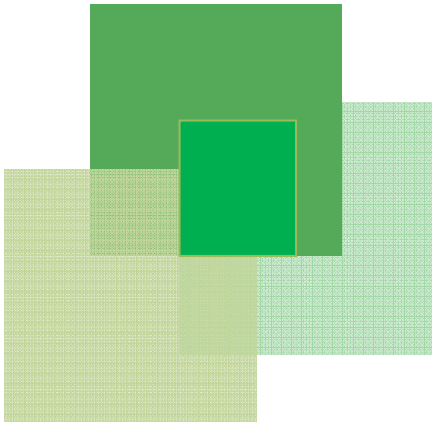

International
Labour
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Geneva

Green jobs and green skills in a brown Philippine economy

Background country study

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Employability
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ILO Country Office
for the Philippines

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Abstract

The Philippines is facing two difficult and intertwined environmental tasks: minimizing the adverse impact of climate change through varied mitigation/adaptation measures and restoring its degraded environment. The way forward for the country is to pursue these tasks with greater vigour, coherence and consistency in the context of the need to green the economy and the labour market. This green economic shift is value-adding, job-creating, and a key to the creation of jobs that are both green (help restore the environment) and decent (promote dignity, security, equity, and stability at work).

However, crucial to this greening process is the formulation of appropriate national action plans on environmental education, skills training, and human resource development in support of this greening vision. These plans are not yet in place despite a law on the integration of environmental education at all levels, although there are significant education/skills initiatives by both the public and private sectors.

At the moment, there are no evident shortages or mismatches in environmental education and skills development, except in projects involving the importation of new technology, largely because the green shift is just starting. The challenge, therefore, is to strategize environmental education and skills development in anticipation of a green shift in the industrial, agricultural, and services sectors, including the greening of the environment and the communities that are vulnerable to climate change risks.

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 offers enormous potential in 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'. This project was implemented through cooperation between the International Labour Organization (ILO) and the European Center 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). Its objective is 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.

Twenty-one 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. 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 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 author of the report, Rene E. Ofreneo, for the 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.

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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

List of tables

List of figures

List of boxes

List of abbreviations and acronyms

A2C2	Albay in Action on Climate Change
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
AUN/SEEN-Net	ASEAN University Network/Southeast Asia Engineering Education Development Network
BFP	Bureau of Fire Protection
BLE	Bureau of Labor and Employment
BOD	Biological Oxygen Demand
BSES	Bachelor of Science in Environmental Science
CC	Climate Change
CDM	Clean Development Mechanism
CEAP	Catholic Education Association of the Philippines
CED	Corporate Engineering Division
CEDEFOP	European Center for the Development of Vocational Training
CEP	Corporate Environmental Policy
CER	Carbon Emission Reduction
CES	Cost and Environment Section
CHED	Commission on Higher Education
CLEEP	Comprehensive Livelihood and Emergency Employment Programme
CNC	Computer Numerically Controlled
CO	Community Organizer
COE/COD	Center for Excellence/Development
CSR	Corporate Social Responsibility
DA	Department of Agriculture
DECS	Department of Education, Culture, and Sports
DENR	Department of Environment and Natural Resources
DepEd	Department of Education
DILG	Department of Interior and Local Government
DNA	Designated National Authority
DO	Dissolved oxygen
DOE	Department of Energy
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
ECC	Environmental Compliance Certificate
ECOP	Employers Confederation of the Philippines
EDC	Energy Development Corporation
EE	Environmental Education
EENP	Environmental Education Network of the Philippines
EIA	Environmental Impact Assessment
EMB	Environmental Management Bureau
EMD	Environmental Management Department
EMS	Environmental Management System Organization
EMSC	Energy Management System Committee
EMU	Energy Management Unit

EnE	Engineering Environmental Graduate Programme
EOI	Export-oriented industrialization
EPD	Environmental Protection Department
EPR	Economic Resiliency Plan
ESD	Education for Sustainable Development
ESU	Environment and Safety Unit
EU	European Union
FCCC	See UNFCCC
FPE	Foundation for the Philippine Environment
GAD	General Administration Division
GFC	Global Financial Crisis
GHG	Greenhouse Gases
GIS	Geographical Information System
GMO	Genetically Modified Organisms
HPCC	Halsangz Plating Cebu Corporation
HRD	Human Resource Development
IACC	Inter-Agency on Climate Change
IEC	Information, Education, and Communication
ILO	International Labour Office
ILS	Institute of Labor Studies
IOE	International Organization of Employer
IPCC	Inter-governmental Panel on Climate Change
ISI	Import-substituting Industrial
ISSP	International Social Survey Programme
ITUC	International Trade Union Council
JFC	Jollibee Foods Corporation
JICA	Japan International Cooperation Agency
KAVS	knowledge, Attitudes, Values and Skills
KEG	Key Employment Generators
LGU	Local Government Unit
LLDA	Laguna Lake Development Authority
MEPZ	Mactan Economic Processing Zone
MHS	Ministry of Human Settlements
MMT	Multipartite Monitoring Team
MOA	Memorandum of Agreement
MTPDP	Medium-Term Philippine Development Plan
NBB	National Biofuels Board
NEDA	National Economic Development Authority
NEEAP-SD	National Environmental Education Action Plan for Sustainable Development
NEPC	National Environmental Protection Council
NHRC	National Human Resource Conference
NICERT	NISARD Certification Services
NIPAS	National Integrated Protection Areas System
NISARD	Negros Institute for Sustainable Agriculture and Rural Development
NGO	Non Governmental Organizations

NSO	National Statistics Office
OFW	Overseas Filipino Workers
OPEC	Organization of Petroleum Exporting Countries
PAGASA	Philippine Atmospheric, Geophysical, and Astronomical Services Administration
PASAR	Philippine Associated Smelting and Refining Corporation
PATLEPAM	Philippine Association of Tertiary Level Institutions in Environmental Protection and Management
PCIJ	Philippine Center of Investigative Journalism
PCO	Pollution Control Officer
PCSD	Philippine Council for Sustainable Development
PD	Presidential Decree
PEACE	Public Education and Awareness Campaign for the Environment
PEZA	Philippine Economic Processing Zone
PFI	PASAR Foundation, Inc.
PHILAMCOP	Philippine Labor-Management Cooperation
PNOC	Philippine National Oil Company
PNP	Philippine National Police
PRA	Participatory Resource Appraisal
PSSD	Philippine Strategy for Sustainable Development
QCCDF	Quezon City Controlled Disposal Facility
RA	Republic Act
RE	Renewable Energy
REAP	Renewable Energy Association of the Philippines
REEP	Renewable Energy and Energy Efficiency Partnership
RoHS	Restriction on Hazardous Substances
SCBI	San Carlos Bioenergy, Inc.
SHES	Safety, Health, Environment, and Security
SOC	Substance of Environmental Concerns
SRES	Special Report on Emission Scenarios
SWS	Social Weather Station
TESDA	Technical Education and Skills Development Authority
TFCC	Presidential Task Force on Climate Change
TMPC	Toyota Motor Philippines Corporation
TMPF	Toyota Motor Philippines Foundation
TR	Training Regulation
TSP	Total Suspended Particulates
TVET	Technical-Vocational Education-Training
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDESD	United Nations Decade of Education for Sustainable Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UP	University of the Philippines
UPLB	University of the Philippines – Los Baños
WB	World Bank

WHO	World Health Organization
WWF	World Wildlife Fund

Preface

The Philippines and the clean development mechanism

In geological terms, the world's climate has gone through periods of warming and cooling over eons but, as far as we are aware, never as rapidly as that being experienced at the present time. Perceptible change can now be measured within the space of a decade. There is a conclusive body of scientific evidence that this present period of warming is being caused by anthropogenic emissions of greenhouse gases.[3] Global warming will not only change the earth's biomes, it will impact on all human activity from agriculture and food security, coastal and marine resources, water resources, land use and forestry, energy and energy security as well as human health.

Although responsible for only a small portion of anthropogenic greenhouse gas emissions globally, Southeast Asia, including the Philippines, has been identified as being among the regions of the world most vulnerable to climate change. Local consequences will include sea-level rise and flooding, altered crop cycles and land-use patterns as well as an increasing number of extreme events (typhoons) as weather becomes less predictable. Changing water temperatures will also impact on the marine environment compounding the effect of sea-level rise and introducing additional uncertainty into fisheries and aquaculture which remain important generators of income for many.

While debate continues as to the extent that the world's climate will change, there is general agreement that over the short to medium term, it is irreversible.

Seeking global solutions to protect the atmosphere

Global warming has been on the international agenda since the 1970s. Initial concern was over depletion of the earth's Ozone Layer. This layer found at altitudes of 10–50km above the ground protects us from the harmful effects of certain wavelengths of ultra-violet radiation that can cause skin cancer and other diseases. Chlorofluorocarbons (CFCs) used in many aerosols; refrigeration and air-conditioning equipment as an industrial solvent were found to be the main culprit.

In 1977, the United Nations Environment Programme (UNEP) began addressing this issue. This led to the Vienna Convention on the Protection of the Ozone Layer in 1985. The 1985 Vienna Convention was followed by the 1987 Montreal Protocol which set clear targets for phasing out CFCs. Over the years, the list of substances to be phased out has increased to nearly one hundred including the hydro fluorocarbons, carbon tetrachloride, and methyl chloroform. The agreement, ratified by 191 countries, has helped cut production of ozone-depleting chemicals from more than 1.8 million metric tons in 1987 to 83,000 metric tons at the end of 2005.[4]

Ozone depleting substances, the focus of early attention, are greenhouse gases (GHG) that contribute to climate change. Their radiative force is about 20 per cent that of carbon dioxide (CO_2). Carbon dioxide emissions were not addressed in these early international agreements but this early debate did provide a focus for addressing the broader problem of global warming.

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[3] Those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation (see preamble to the UNFCCC).

[4] *Scientific Assessment of Ozone Depletion: 2006* (NOAA) available at http://www.america.gov/st/washfile-english/2007/October/20071015114955lcnirellep0.2443964.html#ixzz0tQaguhx0 (accessed 19 July 2010).

Box 1: Impact and vulnerability of Southeast Asia to climate change

A recent report from the Asian Development Bank (ADB) summarized the impact of climate change on Southeast Asia in the following terms:

Southeast Asia has warmed by 0.1 to 0.3°C per decade between 1951 and 2000. It is projected that by the end of the 21st century the mean temperature will increase by 2.5°C.

Precipitation has decreased between 1961 and 1998 and the number of rainy days has declined throughout the region. Wet season rainfall is projected to increase while dry season rainfall will decrease. Note that in the Philippines, the reverse is the case with the number of rainy days and the amount of precipitation both increasing.

Sea level is rising at the rate of 1 to 3 mm per year but in some reports could reach up 8 mm per year.

Extreme weather events such as **drought, flood, and tropical cyclones have increased in intensity and frequency.** A further increase of 10 to 20 per cent in tropical cyclone intensities is predicted for a rise in sea-surface temperature of 2 to 4°C.

Climate change is a real threat to Southeast Asia and the impacts are already being experienced in all sectors.

Climate change has **significantly affected river flows, water reservoirs, and groundwater resources** in many Southeast Asian countries. Consequently, this has caused water stress or shortage of drinking water, a decline in crop production, and a drop in electricity production.

Extreme weather events such as El Niño (drought), La Niña (flood), and tropical cyclones have increased in intensity and frequency and have **contributed significantly to the decline in productions of major export commodities including grains and industrial crops, fish supply, and forest harvests.** Extreme events caused massive damage and loss to lives and livelihoods measured in billions of dollars.

Southeast Asia is struggling against the **loss of its arable lands and coastal areas** due to sea level rise, storm surge, coastal erosion, and soil salinization. A sea level rise of 1 m will flood 40,000 km^2 of land in Viet Nam where 60 per cent is rice land in the Mekong Delta.

A large proportion of the population has been affected by the **outbreak of malaria and dengue fever** and trend has been increasing in recent years. In 2003, dengue cases in the Philippines rose to 30,000 from 5,000 cases in 1990.

Southeast Asia is highly vulnerable to the consequences of climate change. The region is **very sensitive to the direct impacts of climate change** given the heavy dependence of its economy on natural resources; the region's fast growing and large population; the large proportion of its labour force employed in agriculture; the long coast lines with high concentration of human and economic activities in coastal areas; and many people still living below poverty line.

It is the poor people of Southeast Asia that will be highly vulnerable to climate change. The impact of climate change will exacerbate poverty particularly on the income, opportunities for progress, and effects on health.

Source: The Economics of Climate Change in Southeast Asia: A Regional Review, *Asian Development Bank (2009)*

The ozone debate directed world attention to the atmosphere as a finite resource. Aided by advances in meteorology and satellite mapping, during the 1980s, scientists were able to demonstrate not only that the earth's atmosphere was showing increased and unnatural signs of heating up but that climatic changes were occurring faster than had earlier been thought possible.

Established in 1988, The Inter-governmental Panel on Climate Change (IPCC) is an expert body appointed by the United Nations General Assembly to review and assess the scientific literature and make recommendations for broad action by the United Nations on climate change.

On the basis of the 1st IPCC report in 1990, the United Nations Framework Convention on Climate Change (UNFCCC or simply FCCC) was adopted and opened for signature at the UN Conference on Environment and Development held in Rio de Janeiro in 1992.[5] The UNFCCC commits all parties to combat global warming under the principle of "common but differentiated responsibilities"[6] (Box 2) and covers all greenhouse gases not controlled by the Montreal Protocol. The developed countries, which are collectively responsible for 75 per cent of global emissions, recognized that emissions from developing countries will continue to grow in the short term to accommodate their development needs. They also recognized the need for financial incentives as well as technology transfer that would encourage developing countries to reduce their greenhouse emissions. The Philippines became a party to this Convention in 1995.

The IPCC continues to issue regular reports which are noteworthy in the fact that as more data becomes available for analysis, even the worst-case scenarios of earlier reports are found to be overly optimistic and that change is occurring at a faster rate than earlier thought.

The IPCC Fourth Assessment Report issued in 2007 used a number of different emission scenarios to project the range of future climate change patterns throughout the world including in Southeast Asia. Under a continued high emission scenario (known as the A1FI scenario), the mean surface air temperature in the region is likely to increase by 0.87ºC in 2020 over year 2000 levels; by 2.01ºC in 2050; and by 3.77ºC in 2080. For the low emission pathway (referred to as the B1 scenario), the temperature increases will be smaller but still noticeable: projected at 0.75ºC increase in 2020, 1.32ºC by the mid century, and to around 1.96 ºC at the end of the century. Between these boundaries there are a number of other outcomes depending on the variants and parameters selected. The 2007 Special Report on Emission Scenarios points out:

> *For the next two decades, a warming of about 0.2°C per decade is projected for a range of Special Report on Emission Scenarios (SRES) emission scenarios. Even if the concentrations of all greenhouse gases and aerosols had been kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected.*[7]

Efforts to combat global warming take two forms: mitigation — whereby action is taken at a range of levels (from global to local) to change human activity to reduce carbon emissions as well as those of other GHGs and adaptation — the modification of human activity patterns (such as changes to crops and crop cycles) in recognition that over the short to medium term, climate change is irreversible. Stabilising atmospheric temperatures and eventually reversing the warming cycle may take hundreds of years. Reputable scientists are already warning that the atmosphere may be close to a tipping point beyond which climate change becomes irreversible within a geological timeframe and that urgent and concerted global action is needed to keep global warming under the dangerous 2°C level relative to 1990 levels. This will require a global reduction of anthropogenic emissions by between 25 and 40 per cent below 1990 levels by 2020. In turn countries need to move to "low carbon" economies as quickly as possible.

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5 Often referred to as the "Earth Summit".

6 See Box 2.

7 IPCC 2007, Special Report on Emission Scenarios, *Summary for Policymakers* available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf (accessed 2 July 2010).

Box 2: Common but differentiated responsibilities under the UNFCCC

The "common but differentiated responsibilities" principle requires:

- Developed country parties to take the lead in combating climate change and the adverse effects thereof (Article 3.1 of the Convention)
- The specific needs and special circumstances of developing country Parties should be given full consideration. (Article 3.2)
- The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects (Article 3.3)
- The Parties have a right to, and should, promote sustainable development. (Article 3.4)
- The Parties should cooperate to promote a supportive and open international economic system (Article 3.5)

At the same time, all parties should commit to (Article 4.1 of the Convention):

- Developing national inventories of anthropogenic emissions
- Formulate, implement, publish and regularly update programs containing measures to mitigate climate change
- Promote technologies, practices and processes that control and reduce GHGs

While the UNFCCC established the framework and the principles, it is the Kyoto Protocol that provides the "regulatory" detail by which these principles are converted to action. The Kyoto Protocol is an international agreement linked to the UNFCCC. As of November 2009, 187 states had signed and ratified the Protocol including the Philippines.

Unlike the Convention which merely encourages industrialized countries (and the European Community) to stabilize GHG emissions, the Kyoto Protocol sets binding targets for 40 developed countries (Annex I countries[8]) to reduce their GHG emissions. These countries have agreed to put in place policies and measures to collectively reduce GHG emissions (as a first step) by 5.2 per cent of their emissions against 1990 levels during the period of 2008 to 2012.

Furthermore under Article 11, Para 3, the Protocol provides an additional option for Annex II countries of meeting their commitments through cooperation with developing country Parties:[9]

> *"The developed country Parties and other developed Parties in Annex II to the Convention may also provide, and developing country Parties avail themselves of, financial resources for the implementation of Article 10, through bilateral, regional, and other multilateral channels".*

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[8] There are 40 Annex I countries: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, United States of America. The EU is also a member.

[9] Annex I countries are those countries that have made a commitment under Article IV to make an effort to return, individually or jointly, to their 1990 levels for anthropogenic emissions of carbon dioxide and other green house gases not controlled by the Montreal Protocol to their 1990 levels. Annex II countries represent a subset of Annex I consisting of those countries that have made a further commitment to provide additional financial resources, including the transfer of technology to developing country Parties to meet their cost of meeting their own commitments under the UNFCCC.

The clean development mechanism

Under the UNFCCC, countries meet their emission reduction targets primarily through national measures. However, a key feature of the Kyoto Protocol is the creation of additional measures by way of three market-based mechanisms. These are: (i) the Clean Development Mechanism (CDM), (ii) Joint implementation (JI), and (iii) International Emissions Trading (IET). Parties from Annex II countries which have ratified the Kyoto Protocol, regardless of emissions reductions commitments, are permitted to utilize one or more of these mechanisms in order to meet their Kyoto commitments.

These three mechanisms are all intended to provide market-based stimuli to green investment incentives that will encourage Parties to meet the emission targets.

It is the CDM that is of special interest to developing countries such as the Philippines. CDM allows emission reduction projects that assist developing countries in achieving sustainable development and generate "Certified Emission Reductions (CERs)" for use by the investing countries or companies (Annex II Parties). Through qualified emission reduction projects, the CDM is able to stimulate international investment and provide the essential resources for cleaner economic growth in all parts of the world. The CDM assists developing countries in achieving sustainable development by promoting environmentally friendly investments from industrialized governments and businesses.

The CDM provides a business reason for Annex II countries to implement project activities that reduce anthropogenic emissions in non-Annex I Parties, principally the developing countries. The CERs generated by such projects can be used by the Annex II Party to help meet their own emissions targets under the Kyoto Protocol. International emissions trading can be linked to regional or domestic trading schemes, the most notable of which is the European Union Emissions Trading Scheme. These credits can then be sold to companies or governments to meet their own targets, enabling an economic interchange and transfer of technology to the seller and the host country, and a more cost effective method of meeting targets for the buyer. Many countries have established government bodies to promote and help with the development of CDM projects including the Philippines.[10]

Building a green economy

As countries emerge from the Global Financial Crisis, there is widespread recognition that future development, to be sustainable, must also be green. This means a global shift towards low carbon economies. The Philippines stands to benefit from this shift over the short to medium term, in a number of ways:

- The CDM provides opportunities for the Philippines to participate in the global carbon trading market while at the same time gaining new technologies that can contribute to future economic development.
- The CDM also provides incentives for reforestation activities that can benefit local communities — as demonstrated through examples cited in this report.
- Greening produces new jobs and new skills that can be used as the basis for enhancing the Decent Work Agenda.
- Greening does not necessarily impose costs on companies but can also (depending on circumstance) bring rewards.

[10] For a full explanation and discussion of CDM project implementation see *CDM Manual for CDM Project developers*, Asian Development Bank (2010), forthcoming.

There are longer term benefits too provided the incoming administration of President Aquino can improve the domestic investment climate. In recent years, foreign direct investment into the Philippines has been among the lowest in Southeast Asia due to the high cost of doing business as well as perceptions of problems with governance and rule of law.

The Philippines has a number of advantages to exploit. Firstly of course there is the educated and available labour force. The availability of industrial land and the proximity to major Asian markets provide a second set of advantages. If the government can address negative investor perceptions and improve the investment climate then there is an ideal opportunity for the Philippines to benefit from a new wave of "green" industrialization that will reinvigorate the manufacturing sector and provide long term sustainability for the economy.

A necessary first step is to identify the skills available, those needed and the gaps in the market. This report seeks to do this and to recommend policy directions necessary to produce desirable outcomes in areas related to the environment, education and skills development.

This report, commissioned by the International Labour Organization (ILO) as part of a global partnership with the European Center for the Development of Vocational Training (CEDEFOP) and covering 21 countries[11] is the first step towards identifying the skills needed to make the transition to a greener economy through policy applied research. The 21 country reports together with the report of the technical validation workshop as well as the synthesis report are being published progressively on the ILO website at http://www.ilo.org/skills/what/projects/lang--en/WCMS_115959/ index.htm. A summary version of this report will also be contained within another ILO report *Overcoming the Jobs Crisis and Shaping an Inclusive Recovery: The Philippines in the aftermath of the global economic turmoil*, to be published by the ILO Country Office for the Philippines in Manila, Philippines.

Michael Clancy[12]

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[11] The countries covered are: Australia, Bangladesh, Brazil, China, Costa Rica, Denmark, Egypt, Estonia, France, Germany, India, Indonesia, Mali, Philippines, Republic of Korea, South Africa, Spain, Thailand, Uganda, UK, and the US.

[12] Dr Michael Clancy is the editor of this report.

Acknowledgments

This Report is part of a global cross-country study on "Skills for Green Jobs" supervised by Olga Strietska-Ilina jointly with Christine Hofmann, Mercedes Durán, and Shinyoung Jeon from ILO's Skills and Employability Department. These country studies and therefore the study in the Philippines are taking place in the context of the global ILO programme on Green Jobs.

The Philippine study which was funded by the ILO Country Office and the ILO Regional Office for Asia and the Pacific was also technically assisted by these two offices. In particular, Sandra Rothboeck, Ivanka Mamic, and Vincent Jugault shared freely their ideas and insights on climate change and the skilling processes. Their constructive comments on the draft reports resulted in a more rigorous presentation of the results of the study.

In the Philippines, the research team was assisted – institutionally and intellectually – every step of the way by ILO Manila Director Linda Wirth and Deputy Director Keiko Niimi, together with their resident environmentalists Ma. Concepcion Sardaña and Lurraine Villacorta. Ms Niimi even joined the team in the visit-documentation of some of the firms with good environmental and skills development programmes.

Special thanks to Joy Hernandez for her assistance in delivering this knowledge product and to all of them goes our eternal gratitude. Also, we would like to express our deepest appreciation to the cooperating companies, government agencies, non-governmental organizations (NGOs), and, yes, the brilliant editor of this Report, Michael Clancy.

Sa inyong lahat, maraming maraming salamat!

Rene E. Ofreneo

Quick currency reference guide

Cross rates of the Philippine Peso per unit of foreign currency, period averages (2010 to 30 June)

Currency	2010	2009	2008	2007
US dollar	46.3027	47.6372	44.4746	46.1484
Yen	0.5011	0.5099	0.432	0.3919
Euro	60.8394	66.3788	65.1636	63.1489
Sterling	69.9071	74.5944	82.0696	92.3479

Source: Reference Exchange Rate Bulletin, Treasury Department, Bangko Sentral ng Pilipinas; available online at http://www.bsp.gov.ph/statistics/spei_new/tab26.htm (accessed 2 July 2010)

Disclaimer

The views expressed in this report are those of the author and publication does not necessarily imply endorsement by the ILO or any other body.

In accordance with the practice of the ILO this document follows the general spelling conventions as laid out in the Oxford Dictionary. Where two or more alternative spellings are allowed, we normally apply the first such spelling.

Exceptions are made for proper names. Thus we use the general term of “labour market” and “labour scenarios” but “Department of Labor and Employment” (DOLE) and “Labor Code of the Philippines”.

Executive Summary

The Philippines is a low emitter of GHG and yet it is on the global short list of countries most vulnerable to climate change. Climate change is spawning devastating droughts, floods, and land instabilities with increasing frequency and intensity. This vulnerability is further compounded by the sad state of the country's environment and natural resources, characterized, among others, by massive deforestation, biodiversity loss, poor solid waste management, and weak implementation of the laws on clean air and clean water.

And yet, the Philippines has a relatively comprehensive set of environmental laws, enacted over the course of the last four decades. In developing Asia, the Philippines is considered relatively advanced in terms of legislation related to different environmental challenges such as reforestation, biodiversity conservation, air and water quality regulation, solid waste management, renewable energy development and adoption of mitigation/adaptation measures related to climate change. These legislative responses were crafted partly in response to the clamour for environmental reforms raised by a fairly active environmental movement.

However, there is a wide gap between legislation and implementation of environmental reforms. Despite the reforestation laws dating back to the 1970s, the denudation of forests has remained unchecked. The overwhelming majority of the local government units (LGUs) have not complied with the law on the closure of open and unsanitary landfills or dump sites. In environmental education, a 2008 law requires its integration at all levels of basic, tertiary, and technical-vocational education; and yet, the three national educational authorities — Department of Education (DepEd), Commission on Higher Education (CHED), and Technical Education and Skills Development Authority (TESDA) — still have to comply with this integration mandate, (although they have been carrying out some specialized environmental education/training programmes).

Clearly, there is an urgent need for greater vigour, coherence, and consistency in the implementation of environmental laws and programmes; more so in relation to the need to have a "green shift" in the economy in order to combat climate change and environmental degradation.

This green economic transformation is crucial to the creation of jobs that are both green (help restore the environment), decent (promote dignity, security, equity and stability at work), and sustainable (long term). Correspondingly, this transformation requires changes in education and skills development since green and greener industries will naturally require professionals and workers with green skills and competencies that vary across different sectors and sub-sectors of the economy.

Initial findings of this study show that a green restructuring of the Philippine economy is likely to have a positive impact on employment because of the generally labour-intensive nature of the greening processes. Among the more promising job-creating greening processes are the shift from traditional chemical-based farming to the more labour-intensive organic agriculture, the growth of the renewable energy sector (e.g., biofuels, geothermal, wind, and solar), the propagation of "rainforestation" and "integrated social forestry" approaches (which combine reforestation with job/livelihood provision for the host communities), and the expansion of the recycling sector involving waste collection, segregation, and re-processing to produce "new" products. The greening of an industry can also be a strategy for job preservation and company survival during economic crises. This is particularly true in companies adopting environment-friendly processes that are value-adding, energy-efficient, and, consequently, cost-saving.

As to job displacement as a result of a greening process, the evidence suggests that this can occur but only in a limited way. In particular, this is likely to happen when businesses that are unable to comply with environmental standards fold up or choose to close shop. This is illustrated by the closure of some import-substituting old smokestack companies because of their non-

compliance with environmental regulations or inability to meet new environmental standards due to their limited financial capacity to invest in pollution abatement or wastewater treatment facilities. However, large companies with sufficient resources are able to invest in greening processes.

As to skills shortages and mismatches in the green and greener industries, this does not appear to be a major concern at the moment, primarily because the country has not yet made a full and comprehensive shift to a green economy. Securing green professionals such as environmental and sanitary engineers is not difficult because of the availability of graduates from top educational institutions such as the University of the Philippines (UP) and Miriam College which are pioneers in providing environmental education at the tertiary and graduate level. However, the introduction of a new and imported green technology such as pollution abatement, wind power generation and bio-ethanol distillery might necessitate the recruitment and temporary deployment in the Philippines of green experts and professionals from overseas who know how to handle this technology, as illustrated by some of the case studies included in this report.

On industry's demand for green collar workers, this is addressed by the industry in partnership with TESDA through the development of training regulations or skills standards for specific trades, for examples, retrofitters for converters of engines in order to utilize the cleaner CNG fuel.

Overall, however, the green economic shift requires the alignment of education, skills development, and training with the labour requirements of green and greener industries. Hence, the challenge is to strategize environmental education and skills development in anticipation of a green shift in the industrial, agricultural, and services sectors, including the greening of the environment and the communities that are vulnerable to climate change risks. This strategizing requires consultation and dialogue among the stakeholders, industry and labour in particular. Most of the case studies included in this report show the importance of dialogue and labour-management cooperation in support of a greening initiative.

As a pioneering study on the greening of the economy, labour market, and skills/human resources development, this report should be treated as the beginning of a series of studies needed to guide policies that will ensure a successful green job-full shift and secure the support of society at large for such a shift.

Green jobs and green skills in a brown Philippine economy

by

Rene E. Ofreneo[13]

1. The policy context: environment, environmentalism, economy, and education

1.1 Introduction

This research report is part of a larger global project of the International Labour Office (ILO) and the United Nations Environmental Programme (UNEP) inquiring into the skills requirements of the global shift to a low-carbon economy, or more specifically the human resource development needs of "green industries" and "greener industries" (see distinction in the subsequent section on definitions). The global ILO-UNEP project seeks to identify and analyze skills needs for greener economies with respect to new, existing and changing occupation profiles. It also seeks to identify skills and occupations that become obsolete as a result of this global greening shift. The overall objective is to identify strategic skills development responses a country may adopt in the light of environmental degradation, climate change, and the global call for greening of economies.

In the context of the above, the tasks of the Philippine Research Team were to:

- Identify green challenges and issues in the Philippines.
- Review green policy responses, strategies, and programmes, including government responses to the recent global financial and economic crisis.[14]
- Identify sectors/industries with green potential and the possible green jobs and skills components needed.
- Analyze green skills policy strategies and responses in the context of green challenges and the nation's industrial-trade-technology macro-environment policy framework.
- Analyze skills, training, and re-training needs in relation to new green occupations and greener jobs, especially in industries/sectors undergoing structural changes due to climate change and greening of the economy.
- Identify methods, tools, systems, and frameworks for skills anticipation and assessment to ensure coherence and adequacy in terms of quantity and quality in relation to present and future labour market demand for green-collar workers at different levels (enterprise, industry, sector, regional, and national).
- Analyze how the skills response is organized to effectively meet the challenge of greening the economy.

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[14] Also often referred to as the "Global Financial Crisis" or "GFC".

- Draw up conclusions and policy recommendations on skills policies and strategies at the enterprise, local, sectoral, and national levels, including research gaps, in the context of the ILO's Decent Work Programme, climate change challenge, and the global economic crisis.

- Design a human resource development strategy for greening the economy and propose an action plan for this purpose.

1.1.1 Methods

This study has adopted the following composite research methods:

- Compilation of existing literature on green/greening challenges, policy responses, and programmes in the Philippines.

- Analysis of the structural challenges and changes in the economy (industry, agriculture, and services) and the labour market as a result of the green/greening policies, strategies, and programmes.

- Analysis of the labour market and skills challenges and changes as a result of the green-related structural challenges and changes.

- Interview of key informants (tripartite representatives, green industry leaders), key skills development institutions and experts in this field, and conduct focus group discussions (especially in select firms or areas) on green/greening jobs and skills policy challenges and responses.

- Analysis of the green/greening dimension and green/greening gaps in the programmes of public and private education/Human Resources Department (HRD)/TVET institutions.

Case studies Central to this study is the conduct of a number of enterprise-level case studies to illustrate the green job and green skills initiatives of select firms related to the development of new green jobs, greening of existing jobs, and re-training for those adjusting to the triple challenges of climate change, economic crisis, and decent work.

These case studies involve analysis of:

- The new or changing business vision-mission of the company in response to the changing environment (climate change, economic crisis, and decent work) it is confronted with.

- How the new or changing business vision-mission is translated into human resource plans or programmes.

- The ensuing green jobs, greener jobs, and green skills adjustments made in the implementation of the HRD plan or programme.

- The skills requirements of the above jobs.

For this purpose, the research team contacted the responsible officers of the company/institution, organized face-to-face interviews with the managers/HR officials on the business vision-mission of the company/institution and how this is translated into HR programmes/policies, and held focus group discussions or individual interviews with select representatives doing green jobs/tasks/ assignments.

1.1.2 Definitions: green, greener jobs, and green competencies

The ILO, UNEP, International Organization of Employers (IOE), and the International Trade Union Council (ITUC) have jointly endorsed a Research Report entitled *Green jobs: Towards decent work in a sustainable, low-carbon world* (ILO-UNEP-IOE-ITUC, 2008). This Report defines green jobs as follows:

> *"…positions in agriculture, manufacturing, construction, installation, and maintenance, as well as scientific and technical, administrative, and service-related activities, that contributes substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect and restore ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency and avoidance strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution."*
>
> *(pp. 35-36)*

Additionally, the report pointed out that green jobs "*also need to be good jobs that meet longstanding demands and goals of the labour movement, i.e., adequate wages, safe working conditions, and worker rights, including the right to organize labour unions*". Hence, the contention that jobs may be green but not necessarily "decent", for example, jobs in materials recycling plants where workers are not paid the minimum wage and do not enjoy any freedom to organize are green — but not decent. The ideal, of course, is to have jobs that are both green and decent, for example, well-paid jobs in a unionized geothermal plant.

Further, the ILO-UNEP Report (*ibid*) discusses "shades of green" in relation to the "transformation of the economy – in agriculture, mining, manufacturing, services, and infrastructure" due to "a reduction in resource consumption and associated emissions (air and water pollutants, carbon emissions) and the minimization or avoidance of waste streams". Some examples: adoption by existing industry of less polluting methods and techniques, diversification of transport modes, and greening and retrofitting of buildings and infrastructure.

It is in the above definitional context that the Philippine research team has, in its case study selection, focused on two types of jobs — green jobs in green industries and greener jobs in greener industries (i.e. those shifting to more environmentally-friendly methods and processes). The research team also added a third category for the case studies — the green professionals and/or advocates such as the green officers in companies and technical people in green organizations such as the environmental NGOs and in the green/greener companies themselves.

How are the competencies of workers occupying green jobs, greener jobs and green occupations met? The education, training, re-training and other forms of human resource development interventions to build up such competencies would naturally vary from company to company and from industry to industry.

By definition, competence is "*the ability to meet individual or social demands successfully or to carry out an activity or task*" (DeSeCo, 2002). Based on this definition, competency requires the appropriate knowledge, attitudes, values and skills (KAVS) needed to perform a given work or job successfully. As noted in the ILO-UNEP study (*ibid*), green or greener jobs often involve the usual KAVS in the performance of traditional jobs, e.g., machine operations, with the addition, of course, of higher environmental awareness and orientation due to the green/greener nature of industry, with the notable exceptions of those specifically assigned to do specific environmental tasks such as toxic monitoring and the like.

1.2 The Philippine environment: an overview

1.2.1 Population, poverty, and environment

The Philippines is an archipelago of 7,100 plus islands, clustered into three island groups — Luzon, Visayas, and Mindanao. There are 17 administrative regions covering 79 provinces, 117 cities, 1,505 municipalities, and 41,984 barangays or villages (NSO, 2007).

The total population as of 2010 is projected to be over 94 million, or nearly twice the 1980 census figure of 48 million (NSO, 2010, 2005). The rapid population growth rate, a little over 2 per cent a year, has serious implications on job creation, poverty reduction, delivery of basic services and, ultimately, on the maintenance of a healthy environment. As shown in Table 1-1, the Philippines had a labour force of 37.8 million as of April 2009; with a 92.5 per cent employment rate. This means the unemployment rate in the country is 7.5 per cent, which is easily one of the highest in Asia and which affects close to three million workers.

However, there is a great deal of unevenness among the employed or those with work. The employed who are looking for additional work totalled 6.6 million in April 2009, for an underemployment rate of 12.4 per cent. The real underemployment figure is likely to be higher because the number of those working at less than 40 hours a week (Table 1-2) — 14.3 million or 40.9 per cent of all the employed — was more than twice those officially counted as underemployed. Moreover, there were 4.6 million "unpaid family workers", equivalent to 13 per cent of the employed. Thus, given these figures, the contention of the Employers' Confederation of the Philippines (ECOP) that the informal economy accounts for as much as 77 per cent of the employed appears realistic (Ortiz-Luis, 2008).

Mass unemployment, mass underemployment and the poor quality of jobs for the many who are employed are the major explanations for widespread poverty in the Philippines. Official data from the Bureau of Labor and Employment (BLE) show that the poverty incidence has been rising: from 27 per cent in 2000 and 30 per cent in 2003, the figure increased to 32.9 per cent in 2006, affecting around 27.6 million Filipinos. (BLE, 2009). In turn, widespread poverty is the reason for a continuous build-up of urban and rural poor colonies all over the country, which have dire consequences on the utilization of land, water and other natural resources. The huge floods triggered by typhoon Ondoy and Pepeng in September and October 2009 also revealed that these colonies are highly vulnerable to climate-related natural disasters.

TABLE 1-1: LABOUR FORCE, APRIL 2009

Indicators	Total ('000)	Percentage
Household population (15 and above)	59 074	
Not in the labour force [(a)]	21 250	
Labour Force	37 824	100.0
Employed [(b)]	34 993	92.5
Unemployed [(c)]	2 830	7.5
Underemployed [(d)]	6 622	12.4

Source:BLES, Current Labor Statistics, July 2009

Notes to the table:

a/ not in the labour force are of working age, who are neither employed nor unemployed (see definitions below). They include full-time students, full-time housewives/househusbands, disabled and those who have no work and yet are not seeking work.

b/ employed refers to those working or with a job or business.

c/ unemployed refers to those without work or without a job or business, were looking for work and "available for work" if there is one.

d) underemployed are employed who are seeking "additional hours of work in their present job" or "additional job" or "new job with longer working hours".

TABLE 1-2: EMPLOYED IN TERMS OF SOURCE OF INCOME, HOURS OF WORK, APRIL 2009

Indicators	Number of employed ('000)	Percentage (out of 34,993 total)
Income source		
Wage and salaried workers	18 169	52.0
Own account, self-employed	12 228	35.0
Unpaid family workers	4 597	13.0
Hours of work per week		
40 hours and over	19 283	56.6
Less than 40 hours	14 331	41.0
With a job but not at work	839	2.4

Source: BLES, Current Labor Statistics, July 2009

And yet, the Philippines is considered a resource-rich country. It has a total land area of 30 million hectares. The archipelago has shorelines measuring over 18,000 kilometers. Thus, in the *Philippine Yearbook 2005*, the National Statistics Office (NSO) gushed: "*The country is endowed with natural resources – lush forests, rich land, and abundant seas*." But immediately, the NSO wrote:

> *"…It is regrettable though that the demands of a growing population and the enticement of profit persisted to exert pressure on our forest resources. In the same manner, illegal cutting and exploitation of forest resources; pests and diseases; forest fires and other natural calamities; severely threatened biodiversity; indiscriminate use of resources in wetlands and coastal areas; fast disappearance of forest habitat in the upland areas; and deteriorating air and water quality have, over time, taken their toll on the country's forest".*
>
> *(op cit p.413)*

1.2.2 Major environmental problems

The Philippine environment is a degraded one. This can be easily gleaned from the list of environmental concerns which the Department of Environment and Natural Resources (DENR) does not tire of enumerating every year in its Annual Report.

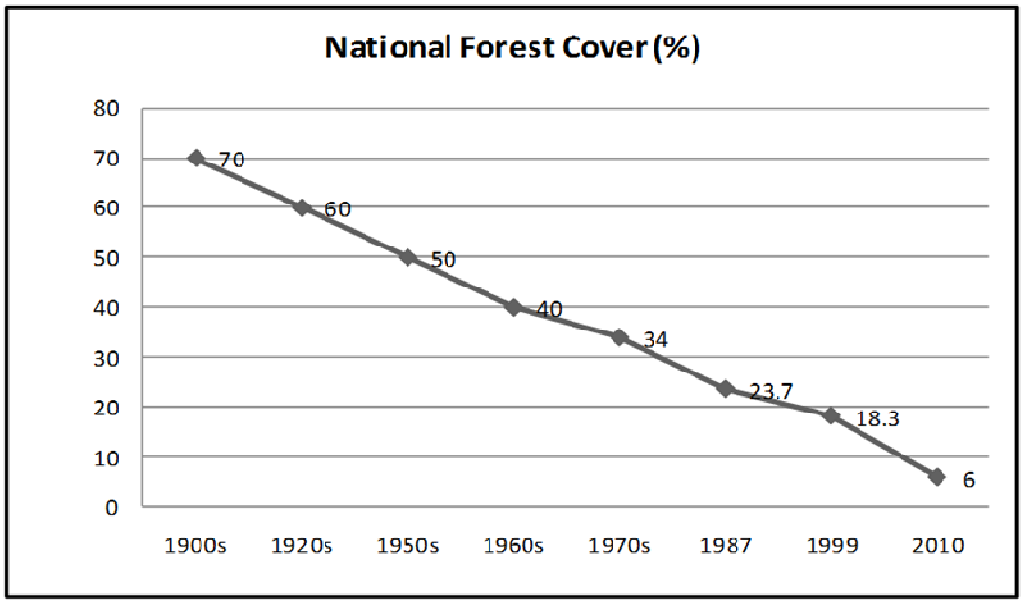
Deforestation

Foremost among these environmental concerns is the massive and continuing decimation of the country's forests. Forest lands are supposed to account for half of the country's land area, or 15.8 million hectares in all. However, most of these so-called forest lands are badly denuded, with the actual forest covering less than a fifth of the country since the turn of the century.

At one time, one of the country's leading dollar earners was forest products (the timber and wood industry). This was in the period 1950–1978, when the deforestation rate was around 200,000 hectares a year (NSO, 2005). The industry tapered off in the 1980s. However, deforestation has persisted up to the present, due to illegal logging, swidden agriculture, population invasion, and other man-made factors (Figure 1).

This deforestation phenomenon has, predictably, destructive consequences such as flooding, soil erosion, shifting land formation, and changing climate patterns and global warming. Table 1-3 shows some of the worst human disasters that have visited the country as a result of deforestation.

FIGURE 1: THE PHILIPPINES DISAPPEARING FOREST



Source: *Environmental Science for Social Change*, Decline of the Philippine Forest, *Ateneo de Manila: Bookmark, 2009*

TABLE 1-3: MAJOR FLOOD AND LANDSLIDE DISASTERS ARISING FROM FOREST DESTRUCTION, 1991–2004

Place	Year	Number of victims
Ormoc, Leyte	1991	6000+ dead
Caraga and Southern Mindanao	2001	253,893 residents displaced
Caraga, Northern and Southern Mindanao, ARMM	2003	23,100 families evacuated
Davao and Agusan provinces	2003	179 dead
Quezon and Nueva Ecija provinces	2004	1,068 dead, 1,163 injured
Southern Leyte	2006	1,122 dead or missing, 500 houses, and a school buried in mud
Bicol provinces	2006	734 dead, 762 missing, 2,360 injured

Source: Haribon, Philippine Biodiversity for Beginners, 2006, for 1991–2003 figures; Candido Cabrido Jr., "Impacts of Climate Change on Agriculture and Biodiversity", November 2008

Because of the massive deforestation and the threats it has posed to the country's environment, the Marcos regime imposed a timber export ban in 1976 and launched a reforestation programme. Succeeding administrations, from 1986 up to the present, have kept the ban in place and have initiated other laws and programmes aimed not only at rehabilitating the forests but also in addressing other pressing environmental concerns. But as shown in Figure 1, deforestation has been winning the race. According to the study by the Ateneo's Environmental Science for Social Change (Ateneo, 2009), the remaining forest cover is predicted to shrink to a mere six per cent by 2010. The DENR, however, gives a much higher percentage to the country's forest cover, roughly 24 per cent. This is because the DENR includes the orchards and plantation growth in the country's agricultural area as part of the forest cover (Republic of the Philippines, 2009).

Other environmental problems

A number of other environmental problems facing the Philippines are equally urgent and distressing. They include the following:

Loss of biodiversity

In 2006, Haribon (*Philippine Biodiversity for Beginners*, ibid), a leading environmental NGO, reported the alarming loss of biodiversity in the country as reflected in the fact that the Philippines has 54 common birds and 54 mammal species facing extinction even if the country is reputed to be the leading host of endemic endangered species in the world on a per area basis. Haribon blames this loss of biodiversity on the decimation or damage to the country's forest cover, mangroves, and seas. It pointed out that only 5 per cent of the country's reef system is in "excellent condition", and only 112,400 hectares of the original 400,000 plus hectares of mangroves has remained. This has naturally reduced the fish catch in the country. Haribon also claimed that there are 16 major rivers, including five in Metro Manila, which are biologically dead.

Air pollution

Philippine air quality, which improved slightly over the period 2003–2007 due to reduced total suspended particulates (TSP), remains problematic. According to the *National State of Brown Environment Report (2005–2007)*, the TSP geometric mean concentrations are still above the 90 $\mu g/Nm^3$ annual mean TSP guideline. The biggest source of air pollution in the country is transport because of the widespread use of fossil fuel and poor compliance with the Clean Air Act, including smoke-belching by old, second-hand, and poorly-maintained vehicles.

Water pollution

This is a major problem, particularly in highly urbanized areas. There are 20 major river basins and 421 principal rivers within the country. All the rivers in Metro Manila have failed the tests for "dissolved oxygen" (DO) and "biochemical oxygen demand" (BOD). The *National State of Brown Environment Report* (DENR-UNDP, 2009) wrote that the major sources of water pollution are domestic sources (48 per cent), agriculture (37 per cent), and industry (15 per cent).

Poor solid waste disposal

This is a nationwide problem and is most serious in the urban Centers. The same report explained that Metro Manila alone generates 2.86 million tons of solid waste per year, followed by nearby Southern Tagalog and Central Luzon, with 1.69 million tons and 1.21 million tons respectively. Overall collection efficiency ranges between 40 per cent (rural areas) to 70 per cent (urban areas). Recycling is also very limited. In 2007, there were 826 open dump sites versus 35 sanitary landfills and 359 controlled disposal facilities. The leading wastes are chicken parts, plastic, and paper. Accordingly, only 2.8 per cent of the LGUs have complied with the law on solid waste management requiring the LGUs to maintain ecological sanitary landfills (*Philippine Daily Inquirer*, August 31, 2009). A majority of the provinces and towns still operate 900 open or controlled landfills.

Climate change concerns

In 1998, the National Economic Development Authority (NEDA) noted under the *Philippine National Development Plan: Directions for the 21st Century* the threats posed by an oscillating climate system due to global warming which spawns destructive episodes of El *Niño* droughts and *La Niña* floods. This oscillating El Niño-La Niña weather pattern causes natural disasters such as droughts, floods, and powerful storms. It is also linked to epidemics of malaria, dengue, red tide, algal blooms, and coral bleaching. NEDA also noted at the time that the "*tragedy of global warming is that, although industrialized countries have caused the bulk of historical and current emissions of greenhouse gases, it is highly likely that the most serious impact of global climate change will hit the developing countries"* like the Philippines.

Eleven years after NEDA wrote the above observations, the Philippines was hit by two powerful storms — "Ondoy" and "Pepeng" — in the months of September and October 2009,

terribly validating the truth on the destructive impact of climate change as the two typhoons flooded more than half of Luzon, including Metro Manila. These storms, which arrived one week apart, revealed the extreme vulnerabilities of the country to floods and landslides due to massive loss of the forest cover, eroded watersheds, and silted river systems. The storms also validated the NEDA's earlier observation about the Philippine tragedy as a low emitter of GHG including carbon dioxide and yet the country is a major victim of climatic changes and abnormalities.

The table below shows the Philippine share in global GHG emissions compared to other countries.

TABLE 1-4: GHG EMISSION SHARE, SELECTED COUNTRIES, 2004

Country	Global share per capita	
	Per cent	GHG share
United States	20.9	20.6
China	17.3	3.8
Russia	5.3	10.6
India	4.6	1.2
Japan	4.3	9.9
Germany	2.8	9.8
Korea, Republic of (South)	1.6	9.7
Singapore	0.2	12.3
Philippines	0.3	1.0

Source: UNDP, Human Development Report 2007/2008

Fighting climate change: human solidarity in a divided world, 2007

Filipino climate change scientists have stressed the adverse impact of climate change on agriculture and biodiversity. Candido Cabrido (*ibid*) explained:

> *When drought occurs during the rice crop's flowering, booting, and milking to maturity, about 60–100 per cent of its yield is lost (DA Drought Matrix for Rice). When the rice crop is hit by typhoons with strong winds (>150 kph) for 12 hours during its flowering stage, about 35–50 per cent of its yield is lost. Also, when the rice crop is hit by flooding with muddy water for seven days during its panicle initiation/booting and flowering to maturity stage yield loss is estimated to be about 50–100 per cent.* [Note: "DA" refers to the Department of Agriculture].

Dr Esteban Godilano, who has produced a climate change map for the DA (Esteban, 2009), concluded that about 43 per cent of the country (13 million hectares) is likely to be affected by a CC-induced drought, 20 per cent (5.53 million hectares) by floods, and 11 per cent (3.4 million hectares) vulnerable to landslides. He summed up the likely negative economic impact of climate change on the country as follows: "*…water shortages, decreases in agricultural productivity, rise in infectious diseases due to heat stress, residents in low-lying coastal areas becoming "climate refugees", disappearance of small islands, decline in livestock production, coral bleaching, and decline in fish catch*".

1.3 Environment movement and policy responses

1.3.1 The environmental movement

National awareness on the central importance of a healthy environment is fairly high. To a great extent, this is due to the sustained efforts of environmental advocates and activists within the government and in the large civil society movement or NGO sector in the country. These efforts

span now four decades of environmental awareness-raising and campaigns for various environmental causes.

As early as the late 1970s, the National Environmental Protection Council (NEPC) under the then Ministry of Human Settlements (MHS) had been advocating land use planning and zoning (including identification of areas for "controlled development" such as cultural minority settlements), rehabilitation of forests and soil conservation, coastal resource management, development of "non-conventional" renewable energy sources, and varied pollution control measures for air, water, lakes, solid wastes, sewage, and industrial effluents (NEPC, 1979).

At the same time, Haribon, originally a bird-watching society was already raising the problem of declining biodiversity. Proponents of "organic agriculture" such as Domingo Abadilla, a pioneer environmentalist and former Administrator of the Philippine Coconut Authority, were writing about the poisoning of the soil by "chemical agriculture" (mostly associated with the Green Revolution of the l970s) and the looming "environmental crisis" in the country (Abadilla, 1982a and Abadilla, 1982b).

Many of the existing environmental programmes today were in fact the subject of policy discussions and debates dating from this time. Thus, it is not surprising that in the wake of the devastations wrought by the September–October 2009 typhoons, a well-known Filipino architect, Felino Palafox, revealed that a government blueprint drawn up in the late 1970s to stop flooding in Metro Manila and prevent township development in flood-prone areas such as Marikina (also referred then as "Marikina Valley") was ignored and shelved by the various administrations which succeeded the Marcos regime (Paglinawan, 2009).

One major policy outcome from these early environmental discourses was the issuance by President Ferdinand E. Marcos of Presidential Decree (PD) No. 1151 (issued June 6, 1977) requiring energy- and resource-intensive industries to submit an "environmental impact statement" about their proposed project, including the "adverse environmental effect" of the project and "alternatives to the proposed action". Subsequently, this decree gave birth to PD 1586 on "environmental impact assessment" (EIA) and, later, the requirement for such projects to get "social acceptance" or "social acceptability" by the host community.

In the second half of the l980s, the environmental movement in the Philippines reached a new high, with the change of government in 1986 and with the release in 1987 by the World Commission on Environment and Development of its report entitled *Our Common Future*. More popularly known as *The Brundlandt Report*, the Philippine edition was reprinted by a Church-funded "Lingkod-Tao Kalikasan", which declared itself as the "Secretariat for an Ecologically Sound Philippines". There has been a proliferation since then of environmental NGOs, estimated by the Philippine Council for Sustainable Development (PCSD) to be over 1,200 in the 1990s (Severino, 1998). Among the more prominent NGOs today are the pioneering Haribon and the Philippine chapters of Greenpeace International and World Wildlife Fund (WWF). At one time, there were large and active environmental coalitions such as the Green Forum and Nuclear-Free Philippines.

During the term of President Corazon C. Aquino, most of the environmental programmes were lodged in the reorganized and expanded DENR through its Environmental Management Bureau (EMB). With the help of then DENR's Secretary Fulgencio Factoran, Haribon worked for the establishment of the Foundation for Philippine Environment (FPE). The FPE, in turn, obtained an endowment fund from the United Nations Development Programme (UNDP), which the FPE manages to help sustain the operations of a number of environmental NGOs.

