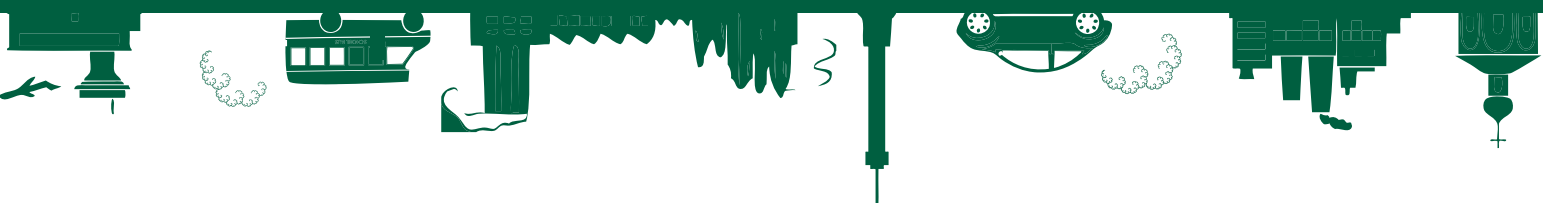


ProGED

Promotion Of Green Economic Development (ProGED) Project



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Greening the Philippine Manufacturing Industry Roadmap

-Strengthening Systemic Competitiveness and Fostering Inclusive Growth-

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Bonn and Eschborn, Germany
T +49 228 44 60-0 (Bonn)
F +49 61 96 79-0 (Eschborn)

Promotion of Green Economic Development
6F Trade and Industry Bldg., 361 Sen Gil Puyat Ave.
Makati City 1226 Philippines
T +63 2 897-8199
F +63 2 753-1441
info@greeneconomy.ph
www.giz.de/www.greeneconomy.ph

Design and Layout
Flor Ian Louie Bantawig

Author
Bernd Gutterer PhD, Como Consult GmbH

Editor
Volker Steigerwald
Raquel Capio

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PROMOTION OF GREEN ECONOMIC
DEVELOPMENT PROJECT (ProGED)

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of South-East Asian Nations
BMZ	German Federal Ministry of Economic Cooperation and Development
BOI	Board of Investment
BPS	Bureau of Product Standards
BSMED	Bureau of Small and Medium Enterprises Development
BTVE-DECS	Bureau of Technical-Vocational Education of the Department of Education, Culture and Sports
CCC	Climate Change Commission
CCO	Climate Change Office
CDC	Clark Development Corporation
CHED	Commission on Higher Education
CEZ	Clark Economic Zone
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DOE	Department of Energy
DOF	Department of Finance
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
DOTC	Department of Transport and Communication
DTI	Department of Trade and Industry
ECC	European Chamber of Commerce and Industries of the Philippines
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
EIP	Ecological Industrial Parks
EMB	Environmental Management Bureau
EMS	Environmental Management Systems
EnMS	Energy Management Systems
EO	Executive Order
EU	European Union
GED	Green Economic Development
GHG	Greenhouse gases
GIZ	German Agency for International Cooperation/Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
ILO	Intergovernmental Panel on Climate Change
IPP	Investment Priorities Plan
ISO	International Standards Organization
LGU	Local Government Unit
KOICA	Korean International Cooperation Agency
MDG	Millennium Development Goals
MSME	Micro, Small and Medium Enterprise
NAPA	National Adaptation Programs of Action
NCAP	National Climate Change Action Plan
NEDA	National Economic and Development Authority
NMYC	National Manpower and Youth Council
OECD	Organization for Economic Co-operation and Development
PCCI	Philippine Chamber of Commerce and Industry
PCIEERD	Philippine Council for Industry, Energy and Emerging Technology Research and Development
PCIERD	Philippine Council for Industry and Energy Research and Development
PCSD	Philippine Council for Sustainable Development
PEDP	Philippine Export Development Plan
PEPP	Philippine Environment Partnership Program
PEZA	Philippine Economic Zone Authority
PIDS	Philippine Institute for Development Studies
PIEEP	Philippine Industrial Energy Efficiency Project
PNS	Philippine National Standards
PPP	Private Public Partnerships
ProGED	Promotion of Green Economic Development Project
PNS	Philippine National Standards
PPP	Private Public Partnership
PSD	Private Sector Development
RA	Republic Act
R&D	Research and Development



QMS	Quality Management Systems
SBMA	Subic Bay Metropolitan Administration
SEZ	Subic Special Economic and Freeport Zone
SO	Special Order
TESD	Technical Education and Skills Development
TESDA	Technical Education and Skills Development Authority
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environmental Program
UNFCC	United Nations Framework Convention on Climate Change United Nations
WB	World Bank
WBCSD	World Business Council for Sustainable Development
WEF	World Economic Forum
WTO	World Trade Organization



1. Executive Summary

The manufacturing sector of the Philippines is challenged to significantly strengthen its competitiveness in order to be prepared for the challenges lying ahead. Seeing the worldwide dynamics of industrial development and the integration process of the ASEAN Economic Community, it becomes obvious that the manufacturing industry needs to successfully position itself as a globally competitive industry on domestic, regional and global markets.

Asia's economies and their businesses are increasingly becoming main drivers for Green Economic Development (GED) worldwide. It is obvious that the manufacturing industry of the Philippines is challenged to be responsive and proactive to this worldwide trend. Already today, the business community sees in the overuse of natural resources and the impacts of climate change a key challenge to do business successfully and to ensure its long-term economic growth perspective.

In a common effort, industry and government in the Philippines have launched an initiative, in which sectoral road maps have been elaborated and submitted to the Department of Trade and Industry and the Board of Investments. The so-called Road Map Process is a unique opportunity to define a well-focused stimulation and promotion for an industry driven GED that is integral part of a modernization and innovation process of the economy of the Philippines. Within the industry sectors, each company have to elaborate and implement their own strategy to unleash the specific market potential for products and service delivery.

Public policies on regulation, subsidies, incentives and information have a central role to play for the green modernization of the industry. Green investment from both the public side and the private side is an investment for immediate returns and for the future.

Worldwide experiences show that without a forceful and coordinated set of actions that removes barriers and sets favorable framework conditions, it is unlikely that even the most economically beneficial options would overcome a short-term sighted "Buy-the-Cheapest" or "Business-as-Usual" attitude. In cooperation with other government entities, the BOI and DTI should contribute to setting framework conditions and to building up capacities that support a paradigm shift towards an innovation process that results in competitiveness, good environmental performance, climate change resilience and job creation.



2. Background

The Philippines aim at strengthening the competitiveness of its companies in order to generate sustainable wealth and reduce poverty. The required structural changes in the manufacturing industry are very demanding. Bearing in mind the worldwide dynamics of industrial development and the integration process of the ASEAN Economic Community, it becomes obvious that the manufacturing industry in the Philippines needs to successfully position itself as a globally competitive industry on domestic, regional and global markets.

The industry and government have jointly launched an initiative in which sectoral road maps have been elaborated and submitted to the Department of Trade and Industry and Board of Investments. The implementation of these roadmaps will be private-sector led while the government acts as facilitator. By creating an adequate environment and by strengthening industries, the government can promote the success of domestic firms, in both the local and international markets, leading to economic transformation.¹

Any industry road map that does not address the use of natural resources, environmental concerns and the challenges deriving from climate change would be necessarily incomplete. “Environment” and “Green Economic Development” have internationally become integrated elements of business practice and business relations during the last decades. In the Philippines, the overuse of natural resources is increasingly becoming a risk to do business successfully.² “Environment” has become a key factor of the systemic competitiveness of industry.

The Department of Trade and Industry (DTI) and its Board of Investment (BOI) acknowledge the strategic importance of a green modernization of the industry. In the context of the project “Promotion on Green Economic Development (ProGED)” whose foreign contribution is funded by the German Federal Ministry of Economic Cooperation and Development (BMZ) and implemented in cooperation with the Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ), an initiative has been launched to elaborate a strategic approach on how GED can be comprehensively addressed within the overall Industry Road Map Process and become integrated into selected sectoral road maps.³

This document contributes to an industrial strategy in the Philippines that aims to enable companies to systematically strengthen their competitiveness, to be a proactive and not only a reactive player on markets and to tap new market opportunities. Any industry policy aiming at favorable framework conditions until 2030 like the Industry Road Map initiative, needs to consider that markets will change tremendously over this period, that its instruments have to be flexible and that many stakeholders from industry, government and the academe have to be involved in such a process.

To deal with this complexity, this paper aims

- a) to identify “green” drivers that are relevant for market development and competitiveness,
- b) to point out strategic options to shape favorable framework conditions and to support a comprehensive capacity development process,
- c) to show the importance of a competitive “green sector” and
- d) to elaborate strategically important “green” elements for the road map of the following six manufacturing sectors of the Philippines:
 - Automotive Manufacturers
 - Auto Parts Industry
 - Pulp and Paper Industry
 - Plastic Industry
 - Housing Industry
 - Furniture Industry⁴

This document identifies the general lines of a GED strategy as an integral part of a comprehensive Industry Policy in the Philippines. It is meant as a conceptual framework for both industries and government to elaborate a long term perspective of GED and it gives suggestions about specific elements that could be considered in the further development of the respective industry roadmaps. Selected indicators should give a guideline how tangible results can be achieved in the near future.

This input to the road map process should be discussed in the technical working groups of the industries and BOI-DTI and within the different industries itself. Industries are challenged to elaborate their own position with regard to

¹ see: Rafaelita M. Aldaba: The Philippine Manufacturing Industry Roadmap: Agenda for New Industrial Policy, High Productivity Jobs, and Inclusive Growth, 2014

² see: Inquirer: Philippines Chamber of Commerce and Industry presents wish-list to government, October 31st, 2013

³ This was not part of the ProGED strategy and deliverables as laid down in the ProGED Implementation Agreement signed between the two Governments in 2013, but was taken up by the GIZ Management of the German component of ProGED upon strong request of DTI

⁴ Furthermore the copper industry elaborated a concept on of a green manufacturing zone. Due to limited information, this concept is documented here without any special comment.



