)* (Jakarta).
- State Minister of Environment. 1999. *First National Communication under the United Nations Framework Convention on Climate Change (UNFCCC)* (Jakarta).
- State Ministry of Environment. PROPER programme
<http://www.menlh.go.id/proper/proper%20baru/Eng-Index.html>
- Sweeney,S; Kubit, J.; Renner, M. 2009). *Green jobs: Challenges to global green job growth* (Ithaca, NY).
- UNEP/ILO/IOE/ITUC (United Nations Environment Programme/International Labour Organization/International Organization of Employers/International Trade Union Confederation). 2008. *Green jobs – Towards decent work in a sustainable, low-carbon world* (Nairobi, United Nations Office at Nairobi). Available at :
http://www.unep.org/civil_society/Publications/Index.asp
- UNFCCC (United Nations Framework Convention on Climate Change).
http://unfccc.int/ghg_data/ghg_data_unfccc/items/4146.php

Annex 1. List of key resource persons

1. Astra International Tbk.

Respondent: Mr. Rachmat Kurniawan, Environmental, Health and Safety Division

2. Carbon Consultant

Respondents: Ms. Rizka Sari (Programme Manager of Camco Global), and Ms. Susy Simarankir (General Manager of PT. Asia Carbon Indonesia)

3. Climate field school for farmer

Respondent: Ms. Kartikasari, Kiki., Senior Staff of Laboratory of Climatology, Bogor Agricultural University

4. Coordinating Ministry for Economic Affairs

Respondent: Mr. Komara Djaya (Expert Staff to the Minister for Economic Affairs)

5. EcoTourism

Respondent: Mr. Ari Suhandi (Director of Indecon Foundation)

6. Green Building

Respondent: Mr. Totok Sulistiyanto, M.Eng.Sc, Core Founding Member – Green Building Council (GBC) Indonesia

7. Indocement

Respondent: Mr. Gunawan Purwadi, AFR (Alternative Fuel Resources) General Manager

8. MedcoEnergi – Power

Respondent: Mr. Kelana Budi Mulia, Director of Medco Power International

9. Ministry of Environment

Resource persons: Ms. Amelia Agusni and Adi Wardoyo

10. Ministry of Manpower.

Resource person: Mr. Rahmat Santosa (Head Division of Research and Development)

11. PT. Petromat Agritech

Respondent: Mr. Armand, Technical Instructure

Annex 2. Questionnaire

Below is the questionnaire distributed to several case studies' locations.

List of Questions on Skills for Green Jobs in Indonesia

1. What is your company's understanding of "green jobs"?
2. Do you have your own strategy to achieve your corporate environmental goals? What kind of strategy is that?
 - by buying green equipments?
 - How do you supervise performance from green technology? i.e. by changing the existing process?
3. How about manpower strategy as related to your environmental goals?
 - Do you have a need to recruit new workers with a specific requirement/skills?
 - Do you arrange trainings which relates to your company's new direction/vision (read: Green)
 - If yes, what kind of training provided?
4. Identification of retraining needs in connection with environmental targets:
 - Did you ever do retraining to increase skill and competence a few position to fill up a need towards green economy and climate change adaptation/mitigation?
 - Did you retrain workers that would have otherwise become redundant?
 - How do you identify necessity for that retraining? What kind of method and approach used to identify?
 - What is the method to apply that retraining?
 - How to make sure so that competence and skill will always protected after retraining?
 - How many people are trained? and what are their background before?
 - In what field that training are given for? How long does the training take?
 - How to make sure if this retraining programme suitable with green economy need and industry demands condition or policy from the country?
 - Who does the training?
 - Do you get any assistance of technical advice from Government or other resources to implement a green job strategy?
5. New green collar occupations:
 - Does your company have new green collar occupations that are created due to environmental considerations, regulations, or mitigation or adaptation strategies for climate change?
 - If yes, so what kind of new green collar occupation/ what kind of position are preferred to promote sustainability?
 - Is the application done in the corporate or business unit or only in units in a particular section?

- What type of skills qualifications and competence are expected from new green-collar occupation?
- What innovations are expected with these green collar occupations?
- What are the gender impacts of the new green-collar occupations?

6. Greening of existing occupations:

- Greening of existing occupations: New types of skills, competences and skill gaps to be incorporated into existing occupational profile
- What are the skills needed to make existing occupations greener
- Which occupations are expected to become greener in your company?
- What position or job in your company is categorized as green in the future? technical workers / field or worker in the office?
- Which qualifications and levels of education attainment are expected? What level of competencies are expected? Are skills levels expected higher, the same or lower?
- What kind of skills and general technical competences are needed?
- How different the new tasks required are and if it would still be appropriate to speak of the same occupation or rather of a new green occupation?
- How is the gender composition and implication to anticipate green existing occupations?