1.3.2 PCSD's agenda 21

The DENR between l987–89 also tried to formulate a "Philippine Strategy for Sustainable Development" (PSSD). In 1992, following the Earth Summit in Rio de Janeiro, the government created the Philippine Council for Sustainable Development (PCSD) which was chaired by

NEDA and co-chaired by the DENR. The PCSD revisited the PSSD when it came up with its local draft of "Agenda 21" as mandated by the Earth Summit.[15] Briefly, the PCSD, an inter-agency body, serves as the government's coordinating Center to monitor Philippine compliance with its global environmental commitments and to foster coherence in domestic economic-environmental policies. Part of the Agenda 21 is "Business Agenda 21", which outlines the role of the private sector in the management of the environment. The ILO (Villacorta and Meirhaeghe, 1995) noted that Agenda 21, a product of "consensus-building" involving the employer and trade union groups, hewed closely to the ILO advocacy programme for "Environmental Management at the Enterprise Level", which promotes stronger work-environment harmonization.

Today, the main preoccupation of PCSD is how to flesh out the Philippine response to the "Climate Change" (CC) challenge under the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 1997 Kyoto Protocol. The Philippines ratified both UN documents in 1994 and 2003 respectively.

However, one outcome of the Philippine ratification of these documents and participation in the global war against climate change is the increased role of the Department of Energy (DOE), which heads the campaign for the research and development of clean renewable energy (RE) as well as the reduction of per capita power consumption in the country. Since 2002, the DOE has been cooperating with the Austrian-supported and UN-backed REEP or "Renewable Energy and Energy Efficiency Partnership", which seeks to promote tie-ups with investors going into RE and with companies seeking to adopt more efficient energy utilization schemes. REEP involves awareness-raising, third-party financing for would-be investors and technical assistance in setting up RE projects.

1.3.3 The increased participation of LGUs

In the meantime, the advocacy for a clean and healthy environment has been embraced by an increasing number of LGUs.

There are many LGU initiatives taken in support of eco-tourism projects. One pioneering and successful LGU-led eco-tourism project is the "ecotour" at Subic Bay where the indigenous people (Aeta tribe) serve as the tour guides for "trekking" in the preserved forests of the former US naval base (Villacorta and Meirhaege, *ibid*). Another but bigger eco-tourism programme is that conducted by the LGU of Puerto Princesa, which promotes itself as the country's "greenest city" and which markets its lush forests, exotic caves, underground river and biodiversity as attractive come-ons for nature lovers. Similarly, the LGU of Bohol has transformed the island province into a major tourist destination by cleaning and sprucing up the entire province, and mobilizing the people in support of eco-tourism.

There are other LGU-led initiatives, to wit:

- Marikina City's dredging and rehabilitation of the Marikina River, the banks of which served as promenade grounds for the city's inhabitants (highly popular before the September-October 2009 typhoons);
- Makati City, the country's premier commercial city, has been promoting prototypes of battery-run "green jeepneys" and "green buildings" such as the Makati University; and
- Davao City and Taguig City also encourage battery-run tricycles.

Some LGUs are also militant in the defence of their environment against the potential threats posed by large-scale mining, such as the ordinance adopted by Oriental Mindoro against

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[15] UN's Agenda 21 is a product of the 1992 UN Conference on Environment and Development (UNCED), which is better known as the "Earth Summit". This Summit produced a number of strategies on sustainable development, which are collectively dubbed as "Agenda 21".

the Mindoro Nickel Project. Governor Arnan Panaligan said that the 9,000-hectare nickel project is a threat to Oriental Mindoro's watershed areas and the ancestral domain (or land) of the Mangyan and Kabilogan tribes (*Oriental Mindoro Ngayon*, May 15, 2009). The stand taken by Governor Panaligan is the same stand taken by almost all bishops in the Philippines, who have aligned with militant anti-mining activists and environmentalists in the country. A similar Church-LGU anti-mining campaign led to the abandonment by a big influential business group of a 7,000-hectare coal exploration-development project in Catanduanes in the Bicol region (Remo and Gianan, 2009).

The LGU of Albay province in the Bicol region has a disaster preparedness programme in place. Like the other provinces of Southern Luzon, Albay is in the path of typhoons that often originate in the Pacific Ocean. Albay is also host to an active volcano, Mayon, which has undergone 50 eruptions in recorded history and which last erupted in December 2009. In addition to the danger posed by volcanic activity, the lahar deposited on the slopes often generates dangerous mud slides in the villages and towns around it during storms.

1.4 Environmental policies, laws, and responses

The Philippines has a rich body of environmental laws, regulations, and programmes. Obviously, this is partly the outcome of the policy intervention efforts of the environmental advocates and activists within the government and those in the large NGO sector in four decades of environmental activism.

1.4.1 Environmental programmes in the 1970s

As pointed out already, a number of environmental laws were promulgated in the l970s by President Marcos, who exercised law-making by issuing PDs. Many of these laws were in implementation of the proposals on zoning, pollution abatement, and resource conservation made by the NEPC. Among the environmental decrees issued are: PD 1151 (Philippine Environmental Policy), PD 1152 (Philippine Environmental Code, with specific rules on air and water pollution), PD 705 (Forestry and Mangrove Preservation), PD 1181 Motor Vehicle Pollution), PD 984 (National Pollution Decree), PD 600 as amended by PD 979 (Marine Pollution), PD 1586 (EIA Law), and PD 825 (Anti-littering Decree).

One agency created by the Marcos Administration was the Human Settlements Commission, which gave birth to the Ministry of Human Settlements (MHS) headed by the (then) First Lady Imelda Marcos. Set up in l976, the Commission introduced the concepts of integrated human settlements, land use planning and environmental management to the Philippines. It organized the first EIA seminar-workshop for the public and private sectors. It also sought to develop environmental technologies such as the "family-size bio-gas plant" and "solar energy collector" (Human Settlements Commission, Annual Report 1976/77). The MHS's National Environmental Protection Council came up with annual "state of the Philippine environment" reports, which gave an objective picture of the different eco-systems (coastal, land, forest, etc.) and the major policy issues which needed to be addressed by the government (see, for instance, NEPC, *op cit*). Thus, it is not surprising that Felino Palafox, as mentioned earlier, came up with a revelation that there were blueprints for comprehensive flood control for Metro Manila drawn up as early as the late l970s.

Aside from the foregoing environmental programmes, the Marcos regime, in response to the oil shocks of the l970s, set up the DOE, which was tasked to develop alternative sources of energy such as geothermal and promote energy conservation and self-sufficiency.

1.4.2 Environmental programmes in the 1980s-1990s

The (first) Aquino Administration (1986–92) and the Ramos Administration (1992–98) tried to strengthen the country's enforcement of environmental laws through a strengthened DENR and the formation of the PCSD as summarized earlier. In 1990, Republic Act (RA) No.

6969 regulating the importation, manufacture, and distribution of "toxic substances and hazardous and nuclear wastes" was enacted.

In 1992, RA 7586 on the "establishment and management of National Integrated Protected Areas System" (NIPAS) was passed, to protect critical areas such as nature reserve, natural park, wildlife sanctuary, protected landscapes and seascapes, resource reserve, natural biotic areas, and others that may be established by law or international agreement. The idea is that biologically-rich areas, unique landscapes, and seascapes shall form part of the country's NIPAS.

Under the Ramos Administration, two other laws were enacted — A 9275 ("Clean Water Act of 1994") and RA 8371 ("Indigenous Peoples Rights Act of 1997"). The first seeks to address problems of water pollution through better coordination among concerned government agencies and LGUs such as water quality management, treatment of waste water, and septic and sewerage management. RA 8371 recognizes the rights of indigenous peoples such as the right to ancestral domain, use of customary laws, and observance of "sustainable traditional resource rights".

These rights are set out in Chapter II of the Act which reads:

> *d) Sustainable Traditional Resource Rights - refer to the rights of ICCs/Indigenous Peoples (IPs) to sustainably use, manage, protect, and conserve: a) land, air, water, and minerals; b) plants, animals, and other organisms; c) collecting, fishing, and hunting grounds; d) sacred sites; and e) other areas of economic, ceremonial, and aesthetic value in accordance with their indigenous knowledge, beliefs, systems, and practices.*
>
> *RA 8371, Chapter II, Section 3*

Under the Estrada Administration (1998–2000), two pieces of landmark legislation with significant implications for business and industry were enacted. The first was RA 8749 or the "*Philippine Clean Air Act of 1999*". This law seeks to limit the emission of GHG and poisonous and toxic fumes through air quality monitoring, development of "airsheds", establishment of emission standards and/or limits for motor vehicles, prohibition of smoking in enclosed public places, and control/regulation of various pollutants affecting the air.

Another significant law was RA 9003 or the "*Ecological Solid Waste Management Act of 2000*". This law seeks to promote waste segregation, proper disposal of solid waste, and adoption of better solid waste management techniques, including waste minimization measures such as composting, recycling, re-use, recovery, green charcoal process, and so on. The law created an inter-agency National Solid Waste Management Commission to coordinate solid waste management plans and programmes. One of the primary objectives of RA 9003 was to phase out unsanitary landfills as garbage dumping grounds by LGUs.

These two environmental laws under the Estrada Administration were clearly inspired by the CC challenge. However, one must add here that both laws were also enacted because of the rising public irritation with air pollution in Metro Manila and the huge mountains of garbage that piled up in the streets of the metropolis in 1998–2000 with the closure of some dumpsites.

1.4.3 Environmental programmes in the new millennium

Under the Macapagal-Arroyo Administration (2001–2010), most of the laws enacted have focused on RE, obviously in response to the twin pressures of the ever-rising cost of imported fossil fuel and the need to contribute to the global mitigation of global warming. Thus, the passage of RA 9367 or the "*Biofuels Act of 2006*". This law gives incentives (e.g., exemption from value added taxes and specific taxes) for investors going into the production and distribution of "*bioethanol (C_2H_5OH) produced from feedstock and other biomass*". However, the biggest incentive provided by the law is the creation of a guaranteed market for pioneer ethanol investors. The law requires that at least 5 per cent of the total volume of gasoline fuel sold and/or distributed

in the country should be ethanol fuel mixed with traditional gasoline. This "E5" market formula is expected to rise to "E10" level once there is sufficient level of bioethanol production in the country (Box 3). Most of the investors are also expected to use sugar cane, corn, cassava, jatropha, and other food crops as source of feedstock, thus raising the possibility of more jobs being created in the countryside. The latter, however, became a controversial proposition with the "global food crisis" hitting the Philippines in the first half of 2008 and putting the supporters of biofuels at a defensive because the issue has been reduced to a "food-or-fuel" policy debate.

Another CC-inspired law is RA 9513 or the "*Renewable Energy Act of 2008*", which again, is a clear response to the ever-rising price of imported fossil fuel. This law provides similar fiscal incentives and the privilege of duty-free importation of needed equipment to those going into renewable energy production such as wind, geothermal, solar, ocean, hydropower, and biomass. The law also provides for the establishment of a regulatory framework to speed up registration of RE developers and help in the acceptance by host communities of these developers.

The 2004–2010 Medium-Term Philippine Development Plan (MTPDP) also calls for the implementation (or application) of energy projects under the Clean Development Mechanism (CDM) of the Kyoto Protocol, establishment of wildlife farms and zoos to safeguard biodiversity, strengthening of protection for "*vulnerable and ecologically fragile areas*" (forest ecosystem, coastal/marine ecosystem, and biodiversity resources), better management of air and water resources, improved handling of solid waste (especially in Metro Manila), and mitigation measures against natural disasters (landslides, floods, and volcanic eruptions). However, there are also programme thrusts under the MTPDP that have come under the critical scrutiny of NGOs and environmental activists such as the liberalization/streamlining in the issuance of the

Box 3: The Biofuels Act (RA 9367)

An important cornerstone of the renewable energy programme in the Philippines is the Biofuels Act. The Biofuels Act, RA 9367, was passed by Congress in November 2006 and signed into law by President Arroyo on January 12, 2007.

RA 9367 mandates minimum biofuel blends into all diesel and gasoline fuels to be introduced incrementally during the first two years with future increases in the mandatory blending to be determined by the National Biofuels Board (NBB) created under the Act as the lead agency for the national biofuels programme. The NBB is composed of representatives from 11 government offices. The minimum blends for biofuel into all diesel and gasoline fuels are as follows:

On Biodiesel

" Within three months from the law's effectivity, a minimum of 1 per cent biodiesel blend present using Coco Methyl Ester but alternatives are also available in all diesel engine fuels sold in the country.

" Within two years from the law's effectivity, a minimum of 2 per cent biodiesel blend, upon the recommendation of the NBB.

On Bioethanol

" Within two years from the law's effectivity, a minimum of 5 per cent bioethanol blend in all gasoline fuel sold and distributed by every oil company .

" Within four years from the law's effectivity, a minimum of 10 per cent bioethanol blend in all gasoline fuel sold and distributed in the country, upon the recommendation of the NBB.

The law became effective in January 2007. Note that for both biodiesel and for bioethanol, the first target is mandated whereas the second target is subject to recommendations from NBB.

environmental compliance certificates (ECCs), opening up of denuded forest lands to private sector development, and the promotion of mining as a dollar generator.

In summary, a chronology of the Philippine environmental laws (Table 1-5) shows that the country has responded positively, in terms of legislation, to the emerging environmental concerns, starting with the grim issue of deforestation in the l970s to the CC-related and rising cost of fossil fuel.

An evaluation of the enforcement of these environmental laws and the implementation of related environmental programmes is worth pursuing. However, such an exercise is not only beyond the scope of this report but also difficult to undertake in the light of the limited enforcement/implementation data available in the various concerned agencies. Thus, one government report to the UN Committee on the Convention on Biological Diversity, *Assessing Progress Towards the 2010 Biodiversity Target* (2009: p 29), frankly admitted:

> *"There are no actual figures for agro biodiversity decline or gain in the country due to the absence of national indicators as well as lack of monitoring".*

TABLE 1-5: SIGNIFICANT ENVIRONMENTAL LAWS, 1970S–2008

Year	Event
1970s	PD 1151 (Philippine Environmental Policy)
	PD 1152 (Philippine Environmental Code)
	PD 705 (Forestry and Mangrove Preservation)
	PD 1586 (Environmental Impact Assessment)
	PD 1586 (Environmental Impact Assessment)
	PD 1586 (Environmental Impact Assessment)
	RA 7586 (National Integrated Protected Areas System)
	RA 9275 (Clean Water Act)
	RA 8371 (Indigenous Peoples Rights Act)
	RA 8749 (Clean Air Act)
	RA 9003 (Ecological Solid Waste Management Act)
2006	RA 9367 (Biofuels Act)
2008	RA 9513 (Renewable Energy Act)

Source: Author's compilation

1.5 The climate change act and the CDM process

The latest environmental law to be enacted by the government is RA No. 9729 (*An Act Mainstreaming Climate Change into Government Policy Formulations, Establishing the Framework Strategy and Programme on Climate Change*). Passed in September 2009, the main content of the law is the creation of a Climate Change Commission, to be headed by the President no less. This Commission is envisioned to serve as the country's sole policy-making body on climate change, thus eliminating the confusion and "squabbling" between the DENR and the DOE as to who should lead or coordinate CC-related programmes. Aside from the Inter-Agency on Climate Change (IACC), the government has established a Presidential Task Force on Climate Change (TFCC) and office of the Presidential Adviser on Global Warming and Climate Change. The leadership of IACC and TFCC had been see-sawing between DENR and DOE (Romero, 2009).

The new law reaffirms the Philippine adherence to the UN's Agenda 21 sustainable development framework, its commitment to cooperate with the global community on the resolution of CC issues, and its declared policy of integrating CC in "*various phases of policy formulation, development plans, poverty reduction strategies and other development tools and techniques by all agencies and instrumentalities of the government*". The Commission is tasked to

formulate within six months a "Framework Strategy on Climate Change" in order to mitigate GHG and other "anthropogenic causes of climate change". [16]

The law also creates an advisory board composed of 14 national line departments and representatives of LGUs, academe, business sector, NGO sector, as well as two special government bodies, the National Security Council and the National Commission on the Role of Filipino Women. However, it is noticeable that the Department of Labor and Employment (DOLE) has not been included in the list. Furthermore, neither TESDA nor the trade union sector has been included.

1.5.1 The carbon market

A key Philippine involvement in the global CC programme is its participation in the "Carbon Credit Market" under the CDM provided for by the Kyoto Protocol. The Kyoto Protocol, under Article 12, allows developed countries to limit or reduce their GHG emissions by buying carbon credits or "certified emission reduction units" (CER) produced by developing countries under the CDM.

The Philippines has been participating in the CDM market since the establishment of the implementing rules of CDM in 2005. As of November 1, 2009, a total of 87 CDM project applications had been received by DENR, the Philippines' designated national authority (DNA) for CDM. Out of the 87 applications, around 40 CDM projects have been registered (Appendix I for complete list of registered CDM projects) while the remainder are awaiting review. However, only two CDM projects had been issued with CERs as of 2009. These are the Quezon City Controlled Disposal Facility Biogas Emission Reduction Project (QCCDF) in Barangay Payatas, Quezon City, and the NorthWind Bangui Bay Project in Bangui, Ilocos Norte. The QCCDF had earned 30,860 CERs as of June 2009, while NorthWind had received CERs for two crediting periods and is earning approximately 56,788 metric tons of carbon dioxide (CO_2) reduction equivalent per year.

For a project to be eligible for registration, it must first secure approval from the DNA, which is granted not only on the basis of the potential emission reductions but also on the project's sustainable development benefits. Projects seeking DNA approval are evaluated as to their economic, environmental, and social sustainability and in their legal capacity to participate in the CDM. Simply put, projects are assessed not only in terms of their potential GHG emission reduction equivalents but also on whether they can provide livelihood and economic benefits in the host community (economic), comply with environmental policies and standards (environmental), and raise the capacity (education and training) of the local stakeholders (social).[17]

The CDM application-certification process is a lengthy one, usually lasting for at least a year from project development to registration. According to Gigi Merilo, Senior Environmental Specialist, Environmental Management Bureau's (EMB) Environmental Education and Information Division, one of the factors that slow down the process is the lack of local CDM auditors, which necessitates the hiring of the services of international CDM auditors in order to validate the CDM project applications.[18] As mentioned, only the QCCDF and the Bangui NorthWind Project were the CDM projects fully in place in the Philippines as of the end of 2009.

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[16] See for example core publication, *Agenda 21*, UN Department of Economic and Social Affairs, Division for Sustainable Development, available at http://www.un.org/esa/dsd/agenda21/ (accessed 18 May 2010).

[17] For further background on the processes involved, see for example *CDM Manual for CDM Project Developers*, ADB 2010 (forthcoming publication).

[18] Interview with Senior Environmental Specialist Gigi Merilo, Environmental Education and Information Division, Environmental Management Bureau, Department of Environment and Natural Resources, December 1, 2009.

1.5.2 Payatas dumpsite CDM facility

The Payatas Biogas Emission Reduction Project of the QCCDF is a CDM project developed by the Quezon City LGU in partnership with Pangaea Green S. r. l. (Italy) and Pangaea Green Philippines, Inc.

By way of background, Barangay Payatas is a waste picker village consisting of more than 3,500 families. Most of the waste pickers, young and old, used to scavenge for recyclable materials from a 22-hectare dumpsite, which had built up a mountain of waste and debris since it began operation in the 1970s. In July 2000, part of the mountain of waste collapsed, burying close to 300 waste pickers (with an undetermined number missing). The dumpsite was immediately closed. However, it was later re-opened to receive wastes only from Quezon City, the largest city of Metropolitan Manila, and only under controlled conditions. The dumpsite was converted during 2004–2007 by the Quezon City LGU into a "controlled disposal facility" involving the closure of the old open dumpsite, greening this dumpsite (meaning covering the site with soil, reengineering the slopes and planting trees and green plants around it), managing the recovery of useful materials such as the tire retrieval project (with the cooperation of Holcim Phil., Inc.), operating a new mound based on solid waste management principles (e.g. separating the biodegradable from the recyclable), and organizing the waste pickers into livelihood groups.

A major component project of the QCCDF is the 10-year CDM project, which is focused on the extraction and flaring of biogas emissions (methane) and its conversion into electricity. Pangaea raised the funds for the project, which were used to install the following facilities:

- Biogas collection network, consisting of appropriate wells, pipes, and gravel filter to allow transport of the gas from the dumpsite to the substations;
- Biogas aspiration and conditioning system, which consists of blowers and purification instruments;
- Dehumidification equipment to transport and clean gas of impurities that can damage the system;
- Biogas flare, a high-temperature torch that burns the methane and converts it to less harmful carbon dioxide, water, and other trace gases;
- Energy production plant, composed of electricity-generating equipment utilizing methane from biogas as fuel and distribution lines for the delivery of electricity to end users (plant equipment and grid); and
- Monitoring and control systems.

Most of the equipment was imported from Europe because of its unavailability in the Philippines.

In the implementation of the project, Pangaea and the Quezon City LGU conducted consultations with the Payatas community. A major Stakeholders' Meeting was held on February 23, 2007 involving officials of the LGU's Payatas Operations Group and the Quezon City Environmental Protection and Waste Management Department officials on one hand, and on the other, the Payatas local community leaders representing different sectors, associations, and cooperatives, including the urban poor, scavengers, recyclers, junk shops, and transport groups.

Today, the QCCDF's CDM project is estimated to have reduced carbon emissions by as much as 110,000 tons a year. The gas-electricity conversion project generates 24,000 megawatt hours (MWh) a year, part of which was given free to the community while the earnings from the sale of the electricity to the national grid, roughly PhP12 million a year, are ploughed back into the community in support of various livelihood and welfare projects. The waste management-

greening-CDM-livelihood programme of the QCCDF has literally become a showcase for the country.

1.5.3 NorthWind power project

The NorthWind Bangui Bay Project in Ilocos Norte (known as the Bangui Wind Mills) promotes the use of wind energy as an alternative and renewable source of electrical power, replacing the electricity generated from fossil fuels and consequently reducing GHG emissions. The 33-MW wind power plant turbine project was developed by the NorthWind Power Development Corporation,[19] a Danish company, in cooperation with the LGU of Ilocos Norte province. It is the first commercial wind project in the Philippines and in Southeast Asia. The site for the project is a strip of barren land, roughly nine kilometers long and 100 meters wide, on the edge of Ilocos Norte facing the seas washing towards southern China. The Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) estimates that the country has "a mean average of about 31 watts per square meter (w/m^2) of wind power density".

The funding for the NorthWind Project was partly obtained through the project's CDM status, with the projected CER's from the operation of the wind power plant turbine serving as collateral for the project's financing. As a CDM project, NorthWind was able to secure financial assistance in the form of a loan from the Danish International Development Agency amounting to US$35 million, with the Philippine Export and Import Credit Agency as the loan guarantor. The project took five years to construct, from 2000 to 2005, and involved the development of 15 turbines (now 20 turbines in all) and construction of a 60-kilometer transmission line to connect the project to the switchboard of the Ilocos Norte Electric Cooperative. The World Bank (WB) helps sustain NorthWind's operations by buying, through the WB's Prototype Carbon Fund, the CERs of NorthWind.

The development of the project was not easy. Aside from the financial and technical barriers, NorthWind has had to face also the lack of Filipino experts and skilled workers familiar with the operation and maintenance of wind technology. This forced NorthWind to hire foreign experts, mainly Danish, to manage the initial phase of the operations and train local workers for the long-term maintenance of the wind power plant. Today, NorthWind is another CDM showcase and attracts busloads of tourists.[20]

1.6 The environment and the economic crisis

1.6.1 Overview of the economic crisis

Like the rest of the world, the Philippine economy slowed down in 2008–2009 due to the effects of the three global "F" crises — food, fuel, and financial. As the world's largest importer of rice, the Philippines, which imports roughly 2 million tons of rice a year, had to bear the high cost of rice, the internationally traded price of which doubled and even trebled during the second quarter of 2008. The Philippines is also highly dependent on imported oil (*Philippine Yearbook*, 2005), which accounts for 45.5 per cent of the country's total energy requirements. Imported coal and indigenous coal resources make up a further 9 per cent and 45.5 per cent of the total respectively. Thus, when oil prices rose beyond the US$100/barrel level in mid-2008; Philippine policy makers were under pressure to develop a "survival programme" that would mitigate the worst effects of the high prices. Then, to complete the picture, the effects of the global financial crisis, which started as a US housing mortgage crisis in mid-2008, were strongly felt in the Philippines in the final quarter of that year, mostly in terms of declining global demand for Philippine-assembled electronic, auto part and other exports in key export markets (US, Japan, and Europe).

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[19] See http://northwindspower.com/ (accessed 18 May 2010).

[20] See http://www.waypoints.ph/detail_gen.html?wpt=windf1 (accessed 18 May 2010).

By the end of 2008, GDP growth was down to a fraction of the recorded 7 per cent growth recorded in 2007 (Table 1-6). For 2009 as a whole, the average figure was less than 1 per cent GDP growth. DOLE estimated that 40,000 workers, mostly in the export-oriented export processing zones and industrial parks, lost their jobs in the final quarter of 2008. DOLE further estimated that jobs of around 200,000 workers were vulnerable to displacement in the first half of 2009 (Aning, 2009).

TABLE 1-6: PHILIPPINE GDP AND EXPORT GROWTH QUARTERLY (2007–2009)

Index	2007				2008				2009			
	Q1	*Q2*	*Q3*	*Q4*	*Q1*	*Q2*	*Q3*	*Q4*	*Q1*	*Q2*	*Q3*	*Q4*
GDP growth	6.9	8.3	6.8	6.3	3.9	4.2	4.6	2.9	0.6	0.8	0.8	1.8
Export growth	9.4	4.6	2.3	9.9	2.8	5.5	4.1	22.3	-36.8	23.4	21.5	N/A

*Source: Josef Yap (November 2009), "*The 2008 global financial and economic crisis: impact on the Philippines and policy responses at the national and regional levels*", Policy Notes, No. 2009-03, NEDA: Philippine Institute for Development Studies. Data for Q4 2009 added by the author*

However, actual job losses in 2009 turned out to be minimal. This is so because remittances by Overseas Filipino Workers (OFWs), instead of contracting (as had been predicted by many), actually rose, increasing to US$1.5 billion a month, from US$1 billion a month in previous years.[21] Overseas Filipinos, numbering around 9 million or 10 per cent of the population, directly support the daily requirements of one-third of the household population (Basa, 2009). They are the main explanation for the continuing growth of service industries such as retailing-wholesaling, food and restaurant, education, real estate, and other service-oriented industries.

As to exports, yes, they dipped into the negative territory during 2009 (see table above). However, many EPZ firms decided to keep their work force intact in anticipation of recovery by the end of 2009. The impact was not as severe as it might have been although for many, it exacerbated an already precarious situation (Dejardin, 2010).

The Philippine government also introduced a number of job creation initiatives to protect the most vulnerable workers. Like other countries, it crafted an infrastructure-based stimulus package, an "Economic Resiliency Plan" or ERP. The ERP had a total budget of PhP330 billion, targeted mostly on job-generating infrastructure development and maintenance projects collectively dubbed as a "comprehensive livelihood and emergency employment programme" or CLEEP.

1.6.2 Environmental policy response

But is there an environmental policy response to the economic crisis?

The CLEEP is not clear on this. CLEEP is overwhelmingly focused on emergency or temporary hiring of unemployed and displaced workers by the various government agencies. There are also cash transfers and "hunger mitigation" programmes for the socially-disadvantaged. The environmentally-related job creation programmes are mainly those already in place or traditionally undertaken by the DENR (on reforestation and watershed management) and DA (special programmes on organic agriculture and organic fertilizer production). CLEEP allows them to hire casuals or contractual workers for job-creating programmes. However, with Ondoy and Pepeng devastating the country in September-October 2009, the government realized that it had to intensify spending on flood control projects and the rehabilitation of infrastructure damaged by typhoons and ensuing floods.

Also, the government has intensified the search for alternative fuels as a solution to the fuel crisis as can easily be gleaned from the passage of the 2006 Biofuels Act and the 2008 Renewable

[21] Although the rate of growth did slow in 2009.

Energy Act. However, these initiatives predated the GFC. Naturally, this renewable energy thrust has strengthened the role of DOE in climate change policy coordination, which explains the confusing leadership issue on climate change involving two frontline departments — DENR and DOE — and other offices such as the Office of the Presidential Adviser on Climate Change (see earlier discussion).

Nevertheless, the importance of renewable energy development and the all-out strengthening of the country's energy security cannot be overemphasized. ECOP and the various business organizations in the country have been citing the high cost of energy as one of the reasons for the low competitiveness of Philippine industry. In response to all this, the DOE Secretary Angelo Reyes, in 2009, outlined the three major energy thrusts of the country — increasing energy self-sufficiency, energy conservation and efficiency, and competitiveness pricing for energy products.

On energy self-sufficiency, the policy thrust is to increase indigenous resource production to account for 60 per cent of the total national consumption. This is being pursued through the intensification of local oil/coal production, the further development of "renewables" such as geothermal, wind, and solar, and the generation of alternative fuels such as biofuel, hydropower, and biomass.

Table 1-7 shows the share of these different energy sources in the country's energy requirements as of 2008. As summarized earlier, the government extends fiscal and other incentives to investments made under the Biofuel and Renewable Energy Acts.

TABLE 1-7: ENERGY AND POWER SOURCES, PHILIPPINES (2008)

Energy sources	Volume in MTOE	Per cent share
Indigenous	22.99	57.99
Fossil fuels	4.80	14.58
Renewables	17.19	43.21
Imported	16.78	42.21
Oil	12.50	31.45
Coal	4.28	10.76
Power generation	**Installed capacity**	**Per cent share**
Coal	4 213	26.88
Oil-based	3 344	21.33
Hydro	3 289	20.99
Natural gas	2 834	18.08
Geothermal	1 958	12.59
Wind	33	0.21
Solar	1	0.01
Total	15 672	100.00

Source: Angelo Reyes (June 30, 2009), "National development through Energy independence", BizNews Asia, San Juan

1.7 Environmental education and awareness-raising

1.7.1 High public awareness, yet high rate of complacency

As pointed out earlier, the relatively high public awareness of environmental concerns is due partly to the sustained efforts of the environmental advocates and activists within the government and in the broad civil society movement. These efforts are supplemented by cooperative and sympathetic media reporters and publishers. Today, environmental news has become a standard daily fare in the major broadsheets of the country.

Moreover, some intrepid and enterprising journalists have made sensational exposes of a number of environmental abuses committed by powerful vested interests. For example, members

of the Philippine Center for Investigative Journalism exposed in 1995 how logging companies had stopped submitting the required aerial photos of their forest concessions to the DENR, obviously to hide from public scrutiny the extent of forest denudation or failure of logging companies to undertake the required reforestation of logged-over areas. This prompted then the newly-appointed DENR Secretary Victor Ramos to issue an ultimatum to the loggers to submit the said aerial photos within a year (Severino, 1998).

The school system is also a good medium for raising environmental awareness and honing environmental skills. However, this has been given official attention only in recent years. Textbooks or courses discussing the environment were largely written or taught on the initiative of individual teachers or private school institutions; for example, the Catholic Education Association of the Philippines has integrated environmental studies into the social studies (Makabayan) and science curriculum for high school students (DENR-UNDP, February 2009).

One problem, however, is that public awareness of the myriad environmental problems and the necessary solutions are rarely translated into actionable programmes. And if these programmes are in place, they are not implemented. This is clearly the situation in relation to the deforestation problem, which generated a number of sound but non-implemented solutions as early as the 1970s.

There are several possible explanations for this complacent attitude. One obvious explanation is bureaucratic inertia.

Another explanation for the weak implementation of environmental programmes is that they are seen by some sectors as a threat to jobs and livelihood. In a 1991 ILO-supported conference on "Labour and Ecology", Atty Evelyn Dominguez of the then Pollution Adjudication Board of the DENR spoke harshly about the "reactionary" attitude of organized labour towards the environment because the Board's "pollution control efforts" were "seen as a threat to jobs, food and economic security". In the 1990s, the Board prosecuted several hundred firms, mainly in the manufacturing sector, which were discharging effluents and other wastes into the Pasig River and the Laguna Lake. Many of these manufacturing plants were issued with a "cease and desist order", an order which was often opposed by the workers themselves (Dominguez, 1991).

However, the research team believes that most of these factories, which are no longer around or to be seen along the banks of the Pasig River, closed down not only because of the environmental compliance orders from the DENR but also, and more importantly, due to the general crisis of manufacturing in the country. This was particularly true in the early 1990s, when Luzon was hit by a debilitating power crisis and outages lasting as long as 10–12 hours. In the mid-1990s, the solution to the power crisis turned out to be expensive. To solve the crisis, the government used oil-fired power barges as a stop-gap measure but the generating cost of electricity from these plants was high. This high cost of power was further compounded by the accelerated liberalization of the market during the Ramos Administration, paving the way for the entry into the domestic market of cheaper imports. The decade ended with the 1997–98 Asian financial crisis which reduced demand and, with many power contracts signed on a "take or pay" principle, costs have remained high in the Philippines ever since.

Still another explanation is the generally complacent attitude of Filipino officials and even the public in general. In 2000, the Philippine Social Weather Station (SWS) participated in an international social survey programme (ISSP 2000) on environmental attitudes. The SWS found that the Filipinos exhibited the most complacent attitude towards the environment as indicated by the high percentage (66 per cent) of those who said that their country is "already doing enough" on the environment; this contrasted to an average of 63 per cent in 15 other countries who answered "not enough". And in a 2007 SWS survey, "*76 per cent of Filipinos want global warming addressed, but most say it should be done gradually*", an answer interpreted by the SWS as another sign of complacency (Mangahas, 2009).

Today, it is hard to find a business person, a labour leader or a government functionary opposed to environmentalism or to any mitigation/adaptation measure related to climate change. In fact, the term "green jobs" is now part of the vocabulary of the tripartite actors. At the recently-held Copenhagen Summit (December 2009), most of the labour groups in the Philippines supported the ITUC's statement entitled "Equity, justice, and solidarity in the fight against climate change" (ITUC, 2009). DOLE, on the other hand, has been supporting the ILO's programme on "green and decent jobs" and has been urging companies to adapt "greener ways" at work (BusinessWorld, 2009a).

Hopefully, the natural disasters which hit the country in September-October 2009 due to the twin typhoons will spur all sectors of society to be more aggressive in pushing for appropriate environmental solutions and programmes. In the meantime, one should not slow down in deepening the public understanding of environmental problems and their implications for the economy, jobs, and skills. The following section provides a brief summary of what is being done on this front.

1.7.2 Environmental education, skills mismatches

The DENR, through the PCSD, initiated the crafting of a National Environmental Education Action Plan for Sustainable Development (NEEAP-SD), which was partly inspired by the United Nations Decade of Education for Sustainable Development (UNDESD) for 2005–2014 (DENR-UNDP, February 2009). In fact, NEEAP had been in place since 1992 through the initiatives of the EMB of DENR and the then Department of Education, Culture and Sports (DECS). Among its objectives are the promotion of mass-based environmental conservation activities through information education and communication campaigns and the improvement of the formal and non-formal environmental education systems (EENP, 1996). However, it only succeeded in partly integrating environmental awareness at the elementary and secondary levels because of insufficient resources and personnel (Segovia and Galang, *op cit*).

In 2004, the NEEAP-SD was redesigned in the context of sustainable development. The idea is to mobilize DepEd, CHED, and the TESDA in producing an environmentally-literate citizenry. However, the implementation of NEEAP-SD has encountered basic problems such as the lack of dedicated units and technical experts on environmental education at all levels, the practical problems of integrating environmental education into the curriculum, education materials, teacher training, and so on (DENR-UNDP, February 2009*).* Except for the partial environmental awareness raising achieved through some courses in basic education, the research team has not found any documents or indicators that the NEEAP-SD programme has really taken off.

Green skills/HRD and job-skills mismatches

A long-running theme in the education-skills development sector is the issue of job-education/skills mismatches. Either the youth is being educated in courses which have no demand in the labour market, or there are available jobs in the labour market but with a lack of qualified candidates to take them up.

The job-skills mismatch was, in fact, a major topic in:

- the 2007 National Human Resource Conference (ILS-DOLE-NWPC-ILO, *The Future Skills Agenda,* 2007);
- the 2008 Final Report of the Presidential Task Force for Education (*The Philippine Main Education Highway*); and
- the 2008 TESDA's *Surging Ahead: Towards Enhanced Worker Employability.*

In the 2007 National Human Resource Conference, the multi-sectoral participants focused on the supply-demand issues in the following key employment generators (KEGs):

(i) agribusiness, (ii) construction, (iii) cyber services, (iv) mining, (v) maritime, (vi) hotels and restaurants, and (vii) health, wellness, and medical tourism. Examples of positive measures raised within the conference to solve the job-skills mismatches are measures to improve English teaching for the benefit of cyber services (call Centers and business process outsourcing).

Green skills or HRD did not even merit a single line, neither in this conference nor in the 2008 TESDA's *Surging Ahead* nor the 2008 Report of the Presidential Task Force for Education, all of which covered other important education-skills concerns such as financing, globalization, and so on. This is unfortunate given the fact that a shift to a green or greener economy would necessarily entail the development of green skills or HRD for the work force needed by the green/greener industries.

EENP, PATLEPAM, and environmental education pioneers

However, it is not correct to say that there have been no advances in environmental education. There has been some progress, especially at the tertiary level. This is thanks to the contributions of two national networks for environmental education and the pioneering efforts of some educational institutions.

The two networks at the forefront of this work are the Environmental Education Network of the Philippines, Inc. (EENP) and the Philippine Association of Tertiary Level Institutions in Environmental Protection and Management (PATLEPAM). EENP was established in 1987 with financial support from the Ford Foundation and the Canadian International Development Agency (CIDA). Its membership is composed of 68 research and academic institutions over the Philippines and one national federation of NGOs. For EENP, "green professions" is not entirely a new concept because the network had already introduced such a concept in the 1990s. For example, on October 23–25, 1996, the EENP organized the First Philippine Congress on Tertiary Environmental Education with the theme "Greening the Professions through Environmental Education". In particular, the congress became a venue for discussions and workshops on the environmental dimensions and perspectives in Architecture, Urban and Regional Planning, Medicine, and Law (EENP, 1996).

EENP claims it continues to implement strategies to help enhance environmental education in the country such as teacher training, curriculum development and research projects. Other reported accomplishments of EENP include the development of an environmental education assessment programme for "Dark Green Schools" and the conduct of two congresses per year that deal with regional and national environmental issues (*ibid*).

On the other hand, PATLEPAM, formed in 1995, has a membership of 380 academic institutions from different parts of the country. PATLEPAM not only provides linkages among colleges and universities but it also networks with CHED, EMB, and the EENP. One of the proposals of PATLEPAM to CHED is to include a three-unit course on "Environment and sustainable development" in the general curriculum of higher education (*ibid*).

Some universities and colleges, especially the members of EENP and PATLEPAM, are now offering degree programmes specializing on the environment such as B.S. in Environmental Studies, B.S. in Sanitary Engineering, M.S. in Environmental Engineering, M.S. in Environmental Science and even Master in Mountain Engineering. Accordingly, CHED has been coordinating with the DENR-EMB on the design and standards for environment education. The degree programmes include courses on environment-friendly technologies, energy conservation and efficiency guides, as well as renewable/non-conventional energy sources (solar, wind, and water). Some elements of the environmental education curriculum are based on Philippine Agenda 21 (DENR-UNDP, *op cit*).

One of the leaders in environmental education in the Philippines is the College of Engineering of the University of the Philippines, Diliman Campus. In 1973, the Environmental Engineering Graduate Programme (EnE) in UP Diliman was established in partnership with

international organizations and academic institutions, including the World Health Organization (WHO), UNDP, University of California, Berkeley, and University of North Carolina – Chapel Hill. The academic programmes offered in UP EnE are M.S. Environmental Engineering and Ph.D. Environmental Engineering. Aside from the courses for graduate programmes, UP EnE also offers environmental engineering courses for undergraduate engineering students, such as Technology and the Environment and Special Problems.

Professors, researchers, and experts in UP EnE are also active in sharing their technical knowledge and expertise in environmental engineering through seminars and training programmes for environmental practitioners in private sector industries and government. Examples of seminars and trainings conducted by UP EnE through the National Engineering Center are Restriction on Hazardous Substances (RoHS) Seminar, Toxic and Hazardous Waste Seminar, and Pollution Control and Environmental Management System Training (Table 1-8 for details).

TABLE 1-8: UP ENE CONTINUING EDUCATION (SHORT-TERM SEMINARS)

Seminar/Training	Details	Participants
Restriction on Hazardous Substances (RoHS) Seminar	• Aims to provide participants with the understanding of the EU Directive 2002/95 on RoHS, the basic concepts of environmental hazardous substances, and the control measures of environmental hazardous substances. • Includes skills based and hands-on practical exercises.	• Specialists in Environment, Health and Safety, Quality Assurance, Production, Purchasing, and Marketing who need to identify environmental hazardous substances.
Toxic and Hazardous Waste Seminar	• Certificate programme that develops technical capacity on the important aspects of toxic and hazardous wastes. • Composed of four training modules: Toxic and Hazardous Waste Management; Chemical Emergency Response and Preparedness; Inspection, Compliance, and Enforcement; and Pollution Prevention.	• Technical staff of government and private industries involved in toxic and hazardous waste management.
Pollution Control and Environmental Management System Training	• Seeks to provide participants to acquire the necessary knowledge and skills to become pollution control officers in their respective companies. • Discusses environmental management systems and procedures, environmental laws, regulatory standards, and compliance.	• Pollution control officers and environmental practitioners.

Source: UP College of Engineering, Diliman

UP EnE was also been selected by Japan International Cooperation Agency (JICA) to serve as the host institution for graduate programmes in environmental engineering for ASEAN students over the period 2002–2008. This is under the AUN/SEED-Net (ASEAN University Network/Southeast Asia Engineering Education Development Network) Project that endeavours to advance human resources development in engineering in ASEAN countries. Aside from Environmental Engineering, College of Engineering-UP Diliman also offers other environment-related graduate programmes such as M.S. and Ph.D. Energy Engineering as well as Diploma and M.S. Water Resources.

On the other hand, the UP College of Science in Diliman, through its Institute of Environmental Science and Meteorology, offers M.S. and Ph.D. Environmental Science, which are directed at enhancing the knowledge and skills of students in environmental assessment, planning, and education.

Another leading academic institution involved in advancing environmental education in the Philippines is the Environmental Studies Institute of Miriam College. Miriam College started

promoting environmental education when it included a module on pollution in the curriculum of its fourth year students (secondary) in 1973. Five years later, Miriam College began to offer B.S. Environmental Planning for tertiary students. The programme is multidisciplinary in approach as it requires subjects from the natural sciences, social sciences, and management. It aims to equip students with the necessary skills for planning with an environmental perspective, including cartography and analytical techniques, land use and urban planning, and community communications (Segovia and Galang *op cit*).

The graduate programme in environmental studies at Miriam College started in 1993 when it offered M.S. Environmental Studies, M.A. Environmental Education, and M.A. Environmental Management. It also conducted distance education graduate programmes in Cebu, Leyte, and Camarines Sur. In 1999, Miriam College introduced its Ph.D. Environmental Studies and Ph.D. Environmental Education. To further promote the institution's environmental education and other environmental programmes, Miriam College also organized an outreach programme called PEACE (public education and awareness campaign for the environment) in 1996 (*ibid*).

1.7.3 RA 9512: integrating environmental education at all levels

The above efforts of Miriam, College of Engineering-UP Diliman and others now offering environmental courses or integrating environmental awareness at the basic education level are likely to multiply in the coming years. This is so once the government — through CHED, TESDA, and DepEd — is able to get its act in implementing RA 9512.

Approved in December 2008, RA 9512 or the "*Environmental Awareness and Education Act of 2008*" mandates the integration of environmental education in:

> *"…school curricula at all levels, whether public or private, including in barangay day-care, preschool, non-formal, technical vocational, professional level, indigenous learning, and out-of-school youth courses or programme. Environmental education shall encompass environmental concepts and principles, environmental laws, the state of international and local environment, local environmental best practices, the threats of environmental degradation and impact on human well-being, the responsibility of the citizenry to the environment and the value of conservation, protection, and rehabilitation of natural resources and the environment in the context of sustainable development. It shall cover both theoretical and practicum modules comprising of activities, projects, programmes including, but not limited to, tree planting; waste minimization, segregation, recycling, and composting; freshwater and marine conservation; forest management and conservation; relevant livelihood opportunities and economic benefits; and other such programmes and undertakings to aid the implementation of the different environmental protection laws" (Sec., 3, RA 9512).*

Commitment of CHED and DepEd

CHED, on its part, has been deliberating on its proposed commitments to the NEEAP and RA 9512. According to Elsa Florendo, the OIC of CHED's Environmental Science, some of the environmental education challenges are environmental training for teachers, development of instructional materials, formulation of standards for environmental education, and establishment of database on Philippine biodiversity. Table 1-9 shows CHED's proposed action measures for the NEEAP.

For DepEd, the mandate of RA 9512 is further buttressed by the requirement of the Climate Change Act of 2009 which tasks DepEd to incorporate climate change principles and concepts into primary and secondary curricula and/or subjects, including science, biology,

sibika,[22] and history. In addition, educational materials such as textbooks and primers must also contain information about climate change.

CHED, TESDA, and DepEd are all required by RA 9512 to deepen environmental education. However, given the realities of curriculum planning and budgetary programming, concrete action measures are likely to be in place only in 2010, at the earliest.

TABLE 1-9: CHED'S PROPOSED ACTION COMMITMENTS TO NEEAP FOR 2009-2014

Action areas	Proposed actions
Maintenance of a common resource facility for environmental IEC exchange, and link with the ASEAN Environmental Education Inventory Database	• Establish database on Philippine biodiversity
Training for teachers or trainers	• Faculty scholarships for earth/natural science teachers
Support for instructional materials development	• Review of CHED memorandum on minimum policies and standards for BS Environmental Science (BSES)
	• Formulation of policies and standards for other environmental programmes
Full utilization of other venues for environmental education (EE)/education for sustainable development (ESD), e.g., multi-media and alternative media	• Adopt Open Learning/Distance Education mode for environmental programmes
Partnership and networking for EE/ESD	• Improved multi-stakeholder/sector participation in CHED activities regarding environmental programmes
Funds/financial support to expand EE/ESD programmes, particularly in the regions	• Operation of the CHED technical committee for environmental science
	• Operation of the CHED Centers of excellence/ development (COE/COD) in environmental science
	• Identification of other potential COEs/CODs

Source: Environmental Science Department, CHED

Going green at TESDA

The research team visited TESDA twice. During the first visit, the team was able to interview Director Irene Isaac of the Qualifications and Standards Office and Marisa Legaspi of the Planning Office. After the research team's discussion of "green jobs", Director Isaac realized that TESDA had been honing environmentally-related skills without formally branding them as "green skills" or "skills for green jobs". This included skills training for solid waste management, integrated pest management, and recycling. For example, in line with the Clean Air Act of 1999, TESDA organized training courses on how to conduct emissions testing and how to do retro-fitting/conversion for vehicles shifting to cleaner LPG/CNG fuel. In order to do this, TESDA amended its Training Regulation (TR) for Automotive Servicing NC III Qualification to include LPG conversion and re-powering (Table 1-10) for the qualification's set of competencies) and developed a corresponding Competency-Based Curriculum for such qualification.

[22] Loosely translated as "social and cultural studies".

TABLE 1-10: COMPETENCIES FOR THE AMENDED AUTOMOTIVE SERVICING NC III QUALIFICATION

Types of competency	Units of competency
Basic competencies	Lead workplace communication
	Lead small teams
	Develop and practice negotiation skills
	Solve problems related to work activities
	Use mathematical concepts and techniques
	Use relevant technologies
Common competencies	Apply appropriate sealant or adhesive
	Move and position vehicle
	Perform measurement and calculation
	Read, interpret, and apply specifications and manuals
	Use and apply lubricant/coolant
	Perform shop maintenance
	Perform job estimate
	Interpret/draw technical drawing
Core competencies	Test and repair electrical security system/components
	Service electronic engine management
	Overhaul engine and associated components
	Service automatic transmission
	Perform maintenance service check-up and repair to auto air-conditioning system
	Install auto air-conditioning system
	Service and repair auto air-con compressor and associated components
	Install LPG conversion kit
	Test and adjust LPG calibration
	Service LPG system
	Remove and replace automotive engine and engine-related systems

Source: TESDA, Training Regulations for Automotive Servicing NC III (includes LPG conversion and Re-powering), promulgated October 2008

On the research team's second visit, TESDA furnished the research team with a list of 16 qualifications (Table 1-11) with green competencies (out of the 215 promulgated TRs as of July 2009) that clearly specify environment-related knowledge, skills, and attitudes in the TRs and curriculum. In addition, the 14 TRs in the agriculture and fisheries sector can also be classified as meant for green jobs. TESDA also has an ongoing programme with DOE to integrate the use of energy-efficient lighting in the TR for electrical installation and maintenance qualifications.

For most of the technical-vocational courses, Director Isaac pointed out that TESDA is likely to push for the inclusion of the environment as a component — mainly as an awareness component — in the curriculum. In relation to this, TESDA is planning to conduct a curriculum review and undertake revisions to incorporate environmental concerns and climate change issues in the contextual-learning matrices for all promulgated qualifications. According to TESDA Commissioner Tony Asper, labour's representative on the TESDA Board, the need to integrate climate change issues in TESDA qualifications also intensified after the calamities caused by typhoons Ondoy and Pepeng.

TABLE 1-11: TESDA TRAINING REGULATIONS WITH GREEN COMPETENCIES

Qualification title	Green competency component
Photo-voltaic (PV) Systems Design NC III	Cover the design, installation, and servicing requirements for solar-power systems.
PV Systems Installation NC III	
PV Systems Servicing NC III	
RAC (PACU/CRE) Servicing NC II	Include the requirements under the Montreal Protocol for shifting to environment-friendly refrigerants.
RAC (Window AC/Domestic Ref) Servicing NC I	
Ice Plant Refrigeration Servicing NC III	
Transport RAC Servicing NC II	
Pest Management (Vegetables) NC II	Promotes integrated pest management techniques relying on agri-ecological pest management in addition to chemical-based pesticides.
Automotive Servicing NC III	Includes servicing of engines using LPG as alternative fuel
Landscape Installation and Maintenance (Softscape) NC II	Includes competency on utilizing, collecting, and disposing of organic wastes in landscaping work.
Deck Seafaring NC I	Contain competency on protecting the marine environment based on the International Convention for the Prevention of Pollution from Ships (MARPOL).
Deck Seafaring NC II	
Deck Seafaring NC III	
Engine Seafaring NC I	
Engine Seafaring NC II	
Engine Seafaring NC III	

Source: Qualifications and Standards Office, TESDA

The TRs being developed by TESDA form part of its national standards setting function for the benefit of the technical-vocational education-training (TVET) sector. These standards are used to determine the readiness and capacity of the workers for certain trades. Most of the TRs for TESDA qualifications are industry-driven in the sense that the requests for TR development originate from the industries themselves and are developed in partnership with industry experts. Upon the development of the TRs, they are presented to the TESDA Board for approval and promulgation. Within one year after the TR promulgation, training service providers or technical-vocational schools are required to register their training programmes in accordance with the promulgated TRs.

The qualifications on photo-voltaic system design, installation, and servicing is an example of an industry-driven TR development. Upon the request of AMORE for the foreign-assisted solar power project in Mindanao, TESDA created the TRs to set standards for training in the solar power industry. According to Supervising TESDA Specialist Zoilo Galang, there are no formally registered graduates yet for such qualifications as of the end of 2009. However, related trainings in the community have already been conducted by AMORE.

While most TRs are initiated by industries, there are also TRs that are developed in partnership with other government agencies such as the DENR. The qualifications related to refrigeration and air-conditioning were created as part of the National CFC Phase Out Plan and in accordance with the Montreal Protocol and the Clean Air Act. Through the TESDA-promulgated TRs on the Refrigeration and Air-Conditioning Sectors, competencies for technicians are identified and addressed during training programmes on recovery, recycling, and retrofitting of refrigeration and air-conditioning systems, which are major sources of ozone-depleting CFCs. In line with this, a Code of Practice for Refrigeration and Air-Conditioning was developed by TESDA, with some funding from the WB and the Government of Sweden.

TESDA does not allocate a separate budget for the development of TRs related to green jobs. Green jobs or not, the funding for every qualification package (consisting of the TR, competency-based curriculum and assessment tools) comes from the TESDA's TR Development

Fund. On the average, the funding amounts to roughly PhP100,000 per qualification package, which varies depending on the nature of the qualification. In addition to the regular TESDA funding, TR development also obtains financial support from ODA donors and industry requesting for the development of TRs for certain trades. While TESDA apportions a specific budget for TR development, there is no separate budget that provides financial assistance to individuals who want to undergo technical-vocational training. Primarily, this is because the training programmes are not conducted by TESDA itself but by the technical-vocational schools and other training providers nationwide. The cost of the training is paid by the training participants through their tuition fees. However, scholarship grants of up to PhP20,000 per capita are given to qualified technical-vocational students through the Pangulong Gloria Scholarship Programme.

Clearly as the Philippines enters the second decade of the new millennium and with climate change coming increasingly to the fore in the international debate about building a sustainable future, there is a historic opportunity for the Philippines under a new administration to revisit national policy, overcome complacency among the population and develop a new social contract among the tripartite partners to encourage new green industries and the greening of existing ones. In this process, agencies such as the DOLE, TESDA, and the trade unions have to be brought into the mainstream of debate.