GED and drive the respective agenda.

In order to foster favorable framework conditions, BOI-DTI should initiate a consultation process with other government entities and the industries with the aim to elaborate a consistent approach and effective instruments that are most crucial for a finally successful industry policy.

3. Key Challenges for a Competitive Manufacturing Industry in the Philippines

The manufacturing sector in the Philippines is required to significantly strengthen its competitiveness in order to be prepared for the challenges lying ahead until the year 2030. With the increasing opening of the national market in the context of the ASEAN integration, it is obvious that new players will challenge not only the export industry of the Philippines but also domestic market players. Only a comprehensive innovation process can foster capacities that are necessary for the generation of economic, inclusive respectively sustainable growth. A strong standing on this more open market will only be reached by industrial sectors fulfilling certain conditions, namely:

- are capable of comprehensive product and process innovation
- are an active part within value chains and are able to climb up the value chain
- have achieved a specialization in respective markets
- have improved their cost performance through technological change and process innovation
- have a capacity to adapt easily to changing market (domestic and international) conditions
- have a capacity to cooperate and interact with stakeholders in business, public authorities, academe and civil society.

Therefore the manufacturing industry in the Philippines needs to strengthen its capacity to be proactive within a rapidly changing business environment by:

- complying with international product and process standards
- strengthening its capacity to innovate respectively to provide innovative services and products
- further developing its business models
- anticipating market developments, client preferences and developments of the regulatory framework relevant for domestic and international markets
- increasing significantly its productivity, correspondingly its cost performance
- responding to requests of society
- (pro)actively incorporating emerging and existing risks such as risks of a changing natural environment and climate change.

4. Green Economic Development as Integral Part of Competitiveness

“Green Economic Development“ (GED) is a strategic element for the modernization and strengthening of the competitiveness of the manufacturing industry of the Philippines. GED is inherent in technological and product innovation, in developing and tapping new markets, in improving cost performance due to a higher resource productivity and in improving resilience with regard to climate change impacts.

Already today, GED has become worldwide integral part of business practice and business relations. After being perceived as an obstacle for economic development, today environment and environmental concerns are seen as a major pillar to deliver sustainable and inclusive growth and to being competitive on national, regional and global markets.

“Many countries at the top of the competitiveness rankings are also the best performers in many areas of sustainability. Going forward, economies that are able to balance economic progress with social inclusion and good and effective environmental stewardship will most likely experience higher rates of human progress and prosperity.”^v

The rapid development of environmental standards for industry and products, the requirements of international markets and within supply chains, the need for protection of natural resources and for responding comprehensively to climate change, a more efficient law enforcement and new consumption patterns are main drivers for this industrial modernization process.

Asia’s economies and their business are increasingly a main driver for Green Economic Development worldwide.^{vi} It is obvious that the manufacturing industry is challenged to be responsive and proactive to this worldwide trend. Already today, the business community of the Philippines sees in the overuse of natural resources and the impacts deriving from climate change a key challenge to successfully do business and to ensure its long-term economic growth perspective. Companies and business associations have started to respond to the following challenges

⁵ WEF: The Global Competitiveness Report, 2013-2014, p.61

⁶ See: OECD: Towards Green Growth in Southeast Asia, 2014



- How to make a more efficient use of energy and input of material/natural resources respectively how to increase resource productivity in order to improve cost performance?
- How to ensure a reliable provision of energy and clean water for production processes?
- How to improve environmental performance of production and service delivery in order to ensure the “license-to-operate” in the society?
- How to meet environmental standards of international markets?
- How to integrate upcoming trends as the application of life cycle analysis, ecological, carbon and water foot print, etc. into business practice?
- How to make production sites, logistics, etc. more resilient against severe weather events and climate change impacts?

Taking into account the developments over the last 40 years and the current trends, it can be predicted that by 2020, the following parameters will have become business reality also in the Philippines:

- Advanced environmental standards and environmental/health related consumer preferences are integral part of all major markets
- Markets for green technologies and services (renewable energies, resource efficient technologies, waste management, etc.) are in an advanced stage
- Environmental legislation has been further elaborated and is much more efficiently and comprehensively enforced
- Energy, water provision, water treatment and waste management are significant cost factors for production and service provision
- Climate change resilient infrastructure has become a key for attracting foreign investments
- A global/regional governance scheme for the mitigation of Greenhouse Gas Emissions (GHG) foster investments for technological and process innovation
- Public and private investment has opened the market potential for new business solutions as climate smart management of transport systems and of building structures.

5. Strategic Elements to Strengthen Competitiveness

To reach these targets, the following key fields of action should systematically be addressed:

- **Energy Efficiency:** Industry representatives in the Philippines point out that high energy costs harm significantly their competitiveness. By increasing the energy efficiency of its operations, companies can respond directly to this obstacle. An improved energy management does not mean necessarily high investment costs in equipment but in many cases it can be achieved through process optimization. Furthermore: an improved energy efficiency can contribute to the mitigation of GHG-emissions that will be of relevance for the upcoming climate change regime.
- **Resource Efficiency:** Many industrial sectors are faced with increasing costs for raw material. It is expected that water consumption will be significantly more costly in the near future. By improving business processes, not only production costs can be reduced but costs for the management of waste, hazardous and toxic waste and as well as waste water. This is of relevance especially with regard to rising costs for waste management along with more comprehensive law enforcement.
- **Meeting International Production and Process Standards:** Participating in global supply chains and having a good standing on major markets depends highly on good quality product and service delivery. Good quality is the result of well organized business processes. Well organized business processes are a key for good environmental performance. Therefore good quality and good environmental performance go hand in hand. Along with the introduction of new standards like life-cycle-analyses and the concept of carbon food print, industries are increasingly challenged to establish comprehensive and consistent management systems that need to go beyond certification processes and prove their value in real business performance.
- **Fostering Innovation:** The industry of the Philippines acknowledges that climbing up the value chain and a specialization in higher quality products are keys for successfully doing business in the future. Innovation rarely is the result of the capacity of a single company alone. Innovation increasingly takes place within a common field of action between companies and research institutes, within industry clusters and/or along global value chains. Like for the design of green products and processes, companies need to develop capacities to interact with stakeholders on very different levels and to be an active part in innovation processes.
- **Mitigating of Conflicts Deriving from the Overuse of Natural Resources:** Companies increasingly



report problems to get access to natural resources such as clean water or they complain that the inadequate disposal of waste is threatening their business. And some industries are blamed by the public, NGOs, and communities for an overuse of natural resources resulting in a significant threat for its licence-to-operate. Here again, companies need to redefine and change their roles within society as corporate citizens. New capacities and skills are needed to communicate with different stakeholders in order to find adequate solutions for mitigating business risks.

- **Attracting Foreign Investments, Natural Resources and Climate Change Resilience:** The industry of the Philippines perceives foreign investments as a key for strengthening its competitiveness. In this context not only capital but the transfer of technology and knowledge are of interest. Assessment of investment risks is mandatory for an increasing number of companies. Natural disaster impacts as occurred in Thailand in 2011 or the Philippines in 2013 have resulted in major disturbances for product delivery and for supply chains. Since the Philippines is one of those most prone countries to climate change risks, foreign investors assess the vulnerability of production sites and infrastructure regarding flooding or typhoons. Furthermore they do expect a reliable provision of power, water and services like waste management. In a common effort between local governments, public shareholders and the private sector, the resilience of production sites has to be significantly be strengthened.

6. Milestones for a Comprehensive “Green” Modernization of the Manufacturing Industry^{VII}

By 2017,

- A consistent policy framework and its effective implementation support the green modernization process of the Industry of the Philippines.
- Subsidies/incentives that have a negative impact on resource efficiency have come under scrutiny.
- Comprehensive incentive schemes foster green modernization in the different industrial sectors.
- Further optimized public procurement guidelines and the application of environmental standards contribute to a strong growth of a green sector and the number of green jobs.
- Each industrial sector has elaborated its strategy on green modernization, implements strategic pilot programs on energy/resource efficiency and on product innovation in collaboration with key stakeholders and has launched key initiatives for becoming integral part of regional and global green innovation initiatives.
- Communicating with business, the government of the Philippines has elaborated a comprehensive approach to make key production areas climate change resilient and to establish ecological industrial zones.
- 70% of listed companies publish a comprehensive sustainability report and therefore comply with reporting standards for foreign investments.

By 2022,

- A consistent policy framework is fostering GED and sets foundations towards a “low carbon” industry. Respective incentive schemes are further developed taken into account national and international experiences. Subsidies or incentives that have a negative impact on resource efficiency and on climate are faced out.
- 80% of exporting companies and 60% of companies with more than 100 employees are working with an integrated quality/environment/energy management system.
- A strong green sector is a key driver for the modernization process of the economy of the Philippines.
- The industry is an integral part of the global “green” innovation communities and strong cooperation between companies, universities and research institutes and within in industry clusters are becoming increasingly a driving pattern for process and product innovation.
- All major production areas in the Philippines have significantly decreased their vulnerability to climate change becoming more resilient and the development of new industrial zones complies with recent international standards of Ecological -Industrial Parks.
- 100 % of listed companies and 30% of companies with more than 100 employees publish a comprehensive sustainability report and therefore comply with reporting standards for foreign investments.
- Green innovation is integral part of curricula especially at technical universities, and vocational training institutes and of in-house training activities in companies.
- 30% of all housing schemes do comply with latest environmental standards.

By 2030,

- The industry of the Philippines is worldwide known for its “green” innovation capacity. Especially industry clusters are highly competitive.
- The manufacturing industry is leader in the ASEAN region with respect to high standards of resource productivity. Furthermore the systematic utilization of most modern renewable energy systems contributes

⁷ The following milestones have been defined on the basis of a) a comprehensive evaluation of the existing industry road maps, b) a consultation process with various industry sectors and government institutions and c) an analysis of policy papers of the Government of the Philippines.



significantly to the “low carbon” performance of the industry. Input costs for production processes are only marginally energy related. Due to high efficiency of processes and closed loop systems, the discharge of waste water and therefore treatment costs are nearly negligible.

