Industrial Wastewater Management in Indonesia

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Outline

1. Regulatory Regarding Industrial Wastewater
2. Industries in Indonesia
3. Facts of Indonesia
4. Issues Addressed in WEPA Workshop
FACTS OF INDONESIA
INDONESIA

Some facts & statistics:
- 17,508 islands
- The biggest moslem country
- About 261,1 million inhabitants in 2016
- 336 different ethnic
- 500 languages & dialects
- lies between two oceans
  (Indian & Pacific) and two continents (Asia & Australia)
- West-east 5150 km, North-south 2000 km
- 81% of Indonesia is sea area
NATURAL BEAUTY OF INDONESIA

- Raflesia hasselti
- Comodo dragon
- Orang Utan
- Bird of Paradise
NATURAL BEAUTY OF INDONESIA

Tea Plantation

Rice Fields
Industrial Development in Indonesia
The 2025 Indonesia Industry Structure
INDUSTRIAL DEVELOPMENT PLAN

I. MINERAL BASED INDUSTRIES
(Mineral, Coal, Oil & Gas, and Petrochemical)
1. Base Steel Manufacturing and Refining
2. Non Iron base Manufacturing and Refining
3. Metal Forming
4. Metal for Strategic Industries
5. Rare Metal Manufacturing and PGM
6. Petrochemical
7. Organic Chemical
8. Fertilizer
9. Salt
10. Cement
11. Synthetic Resin and Plastic Materials
12. Synthetic Rubber
13. Textile Fibre
14. Chemical Industry
15. Plastics, Rubber Processing and Products of Rubber
16. Pharmaceutical Industry and Medicine

II. AGRO BASED INDUSTRIES
17. Food
18. Fresheners
19. Feed
20. Industri Oleo food, Oleo chemical dan Non Food Chemical Industry
21. Forest products and plantation Processing

III. HR & TECHNOLOGY BASED INDUSTRIES
22. Machinery
23. Textile and Apparel
24. Laboratory and Medical Device
25. Transportation
26. Leather and Footwear Industry
27. Electrical Equipment
28. Electronics and Telematics

IV. ENHANCING ROLE OF SME’S
Primarily to strengthening industrial structure by increasing linkages between large industry and SMEs.
LOCATION: IN ALL INDONESIA

Source: Ministry of Industry
THE ROLE OF INDUSTRIAL SECTOR ON NATIONAL ECONOMY

CONTRIBUTION TO GDP
Industrial sector is the biggest contributor of GDP i.e. 23.93%, with growth rate at 5.78% (BPS-Statistics Indonesia, 2014)

TOTAL INDUSTRY
- 23,941 Large and Medium Scale Industries
- 3,418,366 Micro and Small Scale Industries

JOB OPPORTUNITIES
Industrial sector employs 14.8 million manpower. Micro and small scale industry: 10.3 million (70%), middle scale: 700 thousand (5%) and large scale: 3.8 million (25%) (Ministry of Industry, 2014)

Source: Ministry of Industry
### Industrial Growth Rate based on Gross Domestic Product (in %)