2. Anticipation and provision of skills: green restructuring and green capability building

2.1 Introduction

The overall purpose of this Chapter is to outline the HRD/skills challenges that have to be addressed as industries go green and as new green industries come on stream. This means analysis of likely changes in sectoral and sub-sectoral growth patterns as well as the consequent changes in employment patterns and the emerging skills and trades needed as a result of the green shift in the economy. This exercise includes an identification of skills that are likely to get eroded or become obsolete as a consequence of these greening processes.

The discussion in this chapter is supplemented by illustrative case studies on capability building by select green/greener companies and institutions.

2.1.1 No tectonic green shift in the economy…yet!

At this stage, there is no decisive or tectonic shift toward a greener economy although we may be seeing some glacial movement in this direction. The newspapers these days are filled with various environment-related stories. There is also increasing reporting on individual companies "going green" or becoming "greener", as can easily be gleaned from the titles of some business stories, for examples: "SM unit eyes carbon credit trade" (Morales, 2009), "WHO cites Maynilad water safety plan as best practice" (BusinessWorld, 2009b), "e-jeepneys finally on public roads" (Hermosa, 2009), "New business 'philosophy' for Ayala" (Salvosa, 2009), and "Green gizmos enhance buildings in RP" (Salazar, 2009).

However, the initiatives of a score or more firms to "go green" is not enough to draw the conclusion that there is now a green groundswell in the different sectors that make up the economy. There are around a million registered business establishments in the country. In the last establishment census (2000) by the NSO (www.census.gov.ph), the country recorded 820,960 enterprises employing 5.9 million workers (Table 2-1). Wholesale and retail accounted for more than half of the total, followed by manufacturing which had a total of 125,467 establishments as of 2000. Thus, the green initiative of a score or so enterprises, even if they are big, does not mean the economy is now going green. In Chapter 1 it was noted that there are less than a hundred firms seeking CDM accreditation; most of these firms are swine farms, which emit a lot of GHG. The situation is complicated further by the fact that there is no NSO data nor NSO census/survey on

establishments going green/greener. Moreover, one should keep in mind that the establishment data does not cover the vast majority of workers who belong to the informal economy. As discussed earlier, ECOP claims that as much as 77 per cent of the labour force is in the informal economy, a claim which has not been repudiated by any government agency.

TABLE 2-1: 2000 CENSUS OF ESTABLISHMENTS AND WORKERS BY INDUSTRY

Industry description	Number of establishment	Employment
Total Philippines	820 960	5 902,186
Agriculture, hunting, and forestry	3 391	137 340
Fishery	1 252	31 185
Mining and quarrying	376	17 328
Manufacturing	125 467	1 589 214
Electricity, gas, and water	1 318	80 595
Construction	3 154	161 487
Wholesale and retail trade	437 325	1 785 811
Hotels and restaurants	89 472	485 098
Transport, storage, and communications	15 267	301 035
Financial intermediation	24 118	262 165
Real estate, renting, and related business activities	40 477	430 884
Education	9 675	272 202
Health and social work	28 414	158 341
Other community social and personal services	41 254	189 501

Source: Industry and Trade Statistics Department, National Statistics Office, available at www://census.gov.ph/

As to the green industries being promoted in the Philippines, these are mostly in the renewable energy (RE) sector. DOE has been publicizing the fiscal and other incentives that investors, local and foreign, can get by investing under the Renewable Energy Act of 2008 (geothermal, wind, solar, hydro, and biomass) and the Biofuels Act of 2006 (biodiesel, bioethanol). There are exciting investment projects, one of which (San Carlos Bioenergy) is documented here as a case study. However, some observers lament that the renewable energy sector is still unable to attract higher level of investments. In a recent special report entitled "Nascent renewable energy industry awaiting investments", Jose Bimbo Santos (2010) wrote that one reason why the industry is not attracting investors is the fact that the location of RE ventures is mostly in unprofitable remote areas where the demand for electricity is low and where RE exploration/development cost is high.

2.1.2 Study framework on green restructuring

What the research team then did was to outline the possible shape of an economy-wide greening process and the likely HRD/skills requirements of such process. To the research team, this meant assessing the existing structure of the economy and the labour market and discussing the possibility of a high-value, labour-friendly green restructuring in order to ensure that jobs generated should be, in the words of the ILO, both "green and decent". Here the IR/HR background of the research team naturally came into play. However, given the paucity of industry data and non-existence of a green job/greener job catalogue or directory, this exercise had obvious limitations; hence, the operative phrase used by the research team is "to outline".

The research team was also mindful of the ILO-UNEP-IOC-ITUC study, which indicated that green jobs and jobs with "shades of green" are likely to be developed in the following sectors/industries:

- Energy supply (carbon sequestration, co-generation, and renewables);
- Transport (more fuel-efficient vehicles, car-sharing, public transport);
- Manufacturing (clean technologies, energy efficiency);
- Buildings (green buildings, retro-fitting, solar heating);
- Materials management (re-cycling, de-materialization);
- Retail (eco-labels, non-product services);
- Agriculture (soil conservation, water efficiency, organic farming); and
- Forestry (reforestation, agro-forestry).

There are a number of Philippine initiatives in these various sectors/industries. However, it should be pointed out that a green shift in the economy should be able to address the green requirements of other sectors as well, in particular industries in the service sector such as tourism and those of the large informal economy. Also, a restructuring should be based on a realistic recognition of the existing economic structure, employment patterns, and likely trajectories of the economy if environmental or CC-related adjustments are put in place.

2.1.3 The conduct and selection of case studies

Included in this chapter are nine case studies which have been compiled by the team to supplement or illustrate more concretely the nature of skills needs and challenges related to training/retraining for the industries going green/greener, on the HRD requirements of green-collar jobs in the new or emerging green industries, and on the greening of existing jobs. Training/retraining issues naturally arise when an economic adjustment or restructuring, especially a green one, is undertaken. Training/retraining and other HRD programmes are needed by virtually all — managers, supervisors, and staff/rank-and-file — if they have to fulfil the green/greener mission of the enterprise.

It is a given that the HRD and skills development programme of every enterprise is driven by its business vision and mission. If the purpose of a business investment in a renewable sector, e.g., recycling, is to make money out of a recycling operation, the job of the HRD manager is to determine how to achieve this purpose in terms of personnel policies (organization, hiring, deployment, compensation, etc.) as envisioned by the investor, owner, or board of directors. Thus, in the conduct of the case studies, the research team's inquiries were focused on the following fourteen questions:

1. What is the business vision-mission of the enterprise?
2. How is this business vision-mission affected by the emerging culture of environment-alism and development challenges posed by climate chance and environmental degradation?
3. How are the business vision-mission and business commitment to environmentalism translated into HRD/skills development programmes?
4. What are the personnel problems and skills gaps encountered? How are these remedied?
5. What are the good and not-so-good experiences in HRD and skills development?
6. What is the culture of employer-employee relations present in the enterprise?
7. How are the employees/managers/professionals responding to the challenge of environmentalism?

8. What are the enterprise and employee commitments to environmental programmes? What are the indicators?

9. What are the incentives for the enterprise to go into environmental mode?

10. What are the enterprise achievements in the area of environmental concerns?

11. How are the employees involved?

12. What are the key HRD/skills learning in all of this?

13. What are the competencies needed to achieve the business and environmental objectives of the enterprise?

14. What are the lessons and learning based on the company experience?

In undertaking the case study, the research team sought to establish contact with the responsible officers of the enterprise. Once accepted to undertake company interviews, the research team's initial inquiries focused on the business vision-mission of the company/institution in the light of the environmental challenges. These questions were followed by inquiries on how these challenges are addressed in the HR programmes/policies. Finally, the research team validated these findings through focus group discussions or individual interviews with select representatives doing green jobs/tasks/assignments.[23]

2.2 Green structural change and training/retraining needs

2.2.1 Prospects for green restructuring in a brown economy

Is a green Philippine economy attainable? We believe the answer is that it is. But the "transition" is likely to be long and complicated. In a Forum on Green Jobs organized by the DOLE's Institute of Labor Studies (ILS, 2008), it was correctly pointed out that:

> *"…people must guard against…the idea that the transition to a sustainable green economy is inevitable…we need to have a global transition at a speed that is probably in the realm of maybe two or three decades. It has to go against the existing trends. In all the economic transition that people can think of, there have always been many losers, some winners..."*

Given the Philippines' own sad experience with its reforestation programme dating back to the 1970s, the 2–3 decade transition appears very optimistic when applied to the Philippine economy. Nevertheless, the importance of a no-nonsense drive towards a green restructuring of the economy cannot be belaboured. Such a drive would entail, in the view of the research team, the following: (i) identification of key obstacles to a green shift and how to overcome them, (ii) a reorientation of the agro-industrial policy regime in support of the green shift, (iii) adoption of policies addressing urgent environmental concerns (particularly climate change challenges), and (iv) intensification and broadening of positive or affirmative environmental programmes initiated by both the public and private sectors. Eventually, a green restructuring will naturally have

23 However, there were understandable limitations in the conduct of case studies. Companies, even if they were cooperative towards the research project, value company and employee time. One problem encountered by the research team was in setting appointments based on acceptable schedules for the target enterprises. For this purpose, the research team was flexible in adjusting to the different management styles of companies. Some companies are open and liberal and were willing to allow the research team to go around the company premises freely and interview needed personnel. Others allowed only limited time and access. In two cases, top management brought in right away all the managers and technical men/women in one meeting session. In such a situation, the research team had no choice but to simply transform the meeting-interviews into focused group interviews and exchange. This was fine because such an arrangement usually leads to a more in-depth analysis of the green challenges in a company and a fuller and rounded discussion of the HRD concerns in the company. Issues raised or neglected by some informants are supplemented or amplified by others.

serious consequences or ramifications on the labour market and the HRD/skills requirements of the work force.

2.2.2 Obstacles in making the green shift: the DENR perspective

There are many obstacles to making a green shift. The research team agrees with a short list made by the DENR in 2006. In the *Framework Plan for Environment and Natural Resources Management* (2006) prepared with the help of the UNDP, the DENR identified the following key obstacles to environment and natural resource management:

- High population growth rate (about 2.3 per cent), which leads to intense use and abuse of the environment;
- High poverty incidence (about 40 per cent of the population affected), which pushes impoverished groups to invade and destroy various eco-systems;
- Industrialization; and
- Globalization.

On industrialization, the DENR said that the stagnation of Philippine manufacturing, reflected in the decline of its GDP share in the economy (from 37 per cent in 1970 to 30 per cent in 2000), does not mean less environmental degradation. Instead, they foresee such a decline giving rise in the proliferation of small and medium-sized industries whose collective impact on the environment could be worse than before and yet where individual operations are difficult to monitor.

On globalization, the DENR cited both the positive as well as negative impact of globalization on the environment; positive because global competition puts a premium on eco-labelled products and negative because globalization can also facilitate the "dumping" into the domestic market of dirty or polluting products and technologies.

On eco labelling, SGS and other international certifying bodies give globally-competitive industries in the Philippines certifications on quality assurance (ISO 9000 series), food safety assurance (Codex HACCP/GMP), social accountability (SA 8000), environmental management (ISO 14001), and other standards imposed by the global markets. For example, the country's two leading pineapple exporters — Dole Philippines and Del Monte — work hard to get all of these certifications, so that their canned and fresh pineapples can be retailed in Europe, North America, and Japan. These certifications are only given by global certifying bodies after a rigorous audit of production methods, including work processes. There are even overlaps in some of these certifications, for example, the ISO 14001 label is a certification that a product or a process has met the environmental standards for that particular product or process, while SA 8000 is a certification that an exporting company respects internationally-recognized core labour, human, and environmental rights. Incidentally, the environmental and quality certifications are also sought by companies catering to the domestic market so as to demonstrate their compliance with global assurance standards, for example, cement companies like Holcim and water companies such as Manila Water and Maynilad have ISO 9000 and ISO 14001 certifications.

On the other hand, globalization can indeed facilitate the dumping of dirty products and technologies, some of which adversely affect or displace existing domestic industries in a major way. For example, the general liberalization of the vehicle market has eased the entry of second-hand vehicles from Japan, the Republic of Korea, and other countries. These imported vehicles, which outnumber the locally-assembled vehicles in the annual registration of "new" vehicles, are accident-prone (because of conversion of the drive from a right hand to a left hand position). They also violate the Clean Air Act's provision on air pollution, which discourages trade in polluting second-hand imports. To top it all, most of these second-hand imports are undervalued and, therefore, under-taxed. This form of "technical smuggling" is happening not only in the vehicle

market but also in the markets for textiles, garments, shoes, plastics, tiles, rubber, and so on. Collectively, these under-taxed smuggled imports are called *ukay-ukay* or cheap second-hand imports (Fair Trade Alliance, 2006). Yes, most of these imports are cheap for they do not pay the right taxes and oftentimes represent export surpluses being dumped by major exporters when there is overproduction of these goods and the American/European/Japanese market gets saturated. Consequently, they displace domestic producers, workers, and farmers in an unfair or uneven way. And yes, they degrade the environment because most of these products, smuggled and dumped as they are, often escape rigorous environmental and other product standard scrutiny.

Obviously, each of the above four obstacles — high population growth, high poverty rate, weak industrialization, and poor management of globalization — requires separate research and policy analysis in the context of climate change and economic-environmental policy formulation. However, in relation to the green shift framework, all these obstacles are inextricably linked to the need to overhaul or reorient the existing agro-industrial policy regime, as discussed below.

2.2.3 Why overhaul? The agro-industrial policy regime

The Philippines has experienced three waves of industrialization — colonial agro-industrialization (Spanish-American period), post-war import-substituting industrialization (1950s to mid-1970s), and liberal export-oriented industrialization (mid-1970s to the present). All have contributed one way or another, to Philippine environmental degradation. In the case of the first wave, the focus was on the extraction of natural resources, which led to the development of the mining industry (mainly extraction of copper and gold) and the establishment of large-scale plantations, e.g., sugar, rubber, etc. In the case of the import-substituting industrial (ISI) era, the extraction of natural resources was intensified with the opening up of mining projects such as Atlas Mines, the biggest copper mining firm in Asia in the 1960s, and the large-scale harvesting of timber for export and the development of the wood industry (both comatose now) because the foreign exchange earnings from all these activities were used to finance the importation requirements (machines, industrial raw materials, tools) of the ISI industries. In the case of the export-oriented industrial (EOI) era, the mindless extraction process has continued, partly to help finance the foreign debt incurred by a globalizing but debt-dependent government and partly due to the deepening of the policy of allowing foreign investors to go into the extraction of other resources such as fishery resources (for a more detailed discussion of the foregoing, see the seminal study by Gareth Porter and Delfin Ganapin (1998); see also Ofreneo, 1993).

By and large, the shift to the EOI policy regime failed to strengthen the industrial base of the country. While it helped create "new" or "non-traditional" export industries such as electronics assembly, garments manufacture, and auto parts manufacturing (Table 2-2), the policy regime has weakened most of the ISI industries set up in the 1950s–1970s. Many of these ISI industries collapsed during the liberalization decades of the 1980s–2000s (Fair Trade Alliance, 2006; Ofreneo, 1993). The ISI policy regime has also failed to invigorate Philippine agriculture. Thus, the Philippines, a leading industrializing country in Asia in the 1960s, is now one of Asia's agro-industrial laggards and is subsisting mainly on the remittances of around 9 million overseas Filipinos (Fair Trade Alliance, 2006; Yap, 2003). New EOI industries have emerged. But as shown in Table 2-2, electronics assembly, which accounts for half of the country's imports, also contributes over two-thirds of the exports. Garments, a far second, is now sinking rapidly, following the end in 2004 of the Multi-Fiber Arrangement giving Philippine garments exporters sure or guaranteed quota markets in the developed countries (Ofreneo, 2009). Overall, the weak or eroded agro-industrial base is the main explanation for the mass unemployment, underemployment, and poverty in the country, which, in turn, are the immediate reasons why the Philippines has a very large informal economy (see discussion in Chapter 1). Table 2-3 shows the failure of industrial transformation, as indicated by the declining industrial sector, and the phenomenon of de-industrialization, as shown by the dramatic decline of manufacturing employment.

TABLE 2-2: PHILIPPINE TOP TEN EXPORTS AND TOP TEN IMPORTS, 2003 (IN US$M)

Exports	Value	Percentage share
Total Exports	36 231.21	100.00
Top 10 Total	29 833.89	82.34
Key exports		
Electronic products	24 168.31	66.71
Garments	2 265.30	6.25
Auto wire harnesses	507.25	1.40
Other manufactures from imported materials	579.23	1.60
Woodcraft/furniture	409.35	1.13
Petroleum products	536.14	1.48
Coconut oil	504.86	1.39
Bananas (fresh)	333.00	.92
Metal components	261.55	.72
Copper cathodes	268.90	.74
Total Imports	37 496.50	100.00
Top 10 Total	29 243.08	77.99
Key imports		
Electronic products	17 459.44	46.56
Mineral fuels	3 765.64	10.04
Industrial machinery	1 601.13	4.27
Transport equipment	1 359.46	3.63
Textile materials	1 013.46	2.70
Iron and steel	1 062.46	2.83
Telecom equipment	887.11	2.37
Cereals	662.86	1.77
Plastics	762.14	2.03
Chemicals	669.37	1.79

Source: NSO, 2005 Philippine Yearbook

On the other hand, the OFW remittances are the main explanation for the continuing growth of service industries, as discussed earlier.

From the foregoing short narrative on the agro-industrial policy experience of the country, it is obvious that a Philippine greening process must address the challenge of overhauling the present EOI policy regime. An overhaul is also necessary to resolve basic policy contradictions as to whether to go green or not. For example, the 2004–2010 Philippine MPTPD seeks an all-out liberalization in the exploration and development of the country's mineral resources, valued by NEDA at around a trillion dollars. And yet, the country's environmentalists and the Catholic Bishop Conference of the Philippines have condemned this policy as an outright attack on the environment. Thus, the 1995 Mining Act liberalizing the mining industry and which allowed 100 per cent foreign investments into mining exploration and into large-scale resources development was questioned in the Supreme Court by some environmental NGOs as unconstitutional and anti-environment. After a decade of litigation, the Court upheld the government's position. This, however, put DENR on a difficult policy tightrope balancing. Is DENR a guardian of the environment or a promoter of mining, most of which is now conducted in an open-pit and highly mechanized manner?

To add to the complexity, the national government only has control over large-scale projects whereas small-scale mining remains under provincial control and also off-limits to foreign investment. Whereas large-scale projects are required to conform to international best practice, there is no such requirement for small-scale mining. While intended originally to protect the rights of traditional miners, in fact it has produced loopholes which has allowed provincial authorities (often with an interest in mining claims themselves) to classify even large mines as

small-scale in order to escape surveillance of their operations by DENR and to deny payment of royalties to the national government thereby further eroding the national revenue base. This can add to environmental degradation.

TABLE 2-3: EMPLOYMENT BY SECTOR 2004–2008, (IN PERCENTAGES)

Sector	1970	1980	1990	2000	2005	2007
All sector (per cent)	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	53.7	51.4	44.9	37.1	36.0	35.1
Industry	16.5	15.5	15.4	16.2	15.5	15.3
But Manufacturing	11.9	11.0	10.1	10.0	9.5	9.1
Services	28.2	33.0	39.6	46.7	48.5	49.6

Source: BLES, DOLE

Another area of contradiction is agriculture. DA is promoting genetically modified organisms (GMO) technology, which is widely opposed by many NGOs, in particular by Greenpeace Philippines. Moreover, there is also an agribusiness thrust outlined in the MTPDP — the development of 2 million hectares of land for agribusiness production, which is interpreted by DA as the promotion of major foreign and domestic corporations in agriculture. This is the reason why DA announced in 2007 the agreement to allow Chinese corporations to develop 1.24 million hectares to grow Chinese crops based on Chinese technology and management. This generated widespread opposition from the bishops, the peasantry, and other sectors, forcing DA to indefinitely shelve the agreement. However, the plan to develop 2 million hectares for agribusiness in cooperation with major corporations is still in place. And yet, while the DA is officially promoting organic agriculture and organic fertilizer production, at the same time it is heavily committed to chemical farming. And while funds are available for GMO projects there is virtually no funding for organic projects. This is the dilemma.

Who will win the competition — GMO proponents or the agribusiness investors, who are likely to use standard chemical-based farming approaches? Or will it be organic agriculture favoured by a number of environmental NGOs? At the time of this study (2009), the research team witnessed a raging and unresolved controversy in Mindanao over the conduct of aerial spraying by the major banana plantations, which is being opposed in court and in the media by environmental NGOs because of the alleged harmful chemicals being used.

As to industrialization, the implicit strategic assumption of the EOI programme is that the Philippines would be a runaway export winner in the manufacture of labour-intensive exports because it has abundant low-cost labour. This implicit cheap-labour EOI policy has obviously failed and has instead aggravated the triple problems of unemployment, poverty, and environmental degradation. Why not shift the industrial policy then towards higher-productivity, value-adding mode? Such a shift would de-emphasize reliance on an implicit cheap labour policy, which is not workable for the Philippines given the large number of other cheap labour platforms now in the world (Table 2-4).

On the other hand, value-adding and higher productivity means more investments or focus on social partnership and dialogue between labour and management, greater attention to energy efficiency, R&D, and job creation through up-scaling activities. For example, electronics assembly, which has been in place since the 1980s, can graduate to OEM and OMB as what the East Asian NICs and China have done.

The mining dilemma can also be partly resolved through the promotion of value-adding (more processing), environmentally-friendly methods, and strict compliance with international best-practice in both large-scale and small-scale projects.

TABLE 2-4: COMPARATIVE DAILY MINIMUM WAGES, PHILIPPINES VS. SELECT ASIAN COUNTRIES (AS OF DECEMBER 1, 2009)

Economy/city	Daily minimum wage (in US $)
Vietnam	1.26–1.55
Cambodia	1.49–1.66
Indonesia	1.95–3.63
China/Beijing	3.66–4.14
Thailand/Bangkok	4.44–6.09
Malaysia	7.19–15.40
Philippines	8.09
Taiwan	17.90
Singapore	18.06–59.25
South Korea	25.88
New Zealand	54.99–68.74
Japan	63.12–66.54
Australia	50.27–100.53

Source: National Wages and Productivity Commission, Published by BusinessWorld, December 22, 2009

2.2.4 Addressing urgent CC and other environmental concerns

In the meantime, there are greening and CC-related "doables", which no Philippine administration can ignore, whether or not the above proposal for an overhaul of the agro-industrial policy regime is undertaken.

The most urgent task is that of adjusting the broad socio-economic and infrastructure requirements of local area development into a nationwide holistic programme; that is, re-develop and re-strategize development for the urban and rural communities in the context of climate change risks and other environmental problems facing the country. In particular, there is an immediate need to set up strategic disaster preparedness measures, including relocation, for communities lying in flood-prone coastal and lowland areas as well as those in the deforested high lands. Typhoons Ondoy and Pepeng have sent a very concrete and grim warning that most of Luzon, including four-fifths of Metro Manila, is highly vulnerable to disasters that changes in climate and even normal typhoons are likely to bring in with greater frequency and similar ferocity. The clear message coming from global climate change studies is that extreme weather events are likely to occur more frequently in the future. This adds to the urgency of the debate.

In relation to this, Filipino CC scientists have been suggesting the following: (i) adoption of a comprehensive land use policy at the LGU level, infrastructure development to reduce CC risks (e.g., flood control facilities, dikes, etc.), (ii) improvement in water management (changing cropping calendar in order to synchronize planting with water availability), (iii) adoption and propagation of CC-resistant crops and technologies, and (iv) integration of climate change information in economic planning, among others (Lansigan, 2008). The side issues, of course, are: whether the government, at the national and local levels, has the will and wherewithal to undertake the necessary adjustments?

2.2.5 Deepening and broadening affirmative programmes

As detailed in Chapter 1, the Philippines has a fairly comprehensive body of environmental laws, ranging from reforestation to solid waste management and renewable energy development. There should be a no-nonsense drive to implement them and there is a need to resolve apparent contradictions, e.g., GMO versus sustainable agriculture, mining liberalization versus regulated mining.

There are also outstanding LGU environmental initiatives, such as promotion of eco-tourism (case of Bohol, Subic, and Palawan), solid waste disposal facility development (Quezon City) and experiments on battery-run pedicabs (in Davao and Taguig). The challenge lies in

making such programmes or initiatives widespread and sustainable. Elections every three years means many environmental programmes in hotly-divided cities and towns are sometimes not sustained due to changes in LGU leadership.

Added to these are the various initiatives hatched or launched by different NGOs and private sector groups, usually through their respective foundations. Again, these initiatives should be encouraged. However, these should not be used as an excuse for the government to avoid undertaking the necessary coordinating and leadership roles in a comprehensive programme on the environment. Some environmental problems are simply too big for private sector groups, no matter how generously funded; for example, the ABS-CBN Foundation has a heroic Pasig River rehabilitation programme. This cannot be fully accomplished unless the majority of the 10 million or so residents of Metro Manila actively take an affirmative role in the cleaning and maintenance of this historic river.

2.2.6 Likely labour market changes under a green/greener economy

What then are the likely employment and dis-employment effects of the foregoing outline of a green/greener Philippine economy?

On the positive side, most of the environmental care and rehabilitation programmes are labour-intensive and are, therefore, job-creating. The development of dikes to prevent floods, cleaning up of rivers and *esteros*,[24] solid waste segregation, alternative power generation and co-generation, reforestation, rebuilding of flood-stricken communities, and so on all have positive employment effects. For example, Albay, the site of the scenic but disruptive Mayon volcano and which lies on the usual typhoon path in southern Luzon, has a comprehensive CC-related mitigation-adaptation-economic programme which includes clean-up programmes for rivers and canals, eco-cultural tourism, job creation for the out-of-school-youth and vulnerable sectors of society (e.g., working children and homeless), mangrove re-planting, geothermal production, and varied disaster-risk reduction programmes. According to Governor Jose Salceda, their "A2C2" programme (Albay in Action on Climate Change) has given the province more and better economic development opportunities (Salceda, 2008).

As to the broader economy, the shift to sustainable agriculture, more energy-efficient service and manufacturing industries, more value-adding industrial and mining practices (to minimize or reduce tendency towards polluting extractive practices), eco-friendly or eco-oriented service industries (e.g., ecotourism), green building and environmentally-friendly transport are all likely to create more and better jobs for a larger number of Filipino workers.

The downsides? An end to GMO farming is likely to reduce agricultural production and exports in the short term. Major banana producers and exporters have been warning of the collapse of the Philippine banana export industry and jobs in the banana plantations if aerial spraying is banned, as demanded by environmental NGOs. Similarly, the Chamber of Mines of the Philippines and foreign mining investors are warning that further delays in the development of Philippine minerals means lost economic opportunities for the country. They want the bishops, LGUs and environmental NGOs opposed to the mining liberalization law and the manner of its implementation to have a better appreciation of the jobs and economic windfalls the country will obtain from a reinvigorated and world-class mining industry.[25]

On the other hand, Alter Trade, a leading NGO advocate of sustainable agriculture, claims that their 20-year campaign for sustainable agriculture, mainly in Negros in the Visayas, has led to more jobs and better incomes for hundreds of marginalized sugar farmers and their families.

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[24] A Spanish term for a narrow water canal in an urban area and a term widely used in the Philippines.

[25] Mining was a big foreign exchange earner for the Philippines in the 1960s and 1970s. However, the industry collapsed in the 1980s due to weak international metal prices. Through the 1995 Mining Liberalization Act, the government has sought to revive the pre-eminent economic role of mining in earning foreign exchange and creating mining jobs in remote provinces. For a detailed history of Philippine mining, see Lopez (1992).

Alter Trade has pioneered the development and marketing to Japan, Europe, and other countries of organic sugar (called *muscovado*) and organic banana (*balangon*), both which are now being imitated by some agribusiness corporations because of the growing global and domestic market for organic products. Alter Trade's 879 farmer cooperatives, owning 812 hectares of land and organized into 17 "people's organizations" (POs), enjoy regular incomes and now have their own post-harvest facilities (trucks and threshers), farm tractors, irrigation facilities, storage facilities, vermihouses, health center, and training centers, apart from four trading and processing firms (Alter Trade, 2008). The challenge, however, is how to replicate the success story of Alter Trade, which has enjoyed unique solidarity assistance from Japanese and other foreign NGOs over 20 years of organizing, learning, ups and downs in production, product experimentation and now business consolidation.

As to the employment-disemployment effects of restructuring in industry, particularly in manufacturing, the research team was unable to compile sufficient data to reach a meaningful conclusion. However, it should be pointed out, that many marginal and energy-inefficient ISI manufacturing firms in the country disappeared much earlier; in the 1980s and 1990s with the onset of globalization and the rise of China as a major economic power. This was due not only to the campaign of DENR against effluent dumping in the Pasig River (and other rivers) but mainly due to these firm's collective failure to stand up to globalization, deregulation, and smuggling. For example, there were around 300 textile companies in the 1970s, most of which (except for a handful) had disappeared by the turn of the millennium (Ofreneo, 2009). Likewise, most of the ISI and energy-intensive rubber, pulp and paper, plywood, plastic, tile, and other domestic manufacturing industries had also disappeared.

What has remained on the industrial front are mostly firms under the global production chains of transnational firms such as the export-oriented electronic assembly firms, auto parts producers, specialized wood and furniture manufacturers, and so on. Located in the duty-free industrial parks and export processing zones in Regions III, IV, and VI, most of these firms have invested in environmental programmes because of the ISO 14001 requirement of the export market. However, such programmes are usually part of the global standards being observed by transnational firms.

As to the new but emerging RE sector, there are a few investment projects in place. However, the sector as a whole has not yet really taken off (see later discussion). But in general, there are no signs of dis-employment; there are instead indications of increased job creation once an RE investment project takes off, simply because such a project is really a new investment project and employment opportunity.

To summarize, the research team fully agrees with the vision of a green economy that the Church-led multi-sectoral Climate Change Congress of the Philippines outlined in their November 2009 conference on climate change. Part of their declaration entitled "Fairness in a Fragile World – Climate Change: A Declaration of Convergence and Unity" reads as follows:

> *"…We are appalled that the existing development model engendered a system of unsustainable consumption backed up by unsustainable fiscal debts, irresponsible extraction of natural resources, and the amoral reliance on the inward remittances of a third of our labour force…We view with grievous helplessness the policy framework that directly caused de-industrialization and financialization of agriculture, aquaculture and fishing. Jobs in millions and more were lost. We are disturbed that our consumption-driven economy is based on imported products.*
>
> *x* *x* *x*
>
> *"We positively support any and all efforts towards rebuilding our communities, our schools, our farms, our roads, our jobs, and our small and medium-size businesses in the disaster-affected areas.*
>
> *x* *x* *x*

"We seek a moratorium on open-pit mining operations, attainment of the requirement of reforestation, watershed management, community ecology, livelihood, and jobs preservation – as mandates to be resolved positively.

x *x* *x*

"We call for: (a) watershed-based planning and development… (b) proactive and anticipatory approaches to climate change and disaster management using adaptation and mitigation measures...

"We support the twin struggles of the poor and the excluded for economic and environmental renewal, in particular – farmers for agrarian reform and sustainable agriculture; urban poor for housing reform, anti-demolition and river and urban renewal; fisherfolks for fishery and blue or aquatic reform; indigenous peoples for ancestral domain and a ban on illegal logging and large-scale mining in their ancestral domain; and the workers for decent and green jobs through more and greener industries."

2.2.7 Skills mismatches, shortages

Will a shift to a green/greener economy lead to further skills mismatches and skills shortages?

Such a scenario would be a likely outcome were a real and thoroughgoing green restructuring of the economy taking place. This, however, is not the case at the moment. There is more talk rather than action on green restructuring.

Right now, the greater problem in the labour market is the shortage of good quality jobs for the 1 million or so annual labour entrants and the existing "stock" of unemployed (roughly 3 million) and underemployed (6 million or more) as discussed earlier. This is why a high-level "independent review panel" convened in 2003 to analyze the first five years (1995–2000) of TESDA concluded that "*the availability of supply of manpower does not seem to be a major concern among employers" because the labour-surplus Philippine economy has a large pool of 'educated unemployed' "*. In short, the bigger problem is not the labour market mismatch per se but more on the demand side, that is, on the mobilization of investments for the creation of more and better jobs for those who finish college and are unable to find jobs and for the majority who generally drop out from elementary and high school and are now occupying low-end and low-earning jobs, mostly in the informal economy.

However, the TESDA review panel, did recognize the problem of mismatch, mainly in "*a few highly technical ones*" needed or demanded by the global labour market such as "*CNC (Computer Numerically Controlled) machine operators/technicians, internationally certified I.T. programmers/engineers/technicians, medical equipment technicians, mechatronics technicians, and the like*", which the Philippines is unable to provide. This kind of discourse on the labour market mismatch, which is quite common in the country, is distressing and confusing. Distressing and confusing because the traditional meaning of mismatch is "*the lack of fit between the education/technical preparedness of graduates and the requirements of domestic industry*". Yet in recent years, the inability of the educational system to produce the skills and technical know-how demanded by the overseas labour market is now interpreted as a "mismatch"! This requires an added role for the educational system in producing quality graduates for both the overseas labour market as well as the domestic market! Thus, at the 2007 National Human Resource Conference (NHRC) convened "*to address the intractable problem of job-skills mismatch*", one of the sectors identified as having difficulty in getting skilled personnel was the overseas labour market.

The other KEGs identified in the 2007 NHRC include agribusiness, construction, cyber services, hotels and restaurants, maritime, mining and health, wellness and medical tourism. Note the exclusion in the KEG list of "manufacturing", which is a virtual confirmation of the eroded industrial base of the country! Understandably, none in the long list of issues discussed in the

NHRC had any reference to manufacturing. Some of the HRD/skills issues taken up were the lack of agribusiness skills and training among graduates, the poor or inadequate English training in the school system as the explanation for the low hiring rate in the cyber sector (mainly call centers), low enrolment in the medical schools, lack of ethics among tour guides, and so on.

Not surprisingly, there was neither reference to environmental education nor skills development in the 2007 NHRC. Likewise, there was no reference to environmental education and skills development in the 2008 comprehensive report of the Presidential Task Force for Education entitled *The Philippine Main Education Highway: Towards a Knowledge-Based Economy*. The mismatch issue also cropped up in the report. However, this was discussed in a brief and general way, that is, with a statement that many are unable to find jobs suited to their degrees. Again, there was also passing reference to the country's inability to fill up the requirements of the overseas labour market for skills and talents.

Nonetheless, the skills and talent requirements of green restructuring are real and must be addressed. They are likely to deepen if the programme of restructuring is hastened, broadened, and deepened by a reform-oriented government.

A starting point is an identification of sectors and sub-sectors to be promoted or greened and the kind of skills and talents that are likely to be in short supply. In this report, the research team has identified these sectors/sub-sectors as follows:

- Agriculture (shift to sustainable agriculture);
- Service industries (adoption of greener approaches such as more efficient use of energy);
- Local community development (re-building, relocation, etc.);
- Industry (shift to green/greener modes); and
- RE/biofuel sector development.

At the moment, however, there appears to be no major shortage of skills and talents in support of green restructuring. Severino, in his 1998 *Green Guide* (op cit), noted that despite the exodus of Filipino talent, environmental experts and professionals still abound. As pointed out in Chapter 1, UP and other institutions have been producing environmental graduates, sanitary engineers and the like since the 1970s. For example, the case studies included in this report show that firms had no difficulty in getting environmental engineering graduates.

However, it should be acknowledged that there is a dearth of expertise in specialized areas. This was clearly the situation in the Bangui NorthWind project and in the CDM audit process. Investors in the Bangui project had to recruit foreign experts to train Filipinos on the operation and maintenance of windmill equipment, while the DENR's CDM process takes time because there are no certified Filipino experts who can do the CDM audit job. In short, the importation of a green technology that is not yet available in the domestic market means either overseas training for Filipinos assigned to manage and maintain the technology or importation of foreign experts to orient and train Filipinos on this new technology. This is what happened in two of the case studies included in this report — the geothermal development project in the 1980s of the Energy Development Corporation (EDC) and the bioethanol project of San Carlos Bio-Energy Inc., (SCBI). These are discussed later in this chapter.

It is also certain that once a green shift is made at the enterprise level, the said firm has to train or re-train people to manage the shift. The type of training and re-training will naturally vary from firm to firm, as the following cases show.

2.3 Case studies on greener firms and greener HRD/skills development

As noted already, as of November 1, 2009, there were a total of around 40 registered CDM projects in the Philippines as of end 2009 although only two so far have been qualified by the DNA (page 15). For this section, the research team chose the following three firms:

- **Philippine Associated Smelting and Refining Corporation** (PASAR), a government copper smelting firm privatized in 1999. The new owner invested in pollution abatement measures and initiated a number of environmental projects in and around the smelter site. Its copper output has an ISO 14001 certification.

- **Halsangz Plating Cebu Corporation (**HPCC), an export-oriented but energy-intensive firm located in the Mactan Export Processing Zone (MEPZ) in Cebu. It reportedly succeeded in drastically reducing its energy consumption through an energy rationalization programme involving the entire work force.

- **Toyota Assembly Plant** in Sta. Rosa, Laguna. Toyota has adopted greener methods and processes and has initiated a number of green projects within and around its sprawling facility. Some of the green projects are part of the Toyota's world-wide greening programme; others have been undertaken on the initiative of the Philippine joint venture partners of Toyota.

The complete texts of the cases are appended in this report as Appendices II, III, and IV. The following are the case summaries.

2.3.1 PASAR: investing in comprehensive environmental transformation

The Philippine Associated Smelting and Refining Corporation (PASAR) at Isabel, Leyte was a brainchild of the Marcos regime, which nudged a consortium of Filipino copper mining firms, through a joint venture with Marubeni and Mitsui Mining and Smelting, to set up the smelter. The idea was to add more value to copper mining within the Philippines. The Philippines then was Asia's biggest producer of copper, while Japanese copper processing firms were, coincidentally, looking for alternative smelter sites because of the rising number of complaints within Japan against polluting smelters.

PASAR, however, had a turbulent existence from 1983 up to 1999. First, it had to manage difficult technical problems at the beginning of its formation. Second, it had to cope with the even more difficult relational problems — with residents of the host community (Isabel and other neighbouring municipalities) who accused PASAR of causing illnesses blamed on the polluting processes of the firm. Two quarrelling unions were competing with one another to conduct strikes and the filing of legal cases against PASAR; and the municipal and provincial LGUs were unhappy with their limited share of PASAR taxes. By the mid-1990s, PASAR was bankrupt and swimming in PhP30 billion debt.

Somehow, the government succeeded in privatizing PASAR and its debt. Fortunately, its buyer, Glencore AG of Switzerland, was also prepared to retain all the employees and invest in better corporate relations with the employees, the community and the LGUs. On top of this, Glencore AG was committed to environmentalism.

PASAR invested — in a big way — in an environmental transformation programme involving the importation of expensive pollution abatement facilities (e.g., acid plant to convert sulphur dioxide into sulphuric acid, various items of dust-removing equipment and wastewater treatment facility), crafting of varied environmental projects within PASAR and the adjoining communities, and integrating environmentalism into the work processes. Initially, it set aside US$25 million for this environmental transformation programme. Eventually, total environment-related expenditures reached approx. US$50 million.

PASAR also activated the Environmental Protection Department (EPD) and instituted environmental processes needed to acquire the ISO-14001 certification. The EPD was tasked to monitor the plant's processes and check continuously whether the anti-pollution facilities and programmes are working. The mandate of EPD is to ensure that every phase of smelting is in compliance with the environmental laws and regulations. The department is composed of one manager, two pollution control officers, four associates, and 15 contractual employees.

Retraining and training challenges

Because the pollution abatement facilities introduced were new, one of the adjustments made was the retraining of machine operators. The training was provided by the same foreign contractors that supplied the technology to PASAR and was coordinated by PASAR's Electrical and Instrumentation Department which is responsible for the acquisition of the technologies. The commissioning of the imported technology included training on use of the technology, meaning foreign contractors delivered both the technology as well as experts able to train would-be operators in running and troubleshooting the new facilities. One PASAR employee was also sent abroad for training.

The training provided by the foreign contractors is supplemented by the ingenuity of the engineers and operators. According to Bonifacio Fornis, a pollution control engineer, learning to operate the facilities is a relatively easy task provided the operator has the theoretical background knowledge of how such machines work. A knowledge of machine operations had already been acquired by the operators during their engineering education and was refreshed during the training. During actual operations, especially during the initial stage, the operators were guided by the manual that arrived with the facilities and which is used until such time as they acquired the skills needed to control the machines. With their engineering background, they are often able to devise effective ways of troubleshooting when problems arise, even without consulting the foreign contractors.

The EPD also supervises other environmental programmes within PASAR. The company has a tree nursery for its Greening Programme. It maintains a 35-hectare Fish Sanctuary (located right beside PASAR's complex — Figure 2) to preserve the marine ecosystem in the PASAR areas. Both the nursery and the fish sanctuary serve as indicators of the level of pollution being generated by the complex. If fish in the sanctuary are dying or if the leaves of the trees in the nursery are drying, then it means the processes in the smelting and refinery plant are polluting and are not conducive for the environment within and outside PASAR.

The EPD is active in different cost-reducing projects that are beneficial to the environment. Unused raw materials are recycled and used for the creation of new products. For instance, the cottages and fences in the promenade areas near the fish sanctuary are made up of unused materials from the plant.

A smelter with an ISO 14001

As a result of its commitment to environmental quality, PASAR succeeded in acquiring an ISO 9001 certification for its Quality Management System and an ISO 14001 certification for its Environmental Management System. PASAR has a quality policy in place to ensure that the production of Grade A copper cathode is based on the highest quality standards set by the London Metal Exchange (LME) and other markets for non-ferrous metals.

The new PASAR management has also been successful in transforming its formerly adversarial relations with the two competing unions, which eventually merged into one independent union. Union members have become active in the varied greening initiatives of the company. Environmental issues are now included on the regular agenda of the joint Central Safety Committee of PASAR, where the union holds a seat. There are also emergency response teams in PASAR, which are mostly composed of union members. Aside from being supportive of the environmental programmes, the union also serves as the watchdog of the company and the

management in monitoring the compliance of PASAR with local environmental policies and the minimization of polluting processes.

As part of the ISO-14001 standards implementation process, employees are briefed on the corporate environmental policy through the Environmental Management System Handbook, which is distributed to all employees. The handbook provides the employees with information about environmental concerns in the plant and their relationship to safety concerns. Newly-hired employees are required to attend a two-day classroom training session which orients them on the different aspects of the work in the smelting and refinery plant. Included in the training is a discussion of the Environmental Management System in PASAR. In order to reinforce the linkage between environmental concerns and safety concerns, before commencing daily work, the employees are reminded in the usual 10-minute safety talk about environmental, safety, and quality issues.

Finally, PASAR has set up the PASAR Foundation Inc. (PFI), the company's CSR arm, to assist surrounding communities. The FPI has launched a number of environmental programmes for the benefit of these communities. These include a barangay water assistance programme and community-based Isabel watershed management programme. PFI is also helping to rehabilitate five hectares of mangroves in the Isabel coastal areas. Employees of PASAR have volunteered in the planting of mangroves in the coastal barangays of Isabel. PASAR and PFI have also partnered with the local government in the Coastal Resource Management Programme in Palompon, Leyte, a neighbouring town.

As a result, PASAR today has become a favoured destination for various sectors of society; for example, by metallurgical engineering students from top Philippine universities doing practicum, by schools seeking to expose their students to best practice within a heavy industrial enterprise and, lately, even by priests seeking an alternative environmentally-friendly retreat area. Clearly, the PASAR experience demonstrates that a company, no matter how energy-intensive, can be transformed into a more environmentally-friendly, labour-friendly, and community-friendly enterprise. However, crucial in all these transformations is the leadership role of top management, that is, in providing the vision of transformation and supporting the transformation programme with real budget and needed human resources.

2.3.2 HPCC: switching to an all-employee energy saving programme to survive the GFC

The Halsangz Plating Cebu Corporation (HPCC) is a surface finishing company specializing in electroplating and painting services. It operates out of the MEPZ in Cebu, providing electro plating services to primary exporters such as Mitsumi, a giant electronics assembly plant employing around 20,000 workers. Thus, when MEPZ investor-locators were hit in 2008 by the GFC, HPCC's market shrank considerably. At its nadir, sales shrank to a mere 10 per cent of pre-GFC peak demand. And yet, HPCC refused to downsize its work force to match the decline. By astute management, it retained half its work force, a total of 266 employees, 200 of whom were regular employees.

HPCC coped with the market downturn by addressing the demand side and the cost of production. It started an R & D programme in order to create new products and services such as interior and exterior decorative materials for buildings.

FIGURE 2: PASAR'S FISH SANCTUARY

Photo by: Joy Hernandez

On production costs, HPCC was able to bear the high cost of retaining half of the work force amidst a 90-per cent market collapse by embracing an energy reduction programme with the participation of all employees company-wide under the leadership of Ms Edna Nagasaka, HPCC's General Manager. Ms Nagasaka was assisted by a special Energy Management System Committee (EMSC) on which all the departments were represented. With power accounting for almost 40 per cent of HPCC's production cost, the reduction of HPCC's energy consumption by one third represented substantial savings. By way of background, the Philippine Export Processing Zone Authority (PEZA) launched, in 2007, a campaign among investors-locators for a 15 per cent energy reduction for the entire MEPZ. HPCC complied by adopting an energy-saving campaign among its employees.

Creating a company-wide energy saving committee

The initial energy savings results were marginal. Undeterred, HPCC made a strategic re-adjustment of the campaign, by creating a separate and formal committee called the EMSC. Specifically tasked to deal with all aspects of energy conservation and management, the EMSC has representatives from all the 10 HPCC departments. This was to ensure uniformity in information dissemination, in the implementation of the energy reduction measures company-wide and in getting feedbacks from all departments. The Committee was also empowered to go from department to department to undertake energy use monitoring and audit. In addition, top management, through GM Nagasaka, gave full support to the 11-member EMSC, which meets as often as needed in the company boardroom on company time.

The first major activity of the EMSC was a full-blown brainstorming workshop on the causes of the company's high energy consumption. The result of the brainstorming was a fishbone diagram that summarized the energy problems in relation to four critical areas: "man", "machine", "method", and "materials". Then the EMSC set a reduction target of 8 per cent for 2008.

On actionable measures for "man", the committee formulated an EMS Policy to serve as the overall guiding principle for the energy-saving programme. This policy states that "*HPCC commits to implement continuous improvement on efficient utilization of energy through effective Energy Management System that would [provide] support for the entire operations*". After its formal launch in January 2008, the EMSC conducted a series of training and orientation seminars for all employees on energy management. The training focused on a detailed discussion of the "Best Practices in Energy Conservation, Water Conservation, and Solid Waste Management" (Table 2-5 for the course outline of the training programme).

The information and awareness-raising programme was supplemented by the posting of highly visible information materials on EMS Policy, signage, and reminder notices. Energy signages and reminders can be seen close to every light switch and air-conditioning unit throughout the company premises. At the entrance to the plant area, the Energy Performance Monitoring Board is clearly visible and contains basic information, updates regarding targets and performance, and other details about EMS.

TABLE 2-5: COURSE OUTLINE FOR THE TRAINING PROGRAMME

Topics	Timeframe	Teaching methods
Energy conservation		
Review of energy, kinds, and applications in HPCC	10 mins	Discussion
Energy conservation tips for lighting, compressors, HVAC, aircon, boiler, oven, heaters, motors, pumps, chiller	30 mins	
Film showing of "The World Plus Six Degrees"	8 mins	Film
Water conservation		
Review and overview of local, national, and global environmental issues	15 mins	Discussion, presentation, questions and answers
Review of hydrologic cycle	10 mins	
Human impact on water cycle	15 mins	
General tips for water conservation	29 mins	
Presentation of actual solution – famine (due to lack of food/resources)	3 mins	
Solid waste management		
Review/overview of solid waste management programme (both local and national)	10 mins	Discussion, presentation, questions and answers
Payatas dumpsites' actual condition and rehabilitation activities	10 mins	
General ways tips for solid waste minimization	20 mins	
Evaluation		
	20 mins	Written exam

On "methods", the EMS Committee changed the electrical set up in the office. The centralized lighting system was replaced by a system of separate light switches for each area. For example, in the production area, light tubes used to be switched on 24 hours a day because of the centralized lighting system. Now, the switches for lighting in the production area are separated, production line by production line. A scheduled usage of lights has also been formulated and implemented. Facilities such as computers, exhaust fans, lights, and air-conditioning units are turned off when not in use or when not needed. Also, lighting, air-conditioning, and other facilities are cleaned and maintained on a regular basis to increase their energy efficiency.

With respect to "machine-related" problems, the EMS Committee undertook a number of structural and physical alterations. For instance, unnecessary fluorescent tube lights were removed in some areas. Schedules and avoidance of unnecessary use and regular maintenance of machines such as scrubbers and compressors were also implemented.

As mentioned, the initial 2008 target was to reduce energy consumption by 8 per cent. The actual results achieved were more than four times the target, with energy consumption in three different plants dropping as much as 36.9 per cent. There was also a significant reduction in diesel and LPG consumption. Diesel consumption was reduced by 14.54 per cent while LPG consumption dropped by 8.54 per cent. If the total reduction of electrical and fuel energy

consumption of the company is converted into monetary terms, the total savings have been estimated to reach more than PhP238,000 per month.

Continuous improvement

In the spirit of continuous improvement, the Committee continues to analyze the energy consumption data and to look for other problem areas that can be addressed. Members of the committee are tasked to monitor and record the daily energy consumption in their designated areas. The Committee analyzes and compares new data with the previous consumption record.

Incidentally, few of the EMS Committee members have a background in power management, and yet through the varied Committee functions (research, problem analysis, problem solving, etc.), they have all become experts on energy savings and energy usage monitoring. Their knowledge on wise energy use was acquired mostly through internet research, discussion among the EMSC members and implementation of the programme. There is no added remuneration involved, yet the members of the Committee enjoy working as a team.

Because of the Committee's success, HPCC top management has decided to maintain the Committee and to continue giving the support it needs in terms of company time for the committee meetings and monitoring work as well as budgeting for recommended improvements and so on. HPCC has also institutionalized the EMSC training on resource saving for all HPCC employees. The energy-saving strategies implemented by the EMSC have also changed the culture of the organization and the attitudes of employees, particularly with respect to how energy is used. The EMS programme has helped deepen environmental awareness and the spirit of teamwork among HPCC employees. On the other hand, the energy efficiency and the *esprit de corps* developed within the company have helped enhance the overall efficiency in production. HPCC truly deserves the international certification standards it has received — Quality (ISO 9001), Health and Safety (OSHAS 18001) Management Systems and Environment (ISO 14001).

2.3.3 Toyota Philippines: hybrid of Tokyo and Manila environmental programmes

A major player in the Philippine car assembly industry is the Toyota Motor Philippines Corporation (TMPC), which was incorporated as an assembler (joint venture) of Toyota vehicles in the second half of the l980s and after the People Power Revolt of 1986. However, like the other car assemblers, TMPC has had to operate within a harsh economic environment brought about by the ups and downs in the Philippine manufacturing sector, the unchecked smuggling of second-hand vehicles (see earlier discussion) and, more recently, by the oil price crisis and then the GFC.

In 1998, TMPC was granted ISO 14001 certification, making TMPC the first ISO 14001 certified automotive company in the Philippines and the seventh among all industries in the country. TMPC's guiding principle on environmentalism is the so-called Toyota Earth Charter developed by its mother company in Japan. The Toyota Earth Charter promotes contributions towards a prosperous 21st century, pursuit of environmental technologies, voluntary actions, and working in cooperation with society. The green programmes and initiatives of TMPC are implemented in five key areas of operations, including manufacturing, logistics, dealership or marketing, supply of materials, and communications.

Promoting sustainability in all areas

TMPC promotes sustainable mobility in all its products. TMPC ensures that all the vehicles it produces are fuel efficient and SOC-free. This means that TMPC assembles cars with increased energy efficiency and, since 2007, containing no substances of environmental concern (SOC), including hazardous heavy metals such as lead, mercury, chromium, and cadmium.

However, the green programmes of TMPC are a hybrid or combination of the green initiatives of local top management and those of the mother company in Japan. Most of the process-related green programmes, especially in the Manufacturing Division, are initiatives of the

mother company in Tokyo, while the green programmes outside manufacturing are mostly local initiatives under the General Administration Division (GAD). In practice, however, these initiatives not only supplement one another but also often reinforce one another.

TPMC is striving to make the company environmentally friendly in all areas — from raw materials to products, from purchasing to dealership, and from the actual manufacturing processes to the simple day-to-day activities within the plant and the large TMPC land area, which TMPC is reforesting.

In order to increase environmental awareness among the TMPC employees, each "team member" is required to participate in the basic environmental training sessions provided by the company. Other personnel who are directly involved in environmental management and planning are also given special trainings, in addition to the basic environmental trainings (Figure 3).

The basic environmental training programme is composed of five modules: Basic Awareness, Environmental Policy, Objectives and Targets, Solid Waste Management, and Energy Management. All newly-hired employees attend this training so as to orient them concerning the company's environmental programmes. As of now, 100 per cent of the team members, including contractual employees, have participated in the basic environmental training programme.