- Integrated quality/environment/energy management systems are common standard in the industry of the Philippines.
- The Philippines are highly attractive for foreign investments because of its climate change resilient infrastructure and the strong performance of green service and product delivery.
- Environmental and sustainable reporting is a standard for doing business in the Philippines.
- 100% of new housing schemes comply with latest environmental standards.

7. Fostering the Development of a “Green Industry and Service Sector”

As worldwide experiences show, the transformation towards a green and climate change resilient economy fosters new business opportunities, generates new jobs, and contributes in general to a growing wealth of a nation. Similarly in the Philippines, a “Green Industry and Service Sector” can contribute to such a transformation process that overcomes a basically resource based economy and establishes an economy that is built on advanced knowledge and production patterns. It develops through the emergence of new business models, new technologies, new management schemes, new expertise and new skills.

A green sector of the economy has to provide a broad spectrum of products and services

- advanced management systems for domestic, industrial and hazardous/toxic waste, that comprise the adequate collection, processing and final disposal, including services for testing, monitoring and control of compliance
- reliable waste water management systems that ensure the efficient treatment and recycling of domestic and industrial effluents
- improved energy efficiency that fosters a whole range of business opportunities in the provision of technology and process engineering has a high market potential
- the planning, development and implementation of renewable energy schemes, of climate change resilient infrastructure, of “SMART cities”, of “SMART transportation”
- energy efficient and green construction drastically reduces emissions, reduces the use of resources by integrating efficient systems (heating, cooling, lighting, water); by using alternative energy sources (passive solar, alternative energy sources); retaining energy (efficient insulation and windows, thermal mass); and using recycled, reused, or low-energy building materials. Services such as architecture and urban planning and products from very different industrial sectors are needed
- for complying with international standards, new services like laboratories, advisory services, auditing companies, service providers in business communication are needed. New concepts as “carbon credits”, “carbon offset” “life cycle assessment, “carbon foot print”, “water foot print” need quite specialized expertise.

Finally, the development of a green sector will create jobs that span a wide array of skills, educational backgrounds, and occupational profiles. They occur in professional fields such as engineering and architecture, project planning and management, auditing, administration, marketing, retail, and customer services, in research and development and in many traditional blue-collar areas such as plumbing, electrical wiring, recycling, pipe-fitting and masonry. Also, green jobs exist not just in private business, but also in government offices (standard setting, rule-making, permitting, monitoring and enforcement, support programs - to name a few), science and academe, professional associations, and civil society organizations.

It is obvious that dynamics of the development of a competitive green sector will depend on an enabling business environment: the preparedness of industry to innovate respectively to invest, a more efficient law enforcement that is often linked with a decrease of corruption, a revision of regulations that are discriminatory with respect to a more efficient use of environmental resources, incentive schemes that facilitate “green” innovation, a more systemic competitiveness of the industry as such and especially the development of professional capacities that are equivalent to the standards of advanced economies. Therefore the development of a competitive “green industry and service sector” should be explicit part of the modernization process as it is addressed in the Industrial Road Map Process of the Philippines.

8. The Philippine Manufacturing Industry Roadmap

“The Roadmap is about facilitation and coordination to remove the most binding constraints to growth and creation of the right policy framework to encourage the development of the private sector along the lines of our country’s latent comparative advantage. The government is not the proximate cause of growth but private sector, entrepreneurship and investment. The roadmap implementation will be private sector led while the government acts as facilitator. As facilitating government, it will encourage producers to take risks, correct market and government failures and



address changes in policies and institutions. Support programs will be regularly monitored and evaluated in terms of performance and contribution to growth and employment.

Through the creation of industry councils, government and industry can collaborate in continuously pursuing technological upgrading and sustained growth. By creating the proper environment and strengthening industries to ensure that they are not disadvantaged by international competitors, the government can promote the success of domestic firms in both the local and international markets that will lead to economic transformation. Firms, in turn, are expected to put innovation (product, process, marketing) and technology upgrading at the apex of their strategy in order to improve their productivity that can lead to “smart” growth. Only with the right environment can manufacturing unleash its full potentials to take advantage of the market opportunities currently facing us and become an engine for sustained, inclusive, and smart growth, quality job creation, and ultimately, poverty reduction.”^{viii}

GED should be an integral part of this modernization and innovation process. GED has to be driven by the private sector. Each industry and correspondingly each company has to develop its own strategy to unleash the specific market potential for products and service delivery.

But public policies on regulation, subsidies, incentives, and information have a central role to play for the green modernization of the industry. Green investment from both the public side and the private side is an investment for immediate returns and for the future. Worldwide experiences show that without a forceful and coordinated set of actions that removes barriers and sets favorable framework conditions, it is unlikely that even the most economically beneficial options would overcome a short sighted “business as usual” and “buy-the-cheapest” attitude. In cooperation with other government entities, BOI and DTI should contribute to setting framework conditions and to building up capacities that support a paradigm shift towards an innovation process that materializes in competitiveness, good environmental performance, climate change resilience and job creation. The following elements should be integral part for BOIs policy to support the industry of the Philippines in its modernization process.

8.1 Designing Incentive Mechanisms

BOI should promote green growth in terms of designing incentive mechanisms (including conditions, criteria, etc) which could be in the form of income tax holiday or income tax reduction under the BOI Investment Priorities Plan. For granting subsidies, BOI should support the process of legislative instruments as the issuance of an Executive Order or an adequate legislation by Congress.

8.2. Revising Incentive/Subsidy Schemes

BOI should revise its incentive and subsidy scheme based on a thorough analysis. Such instruments should be faced out that have a negative effect on resource productivity, on the environmental performance of industries or restrict the development of “green markets“. Starting with a comprehensive revision of financial and fiscal instruments, good framework conditions and a strong competition framework can be established that strengthens the position and entry of innovative firms and increases the attractiveness for foreign investment.

8.3. Giving a Boost to the Development of a “Green Industry and Service Sector”

BOI should allocate incentives to the development and implementation of renewable energy, material and resource efficiency, new technologies, clean production methods, etc. A process of removing non-economic barriers and of an establishment of a predictable and transparent support framework with incentives that decrease over time should be supported. Furthermore BOI should facilitate a process where individuals, businesses and start-ups get access to low interest loans and favorable financial schemes. In this respect a market development can be fostered that otherwise might take a very long time to emerge and to rise up to a scale allowing significant cost reduction.

8.4. Launching a Green Productivity Initiative in Cooperation with Industry

BOI should launch together with industry associations and other government agencies a program that supports companies to strengthen their capacity to provide good quality products/services and also to ensure high resource efficiency. By promoting international product and integrated process standards through information, training schemes and incentives, the effective implementation of instruments such as ISO standards which is a comprehensive process innovation that links quality, environment and energy management, should significantly strengthen the competitiveness of the companies. In order to meet the financial and organizational constraints of SMEs, adequate management systems for reducing environmental risks and improving environmental performance should be promoted. Good housekeeping measures can be an entry point especially for SMEs.

8.5. Fostering Green Innovation on the National, Regional and International Level

One important option to significantly scale up its capacity for “green” innovation is the industries cooperation with application orientated research institutes and other companies on the national, regional and global level. Such types

⁸ Rafaelita M. Aldaba: ff



of cooperation are in many countries of the ASEAN region a strategic element for the modernization of industry. BOI should support programs that focus on specific innovation processes should contribute to develop a culture of innovation that involves stakeholders and should facilitate specific cooperation in the ASEAN region and on a global level.

8.6. Facilitating International B2B Cooperation for Technology and Knowledge Transfer

Global production and supply chains play a major role for technology and knowledge transfer. Specifically, global players (for instance in the plastic or in the automotive industry) must have an up-to-date knowledge in environmental management or with respect to more advanced and increasingly mandatory concepts like the carbon footprint. BOI should promote a business matching between companies of the Philippines and international companies that are interested in partnering in the field of GED as strategic element for establishing new business relations.

8.7. Promotion of the Philippines as Climate change Resilient and Environmentally Sound Production and Service Delivery Location

Climate change resilient production sites and infrastructure and the provision of relevant environmental services are increasingly a key parameter for decision making of foreign investors. BOI should contribute to a process of establishing (ecological) industrial zones and improving the climate change and environment resilience of existing production sites. This goes hand-in-hand with the communication to potential foreign investors that the physical risks for investments in the Philippines are rather small. BOI should contribute to an institutional decision making process that results in limited reputational risk with regard to environmental performance for investors and international buyers.

8.8. Encouraging a “Green Job Initiative”

The competitiveness and the modernization process in the Philippines is highly dependent on a capacity building process of individuals on all levels of industrial production and service delivery. The respective capacity building process has to be done by vocational training, practice-oriented education at schools and universities, by in-house-training in companies and by trainings provided by entities such as the chambers of industries or DTI.^{ix} BOI, relevant government entities, institutions and industries should initiate a “green job initiative” that provides practice-oriented qualification.^x

8.9. Elaborate a Long-term Strategy to Give Coherent Signals to the Private Sector

DTI should contribute to the elaboration of a long-term strategy on the national level that is essential to give important signals to the private sector for the promotion of technological and process innovations, the deployment of investment in “green” technologies and the allocation of resources for R&D.

8.10. Shaping a Consistent Framework for Promoting Green Economic Development

The so-called Road Map Process is a unique opportunity to define a well focused stimulation and promotion for an industry driven GED. Especially sector specific approaches with main focus on early innovators may generate more tangible results than isolated activities. Numerous initiatives to improve the environmental performance of industry have already been implemented in the Philippines. Currently others are being implemented right now and some new, innovative initiatives are still needed. What is required is a consistent and well-orchestrated framework that sets priorities and avoids overlapping

DTI respectively BOI are perceived by all stakeholders as the government entities that are able to foster a fruitful cooperation with the private sector. Any framework for promoting GED needs a comprehensive cooperation between different government entities. It is certainly a key learning from past activities that the cooperation with the private sector needs flexible, efficient mechanisms that avoid endless loops of decision making and show clear roles and responsibilities.

