

## **Environmental Performance towards Sustainable Development: A Review of Clean Production Policies in Indonesia**

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**Abstract:** This study purposes to depict a linkage between environmental management and corporate sustainability. Applying literature review and content analysis of Indonesian environmental policies, this study takes efforts to describe alignments of environmental performance criteria with sustainable development indicators. Based on Indonesian legal policies on clean production, criteria of environmental performance are determined by Ministry of Environment through a program entitled “Proper” and Ministry of Industry through “Green Industry Award” program. The result of this study is a description of comparison review between local and global criteria of environmental performance and the alignment with sustainable development indicators. The review aims to suggest improvements of Indonesian clean production policies to be in accordance with international standards of environmental performance.

**Key words:** Environmental management, environmental performance, clean production, corporate sustainability, sustainable development gas turbine, annular combustion chamber, CFD, turbulence model, LPG

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### **INTRODUCTION**

Business does not run in a vacuum but it exists in an open environment that allows contacts with other diverse elements. Business has a close relationship with environment. It might disserve environment but on the other side it also takes an important role to support sustainability of the environment (Hawken, 2010). The rapid growth of industrial activities and economic scale has led to the changes of environmental circumstances that bring impacts to ecosystem and society. Thus, companies are required to formulate wise and smart policies regarding their production activities to resolve the problems of environmental pollutions and limitation of resources (Linnenluecke and Griffiths, 2013).

Discussing sustainable development certainly cannot be separated from the concept of triple bottom line. It accommodates the nature of business that is mainly oriented in achieving economic performance (profit), discharging responsibility to social community (people) and preserving environment (planet) for the sake of long-term sustainability (Elkington, 1998). Many recent studies and research show that discussion of Corporate Sustainability (CS) is frequently juxtaposed with the concepts of Corporate Social Responsibility (CSR), Corporate Social Performance (CSP) and Environmental Management (EM) (Amini and Bienstock, 2014). There are

a lot of studies that focus on the relationship between corporate sustainability and corporate financial performance in some countries in the world. In Brazil, a research conducted by Lourenco and Branco (2013) finds that companies with prominent corporate sustainability performance reach higher return on equity than companies with indifferent corporate sustainability. In Czech Republic, businesses take into account the weightiness of corporate sustainability in reaching a long-period corporate performance. Corporate sustainability ought to be unseparated with managerial strategy and organizational planning (Krechovska and Prochazkova, 2014).

Related with triple bottom line, a research conducted in Korea by Lee and Farzipoor (2012) shows important results that the major dimensions of corporate sustainability management are economic transparency and profitability which cover corporate governance, transparency and accountability; social responsibility which includes human rights and social contribution; and environmental sustainability which emphasizes in environmental management and innovation. In achieving environmental sustainability, a company should take strong efforts in safeguarding and restoring the environment, producing innovative goods, processes and services to endeavor sustainable development. Then measurement of corporate sustainability becomes a crucial

matter. According to the research, environmental sustainability can be measured by number of green technology development applied in company's projects, expenses spent in environmental management, costs incurred in producing environmental product innovation, e.g. number of product patents and manhours needed in developing innovative products.

Results of a study conducted by Lodhia and Martin (2014) show that Corporate Sustainability Indicators (CSI) model-formulated by Dyllick and Hockerts (2002), plays an important role for an Australian mining company to integrate reporting on information of environmental, economic and social matters. The use of CSI supports the company to inform its stakeholders about the impacts of company's operational activities to environment and society. However, it is still required the consensus among companies and their stakeholders regarding certain sustainability indicators to be applied in their business practices. Regarding the dynamics of current business situations in which business activities are executed regardless of national and regional borders, this study will describe the alignment between environmental performance criteria applied in Indonesia and sustainable development indicators which are applicable within global business world.

#### **Literature review**

**Sustainable development:** There are a lot of definitions proposed by experts for the concept of sustainable development as well as corporate sustainability. The global-used and the most frequently-cited definition of sustainable development is that stated by WCED in 1987 which regards sustainable development as an effort of business to meet the needs of both present and future generations in balance (Searcy and Elkhawas, 2012). The various definitions come from how people view the concept of sustainability from different disciplines. Commonly, sustainability is defined to cover three major perspectives of economics, social and environment. Yet, scientifically reviews of sustainable development are still needed to be worthwhile in processes of decision making towards corporate sustainability (Bolis *et al.*, 2014). The various definitions then bring different indicators of corporate sustainability in terms of environmental sustainability.