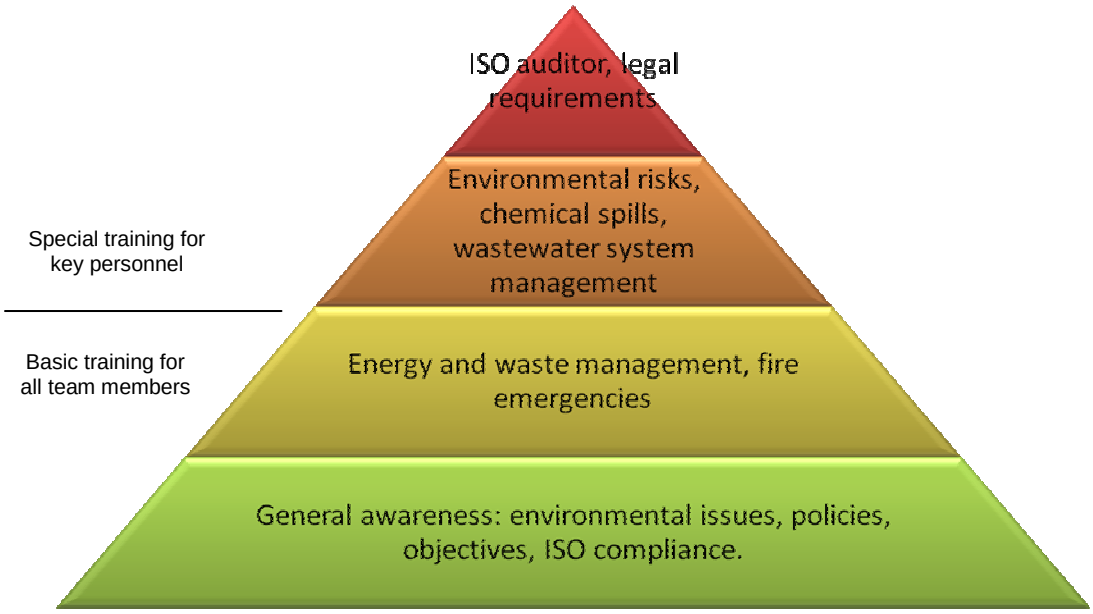
The basic environmental training programme is organized by the HRD. However, the environmental engineers from the Cost and Environment Section of the Manufacturing Division conduct the training because of their expertise in the subject matter. In the absence of the environmental engineers, the training personnel from the HRD conduct the training but only up to the first three modules. Solid Waste Management and Energy Management are strictly handled by the environmental engineers only because such modules require technical expertise.

In addition to the basic environmental training given to all team members, key personnel such as the environmental engineers are required to attend special environmental training such as the Environmental Management System Training conducted by the ISO-14001 certifying body and a minimum of four hours of Pollution Control Training conducted by the Laguna Lake Development Authority (LLDA). Training is also provided for new technologies. For example, a new technology that was recently introduced allows direct online monitoring of energy consumption. For this, TMPC selected team members who are computer literate and yet are deemed unfit to work in the production plant because of poor health conditions. They underwent retraining so that they would learn how to control and run the new programme.

Marrying cost and environment

To make the production process clean, environment-friendly, and cost-efficient, the Cost and Environment Section (CES) under the Manufacturing Division was designated to manage two aspects of manufacturing — the cost and the environment. Initially, the environmental aspect was part of the Environment and Safety Section but after reorganization, the Cost and Environment Section was formed so as to align environmental issues with cost-saving measures.

FIGURE 3: ENVIRONMENTAL TRAININGS AT TMPC



The CES is tasked to ensure that TMPC is compliant with all the environmental standards and targets set by the mother company and with all the environmental laws and regulations enforced by the Philippines government. More specifically, it is responsible for the monitoring of wastewater discharge, air emissions, and water and energy consumption. The CES submits a monthly report to the mother company that records its performance in terms of the specified Environmental Performance Indicators such as water and electricity consumption. The group is composed of eight team members: five in Environmental Planning (two engineers, two technical staff, and one laboratory analyst) and three in Wastewater Treatment Plant. Except for the engineers, all members of the CES are graduates of technical/vocational education.

However, the CES is not the sole body responsible for all environment-related responsibilities at TMPC. All team members, from the top management to the line representatives, are involved. To encourage involvement of all team members in every division, the Environmental Management System (EMS) Organization was formed to serve as a company-wide working group to ensure that all environmental management initiatives are cascaded to each team member and successfully executed. One of the functions of the EMS Organization is to serve as a coordinating body among the different departments/sections for the implementation of the environmental management programme.

Members of the EMS Organization are selected from each department/section and appointed by the management. For the reporting and consolidation of environmental performance per department/section, weekly and monthly meetings are held. Furthermore, quarterly meetings with the President and bi-annual management review are also conducted to keep track of the overall environmental performance of the company.

The environmental programmes of the Manufacturing Division are supplemented by those initiated by GAD. One notable project of GAD is the greening of the area occupied by TMPC. TMPC allotted three hectares for eco-forest development involving 10,000 trees of 86 different species. Because of this reforestation programme, the vicinity of TMPC has been transformed in the space of a decade from almost barren land into a lush forest. Aside from the forest, GAD also maintains a nursery which houses a wide variety of ornamental plants.

Another GAD initiative is the reduction of solid wastes generated from tree trimmings and yard sweepings which are used as composting materials for organic fertilizer. The composting method uses a beneficial fungus called *Tichoderma harzianum* to speed up the process. The organic fertilizer is then is used in fertilizing the trees and other plants.

During rainy season, one of the problems faced by TMPC is the accumulation of garbage in the nearby river coming from the province of Rizal. In order to address this problem, GAD created a bamboo frame cage that traps and collects 50 to 70 per cent of garbage from the river. Within two months of operation, the bamboo frame cage was able to collect 350 kilos of garbage.

Because car manufacturing consumes considerable energy and water, TMPC devised other programmes to conserve water and energy. It introduced the process of rainwater harvesting and distribution using solar-powered water pumps. Through this process, rainwater is collected and used for laundry, sanitary washing (toilet and urinal flushing), and car washing. Solar power is also used in providing electricity in the Activity Center (gym and recreation) and the parking area.

The environmental programme of TMPC is extended outside the premises of the company through the CSR activities of Toyota Motor Philippines Foundation (TMPF). The foundation participates in coastal and river clean-ups in the Save Silang-Sta. Rosa River Foundation (to revive this drying river), tree seed dispersal, and the Philippine Peñablanca Sustainable Reforestation Project (to rehabilitate 2,500 hectares of denuded forest in Sierra Madre). TMPF also partners with academic institutions, e.g., Miriam University and Don Mariano Marcos University, in support of their environmental education programmes.

TMPC is clearly on the high road of environmentalism.

2.3.4 Training/retraining needs in green restructuring: lessons from the three case studies

As can be deduced from the first three case studies, greening efforts need not be job-displacing. In fact, they can be job-creating and job-preserving. For example, TMPC's online environmental monitoring programmes became an opportunity to preserve the employment of workers with frail health and who are computer literate. However, such job preservation requires training in the new technologies Of course; one cannot make a sweeping generalization. Some companies may experience redundancies if the new technologies are job displacing.[26]

The point to be made here is that redundancies are not automatic but depend on case by case.

Greening also requires training and re-training. An example of the latter is PASAR's re-training of machine operators because the new environmental equipment requires new knowledge and skills. Findings from the case studies show that, more often than not, re-training results in the acquisition of additional knowledge and skills, rather than in the erosion or replacement of the old ones. Especially in training required due to the introduction of new technology, old knowledge and skills do not seem to become obsolete because they tend to be the foundation for new learning.

However, it also entails basic environmental training for all, so that everyone can participate in the overall environmental care and observance of environmental standards, and with enthusiasm and consistency. This much can be learned from the experience of all three companies, particularly the HPCC case.

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[26] As pointed out, many ISI manufacturing outfits located on the embankments of Pasig River disappeared in the 1990s, partly because of the DENR's anti-pollution drive and partly because of the failure to compete in a globalized and deregulated market. Such closure, however, does not represent greening per se; rather it is evidence of dying industries.

As to the leaders in the environmental programme, members of the environmental management departments usually have environmental, engineering, and technical/vocational backgrounds. A notable exception is the HPCC case, where most of the EMSC members had no environment/energy expertise at the beginning. It is abundantly clear that it is the nature and the technological complexity of the environmental care programme that determines the recruitment of people who should lead the programme. Thus, in the case of both PASAR and TMPC, some of the environmental equipment and processes require people with engineering backgrounds; in the case of the operations of imported pollution abatement equipment, the operators need a minimum technical/vocational education background to be trainable by foreign experts assigned to train them.

Finally, in all the three case studies and in other stories of successful greening, a key success element is the commitment to environmental transformation by top management. There are no "ifs and buts" about this because top management has to allocate the budget, time, and resources for any environmental programme, not to mention the rallying call for environmentalism. In all cases, the environmental and human resources management departments get their marching orders on environmental care programmes from the top management.

Incidentally, none relied on any government support, not even in the design and conduct of training and retraining programmes. Of course, the government, through the DENR, did play a role with the environmental laws and environmental awareness campaigns it undertakes from time to time, including environmental monitoring.

2.4 Green collar occupations

A green sector is developing in the Philippine economy.

This sector consists mainly of enterprises that are being formed in response to the twin challenges of climate change and the rising cost of fossil fuels. In the process, these enterprises are giving birth to green-collar jobs, whose occupants or holders help run the green enterprises. These include environmental engineers, energy specialists, waste segregators, material recyclers, and sus-agri farmers, among others.

The problem is that there are no available statistics on the number of green-collar workers, green jobs established or the different categories or classes of green-collar workers. Nor as yet, are there any occupational classifications for "green" jobs. In the first place, there is no comprehensive information system developed for the emerging green enterprises, although there are many bits and pieces of information and news stories on planned or projected investments, particularly in the energy sector, and mainly in two areas — the alternative energy sub-sector and the renewable energy sub-sector. The first sub-sector is supported by the Biofuels Act of 2006, while the latter is being boosted by the fiscal and other incentives provided by the Renewable Energy Act of 2008.

Olegario Serafica (2008), the President of the Renewable Energy Association of the Philippines (REAP), listed some of the jobs that will emerge in the RE sub-sector (Table 2-6). Some of the jobs Serafica enumerated are specialized ones (RE resource assessors, energy auditors, and RE planners). However, many other RE jobs are classified the traditional way (mechanics, electricians, trainers, researchers, welders, project monitors, and so on). The difference? These jobs happen to be all parked in the RE sub-sector.

TABLE 2-6: JOBS IN THE RENEWABLE ENERGY SUB-SECTOR

Areas of employment	Job opportunities
Rural electrification	Sales/planning/project engineers
	RE technicians/installers/repairmen
	Community organizers
	RE resource assessors
	RE component fabricators
	Village electricians
	Micro-financiers
	RE project monitors
Industry	Energy managers
	Energy auditors
	RE planners/engineers/researchers
Manufacturing	Designers/engineers/draftsmen
	Metal workers/tinsmith/welders
	Electricians
	Mechanics
Government	Energy managers/officers
	Energy auditors
	RE planners/engineers/researchers
	RE technicians/inspectors
	Rural development officers
	Community organizers
	Trainers
Academe	RE professors/teachers
	Researchers
	Trainers
Livelihood/Agriculture	RE technicians
	Mechanics, electricians, welders
	Researchers

Source: Olegario Serafica, in Institute for Labor Studies, 2008, Green Jobs: Working with Climate Change, *DOLE-ILS*

For biofuel production, likely jobs in the field will include those of the farmers, agronomists, seed developers, and biofuel experts. For those in the biofuel distillery or processing, the jobs will include those of the machine and distillery operators, mechanical engineers, maintenance engineers, environmental officers, and community relations specialists.

On top of the foregoing, however, one must include the CC scientists and researchers (in government, academe, and NGOs/private sector), GHG specialists/monitors, disaster managers, urban/rural developers/re-developers of communities devastated by floods, solid waste collectors, and segregators, etc.

How big will be the size of the green sector and how many green-collar jobs will the sector create? At this point, one can only speculate. The media hype on RE and biofuels has not yet translated into a flood of actual investments and jobs. Most of the stories on so-called investments on RE and Biofuels are those of how some investors are mulling, planning, or still registering RE projects. As pointed out earlier, many investors are wary of the limited market for electricity in the non-grid remote areas and the high cost of developing RE and biofuel projects in such areas. For instance, there are reports on the difficulty of NorthWind's investors in maintaining the financial viability of the Bangui windmills (BizNews Asia, 2009).

There are other constraints. These include the high cost of importing the technology, the peace and order problem at potential sites for RE projects, and the opposition by indigenous people who are protected by other environmental laws such as the NIPAS. Thus, the most developed RE projects are really old projects launched way back in the early 1980s by the Marcos regime, the geothermal and hydro projects, which have been privatized or which have changed ownership.

Investments on biomass and solar power development are few and underdeveloped. However, there are some exciting developments such as the solar panel factory or assembly of Sunpower Philippines which exports to various Asian countries. There are also experimental projects on solar-fuelled cars (produced by the engineering department of De La Salle University), not to mention the battery-run e-jeepneys and e-pedicabs being exhibited in some LGUs.

In the case of biofuels, the situation is complicated by the global debate on whether a country should prioritize food or fuel. This debate has been reprised in the Philippines. This issue became prominent in the second quarter of 2008 when the Philippines was hit by a rice crisis. Teodoro Mendoza, an agronomist professor, wrote, in a *Praymer sa Biofuel* (2008), that biofuels, particularly jatropha, deepen the food crisis and do not help the cause of environmentalism. Lately, another issue has cropped up — the lack of guaranteed price and guaranteed domestic sourcing for bio-ethanol. This is why there is an appeal from the "Ethanol Producers Association of the Philippines" for the government to raise the tariff for imported bioethanol to 20 per cent (Liu, 2009), an almost impossible demand given the liberalized trade regime in the Philippines today, which has reduced most of the industrial tariff peaks at less than 10 per cent (Fair Trade Alliance, *op cit*).

Yes, jobs are increasing in the RE and biofuel sub-sectors, in sustainable agriculture, and in the recycling waste collection and other green industries. But they are not growing as fast as projected. This explains why the Philippines is still very much dependent on fossil fuel and coal, to generate electricity and move vehicles and machines.

2.4.1 Green collar case studies

The research team documented the HRD concerns in the following green enterprises (for the full texts of the reports, see Appendices V, VI, and VII):

- **San Carlos Bio-Energy Inc**. (SCBI), the first bio-ethanol plant in the Philippines and in Southeast Asia.
- **Energy Development Corporation** (EDC), the biggest geothermal project in the Philippines.
- **Metal Wealth**, the country's biggest plastic recycling firm, which buys waste plastic materials of all shapes, sizes and colours from plastic waste collectors.

2.4.2 San Carlos Bioenergy, Inc.: rounded HR greening programme for rounded environmental business

San Carlos Bioenergy, Inc. (SCBI) is the first company in the Philippines and Southeast Asia to venture into the business of bioethanol production and power co-generation. Incorporated in 2005, SCBI was able to start production in January 2009. The sprawling SCBI agro-industrial complex in San Carlos City is a product of the combining the expertise of two companies: Bronzeoak Philippines in biomass power plant engineering of and Zabaleta and Co. in sugar-based agriculture. Bronzeoak is a British-Indian company, while Zabaleta and Co. is a local company with a long history of involvement in Philippine sugar production.

Most of the facilities are imported from India and other countries. SCBI has a cane mill with a crushing capacity of 1,500 tons per day; a fuel ethanol distillery producing 125,000 liters of ethanol per day; a co-generation plant with a capacity of 7.5 MW; a CO_2 recovery plant with recovery capacity of 50 tons per day; anaerobic digestion plant; and integrated waste treatment plant. Each is based on modern technology and is designed to meet local and global standards in relation to the environment.

In fact, the whole SCBI ethanol distillery plant is engineered as a pollution-free and waste-free plant. The distillery meets the emission standards set by WB, meaning it does not emit greenhouse gases such as NO_x and SO_x. Waste materials are recycled. The bagasse, a by-product from the milling of sugar, is converted into biogas and fed to the boiler as fuel. The steam from the boiler is used to power the steam turbines to co-generate electricity of up to 7.5 MW, part of which (about 2.5 MW) is shared with the local electrical cooperative. Solid by-products such as the *mudpresse*[27] are mixed with the wastewater and developed into organic fertilizers through a composting process. In turn, the organic fertilizers are distributed free of charge, on a pro rata basis, to cooperating sugar farmers who supply SCBI with sugarcane. Even CO_2 is recovered in the plant, through the carbon dioxide recovery facility. The plant recovers approximately 50 tons of CO_2 per day, which is sold to soft drink companies for the production of carbonated beverages.

Aside from an integrated wastewater treatment, the plant has an anaerobic digestion plant which removes water pollutants. It also has a reverse osmosis facility which treats and recycles wastewater. Around half of the treated wastewater is reused in the process and most of the remainder is used in composting. Any excess wastewater remaining is used for drip irrigation in sugarcane farms.

Dedicated environmental monitoring

To ensure that SCBI is complying with all environmental standards set by the government, WB and other global institutions, SCBI's Environmental Management Department (EMD) undertakes dedicated environmental monitoring. The EMD monitors the quality of wastewater, ambient air, as well as moist and deep wells. It also undertakes quarterly environmental audit through a multipartite monitoring team composed of the LGU, host barangays, NGO, and DENR.

EMD is composed of eight people — one manager, one pollution control officer, three reverse osmosis operators, and three biogas/anaerobic digestion plant operators. Each EMD staff member has a background in engineering, although not all of them are licensed engineers and engineering graduates. The two key positions in EMD that require a degree and engineering license are the EMD Manager and the Pollution Control Officer; both jobs are occupied by licensed chemical engineers. The EMD Manager also holds a master's degree in environmental engineering. Most of the operators in the department are graduates of technical/vocational courses such as mechanical engineering technology.

Because the operators deal with wastewater treatment operations, EMD Manager Ong pointed out that it is imperative for them to have a basic knowledge of water piping, familiarity with the entire water treatment process, basic technical skills and knowledge, and good working attitudes and values associated with an efficient operator. In addition, they must be trainable because all facilities introduced at SCBI are new technologies that necessitate new skills. For this reason, operators are usually required to undergo training on controlling and troubleshooting the machines. Table 2-7 summarizes the basic competencies for operators.

However, as elsewhere the introduction of new technology does not mean other skills have become obsolete. The new skills are not replacement skills but are additional skills. For example, operators do not rely only on what they learned during the training given by the foreign contractors. When technical problems arise, they also make use of their previous knowledge on machine operations to devise other means of troubleshooting. Moreover, most employees have prior work experience in milling and distillery companies. The knowledge and skills that they acquired from their previous work experience actually became the foundation of their understanding about bioethanol production and co-generation because most of the processes involved in a milling or distillery company are almost the same as that of a co-generation plant.

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[27] The by-product of a by-product; the waste that comes out after the bagasse (a by-product of the sugar milling) has been converted into biogas.

One of the environment-related problems addressed by the EMD during the first few months of SCBI operations was the noxious odour emitted by the plant because the anaerobic digestion facility, which helps reduce noxious odour, was still under construction. The EMD worked closely with the Community and Planters' Relations Department in dealing with the problem. While the EMD was busy looking for technical solutions such as the enzymatic treatment of the distillation's by-products, the Community and Planters' Relations Department was busy organizing consultations with the communities around SCBI and explaining to them the efforts being made by the EMD to eliminate the problem. When the anaerobic digestion plant became fully functional, the odour problem disappeared.

TABLE 2-7: SUMMARY OF COMPETENCY REQUIREMENTS FOR OPERATORS UNDER SCBI'S EMD

Area of competence	Key competencies
Technical competencies	Engineering background. Has background in basic engineering, particularly in mechanical engineering or mechanical engineering technology.
	Knowledge in piping. Understands how pipelines are structured and how they affect the flow of wastewater.
	Troubleshooting. Has the ability to identify machine problems and to provide solutions or recommendations to solve the problems.
General competencies	Trainability. Has the willingness to learn and the ability to easily grasp concepts and operational instructions from superiors and trainers.
	Self management. Displays high level of initiative and commitment to complete assigned work; able to work with minimum supervision and willing to work long hours when needed.

Environmental and HRD directions from the CEO

Company employees obtain guidance on the directions of work at the complex and relations with the farmers and the communities around the complex from the top management. SCBI's prime mover is the Chairman-CEO, Juan Zabaleta, who was instrumental in conceiving the project and in forging the partnership with Bronzeoak and Petron, its main bioethanol buyer. He also initiated the varied organizational, community, environmental, and HRD programmes and innovations. According to the EMD, Mr Zabaleta himself suggested the idea of composting the solid waste materials and the distribution of the compost among the cooperating farmers. The wife of Mr Zabaleta is also active in the green landscaping of the complex's perimeter, which blends beautifully with the rolling hills of San Carlos.

The HRD enjoys the full support of top management in the promotion at all levels of the SCBI's core values — social responsibility, continuous improvement, belongingness, and integrity — based on the guiding business goals of SCBI dubbed the three E's: Environment, Energy, and Employment. According to HR Officer Gloria Pasustento, SCBI has forward-looking HR programmes such as the Workshop on Corporate Direction and Corporate Values for all employees and coffee with the president/resident manager where birthday celebrators for the month have a chance to sit down with the president/resident manager for an informal discussion over a slice of cake and coffee. The HRD also promotes environmental awareness alongside other organizational and personnel concerns in plant operations, particularly on issues of safety, health, and security. A SHES (*Safety, Health, Environment, and Security*) Committee was formed to facilitate the monthly toolbox meetings or consultations with the different department representatives to address the various concerns related to SHES.

The environmental programmes of the SHES Committee, directly supervised by the EMD, are supported, and further reinforced, by the Safety Team and the Community and Planters' Relations Department. All these teams work in coordination with the HRD, which is responsible for general environmental awareness raising and the dissemination of organizational and personnel policy information among all employees. This harmonization is reinforced through an open system of communication, including e-communication, personnel bulletins, and inter-

departmental notices. The HRD is also planning to publish a company gazette or bulletin that would also serve as a medium to promote the programmes of the SHES Committee. While, as of the time of writing, the company gazette is not yet in place, SHES concerns, reminders, and notices are posted on designated bulletin boards and sent to each department through the corporate e-mail. To deepen general environmental awareness among the employees, the HRD sponsored a slogan-making contest, where all employees were encouraged to submit a slogan that promotes SCBI as a green company.

The monthly toolbox meetings of the SHES Committee also serve as a venue to determine the training needs of employees in relation to SHES issues. One of the concerns raised in the SHES Committee is how to create a proactive approach towards dealing with possible disasters. This concern was addressed by conducting training on disaster preparedness in partnership with the Philippine National Police (PNP) and Bureau of Fire Protection (BFP). The team members are trained on proper responses to various emergency situations such as fire, explosion, accidents, and spillage in the transport of alcohol. Emergency response plans have been developed and an emergency response team is in place. Moreover, SCBI is equipped with emergency apparatus, including fire truck and ambulance. The HRD requires employees to observe proper safety measures such as wearing the proper safety gears when necessary.

Since employees have diverse backgrounds and were exposed to different company cultures prior to working in the SCBI, the HRD tries to build up team spirit and unified culture by instilling among the employees, supervisors, and managers the corporate vision and values through varied HR company-wide programmes, as outlined above. Employees are recruited based on the matching of their skills, experiences, and competencies with the green jobs at SCBI. However, once hired, these employees are “transformed” through a rounded or integrated approach to HR development.

On the first day of work, a newly-hired employee attends a job induction given by the HRD which provides orientation about the company and gives him/her an overview on milling and bioenergy. Most of the employees at SCBI, particularly the technical people, have an excellent background about the industry because of their previous work experience in other sugar milling companies and distillery processes. Ms Pasustento, the HR manager, was herself recruited because of her extensive HR experience and community relations work in modern sugar mills such as Victorias Milling. However, prior experience and knowledge are supplemented by new knowledge and skills on how to handle and operate new and state-of-the-art bioethanol milling-distillery-conversion technologies.

The technical people, particularly the operators of the plant facilities, underwent formal training provided by the Indian contractors. For instance, reverse osmosis operators had to attend two half-day classroom training sessions discussing the theories related to reverse osmosis. In addition, the Indian contractors stayed at SCBI for two months to provide hands-on on-the-job training to Filipino operators. The latter were also present in the installation of the facility by the Indian contractors, thus enabling the Filipinos to learn the basics of the assembly process. They were also taught various troubleshooting techniques for problems that may occur. A basic requirement in the recruitment of technical people is trainability and willingness to learn so that there would be less difficulty in applying the new skills and handling of new technologies.

The technical skills training provided by the Indian contractors are supplemented by the HRD with non-technical, behavioural, and organizational skills training such as working in a team. There are also training programmes that members of the HRD have developed themselves such as supervisory or people management training for plant supervisors and junior managers.

With a capacity to supply 30 million liters of fuel ethanol per year, SCBI contributes to the reduction of the country’s imported oil dependence as well as to climate change mitigation. With its success in meeting various environmental standards, the SCBI bioethanol project has been

deemed eligible for Carbon Emission Reduction Certificates under the CDM of the Kyoto Protocol.

SCBI's operations have created employment for residents and income opportunities for sugar farmers of San Carlos City. SCBI employs 226 regular employees, 58 per cent of whom are from San Carlos City. SCBI has also steered away from the debate on food security vis-à-vis bioethanol production. The plant was built in an old and idle sugar milling district, whose nearest sugar central[28] is 83 kilometers from San Carlos. In short, the SCBI project not only stimulated industrial job creation but also helped revive sugarcane farming in the area. SCBI also has a no-land-conversion policy, meaning it does not buy from farmers who have converted their productive sugar lands to the planting of rice and crops.

2.4.3 Energy Development Corporation (EDC): re-investing in skills, competencies, and the forest

The Energy Development Corporation (EDC) was set up originally as a subsidiary of the Philippine National Oil Company (PNOC), established by the Marcos government in response to the oil crisis of the 1970s. The PNOC's mandate was to explore, develop, and generate alternative sources of energy, geothermal in particular.

In 1976, PNOC commenced its geothermal exploration project in Leyte in partnership with the New Zealand Government and the National Power Corporation. However, it was only in 1983 that the PNOC, through its EDC subsidiary, was able to commence commercial operations with the commissioning of the production steam fields in Tongonan, Leyte and in Palinpinon, Negros Oriental. This was followed by the commissioning of several other geothermal plants, making PNOC-EDC a major player in geothermal energy generation in the Philippines (EDC, 2008).

Of the 1.9 GW total installed geothermal capacity of the Philippines, more than 60 per cent (equivalent to 1.15 GW) is generated by EDC. The geothermal power generation of EDC accounts for about 8 per cent of the Philippines' total installed energy capacity. Most of the geothermal energy generated by EDC is from the Leyte Geothermal Production Field, which happens to be the world's largest wet steamfield described by engineers as "*one of nature's most perfectly designed geothermal resources*" (EDC, 2008;[29] Harden, 2008). EDC also operates geothermal steamfields in Negros Oriental, Negros Occidental, Bicol, and North Cotabato and has exploration and development projects in North Cotabato, Negros Oriental, and Sorsogon.

EDC has also ventured into the development of other forms of renewable energy such as the Pantabangan-Masiway hydro energy plants in Nueva Ecija with a total plant capacity of 112.5 MW. It is also developing a wind plant in Burgos, Northern Luzon.

The focus of the research team in this instance was on the geothermal operations of EDC in Leyte.

EDC's geothermal power production processes are considered non-polluting and environmentally benign because of the non-toxic composition of the geothermal steam emitted from the earth's interior. According to Ulysses Rex Bontia, an EDC engineer, the chemical composition of steam emitted from the Tongonan Plant consists of 99.98 per cent water, a safe compound that does not adversely affect the environment. The remaining 0.02 per cent of the steam composition is CO_2, which is re-injected back into the earth's interior by EDC. The EDC

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[28] A sugar mill, which is usually located in a large sugar farming area (a town or even several towns). It services the milling requirements of sugar planters or plantation owners. Because of the central role of sugar mills in the sugar economy as millers/refiners and exporters/distributors, the Spanish term "central" has become the popular term for a sugar mill. Sugar millers are generally more powerful than the ordinary planters because they are the direct link to sugar trading.

[29] Available from the EDC website, see http://www.energy.com.ph/financial-reports/annual-reports/greenergized-2008/ (accessed 4 July 2009).

pioneered development of the technique of re-injecting spent fluids back into the ground in order to ensure that only clean white fumes are released in the atmosphere.

The lush vegetation within the vicinity of the Leyte geothermal field (visible from the plane descending to the Ormoc airport) is also capable of absorbing CO_2 emissions. A study sponsored by the World Bank's Global Environmental Facility (GEF) shows that the current vegetation cover of the Leyte geothermal field has an absorptive capacity of approximately 3.8 tons of carbon, which can store carbon dioxide emissions from the geothermal fields for around 54 years (EDC, 2008). Despite this, EDC is pursuing a comprehensive programme of preserving and developing the forests in their area concession. Because of its low carbon emissions, EDC is registered as an eligible project for the CDM-led carbon credit trade.

Strengthening environmentalism: role of new management

EDC was privatized in 2008. The incoming management adopted as its new corporate vision to "*become the leader in geothermal energy development and renewable energy sources with expertise in exploration, drilling, reservoir management, fluid collection and recycling system, engineering design and construction, power generation, and environment management*". The corporation's mission is to deliver superior benefits to its stakeholders through "*high calibre performance in all its undertakings*". In order to attain this vision-mission, EDC is guided by its core values — teamwork, trust, respect, integrity, and environmental and social responsibility.

In short, the vision-mission of the privatized EDC reaffirms its commitment to sustainable development through renewable energy generation and environmental management systems. This has been strengthened further with the adoption of the Corporate Environmental Policy (CEP), which requires EDC's compliance with all environmental laws, regulations, and requirements, particularly those that affect the company's day-to-day operations. The commitment to conserve and protect the environment means implementing and continuously improving EDC's environmental management system, programmes, and processes. The CEP also promotes risk reduction, pollution prevention, and better resource management. Just like other companies with an environmental management system, EDC believes that the environmental and safety issues within a company are inseparable. In this regard, EDC makes sure that safe operating procedures are implemented and emergency preparedness is always observed.

The environmental policies and initiatives of the top management cascade down to the rank-and-file employees. According to Rene de los Reyes, National President of the Philippine Labor-Management Cooperation Practitioners (PHILAMCOP), the greening programme of the corporation lessens labour-management conflicts and enhances harmony with the community. He further asserted that through the management's partnership with the unions, employee mobilization for the corporation's environmental projects has become an easier task. At present, there are 12 unions across the different project sites of EDC.

EDC has a total personnel complement of 2,582. In the Leyte Geothermal Production Field, there are 1,094 employees, 854 of whom are regular employees. The majority have expertise in engineering and geosciences.

Formation of an energy academy

After EDC's privatization in 2008, the top management recognized the need to invest in skills development and in programmes to upgrade the skills of the corporation's workforce. Training programmes in the past suffered because the government, in the name of cost-cutting, reduced the budget for training and other HR upgrading programmes. With the relatively mature age-profile of many workers, there is also a growing concern within EDC about the need for the training of a new generation of workers. And with its corporate goal of becoming the world's leading producer of geothermal energy, EDC wants its people to develop competencies that conform to the global standards of geothermal power production. It is in this context that the Energy Academy was conceived and established by EDC in 2008, with the aim of conducting

work-related seminars and skills development training for all employees, whether old or new in the organization.

The Energy Academy is an initiative of EDC's Senior Manager for Human Resources Noel Salonga, who observed that, despite the unavailability of academic programmes on geothermal energy technology in the Philippines, the skills and knowledge on such technology are available in EDC through its senior, highly trained, and experienced technical staff. All the technical people of EDC attended foreign training programmes and most of them were given scholarships to study geothermal energy in other countries, such as New Zealand and Iceland. "*Why not build a structure that would take advantage of the available skills and knowledge?*" he quipped.

The Energy Academy offers three levels of training programmes for employees. The first level is the basic geothermal energy course which provides an overview of geothermal energy and geothermal power plant operations. The course is conducted through a one-day classroom lecture and discussion and one-day field trip to the geothermal power plant. All EDC employees, especially the non-technical staff, are required to attend the training. No such training was conducted before privatization. However, in Salonga's opinion, it is imperative for all employees, whether technical or non-technical, to have a fundamental knowledge of the principles of geothermal energy in order to have a deeper understanding of the industry in which they work.

The second level of the training programme is the one-year generalist course given to all technical staff. The first part of the generalist course tackles the science aspect while the second part focuses on the engineering aspect of geothermal energy technology. At the end of the first part, the participants are required to submit a project that applies knowledge of geothermal technology gained through the class study. Although the priority of this training programme is the technical staff, this training is also given to the business development people. According to Salonga, if the business development personnel are equipped with the technical knowledge on geothermal industry, it is easier for them to design appropriate business development programmes.

The third level of the training programme is the advanced and specialized course for selected technical staff. While the trainings for the first and second levels are conducted by the EDC's home-grown internal experts, the trainings for the third level are conducted by foreign experts invited by EDC. The duration of third level training courses varies depending on the complexity of the topic.

At present, the EDC's Energy Academy is still in its formative stage. While the Energy Academy is not yet fully established, EDC continues to give scholarships to its technical employees to take up graduate courses in other countries.

In addition to the establishment of the Energy Academy, the HRD has shifted to competency-based HR systems. One such project was the development of a competency-based assessment tool to help analyze the skills requirements of individual employees. By doing so, the HRD can easily identify the skills gaps and (re)training needs of employees and devise programmes appropriate to a particular competency requirement. Another project is the development of an EDC Competency Dictionary. The Competency Dictionary lists, defines, and classifies the different competencies for all types of jobs within EDC, including the core competencies and technical competencies. Each competency is defined and categorized according to five-level scale — Awareness, Beginner (Application Level), Mature (Career Proficient Level), Mastery (Advanced Level), and Excellence (Expert Level). The competency dictionary-building took between three to six months to complete because of the wide range of job types and their respective competency requirements.

One of the challenges faced by the EDC is to determine how best to keep or retain technical and engineering staff who are being lured by foreign geothermal companies to work overseas. EDC is addressing this through motivation strategies. For instance, employees performing well or with high potential get promoted. Also, almost every employee is now given a

share in the company's stocks. These motivation strategies seem to work. Based on the survey conducted by the Asian Institute of Management, 94 per cent of the employees are happy working in EDC. It was also found out that many employees are proud to be working in the largest geothermal power operations in the country.

Role of EMD: all-out environmental coordination

In 1979, an Environmental Management Department (EMD) was created to oversee the environmental aspects of the geothermal operations and to ensure compliance with applicable environmental laws. Even at this early stage of operations, EDC already recognized the impact of its geothermal operations on the environment and had been keen to initiate and implement a range of environmental projects. Through the EMD, EDC became one of the country's pioneers in the development of environmental standards, programmes, and policies that were ahead of national regulations, including the multi-sectoral monitoring of projects issued with environmental compliance certificate or EIA. Moreover, the EMD laboratory is ISO17015 certified and is able to conduct a wide range of chemical and heavy metals analysis and gravimetric analysis for solids.

TABLE 2-8: OCCUPATIONAL PROFILES OF EMD STAFF IN LEYTE

Discipline	Competencies
Watershed management	Forester (with forestry background)
	Watershed Technician (with forestry background)
	Forest Development Rangers (with forestry or agriculture background)
	Nursery Aide (with agriculture background)
	Community Organizers (with background and experience in community development)
Environmental monitoring	Pollution Control Officers (licensed chemical engineers)
	Laboratory Technicians (with chemistry background and skills in conducting laboratory analysis)
	Environmental Technicians (with environmental management background and skills in conducting field sampling and environmental monitoring)

EMD has a total of 68 employees including a pool of scientists, engineers, foresters, and forest rangers. The environmental and watershed technical personnel include air and water quality specialists, hydrologists, chemists, foresters and GIS specialists. A number are based at the EDC head office at Fort Bonifacio in Taguig City. A total of 25 EMD employees are assigned to the Leyte Geothermal Production Plant, five of whom are in charge of environmental monitoring and the remaining 20 are responsible for watershed management. Table 2-8 shows the profile of the Leyte EMD staff and their principal assignments.

Initially, the EMD's task was concentrated only in monitoring compliance with various environmental regulations. The multipartite monitoring, which is now applied in different companies to ensure environmental compliance, was actually piloted in EDC in 1989. However, from plain compliance monitoring, the role of the EMD has grown as the corporation has widened the scope of its green programmes. EMD leads in environmental awareness-raising not only within the company but also within the surrounding communities. As a result, the environmental skills of the EMD staff, which are focused on environmental management within an enterprise, have to be augmented or supplemented with broader environmental and non-environmental skills. More specifically, competencies are developed for environmental policy review, environmental licensing, expanded laboratory analysis, community relations, community development, and environmental education. Thus, when forest management was defined as one of the key responsibilities of EMD, people with skills in community organizing and watershed management were recruited. In addition to the employees directly working as part of EMD, there is also support provided by the Community Partnership Department for community-related programmes and activities sponsored by EDC.

In fact, one of the most difficult yet challenging responsibilities of the EMD is management of the 17,000-hectare forest area around the vicinity of the Leyte geothermal fields. Part of the forest management responsibility of EMD is to ensure that no illegal logging activities take place in the area and to prohibit the use of slash-and-burn method in farming. The EMD employs one forester and several forest rangers, who are given the authority to apprehend illegal loggers.

According to Leonita Sabando, EMD Deputy Manager, apprehending offenders seemed effective in the beginning. Yet, in the long run, apprehension does not provide a solution or prevent deforestation. In this context, the concept of Integrated Social Forestry as an approach to forest management was developed. Integrated Social Forestry has several aims — to protect the watersheds, to create livelihood for the communities and to allow the forest dwellers to participate in the decision-making process. The positive impact of social forestry is two-fold: (i) the communities of forest dwellers are given sources of income through the livelihood projects and, at the same time; and (ii) the forest is being protected by the forest dwellers and former slash-and-burn farmers themselves. Currently, the farmers are organized into associations to take on the role of forest protectors. EDC repair and cleaning jobs such as maintenance of the huge geothermal pipes and grass cutting are farmed out to these associations to augment community incomes. Some skilled jobs such as carpentry, masonry work, and sewing of working clothes are also directly awarded to community members. In short, the community of forest dwellers has become part of the EDC family under EDC's environmental programme.

On December 11, 2008, EMD, led by EDC Chairman Oscar Lopez, launched a new but massive reforestation project dubbed "Binhi" or "seed" as a commitment or contribution to the Clinton Global Initiative.[30] Binhi's ambitious aim is to restore a 10,000-hectare forest in 10 years by planting Philippines' rare tree species. However, Binhi is not simply striving for a 10,000-hectare forest restoration; more importantly, the programme aspires to save the Philippines' indigenous, premium but endangered trees such as *tindalo, yakal, molave, mayapis, dau, palosapis*, and *mancono*. Binhi's programmes are a blend of the environmental and the social, which are reflected in the four modules of the reforestation plans for various provinces. These four modules are: (i) Tree for Life, which concentrates on biodiversity research in the Mount Kanlaon National Park and Sierra Madre reservations; (ii) Tree for Food, which helps farmers through tree-based livelihood; (iii) Tree for Leisure, which establishes tree-oriented ecotourism parks; and (iv) Tree for the Future, which brings back the endangered, indigenous, and prime Philippine tree species through urban reforestation (EDC, 2008).

It is abundantly clear that EDC is in the business of renewable energy as well as in the upkeep of the environment — for the sake of future Filipino generations.

2.4.4 Metal Wealth Enterprises Co.: recycling wastes to create jobs

Metal Wealth Enterprises Co. is in the business of recycling used or waste plastic materials. As defined, recycling is collecting and re-processing used or waste materials so that they can be used again. It is one solution to the mounting problem of solid waste disposal in the country, especially in the urban areas such as Metro Manila.

In the 13 cities comprising Metro Manila, plastic waste materials are the second major component of total solid waste. They account for at least 21 per cent of the total solid wastes produced, next to kitchen and food wastes (ADB, 2003). Uncollected plastics are also widely blamed for the clogging of city/town drainage and sewage systems, esteros, and river systems, which cause flooding and which spawn various diseases due to the impeded flow of water.

For Metal Wealth, plastic recycling is a solution to the problem of plastic waste disposal and a source of income and jobs for poor people, especially the waste pickers. Occupying a four-

[30] See http://www.clintonglobalinitiative.org/ (accessed 20 May 2010).

hectare site, Metal Wealth is one of the largest plastic recycling firms in the country, if not the largest. This family-owned enterprise has been in the recycling business since the 1970s, starting with metal scrap materials. Metal Wealth shifted to plastic waste recycling because the process is easier and entails less energy consumption. It is also more profitable. Furthermore, the procurement of plastic wastes is less problematic. Compared to plastics, metal wastes account for only 3–4 per cent of the total solid wastes of major cities in Metro Manila (ADB, 2003).

All types of plastic wastes — except, ironically, the bio-degradable — can be recycled at Metal Wealth. These plastic wastes are supplied by a number of waste collectors composed mostly of junk shop operators. Most of the time, trucks carrying plastics sourced from various junk shops can be seen parked at Metal Wealth's receiving area. However, some waste pickers directly deliver the plastic wastes to the recycling plant through their push carts or jeepneys.

The plastics are cleaned and classified by "type" this can be determined according to the process by which a plastic material is manufactured. Once the plastic materials are classified by type, they are then sorted by colour. Sorting by colour is very important because it lessens the amount of dye to be used in colouring the recycled plastics. After the classification and sorting, the plastics undergo a more thorough cleaning and are put into a machine that "tenderizes" the plastic wastes before they are pelletized. The tenderizing process is non-polluting as the plastic is not allowed to melt or vaporize; in fact, once "tenderized" and flattened; it is hosed with water and pelletized. In turn, the pelletized plastics are then put into another machine that recycles them into new plastic products such as plastic bags and plastic ropes. The recycled plastics are usually sold to market vendors and to other customers from nearby provinces.

Two types of employees: regular and "pakiao"

There are two types of employees at Metal Wealth — regular employees and "pakiao" workers. The regular employees at Metal Wealth are the supervisors, machine operators and those doing quality inspection and maintenance. The highest educational attainment of most employees is high school. Regular workers receive the minimum wage and government-mandated benefits such as overtime pay, holiday pay, 13th month pay, and health insurance. Supervisors and senior or long-time regular employees also receive housing allowance.

The "pakiao" employees are mostly plastic classifiers and sorters. "Pakiao" workers are paid based on the bulk or volume of plastics classified and sorted. Initially, the wage of the classifiers and sorters was fixed on a daily rate, at the minimum wage rate. However, Walter Sy, the CEO/President-owner-HR manager, observed that the quantity and quality of the work finished by the classifiers and sorters was uneven and varied. Some workers were more productive and were able to do a greater volume of work, while others did less in any given period. For this reason, Mr Sy developed the concept of the "pakiao" system to "reward" workers with higher productivity with higher daily pay. The "pakiao" system is also aimed at increasing the efficiency and productivity of the workers. Thus, when the wage was changed from a per-day basis to "pakiao", Sy observed that workers became more efficient and productive. Some of the "pakiao" workers are able to earn up to PhP5,000 to PhP6,000 in a week, which is more than twice what a daily minimum wage earner gets weekly (minimum daily wage in Metro Manila is PhP375 as of end 2009). The system is also considered by the workers themselves as fair and equitable, for it provides compensation based on one's output.

Because of the "pakiao" system, work supervision is minimal and the focus of supervision has shifted to inspection of the quality of a worker's output. The research team, in their ocular visit, did not find the work intense or pressure-packed for the workers, who go about their assigned areas in a relatively relaxed manner. Because the compound is large, there are wide spaces between work teams and the piles of plastics they are working on. This certainly contributes to a greater sense of order and safety among the workers. Since plastic is usually highly flammable, a fire truck owned by Metal Wealth is parked in one of the garage sheds as part of a quick-response programme should a fire break out in the compound. However, Mr Sy said that this truck has never been used, except in response to fires breaking out outside of the plant.

There is no formal recruitment process in Metal Wealth. When there is a need to hire more workers, existing workers are simply asked to recommend family relatives or friends. Of course, there are lean periods when the supply of plastics is much less than the company's capacity. In situations like this, the work targets of the "pakiao" workers are simply reduced.

A number of regular workers are second-generation Metal Wealth workers, meaning their parents worked for the company earlier. Some others are friends or relatives recommended by other regular workers. Some workers drop out of work, only to reappear after several weeks or even months. Still, they get accepted by Metal Wealth.

Overall, Metal Wealth has created over 150 jobs, around 50 of which are regular jobs and more than a hundred on a "pakiao" basis. However, Metal Wealth estimates that there are also hundreds of indirect jobs created, meaning those of the plastic waste pickers, garbage collectors, and "traders" of plastic wastes in the metropolis.

At the Payatas solid waste disposal facility several kilometers away from Metal Wealth, the research team met a plastic waste trader supervising the work of 5–7 employees engaged in the collection and initial cleaning of plastic wastes before these are sold to Metal Wealth and other plastic recycling companies. This plastic waste trader, a migrant from the Visayas or central Philippines, nets anywhere between PhP500 to PhP1,500 a day, depending on the volume of plastic materials his employees are able to gather and clean.

Jobs in a plastic recycling firm do not require high education and sophisticated skills. Most of the workers are sorters (Figure 4) who clean the plastic wastes delivered by junk shops and push cart vendors using simple tools such as brooms and water hose before they are segregated by colour. The big and bulky plastic materials such as plastic chairs or beverage containers are chopped into smaller parts, usually by the male sorters.

For classifiers, the skill needed is the ability to classify plastics by type and this is based on how the plastic wastes are manufactured. This can be difficult at first. A classifier must be able to distinguish the different types of plastics. There are four major manufacturing types: "blowing", "injection", "high impact," and "high density". Accordingly, mastering the art of classifying plastics can take as long as one year. One classifier said she was taught by other experienced classifiers on how to differentiate plastic waste materials based on their appearance and on the "sound" that they produce.

In recycling plastic materials, Metal Wealth undertakes trial-and-error experimentation. Some of the processes in the firm were established after experimentations done by Mr Sy and his more skilled regular workers. Only a few of the workers have any theoretical knowledge or background in original plastic manufacturing and the more sophisticated petrochemical manufacturing, both of which require knowledge of physics, chemistry, and engineering processes. In recycling plastic materials, the process is simpler and the recyclers (both managers and workers) learn through trial and error. For example, finding the right colour mix to produce a new colour of plastic requested by customers is initially done by experimenting with different colour combinations until the right blend is achieved. The results from these experimentations are recorded so that when customers order a specific colour of plastic in the future, the company can easily create the right colour mix without having to repeat the trial and error process.

Ironically, one of the problems facing the plastic recycling industry is the limited supply of plastic wastes collected and sold by the junk and waste dealers. When the research team visited the recycling plant, Metal Wealth was only operating at 30 per cent of its capacity because of the inadequate stock of plastic wastes for recycling. Sy said that if only all the plastic wastes could be collected and brought to the plastic recycling plants, jobs would multiply while the problem of plastic waste disposal in the country would disappear.

FIGURE 4: SORTING PLASTICS

BY TYPE (ABOVE) SORTING OF PLASTICS BY COLOUR (BELOW)

Photos by Joy Hernandez

2.4.5 Greening existing occupations

What are the skills gaps in key occupations in those sectors of the economy with the highest greening potential in the Philippines? Which occupations tend to become greener? What

are the necessary training/education policies that should be instituted in anticipation of these skills gaps and greener occupations?

These are difficult questions to answer given the paucity of data on the greening of industry and the training/HRD development needed, the lack of operational programmes yet for the implementation RA 9512 on the promotion of environmental education[31] at all levels (elementary to tertiary and technical-vocational levels), and the uncertain policy directions on how the economy should be greened. What is often played up in the media are the few green initiatives of some major companies such as their plans for CDM accreditation or the launching of "green" villages. There are, of course, the "public interest" green projects of some private sector foundations on reforestation, river dredging, and so on. But many of these initiatives are public relations exercises and most are discussed without any reference to the needed greening of skills and HRD of the people who will run these green enterprises or projects. Hence, the critical importance of the case studies on green skills/HRD development such as those included in this chapter.

In this context, the research team is reiterating the outline of the possible greening directions for the key sectors/sub-sectors of the economy (see earlier discussion on green restructuring). In brief, these are the:

- shift to sustainable agriculture;
- adoption of greener approaches in various service industries;
- greener local community development;
- shift to green/greener production processes in industry; and
- support to RE/biofuel sector.

What kind of skilling/HRD development agenda is needed for the existing occupations in these sectors/sub-sectors? There are no easy answers and no hard and fast rules. The answers obviously will vary from sector to sector.

Agriculture

On agriculture, a shift to sustainable or organic farming requires more scientific skills, as the shift entails a deeper understanding of seed technology and analysis of the characteristics of soil (Godolina, 2009; Mendoza, 2008). Organic farming, to succeed, must also be sustainable in economic terms, which means organic farmers should have the skills to master in an integrated manner the whole value chain of the business of agricultural production from seed production to shelf marketing. The case study on NISARD of Negros, a developmental NGO set up by the two Negros provincial LGUs, addresses precisely the science and business sides of organic farming. Unfortunately, the resources given to NISARD, which relies on volunteers and occasional services of agronomists, are very limited. With the challenges of climate change, promoters and practitioners of organic farming must also take on the multi-faceted challenges of adapting farming methods, e.g., schedule of planting and choice of plants/crops, to the risks posed by climate change.

Services

On service industries, some LGUs and private sector groups have cooperated in the promotion of eco-tourism, a welcome variation away from the crass and environmentally-

[31] The Climate Change Act of 2009 (RA 9512) had no implementing rules promulgated as of end 2009. It assigned to the DepEd (primary and secondary education) and to the Department of Interior and Local Government (DILG) the general task of environmental education and training on climate change for LGUs, respectively. As mentioned earlier, this law has failed to mention any role for DOLE, CHED, and TESDA.

destructive type of tourism found, ironically, in many parts of the country. The shift to eco-tourism means tourist guides, hotel managers, resort operators, souvenir shops, tourist offices of LGUs, and other concerned industry stakeholders must not only have a deeper environmental awareness but also the added skills on how to integrate environmentalism in their day-to-day work and the added knowledge of specialized topics such as biodiversity, mangrove rehabilitation, adaptation/ mitigation measures on climate change, and so on. To a certain extent, this is what has happened in the success stories of Bohol province, Puerto Princesa of Palawan and eco-trekking of Subic. The challenge is how to replicate the green shift and green skilling not only within the tourism industry but also in other service industries such as construction, retail-wholesaling and so on. In the case study on Jollibee (see following section), the "forced" Jollibee response to the twin pressures of compliance with environmental rules and competitive cost-cutting measures led this fast-food chain behemoth in the "greening" (mainly self-learning) of the work of its corporate engineering professionals and those of their store managers nationwide (achieved partly through the inclusion of environmental training programmes as part of the skills upgrading of store managers).

Community development

On local community development, typhoons Ondoy and Pepeng are wake-up calls on the urgent need to re-strategize community development in the light of the risks and disasters posed by CC-related phenomena. One immediate task is skills development on disaster preparedness for local officials. The Climate Change Act of 2009 is correct in identifying the need for training of LGUs nationwide on climate change. However, this training should cover barangay or village heads and should include programmes on enhancing coordination skills of various agencies during emergency periods involving national line agencies, provincial/metropolitan agencies, LGUs, and village levels.

Also, training should not stop at disaster-related issues. A more holistic and challenging training programme would involve re-imagining and re-strategizing local community development in the vulnerable coastal areas, in the eroded upland and hilly areas and (in reality) in the rest of the country in the context of climate change and general environmental degradation. There needs to be a green shift in local community development, a shift towards the building of green communities, green spaces, green infrastructures, and green jobs. Such an exciting but mind-boggling shift would require skills training on green planning (attention local development planning offices), integration of environment concerns in the implementation of socio-economic reforms such as agrarian reform and housing reform (and vice versa), and in the design of green infrastructure. A "Green Building Council" has been formed as a national chapter of a global green building council, which has been advocating the design and planning of green houses, buildings, and infrastructures. This is a good initiative which should be supported.

But clearly, so much has and can be done in local community development and the greening of the work of those involved in community level. For example, community organizers (COs) associated with NGOs and some LGUs are familiar with the "participatory resource appraisal" (PRA), which has been effective in raising the collective consciousness of community residents on the state of the village economy, employment, resource identification, and environment, including waste disposal. The challenge lies in adding the CC dimension to the PRA process. This requires special CC training for COs.

Industrial development

On industrial development, the remaining ISI industries and the existing EOI industries should be assisted in making the green shift. The earlier HPCC case study shows that no expensive technology is needed to substantially reducing energy consumption. What is needed is company-wide mobilization and all-out support of top management, accompanied by learning through internet research, training, and affirmative action measures. The greening should start with the top management, or the owners and CEOs, because they really call the shots in a free-wheeling capitalist system. This should be followed by the green training for HR and other

managers for it is their job to translate the green vision and cascade to the rank-and-file the green mission of the company. All the case studies in this chapter point to this. In some EOI industries, a well-known marketing approach is the promotion of ISO 14001 certification, a process which has made jobs of both managers and rank-and-file workers greener. This eco-labelling process should be promoted more widely not only in the ISI and EOI industries but also in the service sector, private, and public. Global eco-labelling can be supplemented by Philippine eco-labelling, similar to what NISARD is doing. The government should also assist industry make the "green transition" by developing green financing for industries seeking to undertake green restructuring or invest in green/greener projects.