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<thead>
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<tbody>
<tr>
<td>1</td>
<td>Refinery</td>
<td>-0.23</td>
<td>-5.00</td>
<td>-1.89</td>
<td>-0.13</td>
<td>0.92</td>
<td>0.53</td>
<td>1.25</td>
<td>0.53</td>
<td>-1.93</td>
<td>1.14</td>
<td>1.32</td>
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<td>2</td>
<td>LNG</td>
<td>-3.22</td>
<td>-6.19</td>
<td>-1.48</td>
<td>-0.01</td>
<td>-1.30</td>
<td>-3.14</td>
<td>0.01</td>
<td>-2.15</td>
<td>-3.53</td>
<td>-4.26</td>
<td>-5.53</td>
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<td>3</td>
<td>Foods, Beverage and Tobacco product</td>
<td>1.39</td>
<td>2.75</td>
<td>7.21</td>
<td>5.05</td>
<td>2.34</td>
<td>11.22</td>
<td>2.78</td>
<td>9.14</td>
<td>7.57</td>
<td>3.34</td>
<td>7.24</td>
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<td>4</td>
<td>Clothes and Footwears</td>
<td>4.06</td>
<td>1.31</td>
<td>1.23</td>
<td>-3.68</td>
<td>-3.64</td>
<td>0.60</td>
<td>1.77</td>
<td>7.52</td>
<td>4.27</td>
<td>6.06</td>
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<td>5</td>
<td>Wood and forestry-based product</td>
<td>-2.07</td>
<td>-0.92</td>
<td>-0.66</td>
<td>-1.74</td>
<td>3.45</td>
<td>-1.38</td>
<td>-3.47</td>
<td>0.35</td>
<td>-3.14</td>
<td>6.18</td>
<td>7.33</td>
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<td>6</td>
<td>Paper and Wrapping commodity</td>
<td>7.61</td>
<td>2.39</td>
<td>2.09</td>
<td>5.79</td>
<td>-1.48</td>
<td>6.34</td>
<td>1.67</td>
<td>1.40</td>
<td>-4.75</td>
<td>4.45</td>
<td>6.15</td>
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<td>Petrochemical</td>
<td>9.01</td>
<td>8.77</td>
<td>4.48</td>
<td>5.69</td>
<td>4.46</td>
<td>1.64</td>
<td>4.70</td>
<td>3.95</td>
<td>10.50</td>
<td>2.21</td>
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<td>8</td>
<td>Building Material</td>
<td>9.53</td>
<td>3.81</td>
<td>0.53</td>
<td>3.40</td>
<td>-1.49</td>
<td>-0.51</td>
<td>2.18</td>
<td>7.19</td>
<td>7.80</td>
<td>3.00</td>
<td>1.52</td>
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<td>9</td>
<td>Metal-based product</td>
<td>-2.61</td>
<td>-3.70</td>
<td>4.73</td>
<td>1.69</td>
<td>-2.05</td>
<td>-4.26</td>
<td>2.38</td>
<td>13.06</td>
<td>5.86</td>
<td>6.93</td>
<td>4.21</td>
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<td>10</td>
<td>Vehicles and heavy machinery</td>
<td>17.67</td>
<td>12.38</td>
<td>7.55</td>
<td>9.73</td>
<td>9.79</td>
<td>-2.87</td>
<td>10.38</td>
<td>6.81</td>
<td>7.03</td>
<td>10.54</td>
<td>6.05</td>
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<td>11</td>
<td>Others</td>
<td>12.77</td>
<td>2.61</td>
<td>3.62</td>
<td>-2.82</td>
<td>-0.96</td>
<td>3.19</td>
<td>3.00</td>
<td>1.82</td>
<td>-1.13</td>
<td>-0.70</td>
<td>8.91</td>
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</table>

Source: Central Bureau of Statistics, 2017

Food, clothes and petrochemical industry had a good and stable growth rate in the recent years.
Regulatory in Industrial Wastewater
**Policy Tools**

**POLICY TOOLS**

- **Command & Control**
  - For Medium and Big scale enterprises
  - Effluent Standard
  - EIA, Economic Instrument
  - Permit/licencing
  - Compliance
  - Supervision,
  - Law Enforcement
  - Technical Guidelines
  - /assistance

- **Public Service Facility**
  - For Community
  - Public Toilet &
  - Communal waste water
  - Treatment Plant
  - Sewerage Treatment System
  - Solid waste management
  - Community Empowerment

- **Guidance / Technical Assistance**
  - For Small scale enterprises
  - Technical Guidelines
  - Dissemination
  - Technical
  - Assistance
  - Model/piloting
  - Partnership
INTEGRATED WATER POLLUTION CONTROL