The most commonly-used sustainability indicators are those included in Global Reporting Initiative (GRI) which is well-known as sustainability reporting guidelines. GRI covers sustainability indicators which consist of Economic Perspective (EC), social perspective (LA, HR, SO, PR) and Environmental Perspective (EN). Environmental perspective of GRI covers 12 aspects which include 34 indicators as follow.

#### **Aspect of materials**

- EN 1: Materials used by weight or volume
- EN 2: Percentage of materials used that are recycled input materials

#### **Aspect of energy:**

- EN 3: Energy consumption within the organization
- EN 4: Energy consumption outside of the organization
- EN 5: Energy intensity
- EN 6: Reduction of energy consumption
- EN 7: Reductions in energy requirements of products and services

#### **Aspect of water:**

- EN 8: Total water withdrawal by source
- EN 9: Water sources significantly affected by withdrawal of water
- EN 10: Percentage and total volume of water recycled and reused

#### **Aspect of biodiversity:**

- EN 11: Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
- EN 12: Description of significant impacts of activities, Products and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas
- EN 13: Habitats protected or restored
- EN 16: Energy indirect greenhouse gas (GHG) emissions (Scope 2)
- EN 17: Other indirect greenhouse gas (GHG) emissions (Scope 3)
- EN 18: Greenhouse Gas (GHG) emissions intensity
- EN19: Reduction of Greenhouse gas (GHG) emissions
- EN20: Emissions of Ozone-Depleting Substances (ODS)
- EN 21: NO<sub>x</sub>, SO<sub>x</sub> and other significant air emissions

#### **Aspect of effluents and waste:**

- EN 22: Total water discharge by quality and destination
- EN 23: Total weight of waste by type and disposal method
- EN 24: Total number and volume of significant spills
- EN 25: Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention 2 Annex I, II, III and VIII and percentage of transported waste shipped internationally
- EN 26: Identity, size, protected status and biodiversity value of water bodies and related habitats significantly affected by the organization's discharges of water and runoff

**Aspect of products and services:**

- EN 27: Extent of impact mitigation of environmental impacts of products and services
- EN 28: Percentage of products sold and their packaging materials that are reclaimed by category

**Aspect of compliance**

- EN 29: Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations

**Aspect of transport:**

- EN 30: Significant environmental impacts of transporting products and other goods and materials for the organization's operations and transporting members of the workforce

**Aspect of overall:**

- EN 31: Total environmental protection expenditures and investments by type

**Aspect of supplier environmental assessment:**

- EN 32: Percentage of new suppliers that were screened using environmental criteria
- EN 33: Significant actual and potential negative environmental impacts in the supply chain and actions taken

**Aspect of environmental grievance mechanisms:**

- EN 34: Number of grievances about environmental impacts filed, addressed and resolved through formal grievance mechanisms

Dyllick and Hockerts (2002) propose six criteria of corporate sustainability, i.e., eco-efficiency, socio-efficiency, eco-effectiveness, socio-effectiveness, sufficiency and ecological equity. According to them, an ecological sustainable company is that utilizes natural resources less than the level of natural reproduction and development of substitutes. The company does not generate emissions more than the level of natural system's absorption and assimilation. Eventually, the company does not run business activities which lower the eco-system functions. The results of their study are then adopted by Lodhia and Martin (2014) in building interrelated indicators of sustainability across perspectives of triple bottom line, i.e. Environmental-Economic (EE), Environmental-Social (ES) and Social-Economic (SE). In terms environmental indicators of corporate sustainability, they formulate a framework of Corporate Sustainability Indicators (CSI) which include 18 indicators of environmental matters as follow:

**Environmental-Economic (EE) Indicators:**

- EE 01: Water consumed per revenue (Litre/\$)
- EE 02: Energy consumed per revenue dollar earned (PJ/B\$)
- EE 03: Waste generated per revenue dollar earned (Tonnes/M\$)
- EE 04: Carbon emissions per revenue dollar earned (Mt CO<sub>2</sub>-eq/B\$)
- EE 05: Waste generated per assets dollar (Tonnes/M\$)
- EE 06: Carbon emissions per assets dollar (Mt CO<sub>2</sub>-eq/B\$)
- EE 07: Water consumed per project dollar approved (Litres/\$)
- EE 08: Energy consumed per project dollar approved (PJ/B\$)
- EE 09: Waste generated per project dollar approved (Tonnes/M\$)
- EE 10: Carbon emissions per project dollar approved (Mt CO<sub>2</sub>-eq/B\$)