Renewable energy

On RE/biofuel sector development, much has been written about the great economic and employment potential of this sector. Indeed it has, except that the obstacles cited earlier must be addressed before that potential can be realized. Biofuel development must also address the threat of food displacement due to fuel production, an issue that is being fully debated even within the UN system. On skills, most of the jobs, green collar as they are have dimensions that require expertise/educational background on the environment for the environmental managers; environmental/technical/vocational background for technicians and operators tasked to manage the environmental and pollution-abatement technologies; and commitment to environmentalism for all. The case studies on EDC and SCBI clearly illustrate this. Of course, there are RE/biofuel industries which use relatively low levels of technology, in particular, in the solid waste segregation and recycling lines, where jobs tend to be "dirty" and in terms of appearances, "indecent" because some of the jobs in this sub-sector can be well-paying compared to minimum wage jobs in the more formal sectors of the economy. There are also good examples of how dirty and dangerous landfills and waste picking jobs can be transformed, as shown in the Payatas Waste Disposal Facility case discussed in Chapter 1.

What then should be the role of government, particularly the component education institutions — DepEd, CHED, and TESDA — in all this greening processes? Obviously, they should speed up the crafting of comprehensive programmes in line with the two laws on environmental awareness (RA 9512) and climate change (RA 9729), even if in the latter CHED and TESDA are not mentioned. As discussed, all have, one way or another, undertaken environmental awareness-raising and environmental skills/education programmes. The challenge is how to make such programmes more comprehensive, sustained, and fully budgeted. They should dovetail with the greening directions of the economy as outlined above. In this context, TESDA, which has been formulating technical regulation standards (TRS) for certain trades (usually based on industry requests), can be more proactive by identifying the latest emerging green trades in addition to those they identified in 2009. The above outline of a green shift in the economy can be a starting point for a green job agenda for TESDA and CHED in the coming years.

2.5 Case studies on greening existing occupations

In looking at existing enterprises that have adopted a "green" agenda, the research team chose the following:

- **Jollibee**, the country's largest food chain, with over 3,000 employees and hundreds of stores located nationwide.
- **Haribon**, one of the country's oldest and biggest environmental NGOs. Aside from its usual environmental awareness-raising programmes, Haribon has projects on "rainforestation", which promotes sustainable reforestation through the use of native species and the development of livelihood programmes for communities living in the reforestation areas.

- **NISARD** or the Negros Institute for Sustainable Agriculture and Rural Development, an NGO promoting organic or sustainable agriculture based on a cooperation agreement by the two provincial LGUs (Negros Occidental and Negros Oriental).

2.5.1 Jollibee Foods Corporation: greening by adjusting to regulatory and competition pressures

Jollibee Foods Corporation (JFC) is the Philippines' largest indigenous fast food chain, with over 600 stores nationwide and over 50 overseas stores spread across the globe. The undisputed success of Jollibee is attributed to its affordable, well-served and tasty food, coupled with effective marketing strategies. Jollibee has also been active in the acquisition business, acquiring other fast-food chains — Greenwich Pizza, Delifrance, Chowking, Red Ribbon, and Manong Pepe's.

Jollibee has a number of environmental projects developed by its Corporate Engineering Department. These projects were introduced in response both to the pressures coming from the government agencies involved in monitoring compliance by companies in the proper disposal of wastes and also by pressures from the dictates of competition. In short, these projects were not conceived as green projects *per se*. Happily, they all turned out to be great cost savers and greening initiatives at the same time — thanks to the creativity of the Corporate Engineering team.

A brief backgrounder is in order. As part of its sustainability programme, JFC had been seeking to efficiently use its resources at the least possible cost. JFC is committed to value engineering, which means creating value at the lowest possible investment without sacrificing quality. At the same time, as a good corporate citizen, JFC has complied with all the legal requirements of running a business, including the environmental standards set by government. Hence, JFC has had to comply with the various environmental laws, e.g., Clean Water Act and Solid Waste Management Act that were enacted in the 1990s.

It also had to comply with other environment-related regulations issued by government agencies such as LLDA. The LLDA used to remind JFC of its solid, liquid, and other wastes that affected the environmental situation of the Laguna Lake, the country's largest freshwater lake. Jollibee has around a hundred or so stores scattered around or near the Laguna Lake. As early as the 1990s, The LLDA had been asking JFC to meet DENR standards on the quality of water effluents which can be disposed of in accordance with the Clean Water Act. The problem for Jollibee was that the processing of such liquid effluents would require chemical processing through the use of expensive machines. Such machines were usually installed in large manufacturing plants. Jollibee could have been bankrupted had it bought and installed such machines on a per store basis.

Another problem which confronted Jollibee in the 1990s up to the turn of the millennium was the rising cost of electricity and other utilities.

Jollibee did not have a department specifically tasked to address the above environmental and utility cost concerns. It had instead a Corporate Engineering Division (CED), the main function of which is to undertake value engineering analysis and examine or approve engineering and building designs for various Jollibee stores all over the country. CED was asked to find solutions to the above LLDA pressure and the rising cost of energy and other utilities.

In response, the CED created the Technical Services Department, which was divided into two units — the Environment and Safety Unit (ESU) and the Energy Management Unit (EMU). The ESU has seven employees, all of whom have a background in engineering and environmental management. On the other hand, the EMU is a two-person team, composed of an electrical engineer and an accountant.

At first, the ESU was a one-person unit, the work of which was augmented by outside consultants. But due to the relatively high cost of hiring consultants and as a result of the merger of the engineering departments of different Jollibee-acquired fast-food chains, ESU was expanded into a team of seven people. The team undertakes environmental assessment, compliance, and monitoring. It ensures that Jollibee is able to comply with government rules and regulations and secure environmental permits. ESU is also tasked to develop environmental programmes to help Jollibee manage all types of wastes generated by the stores in the most effective manner. For instance, to manage liquid wastes, the ESU developed new technical designs for the sewage systems, grease traps, and septic tanks in Jollibee stores so that effluents such as fats, grease, oil, and domestic wastewater are treated before they are discharged by the stores. Mixing tanks have also been installed to reduce biochemical oxygen demand (BOD).

Proper segregation of solid wastes is implemented at Jollibee stores. But what to do with the collected wastes? The solution developed by ESU was to partner with contracted service providers who collect the solid wastes every night for delivery to designated materials recovery facilities, which undertake secondary segregation. During the secondary segregation, food wastes are combined with left-over soft drinks and the mixture is used as feed for hogs. Plastic materials are recycled while styrofoam wastes are melted in a machine and converted into resin blocks for easier handling and further recycling.

The CED also initiated a cooperation programme with a number of LGUs and NGOs in Metro Manila and Southern Tagalog in order to organize the waste pickers into cooperatives and make the waste collection process systematic and beneficial to all. Among the cooperatives that have been organized are the Metro Manila Eco Aide (Metro Manila), Eco Green (Northern Quezon City), and Ecowaste Management (Laguna, Batangas, and Central Quezon City).

Jollibee is also committed to the reduction of solid wastes within its stores. Jollibee, Chowking, Greenwich, and Red Ribbon outlets now utilize reusable and washable Melamine as an alternative to styrofoam and plastic. Greenwich stores make use of recycled materials for corrugated carton packaging for pizza deliveries and take-out orders. Consequently, the packaging wastes have been reduced by approximately 600 tons annually from Jollibee stores system-wide and by nearly 9.38 tons annually from the Greenwich store chain. Consequently, there has been a corresponding reduction in needed warehouse spaces by 30–50 per cent. These solid waste management initiatives help the environment and increase the profitability of JFC.

The ESU also experimented on the conversion of used cooking oil into biodiesel for Jollibee. The used vegetable oil is converted into biodiesel, which is mixed with regular diesel fuel and used to fuel the boilers in the commissaries and the generators in the stores.

In the promotion of the “FSC” standards in Jollibee stores, the ESU has introduced the concept of “Cleaner Production”, to ensure that cleanliness is observed in every step of the production or service process. There are designated process teams enrolled by different departments such as systems, training, operations, research and development, and engineering. All these teams are supervised by the ESU.

On cost cutting, the CED initially focused on the reduction of energy consumption in Jollibee stores as well as in the Jollibee corporate office. The EMU has introduced a number of energy-saving technologies such as the Evaporative Fresh Air Blower System, Heat Recovery Water Heater, Variable Speed Drive and “Flouresave” (a Jollibee term for its efficient lighting system). It has also pushed for the full installation of energy-efficient Compact Fluorescent Lamps. The total power savings for the stores installed with the Evaporative Fresh Air Blower System, Heat Recovery Water Heater and Variable Speed Drive is estimated to be 14.1 million KWh per year (Table 2-9). This amount of saved power can support the power needs of 10,416 households per year, assuming that the average consumption of each household is 140 kWh per month.

The EMU gives orientation to store managers about simple yet effective ways of reducing energy use. When full conservation measures are strictly employed, the average electricity consumption of a store can be reduced by as much as 10,000 kWh per month. To ensure that proper energy use is observed, the EMU monitors the energy consumption of each store. EMU has also created an "Energy Conservation Template" for the guidance of store managers.

TABLE 2-9: TOTAL ANNUAL ENERGY SAVINGS FOR STORES RETROFITTED WITH EVAPORATIVE FRESH AIR BLOWER, HEAT RECOVERY WATER HEATER, AND VARIABLE SPEED DRIVE

Equipment	Number of stores	KW-hr saved/store	Total KW-hr saved/yr
Evap FAB	564 stores	25 K	14.1M
VSD	22	14 K	308 K
HR water heater	259	12 K	3.1 M
Total Saved			17.5 M

Source: Corporate Engineering Division, Jollibee Foods Corporation

The EMU has also introduced water conservation projects. JFC claims that it is the first major service chain outfit to introduce waterless urinals in selected stores. Each of these waterless urinals means a saving of 150,000 liters of water per urinal annually. Other water conservation initiatives include the replacement of drinking fountains with reusable pitchers, the installation of high temperature dishwashers in the various stores to reduce the volume of wastewater discharge, and the installation of low volume-high pressure faucet aerators to control the flow of water from kitchen faucets.

CED "transformers" and the store managers

Tony Casaclang, the ESU head, said that it is critical for the people in the ESU team to be very knowledgeable about the different environmental laws. Hence, a background in environmental management is necessary. However, people with an engineering background are also needed, especially when the environmental projects require technical skills such as those needed for the biodiesel programme of Jollibee. Casaclang himself was a graduate of engineering and took master's units in environmental management. He also pointed out the importance of a high level of environmental awareness among the members of the team in order to become committed to environmentalism. Further, the ESU members are able to hone existing skills or develop new ones while working together as a team in problem solving.

Most of the ESU members previously worked for Jollibee as consultants. By recruiting former consultants, Jollibee does not have to train them because they already have the skills and knowledge to accomplish their tasks and are familiar with the organizational culture of Jollibee.

On the other hand, the EMU team is composed of Engr Arnel Tesoro, the unit head, and his assistant, who is primarily undertaking the documentation work. Engr Tesoro said that it is imperative that he stays well-informed about the latest energy-saving technologies. Through internet research and other information provided by the various suppliers of Jollibee, coupled with their knowledge about the dynamics of various energy-related processes, the team is able to identify appropriate technical innovations that Jollibee can or should make such as the change in the bulb used by the chain and the introduction of the waterless urinals.

The efforts of the two units of the Technical Services Department under the CED are cascaded or shared with the managers of Jollibee stores nationwide. The store managers are the ones who ensure that every environmental initiative promoted at the corporate level is implemented at the store level. Store managers are automatically designated as the stores' pollution control officers. They supervise environmental compliance at the store level, monitor the energy consumption at the store, and impart the environmental initiatives of the company to the service crews.

One of the challenges for the store managers acting as pollution control officers is deciding how to share the environment-related information with the service crews. Based on an ESU survey, the level of environmental awareness among the service crews is very low. According to Mariel Garcia, a store manager of Jollibee (Starmall branch), the problem regarding environmental awareness is addressed through the day-to-day game planning before the store opens for operation. Environmental issues are integrated in the game planning with a discussion on proper solid waste management and energy conservation measures with the crew. However, raising the awareness level of the service crews is not an easy task, since the majority are short-term contractual employees. Based on the observation of Mariel Garcia, three months of daily reminders through game planning is required to make the service crew fully conversant and compliant with solid waste management procedures and energy conservation measures.

An audit is regularly conducted to assess the performance of the store and of the store manager. The store managers are graded in terms of their compliance with the FSC standards, which now include the energy conservation and environmental components. Some areas inspected by the auditors include the grease trap maintenance, solid waste management, and energy consumption.

Clearly, a strict implementation of the company's environmental management initiatives requires new skills, particularly among the store managers who are basically experts on restaurant management, not on environmental management. In this case, the ESU and EMU play a crucial role in equipping and orienting the store managers on becoming effective pollution control officers of their stores. One of the training sessions given to store managers is the Pollution Control Officers' (PCO) training, a three-day programme organized by the ESU in coordination with the LLDA and the DENR. The PCO training is composed of classroom discussion of the government policies related to the environment, the impact of the store operations on the environment, and the ways and methods of improving the environmental compliance of the store. Store managers are provided with modules outlining the topics that are discussed so that they would understand them more easily.

The PCO training not only consists of classroom training. It also involves educational trips that expose the store managers to the application of the concepts discussed in the classroom. One of the places visited by store managers during the PCO training is a wastewater treatment plant. In such visits, the participating store managers are able to better grasp the concepts relating to water quality and the stipulations of the Clean Water Act.

In addition to the PCO training, the store managers are also required to attend the Energy Management Training Course organized by the EMU. This is a half-day session where store managers are given an overview on energy and energy conservation. More particularly, store managers are provided with background on the electrical system of the store. If store managers do not know the switches and circuit breakers and how they function, it will be difficult for the store managers to understand how to use electricity in an energy-efficient manner. Pointers on how to conserve energy are also discussed in the Energy Management Training Course.

Today, Jollibee realizes that investing on environmental initiatives produces multiple benefits. The issue of environmental compliance is addressed while the initiatives themselves become cost-saving measures for JFC. As stated by Benigno M. Dizon, VP for Corporate Engineering, the cost-saving feature of caring for the environment makes "*environmental protection an investment, rather than a burden*".

2.5.2 Haribon Foundation: professionalizing HR programmes for professional environmental advocates

Haribon comes from the term "Haring Ibon" or "King Bird". Haribon, one of the leading and oldest environmental organizations in the country, started as a bird-watching society in 1972. However, environmental pressures on the bird population, especially on the rare and endangered species, helped transform the group of bird-watching hobbyists into an organization espousing

environmental protection. The first environmental project of Haribon was the Philippine Eagle Project, which sought protective sanctuary for the critically endangered Philippine Eagle. In 1983, the organization became an official conservation foundation and its name was changed from the "Haribon Society" to the "Haribon Society for the Conservation of the Natural Resources". With this, the new environmental advocacy group immediately embraced a comprehensive agenda of research, education, and advocacy on environmental concerns, with special focus on biodiversity. It was accredited by the Department of Science and Technology (DOST) as a science and research foundation conducting studies on biodiversity.

Throughout the 1980s, Haribon was active in a number of environmental advocacy projects such as the campaign against commercial logging in Palawan and the campaign for the establishment of the Integrated Protected Areas System (IPAS), which contributed to the enactment of the NIPAS Act of 1992. In 1989, Haribon, DENR, and the World Wildlife Fund participated in the first debt swap in Asia, the Philippine Debt-for-Nature Swap Programme. This was followed by a second Debt-for-Nature Swap, this time involving negotiation for an environmental endowment fund with the United States Senate. This led to the formation of the Foundation for the Philippine Environment (FPE), an organization that provides funding for hundreds of environmental projects of different NGOs.

In 2001, Haribon was instrumental in the integration of forest management in local governance through the EU-funded project "Integrating Forest Conservation with Local Governance in the Philippines". Haribon also initiated the capacity and capability building of four academic Centers for excellence on biodiversity conservation — Camarines Sur State Agricultural College, De La Salle-Dasmariñas, Silliman University, and Mindanao State University/Iligan Institute of Technology. In 2007, Haribon took an active role in the identification and establishment of 117 green courts that handle environmental cases such as illegal logging. Today, Haribon has an ongoing campaign for "rainforestation", a sustainable forest restoration method introduced by the Visayas State University using native tree species and providing living allowances for communities growing the trees.

HRD and skills concerns of an environmental advocacy group

Haribon is a membership-based organization, with around 40 to 50 employees. To provide additional workforce support, around 50 volunteers help the fixed-term employees. All employees are employed on a per-project basis because funding is usually project-based also. On the average, a project lasts for two to three years. Funding is sourced from local and foreign donors, including the FPE which Haribon helped establish.

Because of the diverse projects being handled by Haribon, there is a need for equally diverse people skills. There are researchers and field workers with different backgrounds such as foresters, geographical information system (GIS) specialists, and biologists. There are also community organizers and environmental planning specialists who undertake community organizing and teach communities about the wise and balanced use of resources. To push the organization's advocacy agenda, there are advocacy officers who are responsible for networking and campaigning. There are also communication specialists who are in charge of Haribon's publications and other materials. In addition, there are training personnel who develop modules and conduct training programmes for the communities and partner organizations. Aside from these technical people, there is also a team of administrative staff in Haribon's central office which provides support for the activities of the organizations.

One of the problems faced by the HRD is skills matching during the recruitment process. Most of the positions being offered by Haribon require very specific technical skills. In the case of the GIS specialist, the necessary skills that an applicant must possess are knowledge of mapping, the global positioning system, and use of mapping software. Examples of people who have such skills are geodetic engineers, who are very few, and foresters, who have only a limited knowledge of mapping. Hence, there is only a small pool of applicants who can qualify given these rare and specific skills requirements.

In the case of community organizers, the main competency requirements are knowledge and skills in community organizing and familiarity with environmental laws and community issues. In addition, they must also be adept in communicating with people at different levels of an organization. In other words, while some positions require very specific technical skills, there are also positions that require both technical skills as well as non-technical behavioural skills.

Another factor that limits the number of qualified applicants for some positions in Haribon is the commitment to environmental advocacy. In order to determine the level of environmental commitment of the applicants, the recruitment team looks at the applicants' past and present involvement in environmental activities or organizations. During the pre-hiring screening interviews, candidates are asked directly about their passion for, and interest in, the environment. It is very important for all employees of Haribon to have a heart for the environment so that it will be easier to align their values with Haribon's advocacy.

To supplement knowledge on the environment, every employee in Haribon is required to attend the basic ecology course given by the HRD during the first day of their work. With the basic ecology course, it is expected that all employees would gain an adequate knowledge of basic ecology, Philippine biodiversity and have an increased level of environmental awareness.

The most common skills development strategies in Haribon are on-the-job training and mentoring. There are also in-house training programmes such as training on basic ecology and community-based resource management. Some employees are also sent to outside training provided by partner organizations such as Birdlife International and by outside service providers on non-environmental training such as supervisory training.

On top of the knowledge and skills before hiring, a Haribon employee acquires additional knowledge and skills on the job. Ryan Guevarra, a forester and researcher at Haribon, said that he learned half of his current knowledge of forestry through his work at Haribon. By being exposed to various training programmes and through field work, he has become knowledgeable in other technologies that can be applied to forestry For instance, Guevarra was sent to a rainforestation training course when he was just starting out in his job as a forester at Haribon. During the training, he realized that, despite his good background in forestry, he was mistaken with some of his preconceptions on growing indigenous tree species, such as the perception that such trees are difficult to grow. Eventually, Guevarra himself became a trainer of rainforestation technology and was able to impart his skills and knowledge to the community members.

Jerbert Briola, an advocacy specialist at Haribon, told the research team that on-the-job training and self-study are the most effective ways to develop the skills and knowledge needed to perform a job. Essentially, an advocacy specialist is responsible for campaigning for the cause of Haribon, strategizing to influence other groups and partner organizations, writing position papers on environmental issues, and lobbying for the passage of environmental laws. Because of Briola's experience in advocacy work prior to becoming a part of Haribon, he already possessed the necessary skills to perform his responsibilities as an advocacy specialist. What was lacking was knowledge of the various Philippine environmental laws, policies, and issues. Before joining Haribon, Briola was more adept in human rights and labour issues. Thus, initially he had a difficult time grasping the green advocacy. Because having sufficient knowledge is crucial to becoming an effective advocacy specialist, Briola filled his own knowledge gap by reading relevant materials on the projects and advocacies of Haribon (i.e. the technology of rainforestation) as well as the different environmental problems in the Philippines (i.e. mining and deforestation).

Haribon also wants to maintain a proper and professional working attitude among its employees. As the organization grows in terms of membership and employees, Haribon has transformed its operation, away from the traditional NGO way of addressing HRD and personnel

concerns in an informal or even lackadaisical manner, e.g., without 201 files[32] or clear personnel policies and programmes. Haribon has put in place personnel policies and systems, including the organization's rules and regulations that are at the core of a human resource management system. Initially, people were resistant to the changes brought about by the HRD programmes implemented by Haribon. There were even staff turnovers due to the resistance of people who had difficulties in adjusting to the new system. Because most Haribon employees formerly worked in other NGO's or had been with Haribon for a long time, they were accustomed to a less formal and less structured way of dealing with the organizations procedures and policies. Some did not take the professionalization efforts of Haribon positively and found it difficult to adjust with the changes that Haribon wanted to implement.

However, the adjustment problem was eased by consultation, consistency in the implementation of policies, and an open feedback mechanism for communication. Haribon also sought alternative ways to develop its human resource management. HR Manager Arlie Endonila sought external assistance to increase their knowledge about labour laws so that the HRD would be able to know how to effectively and lawfully manage personnel concerns. In fact, the research team was asked to conduct an orientation-consultation workshop on labour laws and employee discipline on October 1 (2009).

The HR "professionalization" process has enhanced Haribon's performance and has fostered the development of an organizational culture. Haribon came up with an employee manual, which consists of the organization's vision, mission, values, and rules and regulations. With these policies set in place, managing and instilling discipline among the employees has become easier. Every six months, an employees' performance is assessed based on actual work performance (70 per cent) and on compliance with the organization's rules and regulations (30 per cent).

Haribon is building up or inculcating among the staff and specialists the "Haribonic" culture so that they will become "Haribonic" employees. Being "Haribonic" means being able to uphold the Haribon values of passion for the environment, integrity, and professionalism. Indicators of being "Haribonic" include becoming a member (and not just an employee) of Haribon and taking the environmental advocacy wherever an employee goes. In and out of work, a Haribonic employee retains his/her environmental consciousness spreads the advocacy of Haribon and considers the welfare of the environment in everything they do.

2.5.3 Negros Island Sustainable Agriculture and Rural Development Foundation, Inc. (NISARD): growing organic skills for organic farmers

The island of Negros in the Visayas is divided into two provinces — Negros Occidental and Negros Oriental. After more than a century of chemical agriculture (mainly in sugar production), the governors of Negros Occidental and of Negros Oriental signed a Memorandum of Agreement (MOA) in August 2005 to promote sustainable agriculture and rural development on the island. Part of the MOA involves the creation of the Negros Island Sustainable Agriculture and Rural Development Foundation, Inc. (NISARD), a foundation tasked to help formulate and promote sustainable agricultural and rural development policies and initiatives for the two provinces.

Sustainable agriculture was chosen by the two provincial LGUs as the vehicle for the promotion of rural development because it addresses the three dimensions of sustainable development — social, economic, and environmental. In other words, sustainable agriculture is not only directed towards livelihood and poverty alleviation but also towards the conservation of natural resources. According to Rommel Ledesma, NISARD's Administrator for Negros Oriental Operations, Negros Island has probably one of the most overused land areas in terms of the use of chemical fertilizers and the only way to prevent the complete degradation of land is to promote

[32] A Filipino term for personnel records held by HRDs.

organic farming. NISARD's mission is to "*make Negros Island the Organic Food Island of Asia through organic food production for the promotion of food security, biodiversity, environmental conservation and sustainable agriculture, and rural development*".

NISARD aligns its objectives with the three areas of sustainable development — economic, social, and environmental — that it seeks to address. Its economic objectives are to increase the organic area devoted for agricultural purposes to 10 per cent of the total agricultural land in Negros Island by 2010, increase the local, and export market for organic products, establish NISARD's organic quality assurance system, and promote fair trade and marketing support for farmers. In terms of the social dimension, NISARD aims to alleviate poverty and improve the quality of life of the people of Negros, promote community development, improve health conditions, and increase food security. With respect to environmental considerations, NISARD intends to improve farm diversity, create alternative livelihoods for fishing communities and upland dwellers to allow forest and reef generation/regeneration, and to enhance the management system of water resources.

NISARD-Negros Occidental is a very lean organization composed of five people: one administrator, one lead programme officer, one administrative staff member, and two field personnel. This lean workforce is augmented by a number of consultants, inspectors, trainers, and volunteers who have expertise in organic farming and organic certification services.

NISARD was established in October 2005 and its actual operation started in January 2006. In its first year, the organization implemented its rural development programmes in cooperation with the two provincial governments of Negros and other non-government organizations. NISARD organized the First Negros Island Organic Farmers Festival, which is held annually and participated in by organic farmers in the island. Usually a three to five-day event, the festival includes training programmes and seminar workshops on organic farming. Also, a trade fair is organized to allow the organic farmers display and market their organic products.

In the following year, NISARD conducted capacity-building programmes directed towards organic certification. By December 2008, the NISARD Certification Services (NICERT) was established to provide organic farmers of Negros Island with competitive and independent third-party organic guarantee or certification system that is patterned after national and international organic standard certification systems and adjusted to the distinctive conditions of the island. NICERT is considered to be the backbone of all NISARD's projects and its primary purpose is to take action in response to the increasing needs of various organic farmers to obtain organic certification for the local and foreign market. At the same time, through the seal of guarantee provided by NISARD to organic products, consumers are protected against non-organic products that are misleadingly declared as organic.

NISARD has developed, through NICERT, a number of manuals, including the Operating Manual and Internal Control System Manual, and the forms needed for organic agriculture certification for products such as organic fertilizer, coffee, and sugarcane and services such as organic handling and retailing. These have been developed in conformity with international organic standards. So far the list of organic products and services that NICERT can certify includes:

- Organic fertilizer production (NIOFPA);
- Organic vegetable and fruit production;
- Organic grains production;
- Organic coffee production;
- Organic sugarcane production;
- Organic meat and poultry production;

- Organic aquaculture production;
- Organic production of processed products; and
- Organic handling and retailing.

NISARD organizes awareness-raising festivals such as the Fourth Negros Island Organic Farmers Festival held under the banner "Organik na Negros". The festival, held from November 25–to 27, 2009, lined up activities promoting organic farming, showcasing organic products, and providing marketing and training opportunities for organic farmers. Among the activities planned for this year's organic festival (2010) are trainings courses on packaging and labelling, organic free range chicken production, organic bangus production, and practical organic approaches to livestock.

Aside from the certification services offered by NISARD, there are also other projects being implemented by the organization that provide assistance to the organic farmers in the two Negros provinces. In the case of organic rainforest coffee production, NISARD trained more than 800 farmers in three forest communities on organic production and quality assurance. Besides conducting training and workshops on organic farming technology, NISARD also provides post-harvest assistance to organic farmers to help them market their products and increase their earnings.

NISARD has been active not only in promoting sustainable agriculture. It is also keenly involved in the campaign against genetically modified organisms (GMOs). This stance of the organization is in accordance with a stipulation in the MOA that the two provinces of Negros Island will not support the cultivation of GMOs in the island. In order to intensify the anti-GMO campaign in the island, educational programmes about biosafety were also organized by NISARD.

Developing organic farming skills

Compared to chemical-based farming, organic farming is a more labour-intensive process. It is not simply about taking care of the crops; it is also about taking care of the soil.

Organic farming skills development is part of NISARD's "Education and Promotion of Organic Farming" project. NISARD has been conducting training for farmers who want to try organic farming or sustainable agriculture techniques. Experts on organic farming, mostly from leading agricultural universities, are tapped as resource persons for trainings conducted by NISARD.

Since 2007, NISARD has been conducting training for small farmers on different organic rice farming technologies. A notable organic rice farming technology transferred to the farmers is the Organic Rice-Duck Production, which makes use of ducks in reducing weeds and pests. This technology has been proven effective and profitable based on the testimonials of past training participants. Because of the organic rice-duck production, the income of farmers increased because of the same or greater yields at lower capital costs.

Other training programmes include the following: natural farming systems in piggery and poultry, organic seed production (organic rice and corn seed production and organic vegetable seed production), organic fertilizer production, and NICERT inspection and certification services.

One of NISARD's future plans is to extend the promotion of organic farming to schools. At present, the organization is hoping to offer educational packages to schools as part of its advocacy campaign for organic farming and sustainable agriculture. Apart from the promotion of organic farming among the students, NISARD also aims to educate them about the nobility of farming as a profession.

3. Conclusions and recommendations

3.1 Greening "shifts" in the Philippine economy and labour market?

The Philippines, a low-carbon-emitting archipelago, is on the short list of countries that are most vulnerable to climate change risks, particularly to CC-induced disasters such as tidal inundations, droughts (El Niño), prolonged rainy seasons (La Niña), and fierce storms (typhoons). This vulnerability is compounded by the fact that the country has a degraded environment, which has weakened its capacity to handle risks and disasters as vividly shown in September–October 2009 when four-fifths of Metro Manila and half of Luzon were transformed into a giant lake by Typhoons Ondoy and Pepeng. Nor were the uplands spared; massive deforestation in the past triggered killer landslides, which buried upland communities and isolated many residents in the highlands for days and weeks because of impassable roads and bridges.

The varied and mounting environmental problems facing the country — deforestation, loss of biodiversity, poor management of solid wastes, decimation of mangroves and coral reefs, urban congestion, deteriorating air and water quality, soil erosion, and so on — are well documented. They have been articulated by a motley but militant group of NGOs and environmental activists, who have been pushing for environmental reforms since the 1970s. One outcome of this environmentalism is the large number of environmental laws enacted by the country, from the laws on reforestation and EIA of the 1970s; the clean air and solid waste acts of the 1990s and the RE and biofuel acts of the past decade. As a Party to both the UNFCCC and the Kyoto Protocol and with its Climate Change Act of 2009 in place, the Philippines has committed to undertake various mitigation and adaptation measures outlined by UNEP. Additionally, the CDM process is in place, with the DENR serving as the DNA-certifying body for CDM-eligible projects.

The issue, therefore, is not whether the Philippines should embrace environmentalism or not or whether it should support or not the global campaign on CC. Policy-wise, the government has taken the affirmative side. The core issue, however, is the consistency and decisiveness of the country in implementing existing policies in support of environmentalism and CC mitigation. The woeful record of the Philippines in the implementation of its reforestation laws is a sad testimony to these twin problems of policy inconsistency and indecisiveness.

To these concerns, another policy issue should be added — coherence. Are existing economic and development policies coherent or aligned with environmentalism and the challenges of CC? Apparently, they are not. This is why in the context of the Green Job Challenge posed by the ILO-UNEP, there must be a green shift in the economy. Green/greener jobs can only be generated by a green/greener economy. Furthermore, the green laws will only work in a green economy.

The problem is that this green shift in an environmentally-degraded economy is not easy. There are many obstacles — political, institutional, and even attitudinal problems.

Yet, there are public and private sector green initiatives underway such as reforestation, river dredging, mangrove rehabilitation, and so on. But these green projects are like isolated trees in a vast denuded forestland. The CC-inspired programmes on RE and biofuels, along with the earlier programme on solid waste management, have opened up possibilities for a green sector in the economy. However, these possibilities by and large have remained in the realm of possibilities because the anticipated flow of investments on RE and biofuels as well as the country-wide overhaul of the system of solid waste management have not yet occurred, with the exception of a few outstanding cases such as SCBI, Bangui, Quezon City controlled disposal facility and so on as discussed earlier.

The truth, however, is that there are huge possibilities in greening the economy. Apart from the RE/biofuel sector, greening should include or cover the agriculture sector (through sustainable farming practices such as organic farming and organic fertilizer production), services sector (through the adoption of more eco-friendly and eco-oriented business practices), renewal of urban

and rural communities (in both the lowlands and highlands), and the greening of the industrial sector (through energy-saving, value-adding, and environmentally-friendly processes). The challenge clearly is to determine how to effect a decisive, coherent, and sustained green shift in the economy.

How prepared is the labour market for this green shift? From the case studies and the labour market data compiled by this study, a number of conclusions may be drawn:

- A green shift is job creating (in all the sectors cited in the study) and will help alleviate unemployment. This is illustrated by the "rainforestation" scheme developed by the Visayas State University and which EDC has been successfully used in regenerating the forest concession and in generating jobs for the surrounding communities. Haribon has been propagating this scheme in as many areas as possible.

- The leading labour market problem in the country is the lack of effective domestic labour demand, especially for those possessing elementary and secondary education only. The rise and expansion of green projects such as organic farming, rainforestation, mini hydro power development, and eco-based urban/rural community renewal will help stimulate and sustain demand for this sector of the workforce.

- Labour displacement due to a green shift is minimal or likely to be so. Most of the ISI industries targeted by the DENR's campaign to clamp down on effluent disposal into the Pasig River and other rivers have already closed, due largely to the failure of these industries to survive global competition, smuggling, and high cost of doing business. Their closure had little to do with environmental compliance. Those that have remained are the more financially capable ones which can invest in expensive pollution abatement facilities such as PASAR without displacing workers. The capable ones also include a majority of the EOI industries, mostly those involved in electronic and auto parts manufacture. Most of their environmental programmes are inspired by the ISO 14001 certification requirement of the global market.

As to the labour market mismatch issue in the green/greener industries, this does not appear to be a major problem. The green sector investors have had no problems securing environmental engineers and other professionals as shown by the case studies included in this report. For mechanics and operators of new technologies such as bioethanol distillery or a windmill project, what the sector requires are trainable technicians with an engineering/ technological education background. For new machines being introduced in the country for the first time, foreign experts are asked to do the initial training for the benefit of would-be local experts.

Indeed technology transfer is an integral part of the obligations of Annex II countries under the UNFCCC (Article 4, Para 3).[33] The Philippines should maximize its advantages in this area. As to claims that graduates of environmental courses (see Chapter 1 discussion) cannot find jobs in the country or overseas and end up working in other areas, the research team has not been able to get any data to support this assertion.

The reality is that there appears to be neither green skills shortages nor mismatches in the Philippines because there is no detectable national green shift yet — except as an initiative of some private companies, LGUs, and NGOs. What is in abundance are the usual official declarations that the country has fully aligned itself with the global aspirations to build a climate-friendly world and has put in place the needed enabling environmental laws such as those dealing with renewable energy, solid waste management, reforestation, biological diversity, and so on. The reality is somewhat different. There is a wide gap between the enactment and enforcement of

[33] The full text of the Convention can be found at http://unfccc.int/essential_background/convention/background/items/1349.php (accessed 7 July 2010).

the laws, as most vividly illustrated in the Philippine experience with its laws on reforestation that were enacted way back in the 1970s.

Environmental considerations are also glaringly absent in the usual job-skills mismatches discussed by TESDA, CHED, and DepEd when it comes to education/skills development planning and analyzing the requirements of the labour market. In the first place, green industries and greener industries are not even officially treated as "key employment generators" or KEGs, although there are, again, numerous discussions on how these industries can create more jobs such as those in the renewable energy sector, recycling business, and in the eco-tourism industry.

3.2 Implications on skills and HRD development

The Philippines is considered relatively advanced in Asia in environmental education, as reflected in the steady enrolment of Southeast Asian students in environmental engineering and science courses offered by the University of the Philippines College of Engineering. Despite the absence of a nationally-coordinated programme on environmental education, a number of higher education institutions in different regions have also been offering environment and environment-related courses.

On the TVET side, TESDA has indicated its readiness to develop and integrate "green" competencies in different technical-vocational programmes.

However, institutions providing environmental education and skills development services need to be more proactive in touching base with key industries or sectors going green or becoming greener. One good starting point is the identification of industries or sectors identified by various environmental laws for greening. These include the following:

- **RE/biofuel sector** which is covered by the RE and the biofuels acts. Investors in the sector such as SCBI have had no difficulty securing professionals and skilled workers nor in providing new training in the specific area of SCBI's work. This was due mainly to the close similarity of work in the ethanol distillery with the processes involved in sugar milling, which abounds in the province of Negros. This may not necessarily be the case in other areas, as what happened in the case of Bangui's windmill project where European professionals skilled in handling wind generating technologies were instrumental in skills transfer to Filipinos.

- **LGU sector** and the communities covered by them. The Climate Change Act of 2009 singles out the LGUs for CC education. Apart from the requirements of the earlier laws on solid waste management and clear air/clean water. Under the law LGUs have the responsibility to take a leadership role in educating their citizenry in environmental matters including CC mitigation and adaption as well as measures aimed at protecting communities and equipping them to deal with environmental risks. This is clearly a massive task, for it entails the transformation of tens of thousands of local development planners, LGU leaders, village chieftains and local community organizers/developers into environmental, and CC specialists. Environmentalism should be embedded in local development work. CHED and TESDA have a huge job ahead of them in the general area of community renewal alone.

As outlined earlier, a green shift would require greening of agriculture, greening of the industrial sector, and greening of the service sector. Again, the implications on environmentalism and green HRD/skills development are far-reaching. At the moment, however, most of the HRD/skills issues in the greening processes are being addressed (ably by the select case studies in this report) by the private and NGO sectors with minimal help from government.

3.3 A brief detour — skills development evident from the cases studies

Development of a green economy often requires the development of new technologies and the skills needed to apply these technologies. Indeed, intrinsic in the CDM mechanism is the concept of technology transfer. Is written into the UNFCCC whereby Annex II countries are required to provide both financial resources as well as to " take all practicable steps" to promote the development and transfer of environmentally friendly technologies to developing countries as well as the economies in transition (EIT). At this point, it is important to summarize some of the findings of the research team on the HRD and skills development evident from the nine case studies included in this report.

First, skills development is a complicated, dynamic, and non-linear process. Often it is also additive meaning that acquisition of new skills does not necessarily make existing skills redundant. Skills development can be seen in a number of dimensions:

- Skilling — the deepening of existing knowledge.
- Up-skilling — raising existing skills to a higher level.
- Re-skilling — the relearning of existing but unused skills.
- Side-skilling — acquiring additional skills.
- Multi-skilling — acquiring several skill sets, ostensibly for multi-tasking and versatility.

With the introduction of new and state-of-the-art technologies, employees of green and greener companies such as SCBI and PASAR are able to up-skill to meet the demands of the new technology. However, despite the displacement of old technologies, the skills previously learned have not become obsolete since it was evident that the engineers and machine operators are still able to apply their previously acquired knowledge and skills in operating the new plant and equipment. Furthermore, the techniques, processing, methodologies, and disciplines honed in the workplace are invaluable when maintaining the new technologies, especially when it comes to troubleshooting or development of workplace practices. In the case of TMPC, up-skilling occurs as the job becomes more specialized. Key environmental personnel at TMPC are required to participate in more specialized and technical training compared to more junior team members.

Side-skilling is very apparent in the case of SCBI and Haribon. For SCBI, most employees have had previous work experience in either sugar milling or in distillery companies and the core competencies that they obtained from earlier work have become the foundation of their knowledge on the overall operations of a co-generation plant, which involves both milling and distilling processes. Hence, in addition to the skills for milling and distillery operations, the technical people of SCBI are also able to acquire skills and knowledge on biomass production. The same is true with the Haribon staff such as their advocacy specialist. Being a former human rights advocate, the occupant of the position already possessed the necessary skills for advocacy work such as campaigning, lobbying and writing position papers. However, what was lacking in him from was a deeper knowledge of environmental issues. This required side-skilling. Through on-the-job training, self-study, and mentoring by the senior officials and environmental experts in Haribon, the occupant was able to make the transition to advocacy within the environmental movement.

Closely related to side-skilling is multi-skilling in the sense that both types of skills formation require adding new skills without eroding existing skills. In the case of SCBI and EDC, competencies for technical people at the supervisory level include not only technical skills but also personnel management skills. On the other hand, the responsibilities of Jollibee store managers are not limited to overseeing the day-to-day restaurant operations and supervising the kitchen and service staff of the restaurant. They also function now as the pollution control officers for the stores, in-charge of waste and energy policy management and implementation.

Company-wide greening programmes also often lead to multi-skilling and multi-tasking. Good examples of this were found in the energy-saving programmes of HPCC's EMS Committee and the environment-friendly production of TMPC's EMS Organization. Both environmental working groups are responsible for planning environmental programmes for the company and for monitoring and recording the company's environmental performance. These working groups have inter-departmental memberships and such members undertake multi-tasking in the sense that they are responsible not only for their respective jobs in their line departments but also for their designated jobs as members of the working groups. For instance, the HRD section in-charge for HPCC's EMS Committee not only performs administrative functions in HRD but is also responsible for monitoring the department's energy consumption and ensuring that the department personnel are compliant with the measures implemented by the committee. Because each member of the working group performs multiple, additional skills are also required for the performance of their extra work in the group. These skills include monitoring, record-keeping, and project planning and development.

In most cases, skills formation in the greening process works hand in hand with existing skills. However, in the case of sustainable agriculture, it is probable that the re-skilling process (i.e. training of farmers in organic farming) may make traditional farming skills obsolete should farmers shift completely to organic farming. As mentioned by Rommel Ledesma of NISARD, the shift to organic farming and sustainable agriculture will not be totally successful if the traditional ways of farming — much of which is based on use of chemical fertilizers — are not entirely abandoned.

HRD plays a crucial role in the greening process of those companies included in the case studies. In general, HRD serves as the chief translator of the company's green vision and mission into green programmes — with help, of course, from the EMD or environmental managers in companies with EMD. These green vision, mission, and programmes are cascaded all the way down to the employees, as illustrated by most of the case studies.

At HPCC, the HRD is the overall mobilizing and support staff for the EMSC, which coordinates the company-wide energy-saving and environment-related CSR programmes. EDC's HRD is at the forefront in the development of competencies for the green jobs, including the formation of an Energy Academy in the geothermal industry. At TMPC, the HRD ensures that the initiatives of Toyota Tokyo are implemented locally. At Haribon, the HRD handles the basic environmental training for employees and makes sure that Haribon becomes truly sustainable through the professionalization of the organization.

As mentioned, from the various case studies the research team did not find any cases of labour displacement resulting from the greening process. Instead, the greening programmes of most companies appear to have resulted in increased labour hiring, particularly in the case of SCBI, EDC, PASAR, NISARD, Haribon, and Jollibee. The environmental projects of these companies require the expertise of green professionals, such as environmental engineers and planners (in SCBI, EDC, and Jollibee), organic farming experts and trainers (in NISARD), and experts on biodiversity, watershed management, and natural resource management (in Haribon and the PASAR Foundation).

Another example of job generation is that of Metal Wealth, which has abandoned the metal recycling business in favour of less energy-intensive plastic recycling. As a result of the switch it has created more than 150 direct jobs and hundreds of indirect jobs. The greening programmes have also increased employment opportunities for host communities, as evidenced by EDC's Integrated Social Forestry Programme (rainforestation scheme) which has created employment and livelihood opportunities to residents of local communities living on or around EDC's forest concession.

On the other hand, the greening programme of HPCC has been instrumental in preventing massive labour displacement at HPCC during the height of the GFC. Despite extremely low

market demand, HPCC was able to retain half of its employees — in part due to the increased savings resulting from the reduction of energy consumption which (to an extent) counterbalanced the losses from lower sales volumes.

The role played by TESDA and CHED in skills development is unclear from the case studies presented. What is clear is that the green professionals in the selected companies are local employees who have enrolled in environmental engineering/science courses, while the middle-level skilled people have technical-vocational and even engineering backgrounds which makes them easily trainable for new technologies.

In most cases, the companies/organizations themselves are the skills training providers. For example, NISARD organizes and conducts training programmes for organic farming and sustainable agriculture practitioners, while Haribon foresters provide training in rainforestation and other livelihood programmes.

Jollibee and EDC have developed their own environmental training programmes for employees. Jollibee's CED conducts PCO training and energy management training for store managers. On the other hand, EDC has established its own Energy Academy to make training programmes in geothermal energy technology available.

Other observations:

1. Green professionals are needed in both green and greening industries as well as in green advocacy work. The greening process certainly needs the guiding hand of the experts such as environmental engineers, biodiversity scientists, climate change researchers, and so on.

2. Workers in both green and greening industries require "green" HR orientation. TESDA is correct in immediately concluding that universal integration of environmental issues in skills training means adding a column in the competency table for all skills programmes on environmental awareness.

3. The greening of companies and HRD require the full support and commitment of green CEO/s managers. After all, the HRD is only a translator of the green vision-mission of the business and is not the initiator.

4. Going green means a greater or higher level of team work and productivity because it fosters oneness among the workers, and among the workers and managers.

3.4 Policy recommendations: economy, environment, education, and skills development

Recovery from the GFC does not imply a return to "business as usual". Rather it presents a unique opportunity to rethink the growth paradigm in order to ensure sustainable development into the 21st century. An important component of recovery is the need to incorporate adaption and mitigation programmes to combat climate change. Integral to this is a greening of the global economy.

There is no need to belabour here the central importance of a green shift for the Philippines economy. Such a shift does not mean growing only the green sector; it also means greening the existing agricultural, industrial, and service sectors. In addition, the greening process should cover the green renewal of urban and rural communities all over the country in the context of CC mitigation/adaptation. This green shift requires policy coherence, decisiveness, and consistency on the part of the government and other stakeholders in Philippine society. It is lamentable, for instance, that RA 9729 (Climate Change Act of 2009) still has no implementing rules (as of January 2010).

This green shift entails a restructuring of the economy and the labour market. A successful and thoroughgoing shift means more and better jobs through the creation by the greening processes of green/greener and decent jobs. The green restructuring of the economy and the labour market will obviously take time, patience, and policy boldness. Fleshing out the details of this green restructuring is a major challenge for all sectors of society.

A transition programme, as articulated by the ILO-UNEP and the DOLE's Institute of Labor Studies (Cruz, 2009), is also clearly in order. This transition requires social consensus, which, in turn, requires deeper and sustained social dialogues between and among various stakeholders in society, for example, on key strategic thrusts enumerated by the ILS, namely: building knowledge assets, targeting green sectors, setting standards, maximizing community benefits, linking green job creation with job training, partnering towards building adaptive capacity, mapping pathways out of poverty, and measuring results. Fleshing out the transition scenario and organizing social dialogue, an expertise of ILO, are also significant challenges.

The green shift has serious implications for the education/skills development sector, for example, the tertiary sector needs to graduate more environmental engineers, climate change scientists and researchers, sanitary engineers, and so on. The TVET sector should integrate environmentalism in all TRs and tech-voc courses and develop more TRSs on green jobs and DepEd should promote environmentalism among the schoolchildren nationwide. However, it is inexcusable that all the three sectors still have no comprehensive operational programmes on environmental education in their respective sectors as mandated by RA 9512 (Environmental Education Act of 2008). This should be addressed immediately. CHED and TESDA should also take the initiative of talking to industry, LGUs and other sectors on advancing environmental education and skills development.

Overall, the Philippines cannot afford to lag behind in the global race among countries to shift to a green economic arrangement. Indeed, early action would enable the Philippines to once again regain a pre-eminence within Asia under the new post-crisis economic structure. Such a shift requires green capability building, mainly in the form of environmental education and environmental-related skills development. Without such capability building, a green shift is either likely to be stopped in its tracks because of environmental skills shortages or even mismatches.

The case studies show that the green shift is attainable in the Philippines. There are green experts and greening experiences which abound in lessons on which others can draw. The challenge lies not in making the green shift possible but, rather, in making it inevitable. A good starting point for government would be to foster a dialogue among society's stakeholders, especially the tripartite social partners.

The point is to make the green shift now!

References

Abadilla, D. 1982a. *The Environmental Crisis,* Manila: Philippine Education Co.

— 1982b. *Organic Farming*, Quezon City, AFA Publications.

Alter Trade Corporation. 2008. *20 years of Alternative Trade*, Bacolod.

Aning, J. 2009. "Calabarzon hardest-hit by global crisis," in *Philippine Daily Inquirer*, March 15, Makati City.

Asian Development Bank and Department of Environment and Natural Resources (2003). *Final Report: Waste analysis and characterization study* (Retrieved September 16, 2009 from: http://www.adb.org/Documents/Reports/Consultant/35164-PHI/ full-version.pdf.)

Ateneo. 2009. Environmental Science for Social Change, 2009. *Decline of the Philippine Forest*, Quezon City.

Avendano, C. 2009. "GMA ally's firm probed", in *Philippine Daily Inquirer*, August 19, Makati City.

Basa, C. 2009. "The Other Catch Basin: The Overseas Labour Market", in *Trabaho, Saka, Pangisdaan at Negosyo: Ramdam Ba ang Asenso?* Quezon City: Center for Labour Justice and Fair Trade Alliance, March 2009.

BizNews Asia. 2009. "Out of wind", *BizNews Asia*, San Juan City.

BLES 2009. *Current Labor Statistics*, Bureau of Labor and Employment Statistics. July 2009, Manila.

BusinessWorld. 2009a. "Labour dep't urges companies to adapt 'greener ways' at work", December 14, Quezon City. BW Publishing.

—. 2009b. "WHO cites Maynilad water safety plan as best practice", November 13–14, Quezon City. BW Publishing.

Cabrido, C. 2008. "Impacts of Climate Change on Agriculture and Biodiversity and Potential Mitigation and Adaptive Measures", Paper presented at the 3rd National Conference on Human Ecology, November 25–26, 2008.

Climate Change Congress of the Philippines. 2009. "Fairness in a Fragile World – Climate Change: A Declaration of Convergence and Unity", Conference Statement, issued 19 November at a conference of the same title held at the University of the Philippines.

Cruz, C. 2009. *From Jobs to Green Jobs: A Just Transition Framework*, Manila: DOLE-ILS.

Dejardin, A. K. (2010) "The Philippine labour market in the aftermath of another crisis" in *Overcoming the jobs crisis and shaping an inclusive recovery*, International Labour Organization, Geneva (forthcoming).

Demirbas, A. 2009. "Biofuels securing the planet's future energy needs", in *Energy Conversion and Management* 50, 2239-2249.

DENR-UNDP. February 2009. *National State of Brown Environment Report (2005-2007)*, Quezon City. Department of Environment and Natural Resources.

DENR. 2006. *DENR Framework Plan*, Quezon City. Department of Environment and Natural Resources.

DOLE. 2008. *2007 National Human Resource Conference*, Manila: DOLE. Department of Labor and Employment.

DeSeCo Steering Committee. 2002. "Recommendations to the OECD Education Committee, the Employment, Labour and Social Affairs Committee and the Governing Board of CERI", 02 September 2002.

Dominguez, E. 1991. "Sources and Problems of Environmental Degradation by Industry", in *Philippine Journal of Industrial Relations*, XIII, 1-2, Quezon City: UP-SOLAIR.

Elauria, J. C. et al. 2005. "Assessment of sustainable energy potential of non-plantation biomass resources in the Philippines", in *Biomass and Bioenergy* 29, pp191–198.

EDC. 2008. *Greenergized: the 2008 EDC annual report.* (Retrieved August 25, 2009 from http://s75445.gridserver.com/wp-content/uploads/ 2009/07/2008-EDC-AR.pdf). Energy Development Corporation.

Environmental Education Network of the Philippines, Inc. 1996. "Greening of professions through environmental education", *Proceedings of the First Philippine Congress on Tertiary Education*, 23–25 October, Quezon City.

Environmental Science for Social Change. 2009. *Decline of the Philippine Forest*, Quezon City. Bookmark.

Fair Trade Alliance. 2006. *Nationalist Development Agenda*, Quezon City.

Glunt, J. 2005. "Philippines refiner Petron to sell ethanol", in *Renewable Fuel News.* July 11, p7.

Godilano, E. 2009. "Global Climate Change and Its Impacts on Agriculture and Fishery Production in the Philippines", Paper submitted by the Technical Adviser on DA-ITCAF RS/GIS, Department of Agriculture, October 2009.

Harden, B. 2008. "Hot rocks helping Filipinos power up / Country avoids oil shock through geothermal energy", in *Houston Chronicle*, October 5, p30.

Haribon Foundation. 2008. *Haribon Foundation Annual Report 2008*. Retrieved August 25, 2009 from http://www.haribon.org.ph/files/membership/AR2008.pdf.

—. 2006. *Philippine Biodiversity for Beginners*, Quezon City.

Hermosa, J. 2009. "e-jeepneys finally on public roads", *BusinessWorld*, November 11, Quezon City: BW Publishing.

Hookway, J. 2009. "Asia's 200 most admired companies - readers survey: Jollibee captures top spot in the Philippines - how fast food chain fought back against McDonald's and plans to expand further overseas; strength during global downturn", in *The Wall Street Journal Asia*, June 5, p18.

Human Settlements Commission. *Annual Report 1976-77.*

Independent Review Panel. 2003. *Toward Unlocking the Potentials of the Technical Education and Skills Development Authority*, Marikina City.

ILS. 2008. *Green Jobs: Working with Climate Change*, Forum Proceedings, Manila: Institute for Labor Studies. DOLE-ILS.

Jollibee Foundation. 2008. *Jollibee Foundation 2008 Annual Report.* (Retrieved September 9, 2009 from: http://www.jollibeefoundation.org/downloads/JFAR2008.pdf).

ILO-UNEP-IOE-ITUC. 2008. *Green Jobs: Towards decent work in a sustainable, low-carbon world,* September. Washington D.C. Worldwatch Institute.