By setting priorities and supporting sector specific approaches, BOI should seek cooperation with initiatives such as the Philippine Industrial Energy Efficiency Project (PIEEP), that is implemented jointly between DOE and DTI-BPS and that promotes industrial energy efficiency through adoption of an Energy Management System (EnMS / ISO 50001) and system optimization to make industrial operations more energy efficient, reliable and competitive.

As new types of cooperation are required, BOI should strengthen its capacities to be in the position to initiate and facilitate such initiatives. Such a capacity development process can be supported by development partners respectively the positioning of integrated experts. In order to encourage foreign investment and promote technology transfer, BOI should make a well focused use of PPP activities and instruments such as the “Development partnerships with the private sector” scheme supported by BMZ. (<http://www.developpp.de/en/content/developppde>).

⁹ Links should be established to the major education reform initiative “K-to-12” of the Philippines

¹⁰ As the House Bill No. 4969 („green jobs act“), ILO initiative „Environmentally sustainable construction in the Philippines social housing sector“.



9. Suggestions for “Greening” the Sectoral Road Maps

The following suggestions for “greening” the sectoral road maps have been elaborated on the basis of the consultation meetings with the respective industries and relevant stakeholders from government and academe. The suggested indicators may give guidance how tangible results can be achieved in the near future.^{xi}

9.1. The “Philippine Auto Manufacturer” and the “Auto Parts Industry Road Map”

For the global automotive industry, the environmental performance of its products and processes is a key for business success. The industry is undergoing a fundamental transformation due to changing consumer preferences, due to public pressure, due to rapidly changing legal frameworks and due to pressure towards an improved cost performance. As a leader in technology and innovation, the industry addresses its environmental impacts of the vehicles’ life cycle, starting from the production process, through the use phase and finally their end-of-life

The “Asia-Pacific Region Automotive Industry Sustainable Development Declaration” shows the way the industry in the region should go: “With the APEC region’s auto industry growth potential being so large, it becomes particularly important to enhance cooperation and coordination on the balance between auto industry development and the environment, energy as well as transportation.” This should be done by improving “the auto industry’s technology cooperation, by continuing to foster and improve the auto industry’s innovation ability and competitiveness; further reduce the auto industry’s impact on the environment, promote vehicle safety performance, promote R&D into innovative vehicle technologies, future alternative energy sources and transportation infrastructure, (...) Jointly promote the efficient utilization of resources and improve the recovery and recycling ratios of end-of-life vehicles; further enhance the sharing of best practices between members on the subject of old vehicle scrapping and replacement schemes, with the aim of fostering the development of a circular economy and reducing the negative impact of the auto industry on the natural environment.”^{xii}

In order to strengthen its capacities for innovation and for improving economic and environmental performance, the Automotive/Automotive Parts Industry of the Philippines defines the following strategic elements:

- The industry complies with international “green standards” of manufacturing and supply chain management. It not only complies with the environmental legislation but works actively to improve the environmental performance in its business activities, such as
 1. Reduction of GHG emissions
 2. Reduction of Volatile Organic Compounds emissions
 3. Reduction in the discharge of substances subject to pollutant release laws
 4. Reduction of the volume of waste generated
 5. Reduction of water consumption
- The industry establishes and implements a resource efficiency strategy. The optimization of production processes will result in a reduction of energy consumption, and reduce the input of raw material and natural resources. These measures will not only reduce the costs of inputs but also the costs of the management and disposal of solid and liquid waste.
- The resource efficiency strategy is an integral part of a quality management initiative. By establishing and integrating comprehensively quality management with environmental management and energy management systems, the products and process of the industry will comply with global standards.
- The industry will further foster its integration into global production and supply chains. By being part of an integrated supply chain management of car manufacturers and system suppliers, companies get more involved in “green” innovation processes. In order to foster further its innovation capacity, the industry will seek the cooperation with leading companies and research institutes in the Philippines but especially in the ASEAN region for the implementation of specific projects in fields such as “new fuel and power systems”, “new materials for product innovation”, “low carbon technologies” and “Innovation in industrial processes”.
- Innovation processes within the industry will significantly depend on foreign investments. In order to reduce physical risks deriving from climate change impacts for foreign and domestic investments, the industry seeks a strong cooperation with government agencies and public entities for the development of an infrastructure that decreases the vulnerability of productions sites and logistics
- The industry encourages the government to support the development of a “green sector”. The reliable provision of power and clean water and services as solid/hazardous/toxic waste management is a key for

¹¹This input to the road map process should be discussed in the technical working groups of the industries and BOI-DTI and within the different industries itself. The results of this working process should be comprehensively integrated into the existing sectoral road maps.

¹²Asia -Pacific Region Automotive Industry Sustainable Development Declaration 20th Automotive Dialogue, Beijing, China, 23 April 2014



the competitiveness of the industry. Renewable energies, decentralized waste schemes, new production process schemes, advanced water treatment solutions or technologies for the re-use/recycling of natural resources and waste will rapidly gain ground. The automotive industry will have to integrate tools such as “life cycle assessment, “carbon foot print”, “water foot print”, “resource foot print” into its business practices. Therefore qualified service providers will have to contribute to the innovation process of the industry.

- Capacity development is a key for innovation in the Industry. An improved environmental performance of the industry and its capacity to develop “green” and “low carbon” products depend highly on a qualified management, engineering and well developed skills on the shop-floor level. The industry seeks cooperation with universities, vocational training institutes and training providers to integrate environmental topics in the curricula. The industry strengthens its efforts to develop capacities through internships and in-house-training measures.
- The industry acknowledges that the competitiveness of the industry will also depend on its capacity to interact with stakeholders of government, regulators, consumers, academia and civil society. As “corporate citizens”, the companies and also the industry will actively participate in debates such as about “sustainable mobility” or “sustainable production”.

Indicators

- By December 2015 a strategy paper on capacity building on “environment” is elaborated and by December 2016 100 additional employees are trained on environmental issues.
- By December 2015 the industry has elaborated a communication strategy with respect to environment and relevant communication tools are implemented.
- By December 2016, three pilot projects in the field of “environment” in cooperation with companies and research institutes in the ASEAN region and three exclusively with Philippines’ stakeholders are initiated.
- By December 2016 15 companies have elaborated an environmental report.
- By December 2016, 25 additional companies have received a certification in accordance with ISO 14000 series or ISO 50000. Further 15 companies (especially SME) have initiated activities as “good house keeping measures” that allow a continuous improvement of the environmental performance

9.2. The Proposed Road Map of the Pulp and Paper Industry”

The pulp and paper industry of the Philippines is challenged to promote responsible pulpwood sourcing, to clean pulp and paper production, to ensure responsible paper use, and to give transparency across the pulp and paper sector. Especially the use of clean technology and the comprehensive introduction of cleaner production processes is a key of any modernization strategy.

The economic respective green modernization of the pulp and paper industry in the Philippines is closely linked with a technological modernization process. But any modernization strategy has to take account of the specific particularity of the industry: Out of the 45 paper mills originally established, only 10% (or 5 mills) have really made heavy capital investments to modernize technology as a step towards international competitiveness or economy of scale. Twenty two (22) paper mills, or about half the number, have closed or stopped operations. The rest of the paper mills still in operation (18), remain hardly prepared to meet the challenge of imported paper made cheaper by the tariff reduction program. To help our local producers survive in the long-term the industry must accelerate, if not leap-frog, in technology and structure. ^{xiii}

Develop Systemic Innovation Capacities

This request for acceleration and for leap frogging is of high relevance for the improvement of the environmental performance of the industry. To meet international environmental standards, the industry needs not only to invest in new plants and to retrofit existing plants but needs to strengthen its systemic capacity to innovate. Technology transfer and product and process innovation is nowadays the result of global research and development communities that often goes along within value chains. An active participation in such processes is integral part of competitiveness.

Management of Energy Resources

Today 25% of production costs are energy related. A significant improvement of the energy productivity can generate tremendous win-win situations, both for the cost performance respectively the business performance and for the environment.

¹³ “Most of the 24 paper manufacturers utilize conventional methods of papermaking, including wastepaper repulping, deinking, refining, paper forming and drying, and wastewater treatment and air pollution control. About 5-6 mills (or 10%) have installed more updated technologies of cleaning and treatment of low-grade wastepaper raw materials or have achieved some degree of economies-of-scale in production.” (see: Proposed Road map of the pulp and paper industry”).



Pulp and paper making are both highly energy intensive processes. The pulp and paper production needs high amounts of electrical energy for all the installed equipment; the cooking and drying processes consume significant amounts of thermal energy. A poor efficiency in the water use pattern will automatically translate into a high energy consumption for pumping and treating.

Energy consumption is in most cases connected with different emissions from the combustion of fuels. Whereas in the past mainly the emissions of SO₂, NO_x and Particulates from energy generation have been in the spotlight, nowadays - in the context of the climate change debate - the CO₂-fossil emissions are considered by far as the most problematic impact related to energy consumption.

Because the current availability of renewable energy is still limited, an efficient use of energy is a matter of survival for the industry. Efficient energy generation (especially co-generation), energy transport (insulation), energy application (for example: dewatering and drying technologies) and energy recovery/re-utilization (by heat exchange) are prerequisites for an efficient energy utilization.

The pulp and paper industry is a capital intensive industry. Major investments in many production sites are needed to reach adequate productivity levels. Especially the smaller production units have partially outdated equipment, limited capital and are under strong competitive pressure, etc. At such productions sites relatively small "cleaner production" innovations may be an option.

- o monitoring the combustion efficiency of steam boilers and optimize for maximum efficiency
- o installing economizer/air pre heater for boilers
- o monitoring and replacing defective steam traps on a regular basis
- o installing flash steam recovery system for paper machines
- o avoiding/minimizing compressed air leakages by vigorous maintenance
- o replacing rewind motors with energy efficient motors
- o setting compressor delivery pressure as low as possible
- o installing heat recovery systems.