**Environmental-Social (ES) Indicators:**

- ES01: Employee per Water consumed (Emp/GL)
- ES02: Employee per Energy consumed (Emp/PJ)
- ES03: Employee per Waste generated (Emp/Kt)
- ES04: Employee per Carbon emissions (Emp/Kt CO<sub>2</sub>-eq)
- ES05: Community contribution per Waste generated (\$/Tonnes)
- ES06: Community contribution per Carbon emissions (\$/t CO<sub>2</sub>-eq)
- ES07: Community contribution per Water consumed (M\$/GL)
- ES08: Community contribution per Energy consumed (M\$/PJ)

Based on literature review of some international documents, i.e., Brundtland Report, OECD Guidelines for Multinational Enterprises, the UN Millennium Development Goals, UN Global Compact, UN Millennium Ecosystem Assessment, Barkemeyer (2011) formulates 23 issues of sustainability which cover economic, social and environmental perspectives. Ten items of them are environmental indicators, i.e., achieving access to basic sanitation, combating water pollution, combating soil erosion, protecting biodiversity, preventing climate change, reducing air pollution, reducing corporate ecological footprint, preserving marine ecosystems, protecting forest cover and environmentally-friendly technologies.

A company should take into account both of internal and external orientations in organizing its sustainability strategies to deliver values in its business practices. Internally, the company arranges and conveys its sustainability plans to stakeholders and other related

parties but externally, it also depends on how the other parties react to the plans. Thus, sustainability efforts in the relationship with stakeholders in terms of environmental matters consist of appraising the conservation of environments, animals and vegetation; regulating and appraising water catchments and disposal operations for the good of the region; maintaining native plants, animals and species on land and in oceans (Biggemann *et al.*, 2014)

**Environmental performance:** Environmental performance is closely related with concept of Corporate Social Performance (CSP). Klassen and McLaughlin (1996) focus their study of CSP on three main variables, i.e., social responsibility, environmental performance and financial performance. Rather than using disclosure of annual report in terms of environmental matters, they use environmental award achievements as indicators for measurement of environmental performance management. They emphasize the attributes of CSP on product and operations technologies designed to reduce the impacts on environment; and strong management systems. Their study confirms that environmental performance empirically and positively supports financial performance in various types of industry. Adopting Carroll (1979)'s three-dimensional model of CSP, Clarkson (1995) proposes The Reactive-Defensive-Accommodative-Proactive (RDAP) Scale as follow.

**MATERIALS AND METHODS**

This study attempts to describe alignments of environmental performance criteria with sustainable development indicators through literature review and multiple case studies. Accordingly, this study will discuss the conformity between local and global indicators of environmental performance by applying content analysis on criteria which are prevailed in Indonesia, i.e., “Proper” and “Green Industry Award”.

**RESULTS AND DISCUSSION**

**Analysis:** There two main regulations of environmental assessment for business practices in Indonesia, i.e., “Proper” issued by Ministry of Environment and “Green Industry Award” issued by Ministry of Industry (Table 1).

**“Proper”:** “Proper” is an acronym of “Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan

**Table 1: The Reactive-Defensive-Accommodative-Proactive (RDAP) scale**

Rating	Posture of strategy	Performance
Reactive	Deny responsibility	Doing less than required
Defensive	Admit responsibility but fight it	Doing the least that is required
Accommodative	Accept responsibility	Doing all that is required
Proactive	Anticipate responsibility	Doing more than is required

**Table 2: The Alignment of environmental performance ratings**

Carroll (1979) and Clarkson (1995)	Categories of proper	Performance of proper
Reactive	Black	Intentionally harming environment and violating regulations
Defensive	Red	Meeting the minimum requirements
Accommodative	Blue	Aligning with regulations
Proactive	Green and gold	Beyond compliance and environmental excellence

Lingkungan Hidup” or “Assessment Program of Corporate Performance in Environmental Management”. This program is conducted by Ministry of Environment. According to Regulation of Minister of Environment Republik Indonesia No. 6/2013, Proper is held through monitoring mechanism which aims to give incentive or sanction to companies for their business activities in terms of environmental pollution control, environmental degradation control and management of hazardous waste and toxic. The regulation sets two criteria of corporate performance, i.e., compliance and beyond compliance. Compliance includes assessment of indicators as follow: (Table 2):

- Environmental documents or environmental permits
- Water pollution control
- Air pollution control
- Hazardous and toxic waste management

Beyond compliance includes assessment of indicators as follow:

- Environmental management system
- Utilization of resources which consists of
- Energy efficiency
- Reduction and utilization of hazardous and toxic waste
- Reduce, Reuse and Recycle (3Rs) for solid-material non-hazardous and toxic waste
- Reduction of air pollutants
- Conservation and decreasing of water pollution load
- Protection of biodiversity
- Community empowerment
- Arrangement of summary documents of environmental management performance

The results of assessment are assigned in performance ratings as follow:

**Black:** This category is given to businesses and/or activities those intentionally commit to actions or omissions that result in pollution and/or damage to the environment and violations of laws and regulations or do not fulfill the administrative sanctions.