ILS-DOLE-NWPC-ILO. 2007. *The Future Skills Agenda*, Manila: DOLE-ILS.

ITUC, 2009. "Equity, justice, and solidarity in the fight against climate change", Trade Union Statement to COP15, December 7–18, Copenhagen, Denmark.

Jandusay, R. and Reyes, A. M. 2009. "House committee to probe mining firms in Oriental Mindoro", *Oriental Mindoro Ngayon*, 15 May, Calapan: Provincial Information Office.

Kristmannsdottir, H. and Armannson, H. 2003. "Environmental aspects of geothermal energy utilization", in *Geothermics*, 32, pp. 415–461.

Lansigan, F. 2008. "Global Climate Change: Status and Challenges for Local Area Development in the Philippines", Paper presented at the 3rd National Conference in Human Ecology, NISMED, UP Diliman, Quezon City, November 25–26.

Leogardo, V. et al. 2006. *ECOP: Its Role in Labour and Social Policy*, Makati City. ECOP.

Liu, K. J. 2009. "Ethanol plant needs tariff protection – sugar miller", *Business World*, November 19, Quezon City. BW Publishing.

Lopez, S. 1992. *Isles of gold: a history of mining in the Philippines*, Singapore. Oxford University Press.

Mangahas, M. 2009. "Filipino complacency on climate change", in *Philippine Daily Inquirer*, December 26, Makati City: PDI Publishing.

Mendoza, T. 2008. *Praymer sa Biofuel*, Quezon City: Alliance for Rural Concerns.

Morales, N. 2009. "SM unit eyes carbon credit trade", *BusinessWorld*, July 22, Quezon City: BW Publishing.

Muralla, H. M. 2009. "Special Feature: Earth Friendly Initiatives", *Business World*, June 17, Quezon City. BW Publishing.

National Economic Development Authority. 2004. *Medium-Term Philippine Development Plan 2004-2010*, Mandaluyong.

—.1998. *Philippine National Development Plan: Directions for the 21st Century*, Mandaluyong.

NEPC. June 1979. *Philippine Environment 1978*, National Environmental Protection Council, Mandaluyong: Ministry of Human Settlements.

NSO. 2007. *The Philippines in Figures*, Manila. National Statistics Office.

—. 2005. *Philippine Yearbook 2005*, Manila.

—. 2000. "Distribution of Establishments and Workers", 2000 Census of Establishments. Available at www.census.gov.ph

National Wages and Productivity Commission. 2009. "Comparative Wages in Select Economics", published in *BusinessWorld*, December 22, Quezon City. BW Publishing.

Ofreneo, R. E. 2009. "Development Choices for Philippine Textiles and Garments in the Post-MFA Era", in *Journal of Contemporary Asia*, 39, p.4, Glasgow: Routledge Taylor & Francis Group.

—. 1993. "Labour and the Philippine Economy", Doctoral Dissertation, College of Social Sciences and Philosophy, University of the Philippines.

Ortiz-Luis, S. 2008. “The Practical Approach to Benefit the Majority”, *Philippine Employer*, May. Makati City. ECOP.

Paglinawan, A. October 2009. “A People Caught in Its Own Dung”, forthcoming book.

Porter, G. and Ganapin, D. 1988. *Resources, Population, and the Philippines’ Future: A Case Study*, Washington D.C. World Resources Institute.

Philippine Daily Inquirer. 2009. “GMA’s climate change plan: Reforestation, garbage reduction”, 31 August.

Presidential Task Force for Education. 2008. *The Philippine Main Education Highway: Towards a Knowledge-Based Economy*, Manila. Presidential Task Force for Education.

Recto, R. 2009. “Prospects and challenges in a global crisis”, Statement given by the Director-General of the National Economic and Development Authority at the “Philippine Economic Briefing”, February 25, Dusit Hotel, Makati City.

Remo, A. and Gianan, F. 2009. "We have abandoned coal project, isn't profitable", *Philippine Daily Inquirer*, August 19, Makati City. PDI Publishing, p. A1

Republic of the Philippines. 2008. Republic Act No. 9512, December.

—. 2009. *Assessing Progress Towards the 2010 Biodiversity Target: The 4th National Report to the Convention on Biological Diversity*.

Reys, A. 2009. “National Development through Energy Independence” in BizNews Asia, June 30, San Juan.

Romero, P. 2009. “Climate Change Commission OK’d”, in *ABS-CBN News Online Beta*, 30 July. (http://www.abs-cbnnews.com; downloaded 15 August 2009).

Salazar, T. 2009. “Green gizmos enhance buildings in RP”, *Philippine Daily Inquirer*, December 19, Makati City. PDI Publishing,

Salceda, J. 2008. “Local Government Preparedness and Responses”, in *Energy, Climate Change & Food Security Conference: Responding to Global Challenges through Regional Cooperation and Public-Private Partnership*. Makati City. AIM Policy Center.

Salvosa, F. 2009. “New business ‘philosophy’ for Ayala” Felipe Salvosa, *BusinessWorld*, November 5, Quezon City: BW Publishing.

Santos, J. 2010. “Nascent renewable energy industry awaiting investments”, *Business World*, January 14, Quezon City: BW Publishing.

Segovia, V. M. and Galang, A. P. 2002. “Sustainable development in higher education in the Philippines: The case of Miriam College”, *International Journal of Sustainability in Higher Education*, vol. 3, no. 2, pp. 288–296.

Serafica, O. 2008. “Renewable Greens: Green Jobs in Renewable Energy”, in *Green Jobs: Working with Climate Change*, Forum Proceedings, Manila: DOLE-ILS.

Severino, H. (ed). 1998. *The Green Guide: A Sourcebook on the Philippine Environment*, Quezon City: Philippine Center for Investigative Journalism.

Severino, H. 1998. “Investigating the Environment”, in Severino, Howie, (ed.), *The Green Guide*, Quezon City. Philippine Center for Investigative Journalism.

UNFCC CDM – Executive Board. 23 December 2005, *North Wind Bangui Bay Project Design Document Form* (http://cdm.unfccc.int/UserManagement/File Storage/XKG2H3VVI59T07P95 3BBUDNBE7AJGR; downloaded 22 December 2009).

—. 11 November 2007, *Quezon City Controlled Disposal Facility Project Design Document Form* (http://cdm.unfccc.int/UserManagement/FileStorage/ XKG2H3VVI59T07P953BBUDNBE7AJGR; downloaded 22 December 2009).

UNDP. 2007. *Human Development Report 2007/2008 – Fighting Climate Change: Human Solidarity in a Divided World*, New York: Palgrave MacMillan.

Villacorta, L. and Meirhaeghe, Leentje van. 1995. *National Desk Review: The Philippines,* A Review Paper on the Environment and the World of Work, Geneva: ILO-SEAPAT.

WikiPilipinas. 2009. "Bangui Windmills", downloaded December 15.

World Commission on Environment and Development. 1987. *Our Common Future*, New York N.Y. Oxford University Press.

Yap, J. 2009. "The 2008 global financial and economic crisis: impact on the Philippines and policy responses", in *Policy Notes*, No. 2009–03, November. Makati City. PIDS-NEDA.

Interviews

Director Irene Isaac of the Standards and Qualifications Office and Director Marissa Legaspi of the Planning Office, Technical Education and Skills Development Authority, September 4, 2009.

Director Rebecca Chato, Bureau of Labor Relations, Department of Labor and Employment, January 5, 2009.

OIC Elsa Floreindo, Environmental Science Department, Commission on Higher Education, August 25, 2009.

Senior Environmental Specialist Gigi Merilo, Environmental Education and Information Division, Environmental Management Bureau, Department of Environment and Natural Resources, December 1, 2009.

Supervising TESD Specialist Zoilo Galang, Qualifications and Standards Office, Technical Education and Skills Development Authority, December 22, 2009.

Appendices

APPENDIX I: List of Registered CDM Projects in the Philippines (as of November 1, 2009)

	Name of CDM project activity	Host party approval	Registration date	Annual ERs (tCO_2/y)	Project participants (authorized by host party)	Project participants (authorized by other parties)
1.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP2007)	29-Feb-08	4-Sep-09	4 003	Hacienda Bio-Energy Corporation	Trading Emissions, PLC
2.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP1006)	2-Jan-08	29-Jun-09	6 442	Asian Livestock Corporation, Ltd.	EEA Fund Management, Ltd.
3.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP1008)	29-Feb-08	29-Jun-09	2 531	Cathay Farms Development, Inc.	Equity+Environmental Assets Ireland
4.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP1004)	2-Jan-08	29-Jun-09	12 000	Bonview Farms, Inc.	EEA Fund Management, Ltd.
5.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP1007)	2-Jan-08	25-Jun-09	8 144	Enviroprime Corporation	EEA Fund Management, Ltd.
6.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP1005)	2-Jan-08	20-Jun-09	6 779	Cathay Farms Development, Inc.	EEA Fund Management, Ltd.
7.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP2008)	29-Feb-08	20-Jun-09	1 415	Hacienda Bio-Energy Corporation	Trading Emissions, PLC
8.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project	29-Feb-08	17-Jun-09	2 679	Hacienda Bio-Energy Corporation	Trading Emissions, PLC
9.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP1003)	2-Jan-08	17-Jun-09	1 802	Sorosoro Ibaba Development Cooperative	EEA Fund Management Limited
10.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP2004)	29-Feb-08	15-Jun-09	4 395	Hacienda Bio-Energy Corporation	Trading Emissions, PLC
11.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP1002)	2-Jan-08	15-Jun-09	6 679	Filbrid Livestock Agricultural Corporation	EEA Fund Management, Ltd.

12.	Anaerobic Digestion Swine Wastewater Treatment with on-site Power Project (ADSW RP2003)	29-Feb-08	15-Jun-09	8 063	Hacienda Bio-Energy Corporation	Trading Emissions, PLC
13.	Rocky Farms, Inc. Methane Recovery and Electricity Generation Project	25-Apr-07	20-Apr-09	3 201	Rocky Farms, Inc.	EcoSecurities Group, PLC. EcoSecurities Group Limited
14.	Lanatan Agro-Industrial Inc. Methane Recovery and Electricity Generation Project	25-Apr-07	17-Apr-09	3,227	Lanatan Agro-Industrial, Inc.	EcoSecurities Group, PLC. EcoSecurities Group Limited
15.	Anaerobic Digestion Swine Wastewater Treatment with on-Site Power Project (ADSW RP2001)	29-Feb-08	6-Apr-09	2,403	Hacienda Bio-Energy Corporation	Trading Emissions, PLC
16.	Amigo Farm Methane Recovery and Electricity Generation Project	25-Apr-07	25-Mar-09	5,761	EcoSecurities Philippines, Inc.	EcoSecurities Group, PLC. Cargill International S.A.
17.	Biomass boiler project in the Philippines	2-Jan-08	25-Mar-09	18 529	Armadillo Holdings, Inc.; Kalinisan Steam Laundry, Inc.; Clean Living, Inc.	Mitsubishi UFJ Securities Co., Ltd.
18.	First Farmers Holding Corporation (FFHC) Bagasse Cogeneration Plant	22-Jan-08	10-Sep-08	119 787	First Farmers Holdings Corporation	ENDESA Generacion, S.A.
19.	Makati South Sewage Treatment Plant Upgrade with on-site Power	2-Jan-08	14-Jun-08	28 729	Magallanes Bio-Energy Corporation	Trading Emissions, PLC
20.	Hedcor Sibulan 42.5 MW Hydroelectric Power Project	25-May-07	6-Jun-08	95 174	Hedcor Sibulan, Inc.	
21.	Laguna de Bay Community Waste Management Project: Avoidance of methane production from biomass decay through composting -1	25-Apr-07	16-Mar-08	6 058	Laguna Lake Development Authority	IBRD as a Trustee of Community Development Carbon Fund (CDCF)
22.	Quezon City Controlled Disposal Facility Biogas Emission Reduction Project	25-Apr-07	01-Feb-08	116 339	Quezon City Government	Pangea Green Energy S.r.l.
23.	The Anaerobic Digestion Swine Wastewater Treatment With On-Site Power Bundled Project (ADSW RP1001)	25-Apr-07	17-Dec-07	5 806	Opol Chona's Farm; Sunjin Genetics; Philippine Bio-Sciences Co., Inc.	Equity + Environment Assets Ireland Limited
24.	Goldi-Lion Agricultural Development Corporation Methane Recovery and Electricity Generation Project	19-Oct-06	8-Sep-07	3 994	Goldi-Lion Agricultural Development Corporation Philippine BioSciences Co., Inc. (PhilBIO)	EcoSecurities Group Ltd., EcoSecurities Group, PLC

25.	Superior Hog Farms Methane Recovery	22-Jan-07	7-Sep-07	3 346	Superior Hog Farm, Inc. Philippine BioSciences Co., Inc. (PhilBIO)	EcoSecurities Group Ltd., EcoSecurities Group, PLC
26.	Bondoc Realty Methane Recovery and Electricity Generation Project	22-Jan-07	7-Sep-07	1 785	Bondoc Realty Farm Philippine BioSciences Co., Inc.	EcoSecurities Group Ltd., EcoSecurities Group, PLC
27.	D&C Concepcion Farms, Inc. Methane Recovery and Electricity Generation Project	19-Oct-06	26-Aug-07	3 348	D&C Concepcion Farms, Inc. Philippine BioSciences Co., Inc. (PhilBIO)	EcoSecurities Group Ltd., EcoSecurities Group, PLC
28.	San Carlos Renewable Energy Project	22-Jan-07	13-Apr-07	37 658	San Carlos Bioenergy Inc.	
29.	Philippine Sinter Corporation Sinter Cooler Waste Heat Recovery Power Generation Project	22-Jan-07	5-May-07	61 702	Philippines Sinter Corporation	JFE Steel Corporation
30.	Paramount Integrated Corporation Methane Recovery and Electricity Generation	30-Jun-06	31-Jan-07	7 582	Paramount Integrated Corporation; Philippine BioSciences Co., Inc.(PhilBIO)	EcoSecurities, Ltd.
31.	20 MW Nasulo Geothermal Project	30-Jun-06	10-Dec-06	74 975	PNOC-EDC	International Bank for Reconstruction and Development as Trustee of the Clean Development Mechanism Facility
32.	Gaya Lim Farm Inc. Methane Recovery	30-Jun-06	30-Oct-06	3 130	Philippine Bio-Sciences, Inc.; Gaya Lim Farm, Inc.	EcoSecurities, Ltd.
33.	Uni-Rich Agro-Industrial Corporation Methane Recovery and Electricity Generation	30-Jun-06	28-Oct-06	2 929	Philippine Bio-Sciences, Inc. Uni-Rich Agro-Industrial Corporation	EcoSecurities, Ltd.
34.	Joliza Farms Inc. Methane Recovery	30-Jun-06	23-Oct-06	3 656	Philippine Bio-Sciences Co., Inc.;/Joliza Farms Inc.	EcoSecurities, Ltd.
35.	Gold Farm Livestocks Corporation Methane Recovery and Electricity Generation	30-Jun-06	21-Oct-06	2 929	Philippine Bio-Sciences Co., Inc./Gold Farm Livestocks Corporation	EcoSecurities, Ltd.
36.	Wastewater treatment using a Thermophilic Anaerobic Digestor at an ethanol plant in the Philippines	30-Jun-06	1-Oct-06	95 896	Tanduay Distillers, Inc.;/Absolut Chemicals, Inc.	Mitsubishi Corporation
37.	NorthWind Project	16-Dec-2005	10-Sep-2006	56 788	North Wind Power Development Corporation	The Netherlands Finland

Source: Institute for Global Environmental Strategies, Retrieved 21 December 2009 from http://www.iges.or.jp/en/cdm/report_cdm.html.Note: It is estimated that in addition to eligible projects registered with the DENR, and awaiting carbon agreements, more than 40 others are seeking registration

APPENDIX II: PASAR

Interviewees: Mirardo C. Malazarte, *Senior Vice President for Operations;* Atty Manuel R. Del Rosario, *Senior Vice President, Human Resources and Corporate Affairs; S*herlock Vicente Codilla, *Industrial Relations Officer;* Ruben P. Cajigas, *Executive Director, PASAR Foundation, Inc.;* Bonifacio Fornis, *Pollution Control Engineer, Environmental Protection Department;* Romeo Verallo, *Pollution Control Engineer, Environmental Protection Department;* Juanito Pontañelles, *Union President;* Nelson Collamat, *Union Vice President for Grievance.*

Venue: PASAR Plant, Leyte Industrial Development Estate (LIDE), Isabel, Leyte

Date: August 5–6, 2009

General backgrounder

The Philippines emerged as Asia's biggest producer of copper during the l960s and l970s. Copper ores were mined and concentrated (except for a few high-grade ores) before they were exported, mainly to Japanese copper smelters (Lopez, 1992).[34] In the process, Japan emerged as Asia's biggest exporter of copper by-products during this time (Ofreneo, 1993).

To add more value to copper mining, in the late 1970s the Marcos regime persuaded a consortium of Filipino copper mining companies to set up the Philippine Associated Smelting and Refining Corporation (PASAR) at Isabel, Leyte through a joint venture with Marubeni and Mitsui Mining and Smelting. An 80-hectare area was designated under the Leyte Industrial Development Estate (LIDE) as the PASAR site. The site has deep sea water access and is centrally located. PASAR was also assured of a steady supply of cheap electrical energy from a renewable energy source, the geothermal power plant at Tongonan, which is just 50 kilometers away. The geothermal plant was operated by the government's Energy Development Corporation (EDC), which was privatized in 2008.

The construction of the PASAR copper smelting facility was completed in 1983. It has since been producing smelted copper, technically known as "electrolytic copper cathode".

However, PASAR had a turbulent existence from 1983 up to 1999. First, it had to address serious technical problems at the start of its operations when its casting plant had to be shut down because of an overflow of smelted copper. When this was solved, the problem of copper sourcing cropped up because some copper mining companies in the Philippines collapsed due to indebtedness and the low copper prices experienced in world markets during the 1980s. One big copper producer, Benguet, even refused to supply PASAR because of Benguet's long-term supply arrangement with other processors outside the country.

Then a host of difficult relational problems developed — first, some citizens in the host community (Isabel and other neighbouring municipalities) charged PASAR with polluting the environment and causing sickness; second, two quarrelling unions competed with one another in filing labour cases and even conducting strikes during every bargaining period; third, the municipal and provincial LGUs were not happy with their limited shares of PASAR taxes. By the mid-1990s, PASAR was swimming in debt, piling up a staggering debt amounting to PhP30 billion. Its 1,000 or so employees and families were uncertain about PASAR's future (Leogardo et al., 2006). Rehabilitating and turning PASAR around into a viable and sustainable enterprise was clearly a formidable challenge.

[34] See main reference list for this and other citations.

Privatization and rehabilitation

The government's only viable option was to privatize PASAR.

Fortunately, it found a rescuer in the person of Glencore AG of Switzerland. Together with a consortium of local investors, Glencore was not only willing to buy PASAR's debt and pay the government an additional $85 million; it was also prepared to retain all the employees and invest in better corporate relations with the employees, the community and the LGUs. On top of this, Glencore AG was committed to environmentalism.

After acquiring PASAR, the new owners immediately pursued a general transformation programme for managers and employees alike. Relations with the workers and their unions were addressed through dialogue and open negotiations. The workers were reassured about their tenure or job continuity. The difficult relations with the two rival unions was smoothed through a memorandum of understanding which stated that pending court decisions on cases (mainly CBA and representation claims) filed by the two unions, the company would respect all workers' rights and would grant all employees the benefits and wage increases due to the workers. The grievance machinery was also activated. A series of management, supervisory and employee seminars aimed at aligning the entire work force to the Glencore culture of excellence and productivity in the company was organized. The new PASAR drummed the core values of fairness, teamwork, integrity, "*malasakit*" (concern for all), and excellence as guides in attaining its vision of becoming the global benchmark copper smelter and refinery by 2011.

The official headquarters of PASAR was also transferred from far-away Makati to Isabel, Leyte to enable PASAR to pay taxes directly to the local LGUs and contribute directly to the growth of the host town and province. This move was warmly received by the provincial and local LGUs.

Addressing environmental concerns

The above relational measures were accompanied by programmes to improve the relationship with the host community on the issue of the environment. This was not easy and took time to bear fruit.

As an energy-intensive smoke-emitting copper smelter, PASAR was seen as a threat to the environment and was criticized by certain quarters, the religious sector in particular, for poisoning Leyte's air and water. Because of the fugitive gases emitted by the smelting plant as well as the wastewater disposed into the surrounding seas, PASAR received a number of complaints to the effect that PASAR's pollution was affecting the people's health and the fishing and farming livelihood of the local communities. At one point, some fisherfolk from the towns of Isabel and Palompon claimed that PASAR's wastewater disposal was the reason for the declining fish catch in the surrounding seas. Based on the account of Sherlock Vicente Codilla, PASAR's Industrial Relations Officer, the company was hounded by members of the communities and was even branded a "killing enterprise" by some. Virtually all sectors of the host community, including the LGUs, clergy, academe, and NGOs, were exerting pressure on PASAR's management to eliminate the supposed pollution resulting from the copper smelting process.

For PASAR, there was no other way to move forward but to address the environmental issue head-on. In addition, the early 1990s saw the enactment of the Clean Water Act of 1994 and the Clean Air Act of 1999. PASAR had no choice but to comply with the requirements and standards set by the two laws.

PASAR made a major investment into an environmental transformation programme involving the development of pollution abatement facilities, the crafting of varied environmental projects within PASAR and the adjoining communities, and integrating environmentalism into the

work processes. Initially, it set aside US$25 million for this environmental transformation programme. Eventually, total environment-related expenditures reached around US$50 million.

Among the significant measures undertaken by the new PASAR were the activation of an Environmental Protection Department (EPD) and the institution of environmental processes needed to acquire the ISO-14001 certification for its products. The company also invested in the following state-of-the-arts pollution abatement facilities:

- An acid plant, which converts the GHG SO2 into sulphuric acid
- Dust removal equipment, which sweeps the dust being emitted into the surroundings during the smelting process
- An electrostatic precipitator, which ensures 99 per cent removal of dust from gas stream
- A Continuous Emission Monitoring System, which monitors mainstack emissions for dust particulates and GHG (NO_x, O_2, CO, and CO_2)
- A wastewater treatment facility, which allows three stages of wastewater treatment before being discharged to the receiving body
- A concrete bunker facility that stores the plant's by-products
- Motorized street sweepers, which clean up the dust on the streets so that it can be recycled
- A fluorescent lamp crusher, which prevents mercury emission into the environment
- A refrigerant recovery machine, which collects refrigerants from the air-conditioning units before repair
- A cementation pond, which allows recovery of dissolved copper
- A concrete perimeter fence, which protects the mangroves and prevents the cooling water to flow towards the sea. In compliance with the Clean Water Act, a flow meter was installed at the outlet of the dike.

The above facilities are technology-intensive. They were imported from Germany, Korea, and Japan. During their commissioning, the suppliers provided training to the assigned maintenance technicians. People responsible for the maintenance and operation of these facilities were chosen based on their knowledge of engineering and chemistry.

The EPD has been tasked to monitor the plant's production processes and check continuously if the above facilities are working. The mandate of EPD is to ensure that every phase of smelting is in compliance with the environmental laws and regulations. The department is composed of one manager, two pollution control officers, four associates, and 15 contractual employees.

The EPD team had no difficulties adjusting and adapting to the changes resulting from the introduction of different technologies for pollution abatement and new programmes on environmentalism. Because the pollution abatement facilities introduced were modern and state of the art, one of the adjustments made was the retraining of operators to control such machines. The training was provided by the foreign contractors who supplied the technology to PASAR and was coordinated by PASAR's Electrical and Instrumentation Department which is responsible for the acquisition of these technologies. Commonly, when PASAR acquires a new technology from foreign contractors, the commissioning includes not only the technology itself but also the training on how to use the technology. The foreign contractors deliver the technologies to PASAR

and stay there to train the would-be operators in running and troubleshooting the facilities. However, there were also times when PASAR employees were sent abroad for training.

The training provided by the foreign contractors is supplemented by the ingenuity of the engineers and operators. According to Bonifacio Fornis, a pollution control engineer, learning to operate the facilities is relatively easy, especially when the operator has theoretical knowledge of how the machines work. This theoretical knowledge on machine operations had already been acquired by the operators from their engineering education and is refreshed during the training. In actual operations, especially during the initial stage, the operators are guided by the manual that arrives with the equipment until they acquire the mastery in controlling the machines. With their engineering background, they are also able to devise effective ways of troubleshooting when problems arise without the need to consult the foreign contractors.

The EPD also supervises other environmental programmes within PASAR. The company has a tree nursery for its greening programme. It maintains a 35-hectare fish sanctuary (located right beside PASAR's complex to preserve the marine ecosystem in the PASAR areas. Both the nursery and the fish sanctuary serve as indicators of the level of pollution being generated by the complex. If fish in the sanctuary are dying or if the leaves of the trees in the nursery are drying, then it means the processes in the smelting and refinery plant are polluting and are not conducive to the environment either within or outside PASAR.

The EPD is active in different cost-control projects that are beneficial to the environment. Unused raw materials are recycled and used for the creation of new products. For instance, the cottages and fences in the promenade areas near the fish sanctuary are made up of unused materials from the plant.

PASAR also supports the work of the environmental multipartite monitoring team (MMT) consisting of the EMB-DENR, the LGUs of Isabel and Libertad and some NGOs (including Kiwanis, Philippine Coast Guard, and Kabalikat). The monitoring is undertaken quarterly.

As a result of these measures, PASAR succeeded in acquiring an ISO 9001 certification for its Quality Management System and an ISO 14001 certification for the Environmental Management System. PASAR has a Quality Policy to ensure that the production of Grade A copper cathode would satisfy the highest quality standards of the London Metal Exchange (LME) and other markets for non-ferrous metals.

Empowering the EPD

As can be gleaned from the above discussion that the EPD or the Environmental Protection Department has become a major department within the PASAR organization and has been empowered to undertake a number of programmes in support of environmental protection. Prior to privatization, the EPD was a miniscule office under the Research and Development Department (R&DD). However, it was the head of the R&DD himself who pushed for the institutionalization and expansion of EPD, in order to strengthen PASAR's capacity to address varied environmental concerns. In 1999, the EPD was created as separate department and, since then, it has become active in ensuring that PASAR's smelting processes are not harmful to the environment and compliant to various environmental policies.

Employee and union role on environmentalism

Many employees were initially resistant to the changes initiated by the new management, specifically in building up the new organizational culture and strengthening environmentalism. However, with the management's assurance of the benefits that the company and the employees would be getting from such changes, the employees realized the value of cooperating with the management on its transformation programmes for the organization and the environment. According to *S*herlock Vicente Codilla, the series of seminars in which all employees participated, from the top management to the associates, smoothed the progress of the

transformation programme. With the orientation on the company's vision and mission during the batch-by-batch seminars, the employees' perception on change was altered and they became more open to a change in the organizational culture. Furthermore, Codilla believes that one of the critical factors on the overall transformation of PASAR is the leadership transformation. Guided by the company's vision and mission, the management was able to set a clear company direction towards excellence.

In addition to leadership transformation, the cooperation of the unions was also fundamental in achieving PASAR's transformation process. The two competing unions merged into one independent union. The latter is now a leading and active member of PHILAMCOP.

At present, union members are active in the various greening initiatives of the company. As environmental and safety concerns are interrelated, environmental issues are now included in the regular agenda of the joint Central Safety Committee of PASAR, where the union holds a seat. There are also emergency response teams in PASAR which are mostly composed of union members. Aside from being supportive of the environmental programmes, the union also serves as the watchdog of the company and the management in monitoring compliance of PASAR with environmental policies and the minimization of polluting processes. Overall, the new PASAR commitment to environmentalism has further strengthened not only the environmental transformation of PASAR but also its industrial relations transformation.

As part of the ISO-14001 standards implementation process, employees receive orientation on the environmental policy of PASAR through the Environmental Management System Handbook, which is distributed to all employees. The handbook provides employees with information about environmental concerns in the plant and their relationship to safety concerns. Newly-hired employees are required to attend a two-day classroom training session, which orients them on the different aspects of the work in the smelting and refinery plant. Included in the training is a discussion of the environmental management system in PASAR. The environmental concerns are usually tied in with safety concerns so that employees can easily appreciate the value of environmental protection. Before commencing work each day, all employees are engaged in a 10-minute safety talk into which environmental and quality concerns are incorporated.

Transformation of relations with the communities around PASAR

Because of the former reputation of PASAR as a polluting company, PASAR found it difficult initially to obtain the cooperation and support of the communities around the site. Even after the establishment of the fish sanctuary, fisherfolk in the nearby coastal areas continued to blame PASAR for their low fish catch. Eventually, PASAR was able to reverse the negative community attitudes towards the company through continuous communication and dialogue, concrete investments into anti-pollution facilities, demonstration that PASAR's own fish sanctuary has been teeming with fish, and the launching of varied socio-economic-environmental projects for the uplifting of the communities around PASAR.

PASAR Foundation, Inc.

Projects to benefit the communities around PASAR are undertaken mainly through the establishment of the PASAR Foundation, Inc. (PFI), the company's corporate social responsibility (CSR) arm.

Established in 2005, PFI is committed to work with the target communities towards the attainment of an improved and sustainable quality of life. While the EPD is responsible for the environmental initiatives in the plant, the PFI is responsible for the implementation of environmental programmes in the adjoining communities.

The environmental conservation programmes of PFI include a barangay water assistance programme and community-based Isabel watershed management programme. PFI also initiated the rehabilitation of five hectares of mangroves in the Isabel coastal areas. Employees of PASAR

volunteered in the planting of mangroves in the coastal barangays of Isabel. PASAR and PFI also partnered with the local government in the Coastal Resource Management Programme in Palompon, Leyte, a neighbouring town.

Aside from the foregoing environmental projects, the Foundation is heavily involved in the development of low–cost housing units for poor families in Isabel, in the upgrading of laboratory and library facilities of different schools in Leyte, in assisting various communities in area resource management, in helping displaced families and individuals in undertaking self-help projects through skills and livelihood programmes, in the re-greening of Isabel and other parts of Leyte, and in supporting various youth and children programmes for the province.

Today, PASAR has become a favoured corporate citizen of Leyte.

PASAR has also become a favourite destination for various sectors of society, for example, by metallurgical engineering students from top Philippine universities doing practicum; by schools seeking to expose their students to the management of a heavy industrial enterprise and, more recently, even by priests seeking an alternative environmentally-friendly retreat area. And yet, not so long ago, PASAR was once an object of criticism by the local clergy.

Role of top management

The above transformation programmes clearly show that a company, no matter how energy-intensive, can be transformed into a more environmentally-friendly, labour-friendly and community-friendly enterprise. However, crucial in all these transformations is the leadership role of top management, that is, in providing the vision of transformation, supporting the programme with real budget and actively leading in the transformation process.

APPENDIX III: Halsangz Plating Cebu Corporation (HPCC)

Interviewees: Edna Nagasaka, *General Manager;* Solevilla C. Badilla, *Plant Head;* Ferrybie P. Asoque, *Section-in-Charge, Human Resource Department;* Mariafel R. Cabañog, *OCS;* Brilliant Leal Culango, *Research and Development;* Rogelio P. Salero, *Section-in-Charge, PRM;* Ismaelita Abarquez, *HRD Supervisor;* Joselito Matheu, *EQE Head;* Hazel G. Nacar, *Section-in-Charge, Calibration/REE, Electrical Engineer;* Josephine Cortez, *HR Head;* Edne Becera; *Pollution Control Officer*

Venue: HPCC Mactan Plant, Mactan Economic Zone, Lapu-Lapu City, Cebu

Date: August 20, 2009

General backgrounder

Halsangz Plating Cebu Corporation (HPCC) is a surface finishing company. It specializes in electroplating and painting services. In fact, HPCC is regarded as one of the finest surface service providers in the country. It has obtained international certification standards on Quality (ISO 9001), Environmental (ISO 14001), and Health and Safety (OSHAS 18001) Management Systems.

Electroplating, a popular technique for metal plating, uses electrolysis to apply a coating to the surface of a material different from that of the coating. Various materials are plated for a number of reasons. Some objects are plated in order to improve material strength, prevent corrosion, and create a better-looking finish to the material. For decorative purposes, the most common type of electroplating is nickel plating. Not only does it provide a fine and shiny finish to the surface but it also increases conductivity and improves resistance to material wear and tear.

HPCC operates out of the Mactan Export Processing Zone (MEPZ) in Cebu, providing electroplating services to a number of primary exporters such as Mitsumi. It was founded by President Haruhiko Nagasaka, whose father and grandfather practised the art of electroplating in Japan. Founded in1994, HPCC has developed a pool of clients, most of which are American and Japanese investors doing business in the MEPZ and the nearby Danao Special Economic Zone. HPCC provides services such as anodizing (silver and coloured finish), zinc plating, gold, silver, and nickel plating, chemical/electro polishing, chrome plating, buffing, solder plating, ABS plating, degreasing, reel to reel plating, barrel polishing, glass beads, spray painting, and chromating.[35]

Market collapsing by 90 per cent, yet downsizing to only half

From only 30 employees in 1994, HPCC grew rapidly to a workforce of 500 by 2007. However, in 2008, HPCC was adversely affected by the global financial crisis (GFC), which dampened the demand for the export products of its MEPZ/Danao clients. Most of the clients of HPCC come from the electronics industry, an industry hit badly by the GFC. By the first half of 2009, its market was down to a mere 10 per cent of its pre-GFC peak demand.

And yet despite the downturn, HPCC refused to downsize its work force to match its decline in sales. It retained half of the work force, or precisely, a total of 266 employees. Around 200 of these were regular employees, about 40 per cent were female, and 108 worked in the plant operations. Most of the workers it released from the payroll were non-regular workers. HPCC was reluctant to let go of any regular worker because of its investment into skills development in a niche electro plating business.

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[35] A process mainly used for corrosion protection especially of zinc electroplated steel parts, but also directly on steel, aluminium and manganese. Decoration is possible thanks to the many colour variants (blue, yellow, olive, black, transparent).

HPCC coped with the market downturn by adopting a proactive approach. HPCC started to develop the company's research and development in order to create new products and services that could be offered to the market, aside from electroplating and painting. Among the products designed and developed by the R&DD were interior and exterior decorative materials for buildings. Product and market diversification meant its client base would not be limited to the export-oriented electronics industry only.

By the second half of 2009, HPCC noted signs of recovery among its clients and in HPCC's own business. The sales of the company showed great improvement. With the improvement in sales, HPCC is now gradually increasing the number of its workforce once again and has prioritized those previously retrenched employees who remain unemployed for hiring or re-hiring.

Obviously, HPCC made a wise and strategic decision in trying to keep as many of its pre-GFC workers. With business confidence returning, HPCC does not have to spend precious time and resources on recruitment, training and motivation for new workers.

But how was HPCC able to survive the high cost of retaining half of the work force when the market has collapsed to only 10 per cent? This question is answered below.

Setting up an EMS Committee

One easy explanation is the astounding success of HPCC in embracing an energy reduction programme in 2007 and in fully implementing this programme in 2008 up to the present. This was achieved with the participation of all employees company-wide under the leadership of Edna Nagasaka, HPCC's General Manager. Assisting her is a special Energy Management System Committee (EMSC) on which all the departments are represented. With power eating up almost 40 per cent of HPCC's production cost, the reduction of HPCC's energy consumption by one third as a result of this energy reduction programme represents a dramatic reduction in the overall cost of production for HPCC.

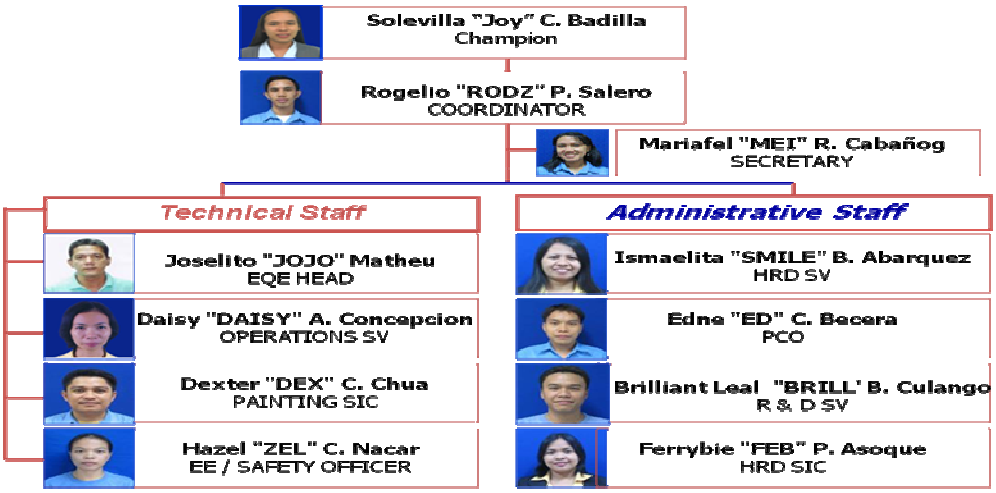
By way of background, in 2007, the Philippine Export Processing Zone Authority (PEZA) launched a campaign among investors-locators to reduce their energy consumption and with a target 15 per cent reduction for the entire MEPZ. The campaign received technical support from the GTZ Cooperation Project on Eco-Industrial Development. Together with the one hundred or so other MEPZ investors-locators, HPCC was asked to participate in the project.

HPCC turned out to be a consistent and serious adherent of energy reduction and it ended up as the champion energy saver in the entire MEPZ.

The initial attempts of HPCC to reduce energy consumption through an open campaign to save energy use were not successful based on the result of the first energy audit conducted by MEPZ. This prompted the company to form a separate and formal committee called the EMS Committee (see Figure 5 for composition of EMSC), which is specifically tasked to deal with energy conservation and management. The EMS Committee has representatives from all the ten departments in HPCC to ensure uniform information dissemination on and implementation of energy reduction measures throughout the company as well as to get feedbacks from all departments.

Top management, through Ms Nagasaka, has given full and all-out support to the 11-member committee, which meets as often as needed in the company board room on company time. The committee has also been empowered to go from department to department to undertake energy use monitoring and audit of energy use measures. It is interesting to note that although the members of the EMS Committee did not undergo formal training, they were able to effectively devise and implement energy saving measures throughout the company. Their knowledge on wise energy use was acquired mostly through internet research which was shared with each member of the committee.

FIGURE 5: HPCC'S ENERGY MANAGEMENT SYSTEM COMMITTEE



The first major activity undertaken by the EMS Committee was a full-blown brainstorming to identify the causes of the company's high energy consumption. The result of the brainstorming session was a fishbone diagram (Figure A2) that summarizes the energy problems as they relate to four areas: ***"man"***, ***"machine"***, ***"method"***, and ***"materials"***. They also looked at the details of the problem according to the criteria used by PEZA GTZ in conducting an energy audit such as energy policy, organization, motivation, information systems, marketing, and investment. After identifying the problems associated with the energy consumption, the EMS Committee set a target of reducing energy consumption by 8 per cent by the end of 2008. The actual saving outcomes — or energy reduction — was more than three times in electrical energy and exceeded the targets in fuel energy use (see breakdown in Appendix Table 1).

APPENDIX TABLE 1: SUMMARY OF THE RESULTS OF THE EMS ENERGY CONSERVATION PLAN, 2008

Mode	Target	Actual
Electrical		
Plant 1 – Operation	8 per cent reduction	26.37 per cent reduction
Plant 3 – Operation	8 per cent reduction	36.90 per cent reduction
Plant 3 – Main Office	8 per cent reduction	26.60 per cent reduction
Fuel		
Plant 1 – Boiler Diesel	8 per cent reduction	14.54 per cent reduction
Plant 3 – PTG LPG	8 per cent reduction	8.54 per cent reduction

The next step taken by the EMS Committee was to identify the necessary actions to be undertaken in order to address the company's high energy consumption. For ***"man",*** the committee created an EMS policy that would serve as the guiding principle in the implementation of the energy-saving measures. The EMS Policy states that "*HPCC commits to implement continuous improvement on efficient utilization of energy through effective Energy Management System that would support for the entire operations*". The EMS Committee also examined the results of the audit of the GTZ and discussed the plans to improve the performance of the company in terms of energy conservation.

In January 2008, the EMS Committee was formally launched. After the launching, the EMS Committee conducted a series of training and orientation seminars for all employees on

energy management. The training focused on a detailed discussion of the "*Best Practices in Energy Conservation, Water Conservation, and Solid Waste Management*".

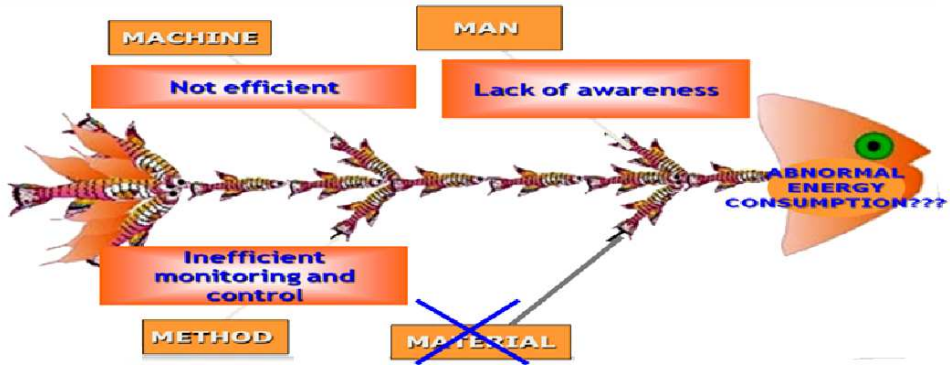
The key performance measure of the training programme is the constant achievement of energy, water, and solid waste EHS targets. To consistently update employees about the importance of resource conservation, the EMS Committee conducts this training annually. Every HPCC employee is required to attend the training.

Another information and awareness-raising programme of the EMS Committee is the posting of information materials such as the EMS Policy, EMS Committee Organizational Chart, as well as signage and reminders within the vicinity of HPCC. When the research team inspected the environs of HPCC, this signage and reminders could be seen in many places. Energy signage and reminders are placed close to every light switch and air-conditioning unit. At the entrance to the plant area, one would not miss the Energy Performance Monitoring Board, which contains basic information, updates regarding targets and performance and other details about EMS.

To address the problems related to ***"methods",*** the EMS Committee changed the electrical set-up in the office. Prior to the implementation of EMS, lighting was centralized, which meant the unnecessary use of electricity in places where no activity was taking place. This has been replaced by a system of separate light switches in every area. For example, in the production area, light tubes used to be switched on 24 hours a day because of the centralized lighting system. Now, the switches for lighting in the production area are separated by production line. A scheduled usage of lights has also been formulated and implemented. Most facilities such as computers, exhaust fans, lights, and air-conditioning units are turned off when not in use or when not needed. Also, lighting, air-conditioning, and other facilities are cleaned and maintained on a regular basis to increase their energy efficiency.

With respect to ***"machine"***-related issues, the EMS Committee made a number of structural or physical alterations. For instance, in some areas, unnecessary fluorescent tube lights were removed. For other machines located in the production area, similar energy conservation strategies were also implemented. Schedules and avoidance of unnecessary use and regular maintenance of machines such as scrubbers and compressors have also been implemented.

FIGURE 6: THE FISHBONE DIAGRAM



Continuous EMS monitoring and outcomes

One of the primary functions of the EMS Committee is to act as the monitoring body of the company's energy conservation measures. Members of the committee are tasked to monitor and record the daily energy consumption in their designated areas. The Committee analyzes and compares new data with the previous energy consumption record.

At the start of the implementation of the EMS, the target was to reduce the company's energy consumption by 8 per cent by the end of 2008. When the EMS was introduced and implemented, the actual reduction in energy consumption was well beyond the target reduction. In 2008, the energy consumption in three different plants dropped more than targeted and in one plant by as much as 36.90 per cent, which is 28.90 per cent higher than the original target (Appendix Table 1).

Despite the dramatic EMS improvement recorded in 2008, the EMS Committee still seeks further improvement. The Committee continues to analyze the energy consumption data and continues to look for other problem areas that can be addressed. For example, this year, the team noticed that even if overall energy consumption was decreasing, the amount of reduction was fluctuating and inconsistent. To address this, the EMS Committee followed the same steps as previously and found the cause of fluctuation in the manner of operations of the boiler. Specific problems related to the boiler operation were identified and the necessary energy conservation measures, including a maintenance schedule and reduction of start-up period, were formulated and implemented.

There was also a significant reduction in the diesel and LPG consumption. Diesel consumption was reduced by 14.54 per cent while the LPG consumption dropped by 8.54 per cent (Appendix Table 1). Again, the EMS Committee was successful in achieving its target.

Institutionalization of the EMS system

As can be seen from the foregoing narrative, HPCC participated in what originally appeared as a PEZA-GTZ initiative to encourage MEPZ investors-locators to reduce energy consumption. Results in the first HPCC efforts on EMS were poor. With the formation of the EMS Committee, positive outcomes have been dramatic. Thus, the decision of HPCC's top management to maintain the committee and to continue giving the support it needs in terms of company time for committee meetings and monitoring work, as well as providing a budget for recommended improvements has paid handsome dividends.

HPCC also realized that energy reduction not only helps the environment but also creates other benefits. If the total reduction of electrical and fuel energy consumption of the company is converted into monetary terms, the total savings are estimated to reach more than PhP238,000 per month. Because of this huge energy cost saving, HPCC was able to survive the GFC-induced market meltdown and is now emerging from the crisis a lot stronger.

Impact on skills, competencies and organizational culture

As mentioned above, the energy conservation programme of HPCC led to the formation of the EMS Committee. This Committee, in turn, transformed the committee members, even those with no background in power management, into experts on energy savings, and energy usage monitoring.

Membership in the EMS Committee is an additional task on top of each member's primary responsibilities in their respective departments. For instance, Helen Nacar, the EMS Committee's Section-in-Charge for Calibration, is an electrical engineer in calibration. However, as a member of the committee, Nacar is also responsible for the monitoring and recording of the energy consumption in the calibration section. Furthermore, Nacar also serves as a trainer during the annual training on the best practices on energy conservation given by the EMS Committee.

Although there is no added compensation for the work they do, the members of the Committee enjoy working as a team. Together they undertake problem analysis as well as problem solving and they enjoy the positive results of their joint work.

The energy-saving strategies implemented by the EMS Committee have also changed the culture of the organization and the attitudes of all employees, particularly with respect to how

energy is used. Prior to the energy conservation programme of HPCC, employees were less mindful of the efficient use of energy. After the adoption and implementation of the energy conservation programme, employees became more conscientious about the proper usage of energy within the company's premises. According to Edna Becera, a member of the EMS Committee, the employees did not have a difficult time in adjusting to the changes that the committee recommended because they understood the importance and the benefits of energy conservation for the firm and for their jobs, especially in the light of the GFC which could have lead to greater job displacement and even, possibly, company closure.

Overall, the EMS has helped deepen the environmental awareness and the spirit of teamwork among HPCC employees. On the other hand, the energy efficiency and the *esprit de corps* within the company have helped enhance the overall efficiency in production.

Business-employee alignment and QESH

The changes in energy and organizational culture among the employees outlined above have, in fact, strengthened the business-employee partnership in the pursuit of the HPCC's business vision "*to be an ethical organization united to deliver customer service through the years*". In line with this vision, HPCC has declared its full quality and service commitment to every stakeholder affected by its business operations — customers, employees, environment, community, suppliers, and stockholders.

For the customers, HPCC aims to sustain its commitment to total customer satisfaction and continuous improvement. For the employees, HPCC's mission is to promote unity of values at all levels to keep a safe workplace conducive towards personal and professional growth. HPCC also values its suppliers and seeks to maintain a healthy relationship with them in the delivery of quality products and services. HPCC's commitment to the stockholders is to provide reasonable return on investment by realizing business with utmost integrity, competence, and productivity. HPCC is also committed to helping the environment and the community.

On top of the above vision-mission of HPCC and in relation to its three international standards certification (ISOs), the company is implementing a policy promoting an integrated management system incorporating core issues of Quality, Environment, Safety, and Health (QESH). The QESH policy, together with the QESH management system, is central to the plant operations and both serve as guiding principles in offering quality plating, painting, and anodizing services. The QESH policy promotes high productivity with the efficient utilization of resources, prevention of pollution, and accidents, compliance with applicable legislation and customers' requirements, and continuous improvement. Every aspect of QESH policy is incorporated or integrated with the business processes of HPCC.

Environmental projects

Aside from its energy saving programme, HPCC has other environment-related projects established outside the HPCC premises. These include the HPCC environmental projects in support of nearby communities and with the involvement of volunteer HPCC employees. Coordinated by the HRD, the HPCC conducts coastal cleanup activities in observance of the International Coastal Clean-up Day every September. In this activity, HPCC volunteers help clean up the coastal areas in Barangay Ipo on Mactan Island. HPCC employees also do volunteer work in the community tree-growing activity in Barangay Agos, also in Mactan. This tree-growing activity is already four-years old.

Conclusion

In general, HPCC's EMS is a model in the promotion of energy efficiency. There are no expensive and sophisticated technologies involved. The energy-saving techniques are simple and a matter of common sense. But what makes the big difference is that the EMS strategy involves the entire work force, has the support of top management and the establishment of a dedicated and

committed committee. HPCC has survived the GFC and is now on its way in becoming an electro plating company of preferred choice in the country. It is manufacturing at highest quality levels at the lowest possible energy cost and with the deep commitment and involvement of the employees. How can one beat such a winning formula?

APPENDIX IV: Toyota Motors Philippines Corporation

Interviewees: Jose Maria Aligada, *First Vice President, General Administration and Manufacturing Divisions*; Mark Anthony Marcelo, *Environmental Engineer*; Danny Peñaflor, *Ground Maintenance in-Charge*; Nestor Parayno, *Project Manager, Special Project Group, General Administration Division;* Alfredo Santos, *General Administration Division*; Ronald Gaspar, *Coordinating Officer, Education Sector Head*; Rosario Sia, *Project Manager, Special Project Group*; Ronald Limbo, *General Administration Division*; Dave Santos, *General Administration Division;* Joel Robles, *General Administration Division*; Ara Dionela, *Human Resource Development Officer*

Date: November 16, 2009

Venue: Toyota Plant, Sta. Rosa, Laguna

Company overview

The Philippine car manufacturing industry has been remarkably resilient despite the GFC, the oil price crisis and the ups and downs in the Philippine manufacturing sector amidst globalization. A major challenge to the industry continues to be the widespread smuggling of second-hand vehicles imported from Japan and the Republic of Korea and dumped on the domestic Philippine market at below-production prices through duty-free ports such as Subic Freeport (Fair Trade Alliance, 2007).

A major player in the domestic auto industry is the Toyota Motor Philippines Corporation (TMPC), which was incorporated as an assembler (joint venture) of Toyota vehicles in the second half of the l980s, after the People Power Revolt of 1986. Its mother company is the Toyota Motor Corporation of Japan, one of the world's biggest car manufacturing companies.

Just like its mother company, TMPC continues to be the leading automotive manufacturer and innovator in the Philippines since its incorporation on August 3, 1988, having a market share of around 39 per cent (2009). TMPC's plant sits in the middle of an 82-hectare area in Sta. Rosa, Laguna and has a production capacity of approximately 25,000 units per year. This level of production is made possible through the efforts of the company's workforce, which consists of approximately 1,600 employees or "team members". TMPC takes pride in manufacturing two high-quality Toyota vehicles: the Vios and Innova. However, other Toyota models are imported from other Toyota manufacturing companies outside the Philippines, principally from Toyota's plant in Bangkok — Southeast Asia's "Detroit".

Environmental initiatives of TMPC

When the research team visited TMPC's plant, they were warmly welcomed by two TMPC team members who allowed them to experience a ride in the Toyota Prius, the hybrid vehicle that boasts of high fuel efficiency and low emissions. As the manufacturer of Prius, Toyota instantly creates the impression of a company with a high level of environmental commitment. However, the company claims that TMPC had been promoting environmentalism even prior to the production of the Prius.

In 1998, TMPC was granted ISO-14001 certification, making TMPC the first ISO-14001 certified automotive company in the Philippines and the seventh among all industries in the country. TMPC's guiding principle on environmentalism is the so-called Toyota Earth Charter developed by the mother company in Japan. The Toyota Earth Charter promotes a contribution towards a prosperous 21st century, pursuit of environmental technologies, voluntary actions, and working in cooperation with society. TMPC translated the provisions of TMPC into an environmental policy which can be summarized as TREES:

- Team members and community awareness;
- Regulatory and legislative compliance;
- Ensure prevention of pollution;
- Environmental objectives and targets attainment; and
- Seek continuous improvement.

In adherence to the Earth Charter and the Toyota Environmental Policy, the green programmes and initiatives of TMPC are implemented in five key areas of operations, including manufacturing, logistics, dealership, or marketing, supply of materials, and communications. Outside TMPC, the company is also active in promoting environmentalism through the corporate social responsibility programmes initiated by the TMPF.

In manufacturing, TMPC promotes sustainable mobility in all its products. TMPC ensures that all the vehicles it produces are fuel efficient and SOC-free. This means that TMPC manufactures cars with continually improving energy efficiency and, since 2007, with no substances of environmental concerns (SOC), including hazardous heavy metals such as lead, mercury, chromium, and cadmium. As mentioned above, TMPC also promotes hybrid technology through the Prius, a vehicle that consumes less fuel than conventional vehicles (at 30 km/l), produces less harmful emissions than conventional vehicles, and is made out of recycled and environment-friendly materials.