Management of Water Resources

Similar to the use of energy, the pulp and paper industry is challenged to address systematically its consumption of water. The production process of pulp and paper is linked to a high consumption of water: cooking, bleaching, transporting, washing the fibre during pulping; diluting; solving, arranging, treating many different materials to a uniform suspension (wet paper pulp) and distributing it finally on the wet end of a paper machine. Because of the high energy intensity of the processes also considerable volumes of cooling water are used.

The pressure on water resources can significantly decrease by meeting up-to-date industry standards and using best available technique (BAT) as long there is sufficient water available in the area.

Comprehensive cleaner production and efficient waste water treatment is essential for any up-to-date environmental performance. Especially the bleaching of chemical pulps may cause significant environmental damage, primarily through the release of organic materials into waterways. Organic substances, which are easily degradable and get released into the natural environment (like rivers, lakes) have the potential to affect seriously the water quality because the available oxygen gets consumed during their degradation. Other organic substances can be hardly biodegradable or even be persistent and can have significant effects on human health and ecosystems.

The production of pulp and paper need important amounts of chemicals, most of them dissolved in the process water. Any strategy that aims to reduce costs and to improve cost performance would assess comprehensively the process pattern not only to reduce the input of chemicals but assess potentials to reduce the consumption of hazardous and toxic chemicals.

Similar to the use of energy, a more efficient use of water resources may generate win-win-options for the company and for the environment. Since costs for water abstraction, water use and water treatment will certainly rise in future, an efficient use of water resources should be a strategic element of business management.

Sustainable Use of Primary Production Material and Inputs

The pulp and paper industry should seek to reduce its ecological footprint by maximizing the use of recycled fibers and sourcing virgin fiber from credibly certified natural forests and plantations. The high ratio of recycled wastepaper decreases the demand for virgin fibers and potentially leads to a decrease of the pressure on forest resources. Nevertheless the use of recycling paper is linked to major constraints. Recycling paper is not an endless cycle because of loss of quality of the used fibers. Therefore the access to economically affordable virgin fibers is a strong need of the industry.



Fibers generated from sustainable forestry can give access to raw material that is needed for high quality products. Furthermore the use of products from sustainable forestry can strengthen the reputation of the industry as an innovative player in the market. “Sustainable” paper products may a driving force for the development of and entering into new markets and are prerequisite in global production chains

For the purpose of good quality fiber production, the Philippines may make use of its huge amount of agricultural wastes, such as rice straw, sugarcane bagasse, and banana plantation. The development of new fibers that meet technological and environmental standards for a competitive price is the result of intense research and development activities.

Environmental Management Systems

The introduction and strengthening of integrated management systems is certainly a main instrument to ensure quality, to improve environmental performance and to increase the resource productivity. Here a comprehensive approach of integration of ISO standards (ISO 9000series (quality), ISO 14000series (environment) and ISO 50000series (energy) is a strong option.

Any certification system has its limitations. An Environmental Management System is that part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy of the organization. But it is a worldwide learning that any management system needs its sound and comprehensive implementation. The final success depends on a strong and committed involvement not only on the management but at the shop-floor level. Sound assessments of innovation options have to be undertaken, resources have to be allocated, a continuous improvement process has to be implemented. Therefore internal capacity building measures in the companies have to cover those different levels and to support the streamlining of respective processes.

Strengthen the License to Operate

The operations of the pulp and paper industry are under close scrutiny of the local, national and global public. A poor environmental performance can endanger the license to operate of the company. Conflicts on the local level with communities and NGOs can result in a threat for the site operations or can seriously affect the reputation. Especially international investors have their own risk management system to assess physical risks (as accessibility to fresh water), legislative risks (caused by poor environmental performance) and reputational risks. Modern industry needs to be transparent regarding its operations and be able to deliver a well focused communication. The capacities to mitigate such risks are certainly a key element to strengthen the license to operate for particular companies and for the pulp and paper sector.^{xiv}

¹⁴In March 2015, the Philippines Paper Manufacturing Association (PPMAI) communicated the following action plan and need of support with respect to GED:

- ✓ small mills need support to implement ISO / EMS programs and obtain certification (training and establishment/acquiring of ISO certifications)
- ✓ industry members need investment incentives to implement environmental performance improvement projects (including projects to improve efficiencies in raw material, energy and water use)
- ✓ pollution control-related projects require investing in high cost equipments with low ROI, therefore, need support in terms of low-interest funding from government and supplier countries
- ✓ industry members want to improve competitiveness in quality and production cost thru improvement in raw material supply chain, better access to fiber raw materials and lower power and fuel costs)
- ✓ local paper mills want to improve their economies of scale thru expansion of production capacity
- ✓ smaller paper mills want to attain the capability to produce higher-value paper products with availability of virgin pulp especially from local sources
- ✓ the industry, especially the smaller mills, need a common testing facility to establish a reputation for compliance with quality and ISO standards
- ✓ integrate ecolabelling standards for pulp/paper products in the existing national product standards set by DTI BPS
- ✓ establishing local pulp production requires large capital investments in a wood-based pulpmill and lesser (but still substantial) investments in non-wood pulpmills based on agri-wastes and annual fibers
- ✓ a wood-based pulpmill requires additional investments in tree plantations and other raw material support programs like smallholder tree farmers and community-based reforestation programs.



Suggested Indicators

Due to the particularity of the economic and technological situation of each company engaged in the pulp and paper industry in the Philippines, only general lines for the modernization process can be defined. Innovation depends largely on the willingness and preparedness regarding significant investments. Nevertheless the following indicators can give a guidance for the modernization process of the industry:

- By December 2015, the industry respectively the industry association has elaborated a strategy on how companies can strengthen their capacities, how a communication on environmental topics with respect to business purposes and the interested public can be comprehensively addressed.
- By July 2016, two projects on sustainable product development and three projects in the field of cleaner production in cooperation with international partners are under implementation.
- By July 2016, a common Testing Facility to support compliance with Quality Standards, especially for smaller paper mills who do not have adequate laboratory facilities is implemented.
- By July 2017, three sustainable forestry programs are under implementation.
- By December 2017, 80% of the operating units have an integrated management system on quality, environment and energy.
- By December 2017, 80% of the virgin fibers (forests) are sourced from sustainable forestry.

9.3. The “Plastic industry Road Map”

The “Philippine Plastics Industry Roadmap” in its version dated 4 January 2013 contains major elements of an environmental strategy. This report intends to give an input to further develop this strategy.

Goal	2016 Strong Philippines	2022 Enter ASEAN + 4 Doors	2030 Global Market Capture
Innovative processes	<ul style="list-style-type: none"> • Set-up R&D Center for plastics • Develop partnership with academic institutions and private groups (such as TESDA, CHED, DOST, Filipino Inventors, ICP, PICHE) for development of innovative process technology 	<ul style="list-style-type: none"> • Forge partnerships with foreign institutions for development/ adoption of process technologies 	<ul style="list-style-type: none"> • At par with ASEAN +4 in terms of product and process innovation
Develop the industry sustainably mindful of finite/limited resources	<ul style="list-style-type: none"> • Increased number of companies practicing 3Rs • Enhanced industry image as an industry that contributes to sustainability • Lobby for legislative policies and regulations in support of the RECYCLING to the industry (such as the RECYCLING LAW) 	<ul style="list-style-type: none"> • Leading industry in innovative products addressing climate change • Development of more green processes and products 	<ul style="list-style-type: none"> • Leading industry in innovative products addressing climate change



<p>Promote/ develop/ strengthen the plastics recycling industry</p>	<ul style="list-style-type: none"> Recover and Recycle 20% of material inputs Development of Recycling Industry Specific Incentives (like ITH and VAT exemption) for existing and new recycling companies to improve facilities and conform to RA 9003 and other related environmental laws Develop new and improve / modernize existing recycling facilities Develop alternative recycling technologies for low value recyclables (e.g. waste to innovative products/ waste to fuel/ waste to energy) Policy support regulating export of scrap plastics to protect the local recycling industry Integration of Informal sector waste pickers to the solid waste management stream Improve recovery systems for plastic waste 	<ul style="list-style-type: none"> Recover and recycle 40% of material inputs Develop technologies to improve recycling efficiency Improve recycling technologies. Develop and promote products with high recycled content Develop eco-parks utilizing recycled plastics/ recyclable materials Promote government procurement preference on recycled products or products with recycled contents Improve alternative recycling technologies 	<ul style="list-style-type: none"> Recover and recycle 60% of material inputs Promotion to market to patronize/ give premium to recycled products or products with recycled contents Improve physical and mechanical procedures of recycling technologies/products thru R&D Adopt alternative recycling technologies nationwide Put up recycling and production facilities in major cities and provinces/municipalities
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Elements of the “Philippine Plastics Industry Roadmap” in its version dated 4 January 2013

Suggestions for the further development of the “Philippine Plastics Industry Roadmap”

- The Plastic Industry of the Philippines may follow the principles of Responsible Care - the global chemical industry’s environmental, health and safety (EHS) initiative to drive continuous improvement in product and process performance. It achieves this objective by meeting and going beyond legislative and regulatory compliance, and by adopting cooperative and voluntary initiatives with government and other stakeholders.
- The industry may aim to strengthen significantly its resource productivity by elaborating and implementing an “initiative for process innovation”. Faced with increasing energy costs, costs for material inputs and costs for waste management, the industry undertakes measures especially in the field of process optimization and technological innovation to reduce production costs and to decrease its emission and effluents to air, soil and water.
- In order to contribute to an effective climate protection the industry may promote economically viable energy efficiency and energy focus measures with a focus on the largest, most effective, and lowest cost abatement opportunities. Major emphasis is given to the implementation of sustainable technologies for energy generation, storage and recovery.
- The industry may advocate a Life Cycle Approach that includes GHG emissions from both production and consumption of products and materials. It supports the LCA methodologies because they enable the assessment of the environmental impact of products and technologies over their complete life cycle, including production, use and end-of-life handling.
- The industry may bring successfully into practice the product stewardship by integrating health, safety and environmental protection as an integral part of the life cycle of chemicals. The industry undertakes evaluations of risks and the development of actions to protect human health and the environment commensurate with those risks. The industry identifies the risks at an early stage and manages those risks by involving all parties in the chemical supply chain including raw materials suppliers, distributors, importers, formulators, manufacturers and end users of chemicals.
- In order to reduce physical risks at production for foreign and domestic investments, the industry may seek a strong cooperation with government agencies and public entities for the development of an infrastructure that decreases the vulnerability of productions site and logistics.
- The industry may focus on preventing accidents and to minimize their impacts in case they occur. The industry seeks to prepare co-ordinated response plans with government and the local community in the event that unexpected threats should endanger life, property or the environment.



