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Indonesian Challenges for Green Industries and Academic Contribution

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OUTLINE

- Green-Industry and Eco-City Indonesia
- Cooperation of Industry-Academic-Government
- Industry-Academic-Government Cooperation Initiatives in Indonesia

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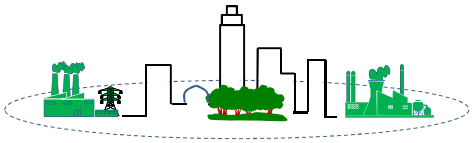
Green Industry Indonesia

Green Industry is characterized by:

- Use of environmentally friendly raw materials
- Efficient in raw material consumption
- Promote 4R program (reduce, recycle, reuse, and recovery)
- Low energy and water use intensity
- Implement waste minimization
- Use of low carbon technology

Contribute to Eco-City

Eco-city



- Healthy human settlement,
- support economic growth
- Its inhabitants live in harmony with the natural environment
- minimum impact on the environment
- conservation of natural resources (water, energy, air, land)
- zero waste system
- efficient mobility infrastructure
- cultural values
- promote education and R&D

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The interventions *(example)*

TECHNOLOGY

Process optimization
Equipment re-design
Process substitution
Improved process automation

OPERATING PRACTICES

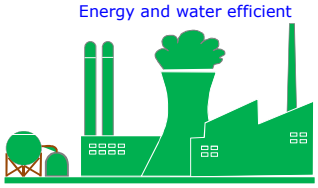
Good housekeeping options
Worker capacity building

RAW MATERIALS

Renewable materials
Substituting and/or reducing hazardous materials, or materials that generate non recyclable or re-useable waste

UTILITIES

Energy and water efficient



PRODUCTS

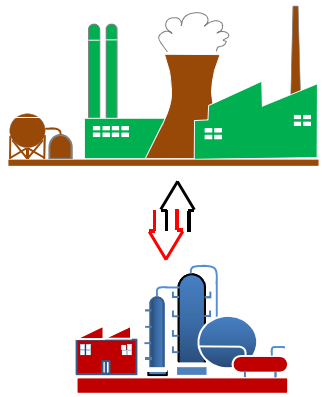
Product composition
Packaging
Re-design
Increase durability

WASTE

Re-use/recycle

Useful application of waste material

Industrial symbiosis (in energy, material, waste treatment) also may lead to green industry



Key Elements of Good Practice in Green Industry

- Commitment and leadership at the highest political level
- Participatory process involving key stakeholders
- Coordination across different key ministries
- Alignment/linking with existing national strategies, policies, and processes.
- Long-term vision combined with the definition of short-and medium-term goals
- Broad scope and long-term character
- Stimulating private investment and contribution to green industry

Adapted from : Good Practice Analysis 2.0 on INDCs, LEDS, NAMAs and MRV- International Partnership on Mitigation and MRV

Case of Indonesia

Good practice: **Alignment/linking with existing national strategies, policies, and processes**

Target Sector: Industry
Mechanism: Incentive for industries to implement green industry

Programs:

- Green Industry Award
- Green Industry Standard
- Ranking of Environmental Performance of Companies ("PROPER" Program)

Green Industry Award
(Ministry of Industry, since 2009)

Green Industry Standard
(Ministry of Industry, since 2015

"PROPER" Program
(Ministry of Environment and Forestry, since 1995)

Green Industry Award
Owner: Ministry of Industry
Existence: since 2009

Evaluation Parameters:
- Use of environmentally friendly raw materials
- Implement 4 R program: reduce, recycle, reuse, and recovery
- Low energy and water use intensity
- Implement waste minimization
- Use of low carbon technology (preferably renewable energy)

Number of industries awarded so far: 236

Green Industry Standards
Decree of Ministry of Industry No 51/M-IND/PER/6/2015

Reference for industries in establishing green industry.
The standard covers:
- raw material,
- energy,
- production process,
- management,
- waste handling and
- other aspects related to green industry.

Strategy:
- Greening of existing industries
- Creation of new green industries

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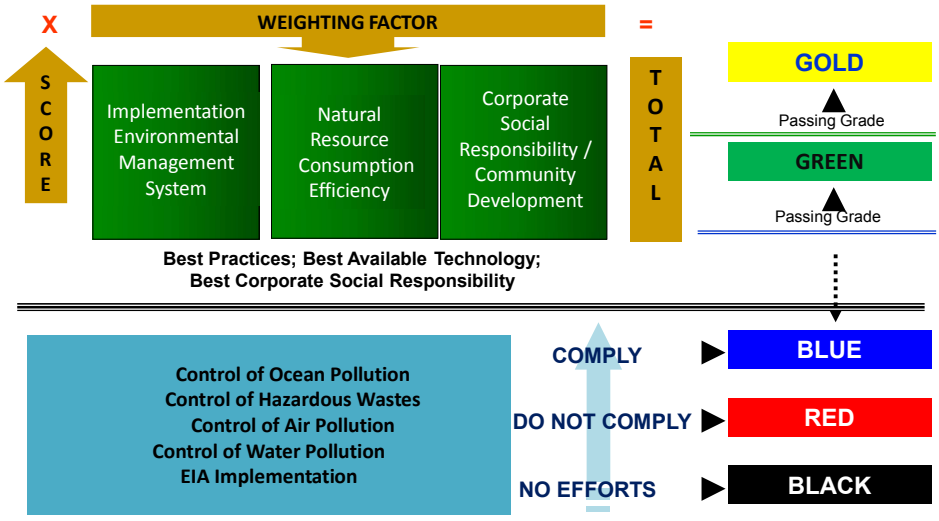
Green Industry Standards