Aside from promoting sustainable mobility in the automobiles that it manufactures, TMPC also practices several sustainable initiatives in different areas of operations. These sustainable initiatives are aimed at greening the company by reducing the impact of TMPC's processes on the environment (see Appendix Table 2 for details).

At TMPC, environmental initiatives are implemented throughout the plant and every team member plays a role in the greening of TMPC. While the Manufacturing Division is the champion for sustainable plant initiatives that are directly embedded in the car production processes, the General Administration Division (GAD) leads in the green programmes for other aspects of company operations other than manufacturing.

One notable project of GAD is the greening of the area occupied by TMPC. According to Danny Peñaflor, the Ground Maintenance in-Charge, TMPC has allotted three hectares for ecoforest, where 10,000 trees of 86 different species are planted. Because of this reforestation programme, the vicinity of TMPC has been transformed into a forest from an almost barren land more than a decade ago. Aside from the forest, GAD also maintains a nursery which houses different ornamental plants. Right now, GAD is fully occupied in reviving the Toyota Forest as it lost more than 700 trees because of the effect of Typhoon Santi which hit the province of Laguna in October 2009.

Another GAD initiative is the reduction of solid wastes generated from tree trimmings and yard sweepings by using them as input materials for making organic fertilizer. The organic fertilizer is produced through rapid composting method using a beneficial fungus called *Tichoderma harzianum*. The organic fertilizer is being used in fertilizing the trees and other vegetations planted in the forest and nursery.

During rainy season, one of the problems faced by TMPC is the accumulation of garbage in the nearby river coming from the province of Rizal. In order to address this problem, GAD created a bamboo frame cage that traps and collects 50 to 70 per cent of garbage from the river. Within two months of operation, the bamboo frame cage was able to collect 350 kilos of garbage.

APPENDIX TABLE 2: SUSTAINABLE PLANT INITIATIVES AT TMPC

Initiative	Results
Reduction of VOC's	Lowering the use of volatile organic compounds in painting due to their harmful effects to the environment; making use of robots in car painting in order to ensure health and safety of team members.
Waste segregation	Promoting proper solid waste management by providing separate bins for different types of solid wastes in the production line (i.e. general waste, recyclable, waste, and hazardous wastes). 
Wastewater treatment plant	Operating a wastewater treatment plant that involves biological, chemical, and physical treatment and is considered as a model plant for wastewater management. 
Water recycling	Using treated wastewater for other purposes such as in watering of plants in the nursery.
Treatment of broken fluorescent lamp	Removal of mercury from fluorescent lamps using a bulb eater and recycling the busted fluorescent lamps into hollow blocks. 
Thinner recycling	Utilizing used thinners for other purposes.
Eco-sites	Maintaining eco-sites in the vicinity of TMPC such as lagoon, fish pond, and aquarium.

Initiative	Results	
Sludge reduction through vermin-composting	Conducting a study on reducing the impact of the generated sludge by making them a primary component in vermin-composting and producing an end product, a type of compost called vermicast.	
Green Purchasing	Encouraging dealers and suppliers to have an Environmental Management System; preferring suppliers with ISO-14001 certification.	

Photos by: Joy Hernandez

Because car manufacturing is a heavy consumer of both energy and water, TMPC devised programmes that aim to conserve water and energy. As part of increasing efficiency in using energy and other resources, GAD introduced the process of rainwater harvesting and distribution using solar-powered water pumps. Through this process, rainwater is collected and used for laundry, sanitary washing (toilet and urinal flushing), and car washing. Aside from using solar power in distributing rainwater for these uses, solar power is also used to provide electricity in the activity Center and the parking area.

Fuel efficiency in TMPC does not end with the manufacturing aspect of the car. Toyota promotes the design and manufacture of fuel efficient vehicles across its range. GAD is in charge of the corporate average fuel efficiency (CAFE) monitoring and making sure that fuel usage of company cars meets the monthly targets that were set.

Green initiatives from Tokyo and Manila

The green programmes of TMPC are a combination of initiatives of the local top management and of the mother company in Japan. According to Jose Maria Aligada, the Vice President for General Administration and Manufacturing Divisions, most of the process-related green programmes especially in the Manufacturing Division are initiatives of the mother company in Tokyo, while the green programmes outside manufacturing are mostly local initiatives. One of the innovations that were developed locally is the rainwater harvesting by Nestor Parayno of the GAD Special Project Group.

Indeed, TPMC is striving to make the company environmentally friendly in all areas — from raw materials to products, from purchasing to dealership, and from the actual manufacturing processes to the simple day-to-day activities in the plant.

Environmental skills development at TMPC

In a company such as TMPC, building a high level of environmental awareness among the workforce is critical because of its widespread environmental programmes that involve not only those who are in charge in environmental management but also each team member of the production line and general administration. In order to enhance environmental awareness among team members, each individual is required to participate in the basic environmental training provided by the company. Other personnel who are directly involved in environmental management and planning are also given special training, in addition to the basic environmental training.

The basic environmental training programme for all team members consists of five modules: (i) Basic Awareness, (ii) Environmental Policy, (iii) Objectives and Targets, (iv) Solid Waste Management, and (v) Energy Management. All newly hired employees attend this training so as to orient them about the company's environmental programmes. As of now, 100 per cent of team members, including contractual employees, have participated in the basic environmental training programme.

The basic environmental training programme is handled and organized by the HRD. However, the environmental engineers from the Cost and Environment Section of the Manufacturing Division conduct the training because of their expertise in the subject matter. In the absence of the environmental engineers, the training personnel from HRD undertake the task but such training is limited only to the first three modules. Solid Waste Management and Energy Management are strictly conducted by the environmental engineers only because such modules require technical expertise that the HRD cannot provide.

In addition to the basic environmental training given to all team members, key personnel such as the environmental engineers are required to attend special environmental training. For instance, Mark Anthony Marcelo, an environmental engineer, has attended the Environmental Management System Training conducted by the ISO-14001 certifying body and a minimum of four hours of Pollution Control Training conducted by LLDA, and Wastewater System Management Training. According to Marcelo, there is an annual budget allocated for outside training provided either by the mother company in Japan or the Toyota regional office in Thailand. There are also times when a Japanese coordinator from the mother company goes to the TMPC to conduct trainings on new technologies.

Recently, a new technology was introduced in the Cost and Environment Section (CES) — the programme for direct online monitoring of energy consumption. Team members who were chosen to operate the technology are computer literate line representatives who are deemed unfit to work in the production plant because of poor health conditions. They underwent retraining so that they would learn how to control and run the programme.

Marcelo, who is a licensed chemical engineer, said that environmental training serves as an important venue to enhance one's knowledge on the environment. For instance, he started as an environmental engineer at TMPC with little real understanding about the environment. His rudimentary understanding has been broadened by his participation in various training programmes. To further widen his knowledge, Marcelo is currently enrolled in the Environmental Engineering Graduate Programme of the University of the Philippines — Diliman.

TMPC's environmental department

To make the production process clean, environment-friendly, and cost-efficient, the CES under the Manufacturing Division was designated to undertake all related responsibilities. As the name implies, the section deals with two aspects of manufacturing — cost control and the environment. Initially, the environmental aspect was part of the Environment and Safety Section but after reorganization, the CES was formed so as to align environmental issues with cost-saving measures. According to Marcelo, the possible reason for the integration of the cost and environmental aspects into one section is for greater appreciation of the importance of observing and meeting environmental standards in the company because most environmental initiatives are also cost-saving initiatives. In essence, the Cost Group of CES is in charge of ensuring cost efficiency in labour costs and material costs while the Environment Group is responsible for the cost efficiency resulting from reduction in the consumption of energy and other utilities.

The Environment Group of CES is composed of eight team members: five in environmental planning (two engineers, two technical staff, and one laboratory analyst) and three in wastewater treatment plant operations. Except for the engineers, all other members of the Environment Group of CES are graduates of technical/vocational education.

Primarily, the Environment Group is tasked to ensure that TMPC is compliant with all the environmental standards and targets set by the mother company and with all the environmental laws and regulations implemented by the government. More specifically, it is responsible for the monitoring of wastewater discharge, air emissions, and water and energy consumption. On a monthly basis, the CES submits a report to the mother company that records performance in terms of the specified environmental performance indicators, such as water and electricity consumption.

The Environment Group of the CES holds all environment-related responsibilities at TMPC. All team members, from the top management to the line representatives are involved. To encourage involvement of team members in every division, the Environmental Management System (EMS) Organization was formed to serve as a company-wide working group to ensure that all environmental management initiatives are cascaded to each team member and successfully executed. One of the functions of the EMS Organization is to serve as a coordinating body among the different departments/sections for the implementation of the environmental management programme.

Members of the EMS Organization are selected from each department/section and appointed by the management. For the reporting and consolidation of environmental performance per department/section, weekly and monthly meetings are held. Furthermore, quarterly meetings with the President and bi-annual management review are also conducted to keep track of the overall environmental performance of the company.

Extending environmentalism outside TMPC

The environmental commitment of TMPC is reflected not in the conduct and management of processes and operations. It is also extended outside the premises of TMPC through the corporate social responsibility (CSR) activities headed by the TMPF.

Among the various environmental activities of TMPF is the participation in the coastal and river clean-up, especially during International Coastal Cleanup Day. TMPF is also involved in the Save Silang-Sta. Rosa River Foundation that aims to revive the drying river that flows from Silang, Cavite to Sta. Rosa, Laguna. TMPC puts high value on water resources because as mentioned by Aligada, manufacturing a single car consumes a great deal of water. Hence, they must do their part in preserving the water resources in the nearby communities.

TMPF is also an active participant in Earth Day and Environment Month activities, such as seed dispersal, tree planting in Brgy. Ichikan, Silang, Cavite, and Laguna de Bay cleanup. It also participates in the Philippine Peñablanca Sustainable Reforestation Project, which aims to rehabilitate 2,500 hectares of denuded forest in Sierra Madre.

TMPF also partners with academic institutions in several environmental programmes. For instance, TMPF signed a MOA with Miriam College in March 2009 on the popularization of a Filipino Low Carbon Lifestyle. TMPF donated PhP300,000 to Miriam College to fund the development of a Low-Carbon Lifestyle Calculator. Also, TMPF provided funding to the Mariano Marcos State University in Ilocos for the rehabilitation and reforestation of the Quiait River.

Indeed, TMPC aims to become environment-friendly in all aspects — from products and processes within the company to CSR programmes for outside communities. In the words of Aligada, Toyota Philippines may not be designing and building Prius, but it will be environmentally-friendly in every way possible.

APPENDIX V: San Carlos Bioenergy Inc.

Interviewees: Gloria Pasustento, *HR Officer*; Noli Segovia, *Plant Operations Manager*; Lauren Joy Y. Ong, *Environmental Manager;* Judito M. Salvador, *Community and Planter Relations Manager;* Noel G. Tolentino, *Boiler Fuel Officer;* Bethel Tapang, *Community and Planter Relations Staff*

Venue: San Carlos Agro-Industrial Eco-Zone, San Carlos City, Negros Occidental

Date: August 11-12, 2009

General Backgrounder

San Carlos Bioenergy, Inc. (SCBI) is the first company in the Philippines and in Southeast Asia to venture into bioethanol production and power co-generation. Biofuel or bio-renewable fuel is produced from biomass — renewable organic matter such as trees, crops, associated residues, plant fibre, poultry litter, other animal wastes, industrial wastes, and biodegradable solid wastes (Biofuels Act of 2006). Biofuel in the form of bioethanol is known worldwide as an alternative fuel or (usually) as an additive to petroleum. The world's production of bioethanol comes mostly from sugarcane (60 per cent) and other food crops (40 per cent).

The Philippines has strong potential in production of alternative energy sources coming from biomass resources. Three out of the top 10 agricultural crops grown in the Philippines can contribute substantially to the country's biomass resources — sugarcane, coconut, and rice. Residues from these crops, sugarcane bagasse, coconut husk and shell, and rice husk and straw are biomass materials that can be used as energy or fuel source (Elauria, et al. 2005).

In 2005, SCBI was incorporated to build and operate an integrated ethanol distillery and power generation plant in the San Carlos Agro-Industrial Economic Zone on Negros Island. It was organized in response to the government campaign for the use of domestically produced alternative vehicle fuel as an alternative to imported fuels. The campaign was sweetened with fiscal incentives in order to promote biofuel production. The Biofuels Act of 2006 stipulates that within two years from taking effect, the total volume of gasoline fuel distributed and sold annually by all oil companies in the country shall be blended with at least 5 per cent locally-produced bioethanol. The Biofuels Act also provides investors in biofuel production and distribution with tax incentives and financial assistance from government financial institutions. In short, the law has created not only a market for bioethanol but is also providing generous tax incentives and financial assistance to investors going into biofuel production and distribution.

Even prior to the enactment of the law, Petron, one of the leading oil companies in the Philippines, was already seeking to bring in ethanol in the local market in support of the National Fuel Ethanol Programme. With the formation of SCBI, Petron in June 2005, concluded a memorandum of understanding with SCBI on Petron's plan to blend SCBI ethanol with Petron gasoline (Glunt, 2005). Hence, the market for the product of SCBI was secured even before the development of its plant facilities.

SCBI's agro-industrial complex

In January 2009, SCBI became the first local producer of fuel grade ethanol that satisfies the quality requirements of the Biofuels Act for "E5" gasoline.

The sprawling SCBI agro-industrial complex in San Carlos City is a product of the combined expertise in biomass power plant engineering of Bronzeoak Philippines and in sugar-based agriculture of Zabaleta and Co. Bronzeoak is a British-Indian company, while Zabaleta and Co. has a long history of involvement in Philippine sugar production.

Most of the plant facilities are imported from other countries, particularly India. There are six main plant facilities in SCBI: a cane mill with crushing capacity of 1,500 tons per day; fuel

ethanol distillery producing 125,000 liters per day of ethanol; a co-generation plant with a capacity of 7.5 MW; carbon dioxide recovery plant with recovery capacity of 50 tons per day; anaerobic digestion plant; and integrated waste treatment plant. Each of them is a product of modern technology designed to comply with both local and global environmental standards.

The fuel ethanol distillery plant of SCBI has the capacity to generate 125,000 liters of anhydrous fuel grade ethanol per day or 30 million liters per year. This amount constitutes 10 per cent of the country's entire requirement for "e5" by 2009, as mandated by the Biofuels Act.

The kind of bioethanol produced in SCBI comes from sugarcane bagasse, which is primarily used for industrial purposes and has no other major use except as a source of energy. Around one-third of the total sugarcane production in the Philippines is comprised of bagasse (Eularia, et al, 2005). For the amount of annual bioethanol production capacity of SCBI, there will be a need for roughly 4,000 tons of sugarcanes per year. All of the required cane will be supplied from the 9,000-hectare San Carlos Sugar District.

Investments on zero-waste and environmentally-friendly processes

Apart from being an ethanol distillery plant, SCBI is also a co-generation power plant. If biofuels are a non-polluting fuel energy source, co-generation is a pollution-prevention process. The co-generation process is non-polluting because the power plant is powered completely by indigenous biomass resources, specifically bagasse. Through co-generation, excess heat is used to improve the efficiency of total energy use by at least 80 per cent, from the normal 33–38 per cent efficiency obtained when generating electrical energy only (Demirbas, 2009). In the case of SCBI, 7.5 MW of energy can be generated through co-generation and about 2.5 MW is exported to the local electrical cooperative. SCBI is able to provide electricity to the City of San Carlos with the excess energy generated through co-generation.

By producing bioethanol and co-generating electrical energy, SCBI contributes to the protection of the environment. However, the efforts of SCBI in conserving what is left of the environment do not stop at biofuel and electricity generation. SCBI also makes sure that the processes involved in the plant operation are not environmentally harmful.

The ethanol distillery plant measures up to the emission standards set by the World Bank. This means that the ethanol distillery plant does not emit greenhouse gases such as NO_x and SO_x. The distillation and co-generation processes at SCBI also involve the recycling of waste materials. For instance, the bagasse, a by-product from the milling of sugar, is converted into biogas and fed to the boiler as fuel. The steam from the boiler is used to power the steam turbines to generate electricity of up to 7.5 MW. Solid by-products, such as the mudpresse, are mixed with the wastewater and developed into organic fertilizers through a composting process.

In turn, the organic fertilizers are distributed free of charge, on a pro rata basis, to cooperating sugar farmers who supply SCBI with sugarcane. SCBI believes that composting has been beneficial not only to the farmers but also to the company. According to Joy Ong, the manager of SCBI's Environmental Management Department (EMD), the company incurs costs (labour, fuel, and inoculants) in composting. However, the company is able to dispose of solid waste by-products from the plant's processes in an environmentally-friendly way. Furthermore, the company benefits from its free distribution of organic fertilizers to farmers because this improves the business and social partnership between SCBI and the cooperating sugar farmers, who prefer the organic fertilizers because the latter increases the quality of the soil and the sugarcane yield compared to chemical fertilizers.

If steam and solid wastes are recycled at SCBI, the same is true with liquid wastes. In fact, the ethanol distillery has zero liquid discharge. While other industries encounter problems with compliance in regard to effluent disposal and wastewater treatment standards, SCBI is able to manage liquid wastes in an efficient and environment-friendly manner. Aside from having an integrated wastewater treatment facility, the plant also has an anaerobic digestion plant which

reduces water pollutants. It also has a reverse osmosis facility which treats and recycles wastewater. Half of the treated wastewater is reused back in the process and the other half is used in composting. Wastewater not consumed in composting is used for drip irrigation in the sugarcane plantations. Drip irrigation, according to Engr Ong, has positive effects on sugarcane planting as it lowers the requirement for chemical fertilizers.

Even carbon dioxide is recovered in the plant, thus preventing emissions to the atmosphere. Through the carbon dioxide recovery facility, the plant recovers approximately 50 tons of carbon dioxide per day. The recovered carbon dioxide is sold to soft drinks companies for the production of carbonated beverages.

On food versus fuel debate

One of the contentious issues about biofuel production is the well-known criticism raised in global and Philippine forums by farmers' groups and some scientists that biofuel production replaces food production. Biofuels feed the motor engines, not the hungry stomachs of people. In the case of SCBI, the debate on food security vis-à-vis sugarcane demand for bioethanol production is considered a non-issue. Before the construction of SCBI, many sugar lands were idle or were rendered unproductive by the crisis that occurred in the sugar industry in the l980s, and which led to the closure of a local sugar mill. The nearest "sugar central" is 83 kilometers away from San Carlos, which makes sugar transport a prohibitive proposition. In short, the operation of SCBI has revived sugarcane farming in the area.

SCBI also has a no-conversion policy, meaning it will not buy from farmers who have converted their non-sugar productive lands planted to rice and crops. Accordingly, SCBI seeks to avoid putting excessive agricultural stress on land availability and reduces mono-crop farming.

Environmental personnel

In order to ensure that SCBI is complying with all environmental standards, the EMD is tasked to undertake environmental monitoring. EMD is composed of eight staff — one manager, one pollution control officer, three reverse osmosis operators, and three biogas/anaerobic digestion plant operators.

It took a while for EMD to completely fill the required positions in the department. Each of the staff member of EMD has a background in engineering, although not all of them are licensed engineers and engineering graduates. The two key positions in EMD that require a degree and license in engineering are the EMD Manager and the pollution control officer, who are both licensed chemical engineers. Aside from having a chemical engineering background, EMD Manager Engr Ong also holds a Master's degree in environmental engineering. The rest of the EMD staff positions need not be filled by licensed engineers but occupants must possess a good engineering background. Most of the operators in the department are graduates of technical/vocational courses such as mechanical engineering technology.

Because the operators deal with wastewater treatment operations, Engr Ong pointed out that it is imperative for staff to have a basic knowledge of piping. This knowledge helps them to easily understand the flow of wastewater, making them more familiar with the entire treatment process. Aside from being equipped with the basic technical skills and knowledge, having good working attitudes and values makes a proficient operator. According to Engr Ong, being highly trainable is one of the critical traits that an operator must possess because all facilities introduced at SCBI are new technologies that necessitate new skills. For this reason, operators are usually required to undergo training on controlling and troubleshooting the machines.

While the introduction of new technology requires new skills, it does not mean that other skills have become obsolete. The new skills are not replacement skills but are simply additional skills. For example, operators do not rely only on what they learned during the training given by the foreign contractors. When technical problems arise, they also make use of their previous

knowledge on machine operations to devise other means of troubleshooting problems. Moreover, most employees have prior work experience in milling and distillery companies. The knowledge and skills that they acquired from their previous work experiences actually became the foundation of their understanding about bioethanol production and co-generation because most of the processes involved in a milling or distillery company are almost the same as that of a co-generation plant.

Even if many applicants satisfy the basic educational and skills requirements, SCBI prioritizes residents of San Carlos City in the hiring process as long as they meet the basic qualifications of the job; this limited the number of applicants eligible for the positions available. As of now, 100 per cent of the EMD staff are residents of San Carlos City.

The staff members of EMD are responsible for monitoring the environmental performance of SCBI and ensuring that environmental standards set by the government and other institutions (such as the World Bank) are met. More specifically, they are tasked to monitor the quality of wastewater, ambient air, moist, and deep wells. They also undertake a quarterly environmental audit through a multipartite monitoring team consisting of the LGU, the host barangays, NGO, and the DENR.

One of the environment-related problems identified during the first few months of the operations was the noxious odour emitted by the plant. During that period, the anaerobic digestion facility, which contributes in the reduction of noxious odour, was still under construction. In dealing with the problem, the EMD worked closely with the Community and Planters' Relations Department. While the EMD was seeking solutions such as further enzymatic treatment of the distillation's by-products, the Community and Planters' Relations Department was organizing consultations with the community and conducting an information campaign among residents to let people know the reason for the noxious emissions and the efforts being made by the EMD to eliminate them. When the anaerobic digestion plant became fully functional, the odour problem disappeared and SCBI became fully compliant with all environmental standards.

Aligning the workforce with the company vision-mission

As a young company, SCBI is still in the period of setting everything in place, including the organizational structure, the plant operating procedures, and the corporate values.

Top management is providing guidance on the directions of work at the complex and in managing relations with the farmers and the surrounding community. SCBI's prime mover is the Chairman-CEO, Juan Zabaleta, who was instrumental in conceiving the project, forging the partnerships with Bronzeoak and Petron, and in initiating organizational, community, environmental and HRD programmes and innovations. According to the EMD, Mr Zabaleta himself thought of creating the organic compost out of the solid waste materials generated by the plant and of working out how such compost should be distributed among the cooperating farmers. The wife of Mr Zabaleta is also active in the green landscaping of the complex perimeter, which blends beautifully with the rolling hills of San Carlos.

The HRD enjoys the full support of top management in the promotion at all levels of the SCBI's core values — social responsibility, continuous improvement, belongingness and integrity; and based on the guiding business goals of SCBI or the three E's — Environment, Energy, and Employment. According to HR Officer Gloria Pasustento, the HR strategies listed in below are translated into concrete HR programmes that endeavour to incorporate the company vision-mission and core values as well as the SCBI guiding business goals.

Examples of these HR programmes include the Workshop on Corporate Direction and Corporate Values for all employees and Coffee with the President/Resident Manager where those celebrating their birthday during the month have an opportunity to sit down with the President/Resident Manager for an informal discussion over cake and coffee. In relation to the environmental awareness raising among employees, the HRD sponsored a slogan-making contest,

where all employees are encouraged to submit a slogan that promote SCBI as a green company. HRD strategies are shown in Appendix Table 3 below.

APPENDIX TABLE 3: HRD STRATEGIES IMPLEMENTED AT SCBI

Strategy	Components
1. HR acquisition	1.1. Implementation of set hiring policy
	1.2 Job analysis programmes, human resources audit and skills inventory
	1.3 Setting up of applicants' data base
	1.4 Psychological testing, trade testing and job interviews
	1.5 Background investigation
	1.6 Cadetship and practicum programmes
2. HR development	2.1 Implementation of training guidelines
	2.2 Employee induction
	2.3 Conducting training needs analysis as one of the bases for coming up with the corporate training programme
	2.4 Training Curriculum
	2.5 Implementation and evaluation of training (Pre and Post)
	2.6 Performance evaluation
	2.7 Job descriptions
3. HR maintenance	3.1 Setting up of Salary/Wage Administration Policy
	3.2 Salary Structure
	3.3 Continual Job Classification/Evaluation
4. HR relations	4.1 Designing of and orientation on company's Handbook and Code of Conduct, including provision of individual copies among employees
	4.2 Putting up of Labour Management Council (LMC), Family Welfare Council (FWC), and Committee on Decorum and Investigation (CODI)

Furthermore, the HRD promotes environmental awareness alongside other organizational and personnel concerns in plant operations, particularly on issues of safety, health, and security. A SHES (*Safety, Health, Environment, and Security*) Committee was formed to facilitate the monthly toolbox meetings or consultations with the different department representatives to address the growing concerns related to SHES.

The environmental programmes of the SHES Committee, directly supervised by the EMD, are supported and further reinforced by the Safety Team and the Community and Planters' Relations Department. All of these teams work in coordination with the HRD, which is responsible for general environmental awareness raising and the dissemination of organizational and personnel policy information among all employees. This harmonization is reinforced through an open system of communication, including e-communication, personnel bulletins, and inter-departmental notices. The HRD is also planning to publish a company gazette or bulletin that would also serve as a medium to promote the programmes of the SHES Committee. While the company gazette is not yet in place, SHES concerns, reminders, and notices are posted on designated bulletin boards and sent to each department through the corporate e-mail.

The monthly toolbox meetings of the SHES Committee also serve as a venue to determine the training needs of employees in relation to SHES issues (Appendix Table 4). One of the concerns raised in the SHES Committee has been the need to create a proactive approach in dealing with possible disasters. This concern was addressed by conducting training on disaster preparedness in partnership with the Philippine National Police (PNP) and Bureau of Fire Protection (BFP). Through a drill, the team members are trained in the proper responses to various emergency situations such as fire, explosion, accidents, and spillage in the transport of alcohol. To further promote safety, emergency response plans have been developed and an emergency response team was formed. Moreover, SCBI is equipped with emergency apparatus, including a fire truck and ambulance, to further ensure that the company is ready to respond to SHES problems. The HRD also enforces strict safety measures and guidelines. Employees are

required to observe proper safety measures such as wearing the proper safety gears when necessary.

Another challenge to the HRD, according to Miss Pasustento, is the formation of a new SCBI culture based on the company's business goals and core values cited above. Since the people in the company have diverse backgrounds and were exposed to different corporate cultures prior to becoming part of SCBI, it has proven difficult for the HRD to build a cohesive team. For a very young company such as SCBI, instilling among the employees, supervisors and managers the corporate vision and values through varied HR company-wide programmes is critical. This HRD is able to do because of the leadership provided by the top management and the support and cooperation extended by other managers. Miss Pasustento beamed that a new SCBI culture is emerging or has already emerged.

APPENDIX TABLE 4: TRANSLATING SHES CONCERNS INTO TRAINING PROGRAMMES

Focus	Outcome
SHES concern	To create a proactive approach towards dealing with possible disasters that may occur in the company premises
Training need	Make ALL employees aware of the possible disasters and develop in them proactive attitudes in dealing with disasters and emergency situations
Training programme	Company-wide disaster preparedness drill, to be conducted in coordination with the local PNP and BFP units

Three Es: energy, economy, and employment

SCBI has a three-pronged rationale for operating the ethanol distillery and power co-generation plant — energy security, agro-economy, and rural employment. With the capacity to supply 30 million liters of fuel ethanol per year, SCBI contributes a great deal not only to the reduction of imported fuel dependence but also to climate change mitigation because of its production of renewable and clean energy. In addition, SCBI's ability to meet various environmental standards makes the SCBI bioethanol project eligible for Carbon Emission Reduction Certificates under the Clean Development Mechanism of the Kyoto Protocol.

In addition to energy security from regular renewable energy production, the agro-economy also benefits from the operation from SCBI. Now that there is a constant demand for raw materials for biofuels, there are greater income opportunities for farmers who grow the feedstock. Besides increased income opportunities, SCBI's operation also created greater employment opportunities for the local population of San Carlos City. SCBI employs 226 regular employees and, staying true to its commitment of creating jobs for the local people, 58 per cent of the total employees are from San Carlos City. Other employees come from neighbouring cities in Negros Occidental such as Bacolod City.

Hiring and orientation of employees

SCBI started its plant operation on January 12, 2009. As a new industry in its early stage of operations, SCBI had to make a number of adjustments, especially in terms of skills and competency development for the employees and culture building for the entire company.

Just like any other start-up company, SCBI's first challenge with respect to human resources development was the recruitment of qualified people for the work. Being a new industry, skills requirements and qualification standards for different technical positions were not yet established. To overcome the problem, the HRD identified skills requirements by benchmarking with related industries, such as sugar mills and distilleries. Eventually, the HRD was able to develop a database that categorized the employees and applicants based on educational background, skills and areas of interest.

As mentioned above, local employment is strongly promoted by the company; that is why San Carlos residents are given priority as long as they meet the basic qualifications for the job. One of the objectives of the company is to develop the local economy, achieved partly by improving the quality of lives of the people in the host community through job creation.

On the first day of work of a newly-hired employee, they attend a job induction given by the HRD to orient them about the company and to provide an overview of milling and bioenergy.

Most of the employees at SCBI, particularly the technical people, have an excellent background for the industry because of their previous work experience in other sugar milling companies and distillery processes. Ms Pasustento herself, the HR manager, was recruited based on her extensive HR experience and community relations work in modern sugar mills such as Victorias Milling.

However, their experience and knowledge are supplemented by new knowledge and skills on handling and operating state-of-the-art bioethanol milling-distillery-conversion technologies. The technical people, particularly the operators of the plant facilities, undergo formal training provided by the Indian contractors. For instance, reverse osmosis operators had to attend two half-day classroom training sessions discussing the theories related to reverse osmosis.

In addition to the classroom training, the Indian contractors stayed at SCBI for two months to provide on-the-job training to Filipino operators. The latter were also present in the installation of the facility by the Indian contractors, thus enabling the Filipinos to learn the basics of the assembly process. They were also taught about various troubleshooting techniques for problems that may occur. A basic requirement in the recruitment of the technical people is trainability and willingness to learn so that there would be less difficulty in applying the new skills and handling of new technologies.

The technical skills training provided by the Indian contractors are supplemented by the HRD with non-technical, behavioural and organizational skills training such as working in a team. There are also training programmes that the HRD has lined up such as supervisory or people management training for plant supervisors and junior managers.

Conclusion

Having the right people with the right skills and competencies for the green jobs in green industries is critical in ensuring company success. However, a rounded or integrated approach to HR development is vital. At SCBI, these include such things as a clear company vision-mission, top management support, employee alignment with the corporate goals and values, inter-departmental cooperation, corporate rapport with the community, and happy blending of technical and non-technical competencies, including environmental awareness.

APPENDIX VI: Energy Development Corporation

Interviewees: Jonas A. Yap, *HR Supervisor;* Leonita P. Sabando, *Deputy Manager, Environmental Management Department;* Ulysses Rex Bontia, *Engineer;* Nikkos Rhet Astorga, *Engineer;* Joselito Paredes, *Community Partnership Department Officer;* Eric Yap, *Administrative Officer;* Rene delos Reyes, *LMC President*

Venue: Ormoc Villa Hotel

Date: August 7, 2009

Interviewee: Noel D. Salonga, *Senior Manager for Human Resources*

Venue: EDC Corporate Office, Energy Center, Fort Bonifacio, Taguig City

Date: December 14, 2009

Note: At the time of the proposed research visit at EDC, Ormoc was affected by the outbreak of H1N1 flu, prompting EDC management to bar any company visits. Hence, the EDC HRD generously acceded to the research team's request for interview by going to the Ormoc Villa Hotel where the research team was billeted. Unfortunately, the EDC team could only share three hours with the team. As a supplement, the research team was able to visit the corporate office of EDC in Manila and interview EDC's Senior Manager for Human Resources who provided relevant information on the skills dimension of the case study.

General backgrounder

The Philippines is the world's second largest producer of geothermal power, next only to the United States. Geothermal power accounts for the about 20 per cent of the country's energy mix. On top of the currently installed geothermal capacity of the Philippines, the country still has the potential to generate about 2,600 MW of additional geothermal power from untapped geothermal resources (Muralla, 2008).

Originally, the development of the geothermal industry in the Philippines was a response to the oil crisis of the 1970s. The Marcos regime sought ways to reduce Philippine dependence on oil imports from the Middle East, which was awash then with petrodollars and was enjoying new global economic clout through the formation of the Organization of Petroleum Exporting Countries (OPEC). The government established the Philippine National Oil Company (PNOC), the mandate of which was to explore, develop and generate alternative sources of energy — geothermal in particular. With widespread tectonic activity as a result of its strategic location along the Pacific "Rim of Fire", the Philippines is naturally endowed with substantial geothermal power potential.

In 1976, PNOC commenced its geothermal exploration project in Leyte, in partnership with the New Zealand government and the National Power Corporation. However, it was only in 1983 when the PNOC, through its subsidiary, the Energy Development Corporation (EDC), was able to commence commercial operations with the commissioning of the production steamfields in Tongonan, Leyte and Palinpinon, Negros Oriental. This was followed by the commissioning of several other geothermal plants, making PNOC-EDC a major player in geothermal energy generation in the Philippines (EDC, 2008).

Today, the fully privatized EDC continues its geothermal operations, the economic importance of which is further accentuated by the challenges posed by climate change, geothermal being considered clean and renewable. EDC also continues to explore and develop new geothermal fields, encouraged partly by the fiscal incentives provided by the Renewable Energy Act of 2008.

From the early years of EDC up to the present, the corporation has produced no less than 81,000 GWh of renewable energy. EDC operations means a total savings of more than US$4 billion since the start of its operations up to 2007. Of the 1,905 MW total installed geothermal capacity of the Philippines, more than 60 per cent (equivalent to 1,150 MW) is generated by EDC. The geothermal power generation of EDC accounts for the about 8 per cent of the Philippines' total installed energy capacity. The source of the majority of the geothermal energy generated by EDC is the Leyte Geothermal Production Field, which happens to be the world's largest wet steamfield and, as described by engineers, "*one of nature's most perfectly designed geothermal resources*" (EDC, 2008; Harden, 2008).

In addition to the geothermal power plant in Leyte, EDC currently operates geothermal steamfields in Negros Oriental, Negros Occidental, Bicol, and North Cotabato. EDC also launched exploration and development projects in North Cotabato, Negros Oriental, and Sorsogon (details in Appendix Table 5). The geothermal power plants operated by EDC are engaged in steam generation, power generation, and power distribution.

APPENDIX TABLE 5: EDC'S OPERATING SITES FOR GEOTHERMAL ENERGY

Site	Location	Size (area)	Total plant capacity
BacMan Geothermal Production Field	Covers the boundaries of Legaspi City, Sorsogon City, and the town of Manito, Albay	25 000 Ha	150 MW
Mindanao Geothermal Production Field	Within the borders of Barangay Ilomavis, Kidapawan City in the province of North Cotabato	112 Ha	106 MW
Northern Negros Geothermal Production Field	North Western part of Mt. Kanlaon, approximately 60 kilometers from Bacolod City	169 Ha	49 MW
Southern Negros Geothermal Production Field	21 kilometers northeast of Dumaguete City in the municipality of Valencia, Negros Oriental	133 000 Ha	192.5 MW
Leyte Geothermal Production Field (world's largest steamfield)	Ormoc City and Kananga Municipality in West Leyte	107 625 Ha	Over 700 MW

Source: www.energy.com.ph

Although EDC's major focus is geothermal power generation, the company has also ventured into the development of other forms of renewable energy. EDC has also developed the Pantabangan-Masiway hydro energy plants in Nueva Ecija with a total plant capacity of 112.5 MW, as well as a wind plant in Burgos, Northern Luzon.

The focus of the research team was on the geothermal operations of EDC in Leyte.

Clean production processes

The geothermal power industry is generating clean and renewable geothermal energy. However, it does not necessarily mean that the production of geothermal power is intrinsically a clean and environment-friendly process. Without environmental safeguards, generating geothermal energy can cause GHG emissions and effluent water discharges which may have polluting effects on the environment. Air pollution may result from the release of geothermal gases from steam comprising carbon dioxide, hydrogen sulphide, methane, mercury, radon, ammonia, and boron. Chemical pollution may also occur when chemicals from the steam are released into the atmosphere or when geothermal fluids have dissolved chemicals that may damage the environment (Kristmansdóttir, 2003).

In the case of EDC, its geothermal power production processes are considered non-polluting and environmentally benign because of the non-toxic composition of the geothermal steam emitted from the earth's interior. According to Ulysses Rex Bontia, an engineer at EDC, the chemical composition of steam emitted from the Tongonan Plant consists of 99.98 per cent water,

an inert compound that does not adversely affect the environment. The remaining 0.02 per cent of the steam composition is carbon dioxide. Despite being a greenhouse gas, this carbon dioxide constitutes only a relatively minute amount of the steam.

This greenhouse compound is part of the spent fluids re-injected back by EDC into the earth's interior. EDC pioneered the development of the technique of re-injecting spent fluids back into the ground in order to ensure that only clean white fumes are released in the atmosphere.

The lush vegetation within the vicinity of the Leyte geothermal field (visible from the plane descending to the Ormoc airport) is also capable of absorbing carbon dioxide emissions. This is based on the study sponsored by the World Bank Global Environmental Facility (GEF). Results of the study show that the current vegetation cover of the Leyte geothermal field has an absorptive capacity of approximately 3.8 tons of carbon. Given this absorptive capacity, the existing vegetation cover can store carbon dioxide emissions from the geothermal fields for around 54 years (EDC, 2008). Despite this, EDC is pursuing a comprehensive programme of preserving and developing the forests in their area concession (see discussion below). Because of its low carbon emissions, EDC is qualified to participate in the CDM-led carbon credit trade.

In 2008, all geothermal power plants of EDC were fully compliant with the hydrogen sulphide standard of 0.007 ppm. With the exception of the Mindanao Geothermal Production Field during the months of February and April in 2008, the general water quality compliance of EDC in other plants is also within the standard of 0.75 ppm for boron content (EDC, 2008).

Post-privatization re-visioning and renewed commitment to environmentalism

Through the initiative of the new management after the privatization process, EDC adopted a new corporate vision and mission. The vision of EDC is to "*become the leader in geothermal energy development and renewable energy sources with expertise in exploration, drilling, reservoir management, fluid collection and recycling system, engineering design and construction, power generation, and environment management*". The corporation's mission is to deliver superior benefits to its stakeholders through "*high calibre performance in all its undertakings*". In order to attain its vision-mission, EDC is guided by its core values — teamwork, trust, respect, integrity, and environmental and social responsibility.

EDC promotes sustainable development through its renewable energy generation and its environmental management system. The latter has been strengthened further with the formal adoption of the Corporate Environmental Policy (CEP) by the EDC's new Board of Directors and top management. The CEP requires EDC's compliance with all environmental laws, regulations, and requirements, particularly those that affect the company's day-to-day operation. The commitment to conserve and protect the environment means implementing and continuously improving EDC's environmental management system, programmes, and processes. The CEP also promotes risk reduction, pollution prevention, and better resource management. Just like other companies with an environmental management system, EDC believes that environmental and safety issues within a company are inseparable. In this regard, EDC makes sure that safe operating procedures are implemented and emergency preparedness is always observed.

The environmental policies and initiatives of the top management are cascaded down to the rank-and-file employees. According to Rene de los Reyes, the National President of PHILAMCOP, the greening programme of the corporation lessens labour-management conflicts and enhances harmony with the community. He further asserted that through the management's partnership with the unions, employee mobilization for the corporation's environmental projects has become an easier task. At present, there are 12 unions across the different project sites of EDC.

EDC's commitment to environmentalism has been rewarded by a slew of environmental awards it has garnered through the years as shown in Appendix Table 6.

APPENDIX TABLE 6: EDC'S ENVIRONMENTAL PARTNERSHIP AWARDS

Date	Award
1993	"Outstanding Corporate Environmental Programme," Personnel Management Association of the Philippines (PMAP)
1995	"Gawad Kalikasan Award," DENR, Senate and Philippine Association of Environmental Professional Inc.
1995	First Runner Up, "Best EIA Study" for Leyte Geothermal Project, DENR, Senate and Philippine Association of Environmental Professional, Inc.
1995-1998	"Outstanding Firm Award" for the Bacon-Manito Geothermal Project for its pollution control and management and environmental education campaign, DENR-Region V
1996	"Award for Integration of Environmental Programme in Operations," De La Salle University
2001	"Mother Nature Award," Pollution Control Association of the Philippines, Inc.
2001	"Top Ten Outstanding Pollution Control Officers Award," Pollution Control Association of the Philippines, Inc.
2003	Excellence in Ecology and Economy (E3)-Large Scale Category, Philippine Chamber of Commerce, Inc.
2003-2004	"Top Ten Pollution Control Officers Awards," Pollution Control Assoc. of the Phils. (PCAPI) Region 8 and PCAPI National for SNGPF
2004	"Best in Environmental and Community Relations Programme " SARINGGAYA Award, DENR Region V, "Outstanding Firm for BGPF," SARINGAYA Award, DENR Region V
2006	Environmental Partner Award, DENR-EMB Region 8
2007	Environmental Partner Award, DENR-EMB Region 8

Source: www.energy.com.ph

Energy academy to address skills and competency concerns

EDC has a total personnel complement of 2,582. In the Leyte Geothermal Production Field, there are 1,094 employees; 854 of which are regular employees. Most of the employees have expertise in engineering and the geosciences.

After EDC's privatization in 2008, senior management recognized the need to invest in skills development and various upgrading programmes for the corporation's workforce. There were training programmes conducted in the past; however, none were conducted in the three years before the privatization programme because of the government restriction on spending by government-controlled corporations, as stipulated under RA 9184 (the *Government Procurement Reform Act*). This law, promulgated in the name of cost-cutting, negatively affected the HR programmes of EDC, including employee productivity.

Now that EDC is fully privatized and given the relatively mature profile of many workers, there is a growing concern within the company about the need for succession and training of a new generation of workers. With the aim of becoming the world's leading producer of geothermal energy, the company wants its people to acquire and develop competencies that conform to the global standards of geothermal power production. In connection with this, the Energy Academy was established by EDC in 2008 with the aim of conducting work-related seminars and skills development training for all employees, whether old or new in the organization. The idea of putting up an Energy Academy is an initiative of EDC's current Senior Manager for Human Resources Noel Salonga as part of EDC's transformation programme after privatization.

When Salonga assumed his current position at EDC in 2007, one of his primary agenda items was the skills development of all EDC employees. Salonga recognized that, despite the unavailability of academic programmes on geothermal energy technology in the Philippines, the skills and knowledge of this technology were available in EDC through its senior, highly trained, and experienced technical staff. All of the technical people of EDC attended foreign training programmes and most of them were given scholarships to study geothermal energy in other countries, such as New Zealand and Iceland. And so he realized, "why not build a structure that

would take advantage of the available skills and knowledge?" From this, the Energy Academy was born to become the local/internal technical training provider of EDC.

At present, EDC's Energy Academy is in its crucial formative stage. However, Salonga's vision for the Energy Academy is for it to become the country's Center for geothermal energy training.

The Energy Academy offers three levels of training programmes for employees. The first level is the basic geothermal energy course which provides an overview of geothermal energy and geothermal power plant operations. The course is conducted through a one-day classroom lecture and discussion and one-day field trip to the geothermal power plant. All EDC employees, especially the non-technical staff, are required to attend this training. No such training was available prior to the establishment of the Energy Academy. However, in Salonga's opinion, it is imperative for all employees, whether technical or non-technical, to have a fundamental knowledge of geothermal energy in order to have a deeper understanding of the industry in which they work.

The second level of the training programme is the one-year generalist course given to all technical staff. The first part of the generalist course tackles the science aspect while the second part focuses on the engineering aspect of geothermal energy technology. At the end of the first part, the participants are required to submit a project applying the knowledge they had acquired during their classes. Although the priority of this training programme is directed at the technical staff, Salonga deems that some portion of the training can also be given to the business development people. According to Salonga, if the business development personnel are equipped with the technical knowledge on the geothermal industry, it would be easier for them to design appropriate business development programmes.

The third level of the training programme is the advanced and specialized course for selected technical staff. While the training programmes for the first and second levels are conducted by internal experts, the training for the third level is usually conducted by foreign experts invited by EDC. The duration of the training varies depending on the complexity of the topic.

In addition to the establishment of the Energy Academy, the HRD also plans to shift to competency-based HR systems. One of the proposals is to develop a Competency-Based Assessment Tool that would help analyze the skills requirements of individual employees. By doing so, the HRD can easily identify the skills gaps and retraining needs of the employees and devise programmes that would target a particular competency requirement.

The HRD has finished the initial and most critical part of the shift towards competency-based HR systems — the development of the EDC Competency Dictionary. The Competency Dictionary lists, defines, and classifies the different competencies for all types of jobs within EDC, including the core and the technical competencies. Each competency is defined and categorized according to five-level scale — Awareness, Beginner (Application Level), Mature (Career Proficient Level), Mastery (Advanced Level), and Excellence (Expert Level). Details are provided in Appendix Table 7. The competency dictionary-building took between three to six months to complete because of the wide range of job types and their respective competency requirements.

One of the challenges faced by the HRD is that of retaining critical skills within the company in the face of poaching by foreign geothermal companies of EDC's technical and engineering people. Employees recruited to work for other foreign geothermal companies are lured by the higher salary offerings. EDC seeks to address this problem through motivation strategies. For instance, employees performing well or with high potential get promoted quickly. Furthermore, almost every employee is now given a share in the company's stocks. These motivation strategies seem to work. Based on the survey conducted by the Asian Institute of Management, 94 per cent of employees are happy working at EDC. It was also found out that

many employees are proud to be working in the largest geothermal power operations in the country.

APPENDIX TABLE 7: EDC'S FIVE-LEVEL SCALE OF COMPETENCIES

Competency level	Qualitative rating	
1	AWARENESS	Significant advancement over Entry Level requirements ("entry" defined as minimum hiring requirements). Capabilities to perform basic types of work as related to the activities/ tasks within the job family with close supervision.
2	BEGINNER (Application Level)	Significant advancement over Entry Level requirements ("entry" defined as minimum hiring requirements). Capabilities to perform basic types of work as related to the activities/ tasks within the job family with close supervision.
3	MATURE (Career Proficient Level)	Significant advancement over beginner level competence is a role model in the department. Capabilities to perform virtually all work assigned in the department/ division/function as related to the activities/ tasks within the job family with minimum supervision. Able to make wise recommendations.
4	MASTERY (Advanced Level)	Significant advancement over mature competency level bringing greater value to the organization and higher learning requirement for the individual. Is a role model within the organization. Capable to provide advices on all work assigned in the department/division/function as related to the activities/ tasks within the job family without supervision and able to decide.
5	EXCELLENCE (Expert Level)	Achievement of a proven track record in providing knowledge and solutions within the organization and is an industry expert and role model. Capabilities to perform most complex and technically demanding work within the organization without supervision and able to decide.

Skills for environmental work

As early as 1979, an Environmental Management Department (EMD) was created to oversee the environmental aspects of the geothermal operations and to ensure compliance with environmental laws. Even at the early stage of operations, EDC recognized the impact of its geothermal operations on the environment and has initiated and implemented a number of environmental projects for the benefit of the community. Through the EMD, EDC became one of the country's pioneers in the development of environmental standards, programmes and policies and was generally ahead of many national regulations, including the multi-sectoral monitoring of projects issued with an environmental compliance certificate and in conducting environmental impact assessment (EIA) processes. Moreover, the EMD laboratory is ISO17015 certified and recognized by DENR-EMB to conduct all sorts of chemical and heavy metals analysis and gravimetric analysis for solids.

The corporate EMD has a total of 68 employees, including a pool of scientists, engineers, foresters, and forest rangers. The environmental and watershed technical personnel are air and water quality specialists, hydrologists, chemists, and foresters. GIS specialists are based at the EDC head office at Fort Bonifacio in Taguig City, Metro Manila. Twenty-five of the EMD employees are assigned to the Leyte Geothermal Production Plant, five of whom are in-charge of monitoring and the remaining 20 are responsible for watershed management.

Initially, the EMD's task was concentrated only on monitoring compliance with various environmental regulations. For instance, EMD took charge in the environmental assessment conducted by the multipartite monitoring team composed of representatives from DENR, LGUs, and NGOs. The multipartite monitoring, which is now applied in different companies to ensure environmental compliance, was actually piloted in EDC in 1989.

From simple monitoring of environmental compliance, the role of the EMD has evolved over the years as the corporation widened the scope of its green programmes. Environmental awareness-raising initiatives are promoted not only within the company but are also extended to the nearby or surrounding communities affected by the projects' operations. As a result, the environmental skills of EMD staff, which basically comprise expertise in environmental management within an enterprise, have to be augmented with broader environmental and non-environmental skills. More specifically, competencies are needed for environmental policy review, environmental licensing, expanded laboratory analysis, community relations, community development, and environmental education.

Extending environmentalism in the communities

Thus, when forest management was defined as one of the major responsibilities of EMD, people with skills in community organizing and watershed management were recruited in order to effectively carry out this responsibility. In addition to the employees directly working as part of EMD, there is also support provided by the Community Partnership Department for community-related programmes and activities sponsored by EDC.

In fact, one of the most difficult yet challenging responsibilities of the EMD is to manage the 17,000-hectare forest area around the vicinity of the Leyte geothermal fields. Part of the forest management responsibility of EMD is to ensure that no illegal logging activities take place in the area and to prohibit the use of slash-and-burn method in farming. The EMD employs one forester and several forest rangers, who are given the authority to apprehend illegal loggers.

According to Leonita Sabando, the EMD Deputy Manager, apprehending the offenders seemed effective in the beginning. Yet, in the long run, apprehending does not provide a solution or prevent deforestation. In this context, the concept of Integrated Social Forestry as an approach to forest management was developed. Integrated Social Forestry has several aims — to protect the watersheds, to create livelihood for the communities and to allow the forest dwellers to participate in the decision-making process. The positive impact of social forestry is two-fold: the communities of forest dwellers are given sources of income through the livelihood projects and, at the same time, the forest is being protected by the forest dwellers and former slash-and-burn farmers themselves. Currently, the farmers are organized into associations to become forest protectors. EDC repair and cleaning jobs such as maintenance of the huge geothermal pipes and grass cutting are farmed out to these associations to augment community incomes. Some skilled jobs such as carpentry, masonry works, and sewing of working clothes are also directly awarded to the community members. In short, the community of forest dwellers has become part of the EDC family under EDC's environmental programme.

On December 11, 2008, and led by EDC Chairman Oscar Lopez, EMD launched a new but massive reforestation project dubbed "Binhi" or "seed" as a commitment to the Clinton Global Initiative. Binhi's ambitious aim is to restore a 10,000-hectare forest within ten years by planting rare species of Philippine native trees. However, Binhi is not simply striving for a 10,000-Ha forest restoration; more importantly, the programme aspires to save the Philippines' indigenous, premium but endangered trees such as *tindalo*, *yakal*, *molave*, *mayapis*, *dau*, *palosapis*, and *mancono*. Binhi's programmes are a blend of environmental and social, which are reflected in the four modules of the reforestation plans for various provinces. The four modules of Binhi are: (i) Tree for Life, which concentrates on biodiversity research in the Mount Kanlaon National Park and Sierra Madre reservations; (ii) Tree for Food, which helps farmers through tree-based livelihood; (iii) Tree for Leisure, which establishes tree-oriented ecotourism parks; and (iv) Tree for the Future, which brings back the endangered, indigenous, and prime Philippine tree species through urban reforestation (EDC, 2008).

It is abundantly clear that EDC is in the business of renewable energy as well as in the upkeep of the environment — for the sake of future Filipino generations.

APPENDIX VII: Metal Wealth Enterprises Co.

Interviewees: Walter Sy, *Owner/Manager;* Gie Baustista, *Supervisor for Recycling;* Celerina Relebo, *Supervisor for Receiving, Classifying and Sorting;* Myla Medina, *Classifier*

Venue: Metal Wealth Enterprises Co., 41 Gen. Luis Street, Novaliches, Quezon City

Date: July 28, 2009

General backgrounder

Recycling is the process of collecting used or waste materials so that they can be reused or reprocessed. Without belabouring the obvious, recycling is one solution to the mounting problem of solid waste disposal in the country, especially in the urban areas such as Metro Manila. The Philippines generated about 19,700 metric tons of solid wastes per day in 2002 and the amount of solid wastes is projected to increase to 28,875 metric tons per day by 2010 — an increase of almost 47 per cent in just eight years. Of the total solid waste generated, only 13 per cent is subjected to recycling and reuse (*State of Brown Report*, 2009).

In the 13 cities comprising Metro Manila, plastic waste materials are the second major component of total solid wastes. They account for at least 21 per cent of the total produced, next to kitchen and food wastes (ADB, 2003). Uncollected plastics are also widely blamed for the clogging of city/town drainage and sewage systems, *esteros*, and river systems which cause flooding and spawn all kinds of diseases due to the impeded flow of water.

Clearly, recycling can help solve the problem of plastic waste disposal. It can also be a source of income for some people, especially the waste pickers. In the Valenzuela area, there are about 40 plastic recycling firms. One of them is Metal Wealth Enterprises Co.