- The industry may encourage the government to support the development of a “green sector”. The reliable provision of power and clean water and services as waste management is a key for the competitiveness of the industry. Renewable energies, well performing decentralized waste, new production process schemes, advanced water treatment solutions or technologies for the re-use/recycling of natural resources and waste will rapidly gain ground. The plastics industry will have to integrate tools as “life cycle assessment”, “ecological footprint”, “carbon foot print”, “water foot print”, “resource foot print” into its business practices. Qualified service providers are needed to contribute to the innovation process in the industry.
- The industry may encourage the government to promote a level playing field for a diverse energy supply. Government policies should support processes, products and applications that offer greater energy and resource efficiency, through enhanced awareness, faster permits for new investment and access to finance.
- The industry may underline the need to strengthen its capacities to develop “green” and “low carbon” products and to realize the potential for a better environmental performance. In this context the industry seeks to strengthen the capacities on management level, in engineering and in well developed skills on the shop-floor level. The industry seeks a cooperation with universities, vocational training institutes and training providers to integrate environmental topics in the curricula. The industry strengthens its efforts to develop capacities through internships and in-house-training measures.

Suggested Indicators

- By December 2015 a strategy paper on capacity building on “environment” is elaborated and by December 2016 100 additional employees are trained on environmental issues.
- By December 2016 15 companies have elaborated an environmental report.
- By July 2016 the industry has elaborated a communication strategy with respect to environment and relevant communication tools are implemented.
- By December 2016 15 additional companies have received a certification in accordance with ISO 14000 series or ISO 50000. Further 15 companies (especially SME) have initiated activities as “good housekeeping measures” that allow a continuous improvement of the environmental performance.
- By December 2016 three pilot projects in the field of “environment” in cooperation with companies and research institutes in the ASEAN region and three exclusively with Philippines’ stakeholders are initiated.

9.4. “The Housing Industry Road Map of the Philippines: 2012-2030”

The estimated housing need in the Philippines stands at 3.9-million, including 832,000 households that cannot afford decent shelter. It is estimated that the housing need will increase to 10.1 million households in 18 years and, given the current industrial capacity and lack of comprehensive housing program, the backlog can hit at least 6.5 million households by 2030.^{xv}

The construction sector generates extensive linkages with other industries. Its growth and impact on the economy goes well beyond the direct contribution of building activities. It supports the materials sector by increasing demand for inputs such as cement, stone, ceramics, metals, wood, and steel among others.^{xvi} Corollary to the global Millennium Development Goals (MDGs) on ensuring environmental sustainability which aims to achieve significant improvement in the lives of at least 100 million slum dwellers worldwide by 2020, the National Slum Upgrading Strategy was formulated as a key component of the social housing program.

In order to serve the population with adequate housing in a sustainable way, the housing industry addresses “environment” on different levels:

- Any comprehensive strategy that intends to decrease environmental impacts needs to address the use of natural resources over the whole life cycle of a housing scheme (“from cradle to grave”): from extraction and production of materials as cement, bricks or steel, to the construction process itself, to the use of resources as energy, water during the life time of a housing scheme until the final disposal of materials after deconstruction
- Recognizing the need to meet the housing demand as the country develops economically, a sustainable strategy has to be in place since current residential and commercial sectors are major producers of GHGs. In the Philippines, 27 per cent of primary electric energy is consumed by households.
- Seeing the increasing exposure of urban and peri-urban areas of the Philippines to climate change impacts

¹⁵See: Housing Industry Road Map of the Philippines 2012-2030

¹⁶See: ILO, Green jobs mapping study in the Philippines, 2014



and extreme weather events, housing programs have a key role to mitigate vulnerability and to strengthen resilience of individuals and communities.

Given the complexity of these challenges, it becomes obvious that a common effort of many stakeholders is needed to “green” housing schemes and to support the housing industry to “green” its processes. “Green innovation” in the housing industry has to be embedded in urban development procedures, development of new standards, integration into regulations such as the National Building Code, etc.

In doing so, relevant new or already existing strategies of government and regulation should be comprehensively implemented and developed further:

- On 21 July 21st 2014, the Department of Energy approved the Energy Efficiency Roadmap 2014-2030 for the Philippines. This key document for the energy efficiency strategy of the Philippines Government for the period 2014-30 points out the construction sector as one of the key sectors to achieve the political targets. By 2030 the energy savings in residential buildings should achieve 20% compared to 2014, this implies tremendous change regarding actual construction activities - there is a strong challenge.
- The National Climate Change Action Plan (NCCAP) assesses the current situation of the country with regard to climate change (CC) risk and outlines - in its strategic direction for 2011 to 2028 - the establishment of “Climate change resilient cities” as a key element to decrease the vulnerability of the Philippines towards climate change
- The National Labor and Employment Plan (2011-2016) identifies social housing as a sector for decent employment generation
- The Philippines Development Plan for 2011-2016 includes decent and affordable housing as a means for inclusive growth.
- The Housing and Urban Development Coordinating Council (HUDCC) accredits appropriate materials and technology for construction of housing facilities. HUDCC also comprises of the National Housing Authority (NHA), which is the sole national agency mandated to engage in housing production for low income families.

Therefore the housing industry can be a major driving force for achieving the industrial modernization process of the Philippines. The National Framework Strategy on Climate Change provides essential hints for “greening” the roadmap of the housing industry

- ✓ institutionalize guidelines for the construction of innovative climate-resilient and energy efficient human settlements
- ✓ promote green infrastructure practices through climate-smart technologies, climate proofing processes and construction of energy efficient buildings
- ✓ install energy efficiency and climate-proofing mechanisms for public infrastructure, cultural facilities, and socioeconomic infrastructure (including telecommunications facilities) through appropriate standards and inventory mechanism; and
- ✓ develop energy efficient and climate-resilient human settlements through government and private sector housing programs, and public awareness campaigns.

“Green Housing” can contribute to a significant job generation. The types of jobs that are created in green building and the retrofitting process include green designers, architects, auditors, engineers, estimators, project managers, and various jobs in the construction crafts, such as pipe fitters, sheet metal workers, and general construction workers, among others. These jobs are created during the initial construction or investment periods and are likely to be local jobs, which is especially beneficial for developing regions and areas of high unemployment.

Furthermore “green housing” will foster new business opportunities and technological innovation. Building structures integrate energy efficient elements as natural ventilation, insulation and low respectively smart energy devices. Apart from reduced energy consumption, less energy costs for households can be achieved. Renewable energies will play a major role for energy supply in housing. Solar thermic applications, photovoltaic systems and systems for cogeneration will be standard to ensure energy safety. Similar examples can be indicated for the development of water saving technologies and procedures, water treatment systems and waste management systems. The installation of equipment for a more efficient use of water as rain water harvesting structures, grey water separation, natural water treatment systems; innovative waste management systems as separation at source and waste to energy systems are cornerstones for a sustainable development and maintenance of housing schemes.

To unlock this potential, the government should introduce relevant measures that overcome the following bottlenecks:



- “Green housing” requires in the initial investment phase a relatively higher financial investment, but this pays off after a given time due to less operation costs for power, water, etc. The benefit is generated over lifetime (cost for the investor, benefit to the resident later). Government incentives may bridge such a “pay-off-gap” by providing special incentives respectively in public tendering processes.
- Public tendering processes in the housing sector have to overcome exclusive low cost driven public procurement procedures. In this respect, experiences with the National Eco-labeling Program (RA 9003) should be taken into account. Here, a cooperation with the EU funded Sustainable Consumption and Production (SCP) Policy Support Project can be considered.
- For instance the Philippines Green Building Council recently launched “Building for Ecologically Responsive Design through Excellence” (BERDE). Green standards such consider parameters for:
 - o optimal site location
 - o structural design efficiency
 - o water efficiency
 - o materials efficiency
 - o indoor environment quality (like ventilation)
 - o operations and maintenance optimization
 - o waste reduction and/or prevention
 - o reduction, if not, elimination of virgin material requirements
 - o recycling of materials
 - o use of environmentally preferred products and
 - o ultimate disposal.
- Housing schemes should be exclusively implemented in areas resilient to climate change impacts. Adequate infrastructure has to be provided to mitigate vulnerability of housing areas in order to protect lives, livelihood and property.
- The government of the Philippines acknowledges with its House Bill 5011 and the Green Building Act the high potential for Job Creation. ILO and DOLE have launched an initiative “environmental sustainable construction in Philippines’ social housing sector”. Under the House bill 5011, it says that “DTI shall develop a special business facilitation program for individuals and business enterprises that create jobs”. Intensive use should be made of corresponding legislation as the proposed by House Bill No. 4969 („green jobs act“) that proposes grants fiscal incentives and tax perks to business enterprises and individuals who participate in the creation of green jobs and practice the use of environment friendly technologies.

Suggested Indicators

- o By December 2015, strategy paper how “green“ elements and challenges of climate change resilience should systematically be addressed in the industry is elaborated.
- o By December 2016, five pilot projects meeting “green“ standards under implementation.
- o By July 2016, policy paper how “green“ can be addressed in public tendering processes elaborated. In this respect, experiences with the National Eco-labeling Program (RA 9003) should be taken into account

9.5. The “Sectoral Competitiveness Roadmap – Furniture Industry“

The furniture industry of the Philippines acknowledges that the compliance with environmental and health standards on global markets is an inherent factor of competitiveness. The ability to prove the sustainability credentials of the industry is becoming more and more important when securing sales and tapping new market opportunities.