Current efforts:

- Implementation of green industry standards in selected industries: textile, tile, ceramics, cement, steel, pulp and paper
- Cataloging environmentally friendly raw materials for selected industries: textile, tile and ceramics, and food industry
- General guideline for energy conservation and CO2 emission reduction
- Technical guideline for conducting feasibility study for energy conservation and emission reduction;
- Guideline for handling of industrial waste water and hazardous wastes

EVALUATION OF "PROPER"

Subject to verification



15 – 20 companies receive GOLD RANK

"PROPER"

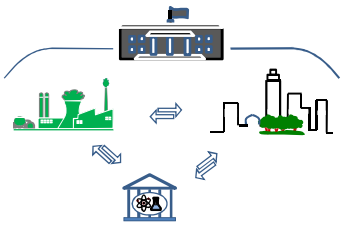
Energy Efficiency Programs

- Energy policy
- Organization Structure and Responsibility
- Plan (long term) : objective and target
- Energy Audit (last 3 years)
- Competency: energy auditor, training, education background
- Reporting
- Benchmarking : World, Asia, National
- Program implementation: success of energy efficiency measures, acknowledgment/prize, contribution to community.

*Achievement of emission reduction is subject to **verification***

Company must prepare detail calculation of baseline emission and mitigation emission

Cooperation of Industry-Academic-Government



Provision/delivery of:

Goods/products
Materials
Services
Energy
Employment

Knowledge/Technology
Education
Settlement
Leisure

Industry – Academic:
- R&D Partnership
- Consultancy
- Capacity Building

Government – Academic:
- R&D Partnership
- Consultancy
- Capacity Building

Policy/regulation
Facilitation
Incentives

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Industry-Academic-Government Cooperation Initiatives

Ultimate objective: GHG emission reduction
Sector: Energy and Materials (when appropriate)
Framework: MRV (Measurement, Reporting, Verification)

Transparency is the backbone of Paris Agreement

Activity*):

- Installation of energy monitoring device in industry
- Development of bottom-up energy model (industry, city, region, national)

*) *Research Project of Institut Teknologi Bandung, Indonesia and*
National Institute of Environmental Studies, Japan

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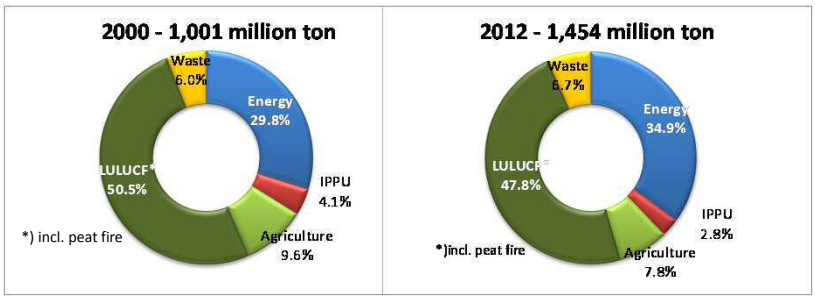
The rationale

Past Trend of GHG Emission



Sectors	Million ton CO2e		Percentage		Average annual growth
	2000	2012	2000	2012	
1 Energy	298	508	30	35	4.5%
2 IPPU	41	41	4	3	0.1%
3 Agriculture	96	113	10	8	1.3%
4 LULUCF *	505	695	51	48	2.7%
5 Waste	61	97	6	7	4.0%
Total	1,001	1,454			3.2%

*) including peat fire

Source: Draft-Indonesia 1st BUR

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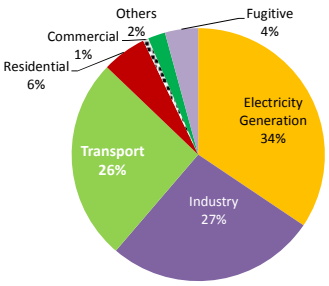
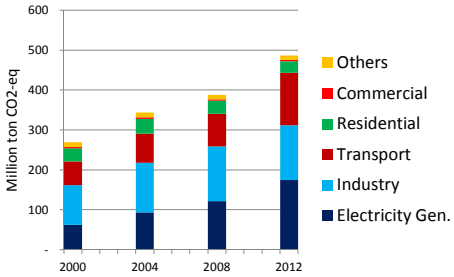
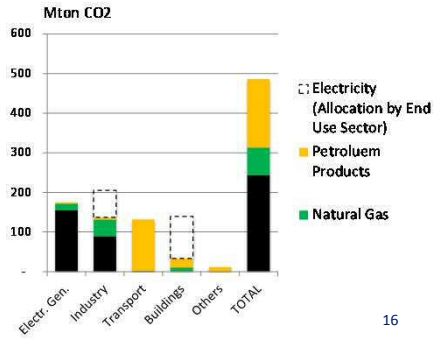
Breakdown of Energy Sector Emissions



Energy 2012
508 mill ton





Combustion Emissions
Major sources: coal & oil
Uses: Power gen., industry, transport
End-use sector: 45% from fuel burning in industry;
Emissions from power generation is accounted by building (60%) and industry (40%) sectors.