Sitting on a four-hectare site, Metal Wealth is one of the largest plastic recycling firms in the country, if not the largest. This family-owned enterprise has been in the recycling business since the 1970s, starting with metal scrap materials. However, Metal Wealth shifted to plastic waste recycling because the process is easier and entails less energy consumption. It is also more profitable and the procurement of plastic wastes is less problematic. Compared to plastics, metal wastes account for only 3–4 per cent of the total solid wastes in major cities of Metro Manila (except in Pasig City, where metal wastes contribute 12 per cent of the total solid waste generation) (ADB, 2003).

All types of plastic wastes — except, ironically, the bio-degradable — can be recycled at Metal Wealth. These plastic wastes are supplied by a number of waste collectors, mostly junk shop operators. Most of the time, trucks carrying heaps of plastics sourced from various junk shops can be seen parked at Metal Wealth's receiving area. However, some waste pickers directly deliver the plastic wastes to the recycling plant through their push carts or jeepneys.

After buying and collecting the plastic wastes in the receiving area, they are cleaned and classified by type. This is determined according to the process by which the plastic material is manufactured. Once the plastic materials are classified, they are then sorted by colour. Sorting by colour is very important because it lessens the amount of dye to be used in colouring the recycled plastics. After the classification and sorting, the plastics undergo a more thorough cleaning and put into a machine that "tenderizes" the plastic wastes before they are pelletized. The tenderizing process is non-polluting as the plastic is not allowed to melt or vaporize; in fact, once "tenderized" and flattened, they are hosed by water and pelletized. In turn, the pelletized plastics are then put into another machine that recycles them into new plastic products such as plastic bags and plastic ropes. The recycled plastics are usually sold to market vendors and to other customers from nearby provinces.

Compensation and working conditions

The regular employees at Metal Wealth are the supervisors, machine operators, and those doing quality inspection and maintenance. The highest educational attainment of most employees is high school level. Regular workers receive the minimum wage and government-mandated benefits such as overtime pay, holiday pay, 13th month pay, and health insurance. Supervisors and senior or long-time regular employees also receive housing allowance.

Initially, the wage of the classifiers and sorters was fixed at a daily rate — the minimum wage rate. However, Walter Sy, the CEO/President-owner-HR manager, observed that the quantity and quality of the work finished by the classifiers and sorters was uneven and varied. Some workers are more productive and are able to do a greater volume of work, while others do less in a given hour. For this reason, Mr Sy developed the concept of the "pakiao" system to reward workers with higher productivity with higher pay per day. The "pakiao" system is also aimed at increasing the efficiency and productivity of the workers. Payment to "pakiao" workers is based on the bulk or volume of plastics classified and sorted Thus, when the wage was changed from a per-day basis to "pakiao", Sy observed that workers became more efficient and productive. Some of the "pakiao" workers are able to earn between PhP5,000 and PhP6,000 in a week which is more than twice the daily minimum wage (the minimum daily wage in Metro Manila was PhP375 as of 2009). The system is also considered by the workers themselves as fair and equitable, for it is compensation based on an individual's output.

Because of the "pakiao" system, work supervision is minimal and the focus of work by the supervisory staff is on inspection of the quality of a worker's output. However, the research team, in their ocular inspection, did not find the work intense or pressure-packed for the workers, who go about their assigned areas in a relatively relaxed manner. Because the compound is large, there are wide spaces between work teams and the heaps of plastics they are working on. This certainly contributes to a greater of sense of order and safety among the workers. A fire truck owned by Metal Wealth is parked in one of the garage sheds as part of a quick-response programme should a fire break out in the compound, plastic being highly flammable. However, Mr Sy said that this truck has never been used, except in response to fires breaking out in other areas of Metro Manila.

Hiring process and job creation

There is no formal recruitment process in Metal Wealth. When there is a need to hire more workers, the workers are simply asked to recommend family relatives or friends.

Some regular workers are second-generation Metal Wealth workers, meaning their parents worked for the company earlier. For example, two supervisors, namely, Gie Bautista and Celerina Relebo, are the daughters of former company drivers. It is also noteworthy that most of the employees have been long-time employees of the company, some as long as 30 years. Celerina Relebo has been with Metal Wealth since 1978 and her first job was that of a sorter. After several years of experience in almost every type of work at Metal Wealth, she was eventually promoted to a supervisory position. According to Relebo, she never thought about resigning from the company because she is satisfied with her salary and the way the employees are managed.

Some regular workers are friends or relatives recommended by other regular workers. For example, Myla Medina, a classifier, was recommended for the job by her husband who happens to be a classifier also.

Some workers drop out of work, only to reappear after several weeks or even months. Still, they get accepted back by Metal Wealth. Of course, there are lean periods, when the supply of plastics is much less than the company's capacity. In situations like this, the work targets of the "pakiao" workers simply get reduced during such periods.

Overall, Metal Wealth has created over 150 jobs, around 50 of which are regular jobs and more than a hundred are on a "pakiao" basis. However, Metal Wealth estimates that there are also

hundreds of indirect jobs created, meaning those of the plastic waste pickers, garbage collectors, and "traders" of plastic wastes in the metropolis.

At the Payatas tip, a solid waste disposal facility several kilometers away from Metal Wealth, the research team met a plastic waste trader supervising the work of 5–7 employees engaged in the collection and initial cleaning of plastic wastes before being sold to Metal Wealth and other plastic recycling companies. This plastic waste trader, a migrant from the Visayas or central Philippines, nets for himself, anywhere between PhP500 to PhP1,500 a day after employees and other expenses have been paid, depending on the volume of plastic materials his employees are able to gather and clean.

Recycling skills and competencies

Jobs in a plastic recycling firm require neither a high level of education nor sophisticated skills. Most of the workers are sorters (Figure 4) who clean the plastic wastes delivered by junk shops and pushcart vendors with simple tools such as brooms and water hose before they are segregated by colour. The big and bulky plastic materials such as plastic chairs or beverage containers are chopped into smaller parts, usually by the male sorters.

For classifiers, the skill needed is the ability to classify plastics by type, based on how the plastic was manufactured. This can be difficult. A classifier must be able to distinguish the different types of plastics according to manufacturing processed. There are four major types: "blowing", "injection", "high impact," and "high density". According to Myla Medina, mastering the art of classifying plastics can take as long as a year. When she was new to the job, Medina was taught by other experienced classifiers how to differentiate plastic waste materials based on their appearance and on the "sound" that they produce. Some classifiers do not even know the right term for each type of plastic but, based on the appearance and sound, they are able to correctly classify the plastic wastes.

Trial and error

In recycling plastic materials, Metal Wealth undertakes trial-and-error experimentation. Some of the processes used in the firm were established after experimentation done by Mr Sy and his more skilled regular workers. Incidentally, most of the workers do not have any theoretical knowledge or background in original plastic manufacturing or the more sophisticated petrochemical manufacturing, both of which require knowledge of physics, chemistry, and engineering processes.

In recycling plastic materials, the process is simpler and the recyclers (both managers and workers) learn through trial and error. For example, finding the right colour mix to produce a new colour of plastic requested by customers is initially done by experimenting with different colour combinations until the right blend is achieved. The results from these experimentations are recorded so that when customers order the same colour of plastic in the future, the company can easily create the right colour mix without having to repeat the experimentation process.

Limited waste supply

One of the problems facing the plastic recycling industry is the limited supply of plastic wastes collected and sold by the junk and waste dealers. When the research team visited the recycling plant, Metal Wealth was only operating at 30 per cent of its capacity because of an inadequate stock of plastic wastes. Mr Sy commented that if only all the plastic wastes could be collected and brought to the plastic recycling plants in Manila, jobs would multiply while the problem of plastic waste disposal in the country would disappear.

APPENDIX VIII: Jollibee Foods Corporation

Interviewees: Carina A. Agarao, *Corporate Affairs Manager;* Benigno M. Dizon, *Vice President for Engineering;* Tony Casaclang, *Head, Environment and Safety Unit;* Arnel Tesoro, *Head, Energy Management Unit*

Venue: *Jollibee Plaza, F. Ortigas Avenue, Ortigas Center, Pasig City*

Dates: *July 28-29, 2009*

Interviewee: Mariel Garcia, *Store Manager, Jollibee – Starmall Branch*

Venue: *Starmall Branch, EDSA, Mandaluyong City*

Date: *August 4, 2009*

General backgrounder

In the latest Asia 200 survey of subscribers of *The Asian Wall Street Journal*, Jollibee Foods Corporation emerged as number one among the 200 Most Admired Companies of the Philippines (Hookway, 2009). Other surveys have given a similar result. Jollibee is not new to receiving recognition for its success in the fast-food restaurant industry. After 10 years in the business, Jollibee already had a spot in the Top 500 Philippine Corporations (1984) and, a few years later, in the Top 100 Philippine Corporations (1987).

Jollibee has gone far since its inception more than 30 years ago. Starting as a two-branch ice cream parlour in 1975, Jollibee has become today the country's largest and leading fast food chain, with over 600 stores nationwide and over 50 stores elsewhere across the globe. The undisputed success of Jollibee is attributed to its affordable, well-served, and tasty food, coupled with effective marketing strategies.

Jollibee has also been active in the acquisition business, acquiring other fast-food chains. In 1994, Jollibee purchased Greenwich Pizza; in 1995, it acquired the franchise of Delifrance; and later, Chowking, Red Ribbon, and Manong Pepe's.

Jollibee's guiding principles are embedded in the initials "FSC" which stands for 'Fast', 'Service', and 'Cleanliness'. By observing "FSC" standards, Jollibee is able to successfully attain its mission "*to serve great-tasting food, bringing the joy of eating to everyone*". The evidence of Jollibee's dedication to high quality standards are the various awards it has obtained for its commissaries. In 1997, Jollibee's commissary in Pasig was named the Outstanding Industrial Plant in NCR by the LLDA and as the Most Improved Industry by the Sagip-Pasig Movement (save Pasig River). At present, Jollibee continually seeks improvement in order to truly become a global brand in the quick service restaurant industry.

Responding to environmental and competitive measures by developing green and energy cost-saving measures

Jollibee has a number of environmental projects in place developed by its Corporate Engineering Department. These projects were products of research and innovation. They were also developed in response to the pressures coming from government agencies involved in monitoring compliance by companies in the proper disposal of wastes as well as the dictates of competition. In short, these projects were not conceived as green projects *per se*; but happily, they all turned out to be great cost savers and greening initiatives at the same time — thanks to the creativity of the Corporate Engineering.

By way of further background, as part of Jollibee's sustainability programmes, the company sought ways to wisely and efficiently use its resources as part of cost-saving measures. Jollibee espoused the principles of value engineering or the process of creating value at the lowest possible investment without affecting quality.

At the same time, as a good corporate citizen, Jollibee has had to comply with all the legal requirements of running a business, including the environmental standards set by government. In the late 1990s, environmental concerns became part of the country's legislative agenda as various environmental laws (i.e. Clean Water Act and Solid Waste Management Act) were enacted. Jollibee has had to comply with these laws and other environment-related regulations.

One government agency that has kept reminding Jollibee about these regulations is the LLDA, which monitors the environmental situation in Laguna Lake, the country's largest freshwater lake dividing the provinces of Rizal and Laguna. Jollibee has around a hundred or so stores near and around Laguna Lake. Hence, the LLDA constantly notified Jollibee and other similar enterprises of the requirements of the above laws, especially the proper segregation and processing of solid and liquid wastes. In addition, the LLDA had been asking Jollibee to meet certain standards on the quality of its water effluents which can be disposed of in accordance with the Clean Water Act. The problem for Jollibee was that the processing of such liquid effluents required chemical processing through the use of expensive machines. This can easily be done by major manufacturing firms; but Jollibee operates at the retail level and could be bankrupted if it had to buy such machines on a per store basis.

Another problem which confronted Jollibee from the 1990s up to the turn of the millennium was the rising cost of electricity and other utilities. To keep its mass market, it has had to keep the prices of its food service at a low and stable level. Power is a major input to the process. Hence, the challenge became keeping the cost of electricity and other utilities also stable.

At the time, Jollibee did not have a department specifically designated for the purpose of addressing different environmental and utility cost concerns. It had instead a Corporate Engineering Division (CED), the main task of which was to undertake value engineering analysis and examine or approve engineering and building designs for the various Jollibee stores mushrooming all over the country.

The job of responding to the LLDA pressure and to the utility cost pressure fell into the lap of the CED. The CED, created the Technical Services Department to address the environment and energy conservation challenges. In turn, the Technical Services Department of Jollibee was divided into two units — the Environment and Safety Unit and the Energy Management Unit. The Environment and Safety Unit has seven employees, all of which have a background in engineering and environmental management. On the other hand, the Energy Management Unit is a two-person team consisting of an electrical engineer and an accountant.

The green initiatives of the Environment and Safety Unit

At first, the Environment and Safety Unit (ESU) was a one-person unit, which was given assistance by a number of outside consultants. However, as a result of the merger of the engineering departments of different Jollibee-acquired fast-food chains (i.e., Greenwich, Chowking, and Red Ribbon) and because of the relatively high cost of hiring external consultants, the unit was expanded to be able to undertake environmental assessment, compliance, and monitoring works in-house.

In general, the ESUs primary responsibility is to ensure that Jollibee complies with the government's rules and regulations, environmental permits, and standards required by the various laws. It acts as a monitoring body that oversees the solid, liquid, and air quality of Jollibee and fraternal/sister chains. However, the responsibilities of the unit are not limited to compliance and monitoring.

It was also tasked to develop environmental programmes to help Jollibee manage all types of wastes generated by the stores in the most effective manner. For instance, to manage liquid wastes, the ESU designed the sewage systems, grease traps, and septic tanks of Jollibee stores so that effluents such as fats, grease, oil, and domestic wastewater generated by the stores are treated before they are discharged. Grease traps and mixing tanks also undergo quarterly deep cleaning and siphoning by a recognized contractor. In Jollibee stores, 4–6 cubic meter mixing tanks are installed to reduce biochemical oxygen demand (BOD). The installation of mixing tanks is an effort initiated by Jollibee to comply with the BOD standards required by the Philippine Clean Water Act. All of these initiatives are part of Jollibee's endeavours to improve the quality of effluent being discharged by Jollibee stores, especially in areas being monitored by LLDA.

In the case of solid waste management, proper segregation of solid wastes is implemented at Jollibee stores. But what to do with the collected wastes? To this, the solution developed by the ESU is to enter partnerships with contracted service providers in the collection of solid wastes every night and to be brought to designated materials recovery facilities for secondary segregation. During the secondary segregation, food wastes are combined with left-over soft drinks and the mixture is used as feed for hogs. Plastic materials are recycled while styrofoam wastes are melted in a machine and converted to resin blocks for easier handling and recycling.

Additionally, the CED initiated a partnership with a number of LGUs and NGOs in Metro Manila and Southern Tagalog in order to organize the waste pickers into cooperatives to make the waste collection process systematic and beneficial to all. This was initially tried in San Juan and Manila and is now being replicated in other parts of Metro Manila and Southern Tagalog. Among the cooperatives that have been so organized are the Metro Manila Eco Aide (Metro Manila), Eco Green (Northern Quezon City), and Ecowaste Management (Laguna, Batangas, and Central Quezon City).

The solid waste management initiatives in Jollibee are not only limited to proper waste collection and disposal. Jollibee is also committed to the reduction of solid wastes within the stores. Jollibee, Chowking, Greenwich, and Red Ribbon stores now utilize reusable and washable Melamine as an alternative to styrofoam and plastic wares. In addition, Greenwich stores make use of recycled materials for corrugated carton packaging for Greenwich pizza deliveries and take-out orders. Consequently, the packaging wastes have been reduced by approximately 600 metric tons annually from Jollibee stores system-wide and by nearly 9.38 metric tons annually from Greenwich stores system-wide. Because of the reduction of packaging wastes, there has been a corresponding reduction in needed warehouse space by 30 to 50 per cent. Aside from helping the environment, the solid waste management initiatives of Jollibee also provide additional benefits to the company as they address the increasing costs of packaging materials. In other words, solid waste reduction has become another cost reduction formula for Jollibee.

The ESU also introduced the conversion of used cooking oil into biodiesel for Jollibee. The used vegetable oil is mixed with diesel fuel and used to fuel the boilers in the commissaries and the generators in the stores.

As part of the promotion of the "FSC" standards in Jollibee stores, the ESU also aims to introduce the concept of "Cleaner Production". The objective of the programme is to ensure that cleanliness is observed at every step of the production process. To implement this programme, there are designated process teams enrolled by different departments such as systems, training, operations, research and development, and engineering. All teams are supervised by the ESU.

The cost-saving initiatives of the Energy Management Unit

To promote the corporate value of frugality, the CED has sought ways to cut costs through value engineering. In line with this, among the first initiatives of Corporate Engineering was one to conserve energy consumption in Jollibee stores as well as at the Jollibee corporate office. As the energy conservation initiatives and programmes of Jollibee expanded and developed, the Energy Management Unit (EMU) was formed as a separate unit under the CED.

Over time, the EMU has introduced a number of innovations and energy-saving technologies such as the Evaporative Fresh Air Blower System, Heat Recovery Water Heater, Variable Speed Drive, and Flouresave. It has also pushed for the full installation of energy-efficient Compact Fluorescent Lamps. The total power savings for the stores installed with the Evaporative Fresh Air Blower System, Heat Recovery Water Heater, and Variable Speed Drive is estimated to be 14.1 million KWH per year (Table 2-9). This amount of saved power can support the power needs of 10,416 households per year, assuming that the average consumption of each household is 140 KWh per month.

Aside from power conservation, EMU has also exerted efforts to conserve water. Jollibee was the first to introduce waterless urinals in selected stores. The waterless urinals enabled a saving of 150,000 liters of water per urinal annually. Other water conservation initiatives include the replacement of drinking fountains with reusable pitchers, the installation of high temperature dishwashers in Jollibee, Chowking, and Greenwich stores to reduce the volume of wastewater discharge, and the installation of low volume-high pressure faucet aerators to control the flow of water from kitchen faucets.

Besides the energy savings resulting from the introduction of different innovative technologies by the CED's EMU, there has also been a remarkable reduction of energy consumption in stores resulting from the minimization of unnecessary use of energy. The EMU provides guidance to store managers on simple yet effective ways of reducing energy consumption. When full energy conservation measures are strictly employed, the average electricity consumption of stores can go down by as much as 10,000 KWh per month.

To ensure that proper energy use is observed, EMU monitors the energy consumption of each store. Monitoring not only includes the gathering of the monthly kilowatt-hour consumption of each store, but also involves making a comparison with the kilowatt-hour consumption before the implementation of the energy conservation programme and with the same month of the previous year.

By means of an Energy Conservation Template created by the Unit, store managers are guided by the theoretical energy consumption of the store, which indicates the most energy-efficient energy consumption for their operations. The actual energy consumption of the store is then compared with the theoretical energy consumption in order to determine the store's compliance with the energy management standards. By performing these monitoring and evaluation techniques, the EMU can assess the effectiveness of the energy conservation measures practised by different stores.

The CED's environmental and energy transformers

What kind of people are in the CED's environmental and energy units? What is their background and skills profile?

Given the extent of the responsibilities of the ESU, Tony Casaclang, the unit head, said that it is critical for the people in the team to have a thorough knowledge of the various environmental laws. Hence, a background in environmental management is necessary. However, people with an engineering background are also needed for the job, especially when the environmental projects

require technical skills such as the biodiesel programme of Jollibee. Casaclang himself was a graduate of engineering and took master's units in Environmental Management. He also pointed out the importance of a high level of environmental awareness among the members of the team in order to become committed to environmentalism.

In addition to the knowledge of environmental laws, engineering/technical education background and passion for environmentalism, the members of the ESU are able to hone existing skills or develop new ones through actual exposure to the job and working together as team in doing problem solving. Engineer Casaclang believes that environmental values are also further developed and honed as the staff becomes more involved with responsibilities addressing environmental issues.

Most of the members of the ESU previously worked for Jollibee as consultants. By recruiting former consultants, Jollibee does not have to train them because they already have the skills and knowledge to accomplish their tasks and are familiar with the organizational culture of Jollibee.

On the other hand, the EMU is composed of Engr Arnel Tesoro, the unit head, and his assistant, who is primarily responsible for documentation. Engr Tesoro said that it is imperative that he stays well-informed about the latest energy-saving technologies. Through internet research and other information provided by the various suppliers of Jollibee, coupled with their knowledge about the dynamics of various energy-related processes, the team is able to identify appropriate innovations or adjustments that Jollibee can or should make such as the change in the lighting used by the chain and the introduction of the waterless urinals.

Cascading and spreading the CED initiatives Jollibee-wide

The efforts of the two units of the relatively lean Technical Services Department and the CED in general while necessary are not sufficient to ensure that the environmental and energy management initiatives of Jollibee are implemented in each of the 600 plus Jollibee stores nationwide and across the globe. For this reason, it is important that all such initiatives are passed on to the managers and workforce of the stores.

While the two units of the Technical Services Department handle all the environmental and energy issues at the corporate level, the store managers are the ones who ensure that every environmental initiative is implemented at the store level. Thus, being a store manager at Jollibee entails additional responsibility above and beyond store management. Store managers are automatically designated as the stores' pollution control officers. They supervise environmental compliance at the store level, monitor the energy consumption at the store, and impart the environmental management initiatives of the company to the service crews.

One of the challenges to the store managers as pollution control officers is the trickling down of the environment-related information to the service crews. Based on the survey conducted by ESU, the level of environmental awareness among the service crews is often very low. Therefore, store managers are expected to develop ways to raise the level of environmental awareness among service crews. As mentioned by Engr Casaclang, environmental awareness is a key to better understanding of the environmental management initiatives of Jollibee.

According to Mariel Garcia, store manager of Jollibee (Starmall branch), the problem of environmental awareness is addressed through the day-to-day game planning before the store opens for operation. Environmental issues are integrated into the game planning by discussing proper solid waste management and energy conservation measures with the crews. However, Mariel Garcia said that raising the awareness level of the service crews is not an easy task. Service crews in Jollibee are contractual employees and their term of employment usually lasts for five months only. This is primarily due to the fact that most of the service crews in Jollibee are students who work for additional income on a part-time basis. However, Mariel Garcia relates that she herself started as a part-time service crew and eventually made her way to the store manager

position because of her good performance and interest in making a career in the food and beverage industry.

Based on the observation of Mariel Garcia, three months of daily reminders through game planning is required to make a service crew fully compliant with solid waste management procedures and energy conservation measures. When the contract is terminated, a new set of service crews have to be oriented and trained.

In order to motivate the workforce to do their best in complying with environmental standards, an audit is regularly conducted to assess the performance of the store and the store manager. During the audit, the store managers are graded in terms of their compliance with the FSC standards, which already include the energy conservation and environmental components. Areas inspected by the auditors include the grease trap maintenance, solid waste management, and energy consumption. The results of the audit affects the performance appraisal of the store managers. This is also one way of monitoring the stores adherence to the FSC standards promoted by the top management.

As a form of incentive for top-performing stores and store managers, they are given recognition during the annual FSC Awards. The FSC Awards is a prestigious awarding ceremony organized and handled by the Quality Management Department and HRD to encourage Jollibee workforce to deliver the customer clean and high quality food and service.

Energy and environmental training for managers

Clearly, a strict implementation of the company's environmental management initiatives would require new skills, particularly among the store managers who are basically experts on restaurant management and not on environmental management. In this case, ESU and EMU play crucial roles in equipping the store managers with the necessary knowledge and skills to become effective pollution control officers of their stores.

As most store managers have zero knowledge on pollution control and other environmental issues, it is therefore a "must" to fill in such knowledge gap so that store managers can effectively carry out their responsibilities. Filling in the knowledge gaps is made possible through training programmes that enhance the store managers' understanding of environmental concerns.

One of the training programmes given to store managers is the Pollution Control Officers' (PCO) training, a three-day training programme organized by the ESU in coordination with the LLDA and DENR. The PCO training consists of classroom discussion of government policies related to the environment, the effects of the store operations to the environment, and the ways and methods of improving the environmental compliance of the store. Store managers are provided with modules outlining the topics that are discussed so that they understand them more easily.

The PCO training not only consists of classroom training. It also involves educational trips that expose the store managers to the application of the concepts discussed in the classroom. One of the places visited by store managers during the PCO training is a wastewater treatment plant. Through such visits, the participating store managers are able to grasp the concepts relating to water quality and the stipulations of the Clean Water Act more easily.

One of the strengths of the PCO training programme is the comprehensiveness of the issues tackled. However, from the perspective of a store manager, the PCO training can still be improved so that the attendees can be more appreciative of the subjects under discussion. Mariel Garcia suggests that it would be better if the approach used by the trainers during the discussion is less technical so that the concepts introduced in the training are easily understood. For a person that is more attuned to concepts related to food, beverage, and customer service, comprehension of technical terms such as effluent standards, BOD, and the like are often incomprehensible. In this regard, both Engineers Tesoro and Casaclang have recognized that there is a need for the trainers

to be able to communicate in layman's language and convey their meaning to the participants of the training.

In addition to the PCO training, the store managers are also required to attend the Energy Management Training Course organized by EMU. The training is a half-day session where store managers are given an overview on energy and energy conservation. More particularly, store managers are given a background on the electrical system of the store. If store managers do not know the switches and circuit breakers and how they function, it will be difficult for the store managers to understand how to use electricity in an energy-efficient manner. Pointers on how to conserve energy are also discussed in the Energy Management Training Course.

Despite the training on pollution control and energy management, Engineers Casaclang and Tesoro believe that the upgrading of skills of store managers should not be limited to such training. Because of the increasing attention given to environmental issues and the equally increasing demand for the stores to become environment-friendly, the Technical Services Department recognizes the challenge of further enhancing and deepening the Environmental and Energy Management Initiatives of Jollibee. In order to further integrate the environmental issues in Jollibee's operations and raise environmental awareness among the workforce, the ESU plans to devolve some of their responsibilities to the HRD.

The primary aim of ESU with respect to the devolution of its function is to incorporate the environmental issues dealt with by the stores to the Business Operations Training Programme. The Business Operations Training Programme of Jollibee is the training given to prospective managers and assistant managers. According to Engr Casaclang, were the programme to include an environmental component, then the store managers would attain a better level of environmental awareness at the time of their promotion to a managerial position. In such cases, it would be easier for them to perform their role as the store's pollution control officers because, to a certain extent, they would be equipped with an overview of the environmental concerns and their relationship with Jollibee's business operations.

On the other hand, the EMU aims to come up with an automated system for the monitoring of the energy consumption of all Jollibee stores nationwide. The Unit also intends to conduct energy management skills orientation training for managers assigned to stores located as far from Manila as General Santos City in Mindanao. It also seeks to improve its existing programmes and efforts through research and development. One of the prospective research and development projects that the unit has under consideration is the use of wind and solar energy for selected Jollibee stores.

Along the way, Jollibee has realized that investing in environmental initiatives brings multiple benefits. The issue of environmental compliance is addressed and the initiatives themselves become the company's cost-saving measures. As stated by Benigno M. Dizon, Vice President for Corporate Engineering of Jollibee Foods Corporation, the cost-saving feature of caring for the environment makes "*environmental protection an investment, rather than a burden*".

Expanding environmentalism beyond the stores

Jollibee's environmental programmes are not confined within the walls of the Jollibee stores. Through the corporate social responsibility programmes of the Jollibee Foundation, Jollibee is helping a number of communities with their environmental programmes and encouraging volunteerism among their employees by encouraging them to participate in earth-friendly programmes.

In celebration of Earth Day in 2009, employees of Jollibee stores in Metro Manila, through the leadership of Jollibee Foundation, participated in the clean-up activity in the vicinity of the Cultural Center of the Philippines (CCP). Volunteer employees of Jollibee Metro North engaged in tree-planting activities in the La Mesa Dam Eco-Park.

Conclusion

To conclude, Jollibee's efforts to deal with the pressures of complying with the government's environmental standards and to cope with the challenges of stiff and fierce competition in the fast-food chain industry have pushed it to develop great innovations in environmental management and energy and utility management which are being emulating by other industries. In the process, Jollibee has become an increasingly green CC-friendly chain, thanks to the pioneering efforts of the CED visionaries, the green and energy transformers.

APPENDIX IX: Haribon Foundation

Interviewees: Blas Troy Tabaranza, *Executive Director;* Arlie Joy Endonila, *HR Manager;* Anabelle Plantilla, *Director, Organizational Sustainability Division;* Ryan Guevarra, *Forester/Researcher;* Jerbert M. Briola, *Advocacy Specialist*

Venues: Haribon Foundation, Quezon City and UP Campus, Diliman, Quezon City

Dates: July 27, 2009; August 18, 2009; September 19, 2009

General backgrounder

Haribon comes from the term "Haring Ibon" or "King Bird".

Haribon, the NGO, is one of the leading, largest, and oldest environmental organizations in the Philippines. It started as a bird-watching society in 1972. However, environmental pressures on the bird population, especially on rare and endangered species, helped transform the group of bird-watching hobbyists into an organization espousing environmental protection. The first environmental project of Haribon was the Philippine Eagle Project, which sought protective sanctuary for the critically endangered Philippine Eagle. In 1983, the organization became an official conservation foundation and its name was changed from the "Haribon Society" to the "Haribon Society for the Conservation of the Natural Resources". With this, the new environmental advocacy group immediately embraced a comprehensive agenda of research, education, and advocacy on environmental concerns with special focus on biodiversity. It was accredited by DOST as a science and research foundation conducting studies on biodiversity.

In the decade of the 1980s, Haribon was active in a number of environmental advocacy projects such as the campaign against commercial logging in Palawan and the campaign for the establishment of the Integrated Protected Areas System, which contributed to the enactment of the NIPAS Act of 1992.

In 1989, Haribon, DENR, and the World Wildlife Fund participated in the first debt swap in Asia, the Philippine Debt-for-Nature-Swap Programme. This was followed by a second Debt-for-Nature-Swap, this time involving negotiation for an environmental endowment fund with the United States Senate. This led to the formation of the Foundation for the Philippine Environment (FPE), an organization that provides funding for hundreds of environmental projects of different NGOs.

In 2001, Haribon was instrumental in the integration of forest management into local governance through the EU-funded project "Integrating Forest Conservation with Local Governance in the Philippines". Earlier, Haribon was involved in the formation of broad of environmental coalitions such as the PAMANA, a national alliance of fisherfolk and LGUs promoting coastal resource conservation. Haribon also initiated the capacity and capability building of four academic Centers for excellence on biodiversity conservation — Camarines Sur State Agricultural College, De La Salle-Dasmariñas, Silliman University, and Mindanao State University/Iligan Institute of Technology. It has been conducting an inventory of the important biodiversity areas and marine protected areas in the Philippines.

In 2007, Haribon took an active role in the identification and establishment of 117 green courts that handle environmental cases such as illegal logging. As a response to the decreasing forest cover and to the effects of deforestation, particularly in the Quezon and Aurora areas of Luzon, Haribon launched the "ROAD to 2020" campaign in 2005. This campaign brings together organizations and advocates supportive of "rainforestation", a forest restoration method introduced by the Visayas State University using native tree species and providing living allowances for communities growing the trees as an incentive to their preservation. The ROAD to 2020 campaign is a continuing project of Haribon in cooperation with other environmental

organizations, academic institutions, and private institutions, aimed at reforesting one million hectares of the country's rainforests.

In sum, in nearly four decades of existence, Haribon has amply demonstrated that it is the country's leading environmental advocacy organization. It has made remarkable contributions in different areas of environmental advocacy involving the community, government, academe, and other stakeholders through various projects such as biodiversity conservation, setting up of environmental support fund, environmental policy formulation, and environmental research, training, and education. It also remains a steadfast affiliate of the Birdlife International, an international alliance of conservation organizations protecting birds and their habitats.

But what are the HRD and skills concerns in an organization fully dedicated to environmental advocacy and forest restoration and composed of supposedly green professionals and advocates?

Diverse environmental concerns, diverse organizational problems, diverse skills requirements

Haribon is a membership-based organization, with around 40 to 50 employees. To provide additional workforce support, around 50 volunteers help the fixed-term employees. All such employees are employed on a per-project basis because funding is usually project-based also. On the average, a project lasts for two to three years. Funding is sourced from local and foreign donors, including the FPE which Haribon helped establish.

Because of the diverse projects being handled by Haribon, there is a need for the involvement of an equally diverse group of people with the range of skills needed by these projects. There are researchers and field workers such as foresters, geographical information system (GIS) specialists, and biologists. There are also community organizers and environmental planning specialists who undertake community organizing and teaching the community on the wise and balanced use of resources.

To push the organization's advocacy agenda, there are advocacy officers who are responsible for networking and campaigning. There are also communication specialists who are in charge of Haribon's publications and other materials. In addition, there are training personnel who develop modules and conduct training programmes for the communities and partner organizations. Aside from these technical people, there is also a team of administrative staff in Haribon's central office who provides support for the activities of the organizations.

One of the problems faced by the HRD is the skills matching during the recruitment process. Most of the positions being offered by Haribon require very specific technical skills. In the case of the GIS specialist, the necessary skills that an applicant must possess are knowledge of mapping, global positioning system, and use of mapping software. Examples of people who have such skills are geodetic engineers, who are very few, and foresters, who only have limited knowledge of these topics. Hence, there is only a small pool of applicants who can qualify given these rare and specific skills requirements.

In the case of community organizers, the competency requirements are knowledge and skills in community organizing and familiarity with environmental laws and community issues. In addition, they must also be adept in communicating with people at different levels of organization. In other words, while some positions require very specific technical skills, there are also positions that require technical skills as well as non-technical behavioural skills.

Commitment to and added skills on environmental advocacy

Another factor that limits the number of qualified applicants for some positions in Haribon is a commitment to environmental advocacy. In order to determine the level of environmental commitment of the applicants, the recruitment team looks at the applicant's past and present involvement in environmental activities or organizations. During the pre-hiring screening

interviews, they ask potential employees directly about their passion and interest on the environment. It is very important for all employees of Haribon to have a passion for the environment so that it is easier to align their values with Haribon's advocacy.

To supplement a person's knowledge on the environment, every employee in Haribon is required to attend the basic ecology course given by the HRD during the first day of their work. With the basic ecology course, it is expected that all employees will have an adequate knowledge of basic ecology, Philippine biodiversity, and an increase level of environmental awareness.

The most common skills development strategies in Haribon are on-the-job training and mentoring. There are also in-house training programmes such as training on basic ecology and community-based resource management. Some employees are also sent to outside training provided by partner organizations such as Birdlife International and World Wildlife Fund as well as by service providers on non-environmental courses such as supervisory training.

On top of the knowledge and skills before hiring, a Haribon employee acquires additional knowledge and skills on the job. Ryan Guevarra, a forester and researcher at Haribon, said that he learned half of his current knowledge in forestry through his work at Haribon. By being exposed to various training programmes and field work, he has become knowledgeable in other technologies that can be applied to forestry. For instance, Guevarra was sent to a rainforestation training course when he was just starting out in his job as a forester at Haribon. During the training, he realized that, despite his good background in forestry, he was mistaken with some of his preconceptions on growing indigenous tree species, such the perception that such trees are difficult to grow. Eventually, Guevarra himself became a trainer of rainforestation technology and was able to impart his skills and knowledge to the community members.

On the other hand, Anabelle Plantilla, the Director for Organizational Sustainability and former Executive Director of Haribon, has experienced several different types of jobs at Haribon in her 14 years of service in the organization. However, since her early years at Haribon, the majority of her responsibilities have been related to marketing and fund-raising. Plantilla has a very good background in environmental issues, being a graduate of environmental management. Although her good background on the environment helped her a great deal in performing her job at Haribon, she admits that she found her function quite difficult to carry out. As Plantilla puts it, there is no school for fund-raising and most of the effective fund-raising activities depend merely on one's creativity.

Initially, Plantilla did just that, squeezing her creative marketing juices and devising every feasible fund-raising activity possible. However, when there were opportunities abroad for training on fund-raising, Plantilla was fortunate to participate. She was sent to Switzerland to observe how the World Wildlife Fund, a partner organization of Haribon, operates. Because of this experience, she became exposed to other effective fund-raising strategies, which she was able to apply in Haribon. She also attended another fund-raising training activity in Indonesia, along with representatives of other NGOs. According to Plantilla, the training and on-the-job observations widened her horizon on marketing and resource mobilization approaches and aided her in developing fund-raising projects that will ensure the organization's sustainability.

The knowledge that Haribon employees learned from trainings and on-the-job is not limited to their area of specialization. For instance, Plantilla said that her knowledge of marketing and fund-raising strategies is supplemented by her expanded knowledge on trees and birds. She said that by appearing knowledgeable, especially her ability to identify different species of trees and birds, she is able, more easily to convince potential partners and donors to invest in the protection of the environment.

For Jerbert Briola, an advocacy specialist at Haribon, on-the-job training and self-study are the most effective ways to develop the skills and knowledge needed to perform a task. Essentially, an advocacy specialist is responsible for campaigning for the cause of Haribon, strategizing to influence other groups and partner organizations, writing position papers on environmental issues,

and lobbying for the passage of environmental laws. Because of Briola's experience in advocacy works prior to being part of Haribon, he already possessed the necessary skills to perform his responsibilities as an advocacy specialist. What was lacking was specific knowledge of various Philippine environmental laws, policies, and issues. Before joining Haribon, Briola was more adept at human rights and labour issues. Thus, initially he had a difficult time grasping the green advocacy. Because having sufficient knowledge is crucial to becoming an effective advocacy specialist, Briola filled his own knowledge gap by reading relevant materials on the projects and advocacies of Haribon (i.e. the technology of rainforestation) as well as the different environmental problems in the Philippines (i.e. mining and deforestation).

Being a fund-dependent organization, Haribon has difficulties in providing its employees with the range of benefits that most employees from private institutions enjoy. Despite this, Plantilla said that Haribon strives to spread learning and training opportunities across all employees, administrative staff, and field workers alike. In this way, Haribon employees may not be receiving financial benefits but the organization ensures that they will be enriched with valuable experiences from travels and trainings. Through this, Haribon is able to contribute to the personal development of its people and, at the same time, it is also able to address the skills gaps among the employees.

Towards HR professionalism

Haribon also upholds the proper and professional working attitudes among its employees. As the organization grows in terms of membership and employees, Haribon has transformed its operation, away from that of a traditional NGO addressing HRD and personnel concerns in an informal or even lackadaisical manner, e.g., without 201 files or clear personnel policies and programmes. Haribon has put in place personnel policies and systems, including the organization's rules and regulations that are at the core of a human resource management system. Initially, the people were resistant to the changes brought about by the HRD programmes implemented by Haribon. There were even staff resignations due to the resistance of people who had difficulties in adjusting to the new system. Because most Haribon employees formerly worked in other NGO's or have been with Haribon for a long time, they were more accustomed to a less formal and less structured way of dealing with the organizations procedures and policies. Some did not take the professionalization efforts of Haribon positively and found it difficult to adjust with the changes that Haribon was implementing.

However, the adjustment problem was eased by consultations, consistency in the implementation of policies, and an open feedback mechanism and communication. Haribon also sought ways to develop its human resource management. HR Manager Arlie Endonila sought external assistance to increase their knowledge about labour laws so that the HRD would be able to know how to effectively and lawfully manage personnel concerns. In fact, the research team was asked to conduct an orientation-consultation workshop on labour laws and employee discipline on October 1, 2009.

The HR "professionalization" process has enhanced Haribon's performance and the development of an organizational culture. Haribon developed with an employee manual, which includes the organization's vision, mission, values, and rules and regulations. With these policies set in place, managing and instilling discipline among employees has become easier. Every six months, an employees' performance is assessed based on actual work performance (70 per cent) and on compliance with the organization's rules and regulations (30 per cent).

Building up Haribon culture and loyalty despite limited resources for personnel welfare

Haribon is inculcating among the staff and specialists the "Haribonic" culture so that they become "Haribonic" employees. Being "Haribonic" means being able to uphold the Haribon's values of passion for the environment, integrity, and professionalism. Indicators of being "Haribonic" include becoming a member (and not just an employee) of Haribon and bringing the

environmental advocacy wherever an employee goes. In and out of work, a Haribonic employee retains his/her environmental consciousness, spreads the advocacy of Haribon, and considers the welfare of the environment in everything an employee does.

This is not easy given the limited resources Haribon has. Aside from the difficulty in finding the right people for the job, the HRD also has problems in retaining their employees. Being a non-profit organization, the salary offered to employees by Haribon is not as competitive as those being offered by other institutions and industries. Some employees choose to work in call centers or business outsourcing companies because of the higher pay. In addition, some employees tend to be concerned about job security because the jobs offered by Haribon are offered on a per-project basis. Although the HRD has been planning to include regularization in their employment programme, there is a need to have a constant source of funds to sustain regularization.

Nevertheless, despite the per-project tenure set up, there are employees who have been with Haribon for more than 10 years, obviously sustained by their love for the environment and belief in what Haribon is doing.

APPENDIX X: Negros Island Sustainable Agriculture and Rural Development Foundation, Inc.

Interviewee: Rommel T. Ledesma, *NISARD Administrator for Negros Occidental Operations*

Venue: Provincial Capitol Building, Bacolod City, Negros Occidental

Date: August 13, 2009

General backgrounder

The island of Negros is divided into two provinces — Negros Occidental and Negros Oriental. After more than a century of chemical agriculture (mainly in sugar production), the then governors of Negros Occidental and Negros Oriental signed a MOA in August 2005 to promote sustainable agriculture and rural development in the island. Part of the MOA involves the creation of the Negros Island Sustainable Agriculture and Rural Development Foundation, Inc. (NISARD), a foundation tasked to help formulate and promote sustainable agriculture and rural development policies and initiatives for the two provinces.

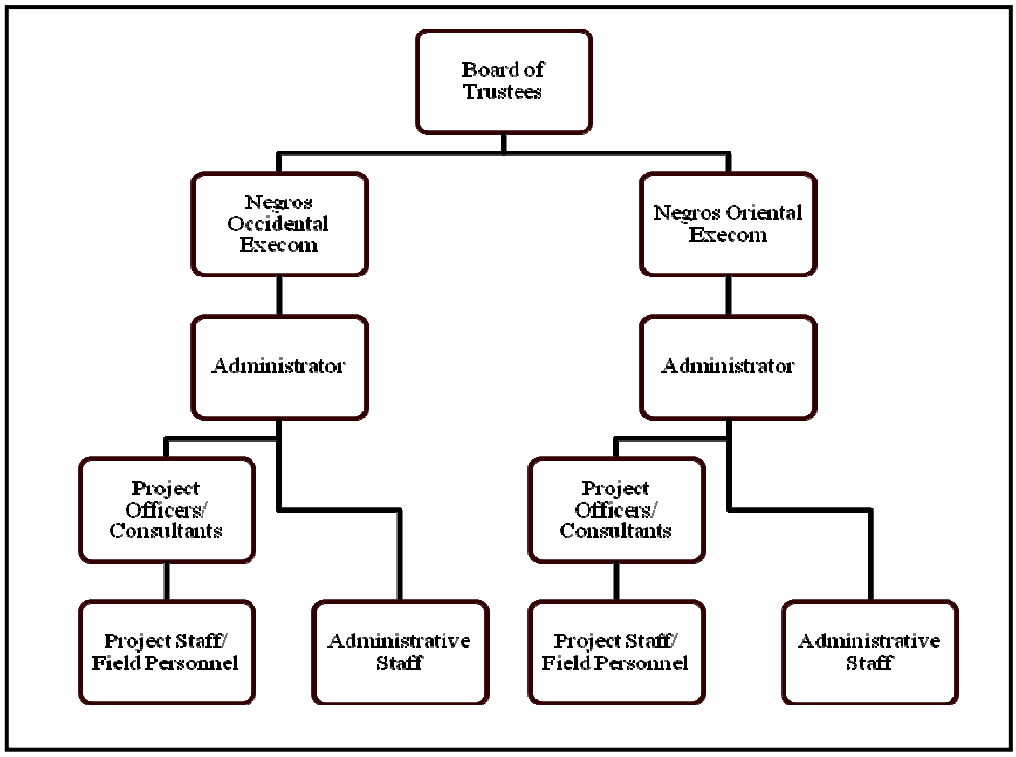
Sustainable agriculture was chosen by the two provincial governments as the vehicle for the promotion of rural development because it addresses the three dimensions of sustainable development — social, economic, and environmental. In other words, sustainable agriculture is not only directed towards livelihood and poverty alleviation but also towards the conservation of natural resources. According to Rommel Ledesma, NISARD's Administrator for Negros Oriental Operations, Negros Island has probably one of the most overused land areas in the Philippines in terms of the use of chemical fertilizers and the only way to prevent the complete degradation of land is to promote organic farming. As primarily an agricultural economy, Negros will have difficulty in encouraging other types of industries to establish themselves on the island. The only way for Negros to move forward in economic development is to improve its agricultural resources through following an organic path.

Hence, NISARD's mission is to "*make Negros Island the Organic Food Island of Asia through organic food production for the promotion of food security, biodiversity, environmental conservation and sustainable agriculture, and rural development*". In this vein, NISARD's vision is to develop "*an ecologically-balanced, peaceful, and progressive Negros Island characterized by an empowered, healthy, and self-reliant citizenry with a globally-competitive agro-industrial diversified economy anchored on sustainable development under responsive and accountable governance promoting gender equality and social justice shared by a dynamic civil society*".

NISARD aligns its objectives with the three areas of sustainable development — economic, social, and environmental — that it seeks to address. Its economic objectives are to increase the organic area devoted for agricultural purposes to 10 per cent of the total agricultural land in Negros Island by 2010, increase the local and export market for organic products, establish NISARD's organic quality assurance system, promote fair trade, and provide marketing support for farmers. In terms of the social dimension, NISARD aims to alleviate poverty and improve the quality of life of the people of Negros, promote community development, improve health conditions, and increase food security. With respect to the environmental considerations, NISARD intends to improve farm diversity, create alternative livelihood for fishing communities and upland dwellers to allow forest and reef generation/regeneration, and enhance the management system of water resources.

NISARD-Negros Occidental is a very lean organization composed of five people: one administrator, one lead programme officer, one administrative staff, and two field personnel. This lean workforce is augmented by a number of consultants, inspectors, trainers, and volunteers who have expertise in organic farming and organic certification services (Figure 7).

FIGURE 7: NISARD'S ORGANIZATIONAL STRUCTURE



What NISARD has accomplished so far

NISARD was established in October 2005 but its actual operation started in January 2006. In its first year, the organization began to implement its rural development programmes in cooperation with the two provincial governments of Negros and other NGOs. NISARD organized the First Negros Island Organic Farmers Festival, which is now held annually and in which organic farmers across the island participate. Usually a three to five-day event, the festival includes training programmes and seminar workshops on organic farming. Also, a trade fair is organized to allow the organic farmers display and market their organic products.

In the following year, NISARD conducted capacity-building programmes directed towards organic certification. By December 2008, the NISARD Certification Services (NICERT) was established to provide organic farmers of Negros Island with competitive and independent third-party organic guarantee or certification system that is patterned after national and international organic standard certification systems and adjusted to the distinctive conditions of the island. NICERT is considered to be the backbone of all NISARD's projects and its primary purpose is to take action in response to the increasing needs of various organic farmers to obtain organic certification for the local and foreign market. At the same time, through the seal of guarantee provided by NISARD to organic products, consumers are protected against non-organic products that are misleadingly declared as organic. NISARD has developed, through NICERT, all types of manuals, including the Operating Manual and Internal Control System Manual, and forms needed for Organic Agriculture certification for products such as organic fertilizer, coffee, sugarcane, and services such as organic handling and retailing. These have been developed in conformity with international organic standards.

NISARD organizes awareness-raising festivals such as the Fourth Negros Island Organic Farmers Festival, under the banner "Organik na Negros". The festival, held from November 25–27, 2009, lined up activities promoting organic farming, showcasing organic products, and providing marketing and training opportunities for organic farmers. Among the activities in the

2009 organic festival were training sessions on packaging and labelling, organic free range chicken production, organic bangus production, and practical organic approaches to livestock.

Scaling the value chain

Aside from the certification services offered by NISARD, there are also other projects being implemented by the organization that provide assistance to the organic farmers in the two provinces of Negros. In the case of organic rainforest coffee production, NISARD trained more than 800 farmers in three forest communities on organic production and quality assurance. Besides conducting training and workshops on organic farming technology, NISARD also provides post-harvest assistance to organic farmers to help them market their products and increase their earnings. After harvesting, NISARD buys the fresh coffee beans from the farmers at a stable price, which is PhP1–2 higher than the amount paid for by the usual traders/buyers. Afterwards, NISARD provides the farmers with post-harvest facilities so that the farmers can mill the coffee beans that NISARD brought from them. In other words, the farmers' income stream is not limited to earnings from farming only; it is extended to value-added services such as milling, since the farmers also get paid for their labour in the milling process. Through the post-harvest assistance given by NISARD, the organic farmers are able to move to the next level in the value chain of the coffee production. In this case, NISARD is able to increase the economic activities in the forest communities by creating more jobs for the farmers and other locals. In the future, NISARD intends to also equip the communities with coffee roasting technologies so that practically all possible economic activities would stay with the farmers in the forest communities.

NISARD has been active not only in promoting sustainable agriculture, it is also keenly involved in the campaign against genetically modified organisms (GMOs). This stance of the organization is in accordance with a stipulation in the MOA that the two provinces of Negros Island will not support the cultivation of GMOs in the island. In order to intensify the anti-GMO campaign in the island, educational programmes about biosafety were also organized by NISARD. On July 23, 2008, Camilo Rodriguez-Beltran, a Brazilian expert from the Center for Integrated Research in Biosafety, gave a lecture about the health considerations of genetic engineering.

Impact on skills development

Compared to chemical-based farming, organic farming is a more labour-intensive process. As pointed out by Ledesma, organic farming is not simply about taking care of the crops; it is about taking care of the soil (so that the soil will take care of the crops).

Hence, an organic farmer must possess the vital skills and knowledge needed to make organic crop growing successful. Furthermore, if the goal of Negros Island is to encourage sustainable agriculture among its farmers, then it is imperative for NISARD, the implementing and monitoring body of the MOA, to work towards the developments of the skills of farmers who want to go organic. The organic farming skills development is part of NISARD's "Education and Promotion of Organic Farming" project, which concentrates on sustainable agriculture, farming strategies, and market awareness.

In this regard, NISARD has been conducting training for farmers who want to try organic farming or sustainable agriculture techniques. Experts on organic farming such as Robert Gasparillo, NISARD's Lead Programme Officer, and Prof Armando Aquino, an agriculture professor from the University of the Philippines-Los Baños (UPLB) and NISARD consultant for Organic Certification, are the principal resource persons of NISARD in most training programmes on organic farming.

Since 2007, NISARD has been conducting training for small farmers in different organic rice farming technologies. A notable organic rice farming technology transferred to the farmers has been the Organic Rice-Duck Production, which makes use of ducks in reducing weeds and pests. This technology has been proven effective and profitable based on the testimonials of past

training participants. Organic rice-duck production increased the income of farmers because of the same or greater yields at lower capital costs.

One of the seminars organized by NISARD in November 2008 was the Natural Farming System for Piggery and Chicken Workshop participated by the small- to medium-scale producers of pigs and chickens. This was a two-day seminar-workshop which discussed the fundamental concepts of natural farming systems, including the preparation of natural feeds housing.

Also in November 2008, a two-day seminar workshop on organic seed production was also organized by NISARD. The training was provided by Prof Aquino who discussed rice and corn seed production and Dr Rodel Maghirang of UPLB who provided a lecture on organic vegetable seed production. The objective of the training was to encourage the production of organic seeds in order to supply certified organic seeds to the organic farmers in Negros as an alternative to commercial hybrid seeds.

The training programmes provided by NISARD are not only for the benefit of the farmers and other organic farming practitioners. NISARD also conducts training for the local inspectors of NICERT so as to enhance their competence in the certification services offered by the organization. In December 2008, the Organic Inspectors Association — Negros Island, the inspection arm recognized by NISARD, underwent an organic certification training through NISARD. In order to further develop the skills of the local inspectors, NISARD commissioned Gil Carandang, an international inspector, to conduct "on the job coaching" for the local inspectors who were then inspecting the production of organic fertilizer. The "on-the-job coaching" was supplemental to the training that was already being provided by NISARD.

The local inspectors are mostly organic farmers, organic farming practitioners, and members of the provincial agricultural office. Aside from their regular jobs, they also work for NISARD on a part-time and per-job basis by conducting inspection for organic certification.

One of NISARD's future plans is to extend the promotion of organic farming to schools. At present, the organization is hoping to offer educational packages to schools as part of its advocacy campaign for organic farming and sustainable agriculture. Apart from the promotion of organic farming among the students, NISARD also aims to educate them about the nobility of farming as a profession.

Conclusion

The HRD dimension of the NISARD operations can be viewed at two levels — at the grassroots or farm level and at the foundation level. At the former, the tasks of NISARD are to help impart to farmers and their communities knowledge of organic farming, enhance their skills in managing organic farming through a whole value chain system, and extend appropriate support services as they shift to the culture of organic farming. At the same time, NISARD as a foundation is staffed by officers and volunteer trainers/educators who serve as catalysts in organic farming in their capacity as green professionals and advocates. The job of the latter is not easy given the limited resources and limited staff involved. On the other hand, NISARD's ambition is big — to overhaul a century of chemical-based sugar agriculture and switch to a sustainable organic base. To achieve such a goal requires a high level of commitment and a considerable budgetary commitment from the two LGUs.