Since environmental and health standards will develop further, the industry takes a proactive stand with respect to these developments by integrating upcoming trends at an early stage in its business processes design and product design.

The furniture industry will increasingly comply with timber regulations on international markets like the EU Timber Regulation (EUTR). By increasingly making an intensive use of eco-labelling certifications like Forest Stewardship Council - Chain of Custody (FSC-CoC), the industry discloses its practices that the timber used for its products is legally harvested.

The furniture organization complies with environmental standards such as industrial emissions or waste management standards of the Philippines and of international markets. For instance: as a downstream user of chemicals, the industry will comply with obligations such as the REACH (Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals)-directive of the European Union.



By successive introduction of environmental management systems, the furniture industry decreases its current consumption of materials and energy, reduces its emission levels, treats waste water effectively and manages waste efficiently (including recycling measures such as recovery of used solvents). By reducing its emissions of Volatile Organic Compounds (VOCs) in activities such as adhesive coating, coating of metallic, plastic and wood surfaces, surface cleaning, wood impregnation, manufacture of coatings preparations, varnishes, inks and adhesives, wood and plastic lamination, the industry will increasingly introduce international manufacturing standards.

Optimized production processes should allow the companies, the reduction of material input (wood, chemicals as paints, etc.) and therefore the reduction of waste generation. All these measures contribute to a significant reduction of production costs respectively to an improved cost performance of the companies. Since good quality and good environmental performance go hand in hand, the industry aims to interlink comprehensively quality management with environmental management systems.

In order to tap the rapidly developing market for environmental friendly and health safe furniture, the industry positions itself as an innovative player that offers attractive eco-design on the global markets. Here the furniture industry seeks systematic collaboration with world leading design schools and innovative designers like the world famous from Cebu. In the context of this initiative the furniture industry strengthens its capacities to promote a coherent concept of “eco-innovation of the furniture industry in the Philippines” on international trade fairs and in respective business communication.

This list gives an overview on government agencies that are relevant for the establishment of a GED from the public side. As indicated above -specific initiatives and programs have to be identified through a consultation process and implemented - if needed - within a common action framework

The industry aims to achieve the following indicators until 2019:

- By December 2015, in collaboration with DTI, a strategy paper how to position industry on “green” international markets elaborated. Recent experiences for promoting a “green furniture industry” should be taken into account and learnings should systematically be addressed
- By December 2016, one major foreign investment contributes significantly to knowledge and technology transfer in the field of „green furniture industry“
- By 2018 it has achieved that 90% of its companies have internationally acknowledged certification of used forest products.
- By 2017 80% of the companies have reduced significantly production costs through optimized process management and new technologies (reduction of inputs of material, energy, water and establishment of recycling systems).
- By 2018 systematic communication has contributed to the image as industry of excellence on international markets (indicators: sales 120% above sales in 2015, employment up 50%).
- By 2019 40% of the exporting companies provide higher class furniture in eco design (by 2016 a close cooperation with 5 leading international schools in eco-design was established).

9.6. "Philippines Industry Road Map for Copper": Development of a Green Domestic Manufacturing Zone

The copper industry has elaborated the "Philippines Industry Road Map for Copper". One of the suggested action items is the development of a copper industry cluster, preferably in Leyte, which may be supported through the establishment of a green domestic manufacturing zone.

The establishment of a green domestic manufacturing zone and development of a copper industry cluster in Leyte is aimed to be a medium to long-term strategic economic development objective that would be consistent with the DTI's view of industry development in the context of rehabilitation efforts in Typhoon Yolanda-affected areas.

The establishment of a green domestic manufacturing zone and the attendant infrastructure requirements of said zone are believed to be supportive of the government's effort to encourage the revival of economic activities in the area by attracting investors and businesses to locate in Leyte and provide employment.

The purpose is to establish a zone covering an area of 5,000 hectares to cater to the copper industry (copper wire rod and downstream copper products producers) and other manufacturing and service businesses wherein the locators and the zone management seek to enhance environmental, economic, and social performance through collaboration in managing environmental and resource issues.

Collaborative strategies will, among others, include shared pollution management systems, by-product synergy, shared logistics and shipping and receiving facilities, shared parking, green technology purchasing blocks, multi-partner green building retrofit, district energy systems, district cooling systems, and local education and resource centers. This is an application of a systems approach, in which designs of the zone and infrastructure including the buildings, and processes/activities of locators are integrated to address multiple objectives.



The proposed green manufacturing zone seeks to achieve:

- Resource efficiency in energy, materials, water, and transportation, with the cost savings gained through higher efficiency
- Cleaner production through good housekeeping, reduction and substitution of toxic materials, strict control of emissions, separation of by-product or residual materials, etc.
- Use of renewable energy and materials to replace fossil fuel sources and finite material supplies
- Design buildings to higher energy and environmental standards and use of green architecture and engineering in new facility and infrastructure design
- Enhancement of quality of life and economic development in neighboring communities through projects between industry and community government and community-based organizations.
- Ecological site planning and utilization based upon clear understanding of the carrying capacity of air, water, and ground systems and the nature of remaining native ecological systems
- Establishing environmental management systems such as ISO 14000 with objectives and indicators informed by eco-industrial development, not only compliance with regulations

A “green” manufacturing zone is proposed as it can enhance the competitiveness of the property and its locators. To make the project feasible it should be attractive to businesses as a manufacturing site. Greening the zone will enhance the competitive advantage of the property. Locators may see such green manufacturing zones as offering a unique level of excellence in inter-company collaboration and in services and amenities available. The assumption here is that there will be increasing motivation for companies to improve both their environmental performance and their image, as the market increasingly demands it

One major aspect of managing an industrial zone is maintaining good relations with regulatory agencies and neighboring communities. These stakeholders are likely to view the manufacturing zone and its locators incorporating environmental considerations in their activities as signs of strong commitment to protect the environment by maintaining a site managed with low levels of pollution and high efficiency of resource use.

Suggested indicator

- By December 2015, feasibility study for the establishment of the Industry Cluster commissioned. By April 2016, further steps decided on the basis of results of the study.

10. Selected Government Entities Relevant for “Green Economic Development” of the Industry of the Philippines^{XVII}

- The Department of Trade and Industry (DTI) is responsible for realizing the country’s goal of globally competitive and innovative industry and services sector that contribute to inclusive growth and employment generation.
 - The Philippine Board of Investments (BOI), an attached agency of the Department of Trade and Industry (DTI), is the lead government agency responsible for the promotion of investments in the Philippines. Taking the lead in the promotion of investments, BOI assists domestic and foreign investors to venture and prosper in desirable areas of economic activities.
 - The Bureau of Product Standards (BPS) of DTI formulates Philippine National Standards (PNS) or adopts relevant international or foreign standards to help industries produce quality products or services and raise productivity. These standards not only protect the consumers but also facilitate trade in the global market. Some of these include the family of international standards on Quality Management System (ISO 9000) and Environmental Management System (ISO 14000).
 - The Bureau of Small and Medium Enterprises Development (BSMED) is attached to DTI and is mandated to promote and develop micro, small and medium enterprises (MSMEs) in the country. It initiates and implements programs and projects addressing specific MSME needs in technology development and transfer, financing, marketing and training, and market promotion through trade fairs.
 - The Investment Promotion Agencies (IPA) have - aside from BOI and PEZA - a network of IPAs across the country, including: CDC - Clark Development Corporation (CEZ - Clark Economic Zone) and SBMA - Subic Bay Metropolitan Administration (SEZ - Subic Special Economic and Freeport Zone).
 - The Philippine Economic Zone Authority (PEZA) is tasked to promote investments, extend assistance, register, grant incentives to and facilitate the business operations of investors in export-oriented manufacturing and service facilities inside selected areas throughout the country proclaimed by the

¹⁷This list gives an overview on government agencies that are relevant for the establishment of a GED from the public side. As indicated above specific initiatives and programs have to be identified through a consultation process and implemented - if needed - within a common action framework



President of the Philippines as PEZA Special Economic Zones.

- The Climate Change Commission (CCC) was created under the Office of the President. The CCC is the lead-policy making body of the government tasked to coordinate, monitor and evaluate government programs and ensure mainstreaming of climate change in national, local, and sectoral development plans towards a climate-resilient and climate-smart Philippines.
- The Commission on Higher Education (CHED) is the key leader of the Philippine Higher Education System effectively working in partnership with other major higher education stakeholders in building the country's human capital and innovation capacity.
- The Department of Energy (DEO) is mandated to prepare, integrate, coordinate, supervise, and control all plans, programs, projects and activities of the Government relative to energy exploration, development, utilization, distribution, and conservation.
- The Department of Environment and Natural Resources (DENR) is responsible for the conservation, management, development, and proper use of the country's environment and natural resources, specifically forest and grazing lands, mineral resources, including those in reservation and watershed areas, and lands of public domain, as well as the licensing and regulation of all natural resources as may be provided for by law.
 - The Climate Change Office (CCO) was created under the DENR Administrative order 2009-04 and serves as the coordinating mechanism internally among the DENR offices as well as externally, with other national government agencies, non-government organizations and local government units on matters related to climate change.
 - The Environmental Management Bureau (EMB) is mandated to formulate plans and policies and set appropriate environmental quality standards (water, air and noise) for the prevention, control of pollution and protection of the environment.
 - The Philippine Environment Partnership Program (PEPP) pursuant to DENR Administrative Order 2003-14 is a DENR partnership program with industries, in cooperation with the other environmental-related agencies, aimed to support industry self-regulation towards improved environmental performance. The PEPP seeks to provide a package of incentives and reward mechanisms to industries in effective voluntary self-regulation and improved environmental performance.
- The Department of Finance (DOF) formulates revenue policies that will ensure funding of critical government programs that promote welfare and accelerate economic growth and stability.
- The Department of Interior and Local Government (DILG) establishes and prescribes rules, regulations, implementing laws on public order and safety, the general supervision over Local Government Units (LGU) and the promotion of local autonomy and community empowerment and monitor compliance thereof. Among others, DILG formulates plans, policies and programs which will meet local emergencies arising from natural and man-made disasters.
- The Department of Labor and Employment (DOLE) is mandated to formulate policies, implement programs and serve as the policy-coordinating arm of the Executive Branch in the field of labor and employment.
- The Department of Science and Technology (DOST) is mandated to provide central direction, leadership and coordination of scientific and technological efforts and ensure that the results therefrom are geared and utilized in areas of maximum economic and social benefits for the people.
- The Local Government Units (LGU) are mandated to formulate and implement local programs and enforce local regulations that are - among others - supportive of green objectives.
- The National Economic and Development Authority (NEDA) is mandated to coordinate the development planning and policy formulation process, in order to achieve the objectives of sustainable economic growth coupled with an equitable distribution of income and wealth.
- The Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) is tasked to develop national competence in research and development in strategic areas of industry, energy and emerging technology sectors in the country. Its priority sectors include alternative sources of energy, energy efficiency, renewable energy climate change adaptation, and other environmental issues.
- The Technical Education and Skills Development Authority (TESDA) is asked to manage and supervise technical education and skills development (TESD) in the Philippines.