**Red:** This category is given to businesses and/or activities those run efforts of environmental management but do not align with qualifications required by regulations.

**Blue:** This category is awarded to businesses and/or activities those run efforts of environmental management in alignment with qualifications required by regulations.

**Green:** This category is awarded to businesses and/or activities those run efforts of environmental management more than qualifications required by regulations (beyond compliance) through environmental management system, efficient utilization of resources and good community empowerment.

**Gold:** This category is awarded to businesses and/or activities those consistently show the environmental excellence in production and service process, apply business ethics and those are responsible with community. In accordance with environmental performance, Proper has alignments with ratings proposed by Carroll (1979) and Clarkson (1995).

**Green industry award:** Green Industry Award is a program launched by Ministry of Industry through Regulation of Minister of Industry No. 05/M IND/PER/1/2011. The program is to select companies within Indonesian manufacturing industry those meet qualifications of socially and environmentally responsibilities. Assessment criteria of Green Industry Award are divided into two categories, i.e. Small and Medium Industry and Big Industry. The assessment of Small and Medium Industry includes criteria as follow: Production Process, weighted 70% of assessment. It encompasses production efficiency program, utilization of input material, energy, water, process technology, products, human resources and working environment. Performance of Waste/Emission Management, weighted 20% of assessment.

It encompasses efforts in reduction of CO<sub>2</sub>e emission and quality standards of environment and waste/emissions management. Corporate Management, weighted 10% of assessment. It encompasses certifications, Corporate Social Responsibility, achieved awards and the health of employees. Green Industry Award is a program launched by Ministry of Industry

**Table 3: The classification of green industry award**

Classifications levels	Interval of result
5	90.1-100.0
4	80.1-90.0
3	70.1-80.0
2	60.1-70.0
1	50.1-60.0

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It encompasses waste/emission management and Health Safety Environment (HSE). Corporate Management, weighted 10% of assessment. It encompasses certifications, Corporate Social Responsibility and achieved awards. Each criterion is given score within 0-4 and the classification of performance based on the total result is as follow.

An industrial company can be categorized of having commitment to the environment if it can meet at least 50% in each aspect of the assessment. While, an industrial company which can meet above 90% in each aspect of the assessment, it can be awarded as a company that has sustainably implemented green industry principles. Thus, based on classification of Green Industry Award, the categories are divided into non-compliance (<50%), compliance (at least 50%) and beyond compliance (above 90%). Through content analysis, the alignment of the criteria of Proper and Green Industry Award with sustainable development indicators of GRI can be figured as follow in Table 4.

Table 4: The alignment between criteria of proper and green industry award with sustainable development indicators

Sustainable development aspects of GRI	Proper	Green industry award
Materials	Reduce, Reuse and Recycle (3Rs) for solid-material non-hazardous and toxic waste	Utilization of input material in production process
Energy	Energy efficiency	Utilization of input energy in production process
Water	Water pollution control, conservation and decreasing of water pollution load	Utilization of input water in production process
Biodiversity	Protection of biodiversity	-
Emissions	Air pollution control, reduction of air pollutants	Reduction of CO <sub>2</sub> e emission, waste/emission management
Effluents and Waste	Hazardous and toxic waste management, reduction and utilization of hazardous and toxic waste, Reduce, Reuse and Recycle (3Rs) for solid-material non-hazardous and toxic waste	waste/emission management
Products and services	-	Products in production process criteria
Compliance	Environmental documents or environmental permits, arrangement of summary documents of environmental management performance	Certifications in corporate management criteria
Transport	-	-
Overall	-	-
Supplier environmental assessment	-	-
Environmental grievance Mechanisms	-	-

### CONCLUSION

It can be concluded that most of global criteria of sustainable development based on GRI aspects have been met by criteria of Indonesian environmental performance, i.e., proper and green industry award. However, improvements of detail criteria are still necessary to be done. Protection and conservation of biodiversity need to be included in Green Industry Award criteria. Aspects of products and services also need to be added in Proper criteria. Aspects of transport, overall environmental expenditures, supplier environmental assessment and environmental grievance mechanisms are also important indicators to be added into criteria of Proper and Green Industry Award. Concerning Indonesia is a part of global business world in which business activities are conducted in cross-countries, the improvements of national environmental performance criteria are necessary to be done in order to reach comprehensive clean production policies in Indonesia as an effort of being in accordance with international standards of environmental performance.

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