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Measurement, Reporting, and Verification (MRV)

Within the context of climate change arena, MRV stand for **M**easurement/ Monitoring, **R**eporting and **V**erification of GHG emission.

The term MRV is originated from UNFCCC Decision 1/CP.13 – 2007, Bali Action Plan:

*Paragraph 1 (b)(ii) of the Decision underlines the need for "…. nationally appropriate **mitigation actions** by developing country Parties in the context of **sustainable development**, supported and enabled by technology, financing and capacity-building, in a **measurable, reportable and verifiable** manner.*

Transparency is the backbone of Paris Agreement

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The Needs for MRV

MRV lately become important issue within the context of NAMAs (Nationally Appropriate Mitigation Actions), i.e. climate change mitigation actions that are in line with country development objective and in support to sustainable development.

The issue of MRV is still relevant and an important component in the global efforts in climate change mitigations organized/managed under **NDC** (Nationally Determine Contribution).

In order to have credible claim of the GHG emission reduction achieved by implementing all mitigation efforts, including the INDC, the reduction has to be measured, reported, and verified (MRV-ed).

Those are the rationale that we have to continue researches that support to the development of MRV system in all sectors, including in industrial sector.

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ITB – NIES Research Toward Green Industry

Focus area: industry sector
Activities :
(a) Installation of equipment to monitor energy system performance in industry *)
(b) Capacity building for climate change mitigations in industry and the associated monitoring system
(c) Modeling of Low Carbon Development incorporating mitigation actions in industry sector

*) Energy monitoring is to identify the potential of energy efficiencies measures. When implemented will **lead to green industry**

The efficiency may be obtained through technological intervention at an industry or through integration of energy system between industries in a location (i.e. industrial park).

Other uses of monitoring: develop baseline emission

Previous ITB - NIES Research Collaboration
AIM Modeling Research: ITB-IPB-NIES-Kyoto University
- *Extended Snapshot (ExSS) - Scope: National and Sub-National (DKI Jakarta)*
- *End Use Model - Power, Industry, Transport, Commercial, Residential - Scope: National*
- *CGE - National - for evaluating impact of national action plan (RAN) - Scope: National*

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INDONESIA
INDUSTRIAL PARKS
TOTAL: 232 SITES

71 PARKS OUTSIDE JAWA

Candidates for monitoring:
- Glass Industry
- HPL Paper and Adhesive

MODELING:
EXISTING CITY-WIDE SIMULATION: JAKARTA

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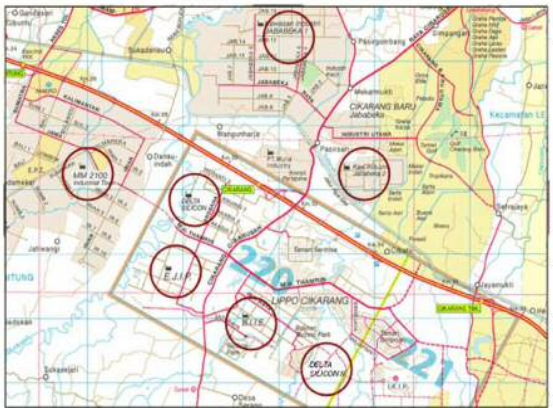
West Java Industrial Estates and Their Typical Industries



Cikarang	Typical Industries
Jababeka Cikarang Delta Silicon Cikarang EJIP (East Jakarta Ind. Park) Hyundai Cikarang MM22100 Cikarang	Plastic Packaging Metal Production Automotive Spare-part Electronic Component Chemical Product (Detergent, Chemical for Lab.) Paper Packaging

Karawang/Bekasi	Typical Industries
Surya Cipta	Automotive Food and Beverages

Banten	Typical Industries
Krakatau Industrial Estate Cilegon (KIEC)	Petrochemical Electricity

Outside Industrial Estate
- Automotive (Honda, Toyota, Suzuki,Mitsubishi, etc.)
- Paper Industry (Pindodeli – Karawang)
- Textile raw material (Indo-Bharat Rayon, Viscose Rayon, Indorama, etc.)
- Textile industry in Bandung Regency (industrial cluster)

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Challenge / Opportunities

ITB – NIES research is not limited to the current scope/activity but also will include:

1. Symbiosis between industries and surrounding establishments (other industries/consumers)
2. Promoting the results of currents research and relevant ideas to other industries (individual as well as to industrial park or region)
3. Integrating the plant level information for developing LCD Model in industrial park, city, regional (province) and national level

Thank You

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