11. Selected Government Laws and Regulations

- RA 4109 Charter of Bureau of Product Standards
- RA 6969 Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990
- RA 7796 Technical Education and Skills Development Act
- RA 8749, Clean Air Act
- RA 9003 Ecological Solid Waste Management Act
- RA 9275 Clean Water Act
- RA 9501 Act to Promote Entrepreneurship Strengthening Development and Assistance Programs to MSME, amending RA 6977, otherwise known as the Magna Carta for Small Enterprises
- RA 9512 Environmental Awareness and Education Act of 2008).
- RA 9513 Renewable Energies Renewable Energy Act
- RA 9729 Climate Change Act
- PD 1586 Environmental Impact Statement System
- Ratification of UNFCCC by the Senate of the Philippines (1994)
- Kyoto Protocol signed by the Government of the Philippines (1998)
- National Framework Strategy on Climate Change, 2010 - 2022
- The Philippine Strategy for Climate Change Adaptation, 2010 - 2022
- SO 2006-787 - the Inter-Agency Working Group (IAWG) and a Program Steering Committee for the Adaptation to Climate Change
- SO 2006-788 - DENR representation to the Inter-Agency Committee on Climate Change RA 9367
- AO 171 - the Presidential Task Force on Climate Change (PTFCC) with DENR as Secretariat and IACCC as its technical arm.
- AO 171 - the PTFCC based at DOE and chaired by the DOE Secretary
- AO 2003-14 the Philippine Environment Partnership Program (PEPP) is a DENR partnership program with industries, in cooperation with the other environment related agencies, aimed to support industry self regulation towards improved environmental performance.
- DENR Special Order 2007-653 - the Advisory Council on Climate Change Mitigation, Adaptation and Communication; served as a technical arm of the PTFCC
- EO 774 - PTFCC and various Task Groups on Climate Change
- EO 785 - PTFCC to develop the National Climate Change Framework; effectively coalesced the old PTFCC and the PAGWCC into the new PTFCC
- Executive Order 301 (EO 301), "Establishing a Green Procurement Program for All Departments, Bureaus, Offices and Agencies of the Executive Branch of Government



12. Glossary of Selected Terms of Concepts and Terms of GED

- **Adaptation:** Anticipating the adverse effects of climate change and taking appropriate action to prevent or minimize the damage they can cause, or taking advantage of opportunities that may arise.
- **Clean Technology:** Manufacturing process or product technology that reduces pollution or waste, energy use or material use in comparison to the technology that it replaces. In clean as opposed to “end-of-pipe” technology, the environmental equipment is integrated into the production process
- **Climate Change:** Any change in climate over time, whether due to natural variability or as a result of human activity. The UN Framework Convention on Climate Change defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”
- **Disaster Risk Management:** The systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters.
- **Eco-labeling:** A voluntary method of certification of environmental quality (of a product) and/or environmental performance of a process based on life cycle considerations and agreed sets of criteria and standards.
- **Ecological Footprint:** An index of the area of productive land and aquatic ecosystems required to produce the resources used and to assimilate the wastes produced by a defined population at a specified material standard of living, wherever on earth that land may be located.
- **Good Housekeeping:** is a less complicated approach that can succeed in putting companies on the road towards ISO 9000 and ISO 14000. The adoption of such International Standards is aimed at helping companies to take a more systematic approach to managing quality and environmental aspects through the implementation of consistent procedures and processes. Similarly, but at a much more basic level, “good housekeeping” can help industrialists to see the link between environment, quality, and productivity. The approach can therefore be a practical first step for companies, especially SME’s, to address the basic issues of quality and environmental management.^{XVIII}
- **Green Economic Development:** GED includes the main elements of the concepts of “green growth” and “low carbon economy”. The International Chamber of Commerce and Industry states: “The business community believes that the term “green economy” is embedded in the broader sustainable development concept. The “green economy” is described as an economy in which economic growth and environmental responsibility work together in a mutually reinforcing fashion while supporting progress on social development. Business and Industry has a crucial role in delivering the economically viable products, processes, technologies, services, and solutions required for the transition to a Green Economy.”^{XIX}
- **Green Growth:** Fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyze investment and innovation, which will underpin sustained growth and give rise to new economic opportunities.^{XX}
- **Greenhouse Gases:** Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth’s surface, the atmosphere and clouds. This property causes the greenhouse effect. Water vapor (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the Earth’s atmosphere. There are human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine and bromine containing substances. Beside CO₂, N₂O and CH₄, the Kyoto Protocol deals with sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).
- **Green Procurement:** Taking environmental aspects into consideration in public and institutional procurement.
- **Hazardous Waste:** By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Substances classified as hazardous wastes possess at least one of four characteristics: ignitability, corrosivity, reactivity or toxicity, or appear on special lists.

¹⁸See: International Standards Organizations: ISO 9000 + ISO 14000 NEWS 5/1999

¹⁹See: International Chamber of Commerce: The ICC Task Force on Green Economy

²⁰OECD: Green growth and private sector development: Stocktaking of DCED Experiences, 2014



- **Life-cycle Assessment (LCA):** is also known as life-cycle analysis, ecobalance, and cradle-to-grave analysis). It is a technique to assess environmental impacts associated with all the stages of a product's life from cradle to grave (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling).
- **Low Carbon Economy:** is an economy based on low carbon power sources that therefore has a minimal output of greenhouse gas (GHG) emissions into the environment biosphere.
- **Mitigation:** Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards
- **Resilience:** The capacity of a system, community or society potentially exposed to hazards to adapt by resisting or changing in order to reach and maintain an acceptable level of functioning and structure
- **Sustainability:** A characteristic or state whereby the needs of the present and local population can be met without compromising the ability of future generations or populations in other locations to meet their needs
- **Technology Transfer:** A broad set of processes covering the flows of know-how, experience and equipment among different stakeholders.
- **Vulnerability:** An intrinsic feature of people at risk. It is a function of exposure, sensitivity to impacts of the specific unit exposed (such as a watershed, island, household, village, city or country), and the ability or inability to cope or adapt. It is multi-dimensional, multidisciplinary, multisectoral and dynamic. The exposure is to hazards such as drought, conflict or extreme price fluctuations, and also to underlying socio-economic, institutional and environmental conditions.
- **Water Stress:** Occurs when low water supplies limit food production and economic development, and affect human health. An area is experiencing water stress when annual water supplies drop below 1 700 m³ per person.^{xxi}

²¹Sources of glossary: UNEP: Geo4, 2007, OECD and private sector development: Stocktacking of DCED Experiences, 2014



13. Bibliography

- DENR: Philippine Strategy for Climate Change Adaptation, 2010 - 2022
- DTI: Development Cooperation Framework 2011-2016
- DTI-BOI: The Investment Priorities Plan of 2014-2016
- ESCAP/KOICA: Low Carbon Green Growth Roadmap for Asia and the Pacific - Turning resource constraints and the climate crisis into economic growth opportunities, 2012
- GIZ: Climate Change adaptation in Industries and Industrial Areas
- GIZ: Climate Change and Private Sector Development - Integrating green growth strategies into the MSME Development Plan 2010-2016
- ILO: Green jobs mapping study in the Philippines, 2014
- International Council of Chemical Industries: Addressing the Avoided Climate Change Challenge
- International Institute for Environment and Development: A changing future for Paper
- International Chamber of Commerce: Green Economy Roadmap, 2012
- LG Electronics: Manual of the hazardous substance management in the parts and models
- MSMEDC: Micro, Small and Medium Enterprise Development Plan 2011-2016
- NEDA: Philippine Development Plan 2011-2016
- OECD: Green growth and private sector development: Stocktaking of DCED Experiences, 2014
- OECD: Towards Green Growth in Southeast Asia, 2014
- OECD: Achieving the low „Low Carbon, Green Growth“ Vision in Korea, 2012
- Office of the President of the Philippines 2010: National Framework Strategy on Climate Change
- PricewaterhouseCoopers: Driving forward with green manufacturing
- Rafaelita M. Aldaba: The Philippine Manufacturing Industry Roadmap: Agenda for New Industrial Policy, High Productivity Jobs, and Inclusive Growth; 2014
- Switch Asia Policy Support Component in the Philippines: An Energy Efficiency Roadmap for the Philippines 2014-30
- The Cement Sustainability Initiative - 10 years of progress - moving on to the next decade, 2012
- Toyota: Green Purchasing Guidelines
- UNDESA: Exploring green economy policies and international experience with national strategies, 2012
- UNEP: GEO4, 2007
- WEF: The Global Competitiveness Report 2013-2014
- Western Cape Government of Republic of South Africa: Green is Smart Western Cape Green Economy Strategy Framework 2013
- World Business Council for Sustainable Development: Innovating for Green Growth
- World Steel Organisation: Steels contribution to a low carbon future