Permit (licencing), supervision, law enforcement, economic incentive, assistance

Public services facility, supervision, community empowerment, partnership, assistance

- Enhancing compliance of medium and big scale enterprises
- Increasing the number and effectiveness of facility for small scale enterprises and community
- Strengthening effectiveness of non point source pollution management
- Restoration of hydrology, morphology and ecology of water body

Water quality monitoring

Output: Reduction of water pollution load

Outcome: Water Quality Improvement

Outcome: Ecosystem Recovery

Impact: Increasing of community welfare

Manual & Otomatic

Conservation programme: Civil Construction and Vegetative work

- Lowering of max/min discharge ratio rate
- Declining of erosion and sedimentation rate
- Lowering of runoff coefficient rate
Environmental Impact Assessment (AMDAL)

AMDAL
“Study about the impact of an activity to the environment”

Decree of Ministry of Environment no. 5/2012

Every activities that is in AMDAL-obligatory-list must have an AMDAL document

Other activities that is not in AMDAL-obligatory-list must have an UKL-UPL document

AMDAL-obligatory-list Industry

- Cement industry (via clinker production)
- Pulp and paper industry with capacity ≥ 300,000 ton pulp/year
- Upstream Petrochemical Industry
- Industrial Estate
- Shipyard industries with graving dock system
- Propellant, ammo and explosive industry
- Black tin smelting industry
- Other industries that use ≥ 5 ha area (city) or ≥30 ha (rural)
Pre-requisite for Industries

Every activities that is AMDAL or UKL-UPL-obligatory must have an Environmental Permit

Government Regulation no. 27/2012

Industry

AMDAL-Obligatory?

Yes

AMDAL document complement

AMDAL document, based on Appendix III Decree of Environmental Ministry no. 16/2012, consists of:
• Reference Framework (Kerangka Acuan/KA) Document
• Environmental Impact Analysis Document (ANDAL)
• Plans for Environmental Management (RKL) and Plans for Environmental Monitoring (RPL) document

No

UKL-UPL document complement

UKL-UPL document, based on Appendix IV Decree of Environmental Ministry no. 16/2012

Requesting environment permit by completing:
• AMDAL/UKL-UPL document
• Deed of Industry Establishment
• Company Profile

Environment Permit
Some Efforts to Support Environmental-Friendly Industries

**Green Industry**

- Mentioned in Indonesian Law no. 3/2014
- “Industry has to fulfill the requirement of Green Industry Standard after it has been fully implemented”

- There are already **8 industries** that have “Green Industry Standards” from Ministry of Industry:
  - Portland Cement
  - Pulp and paper
  - Ceramic tile
  - Textile dyeing
  - Milk powder
  - Crumb rubber
  - Ribbed smoked sheet rubber
  - Inorganic fertilizer

**Soft Loan Program**

- **Financial help** from government to support the intention to invest on waste prevention and management
- Targeting local **small and medium-sized enterprise** with assets less than Rp 10 billion (excluding land and building)
- Maximum loan of Rp 5 Billion, with repayment period of 3 - 10 years

**Programme for Environmental Performance Rating (PROPER)**

- Evaluation on compliance and performance level of industry beyond the required level in regards of waste / environmental management
- Regulation regarding PROPER programme is written on **Decree of Ministry of Environment no. 3/2014**
Resource Efficient and Cleaner Production (RECP)

*Integrated* and *continued* application of *preventive environmental* practices and *total productivity* techniques to processes, products and services to *increase efficiency* and *reduce risks* to humans and environment.
RECP Network in Indonesia

Programme Management
(UNIDO - PM, CTA, NPO)

- CRECPI
- CTB
- ICPC
- CADGIE

Business Services Providers
(academia, technical/innovation centres etc)

SCP Resource Pool

Network RECP Indonesia (NRECPi)
Milestone of Wastewater Regulation

- Obligation to fulfill the wastewater quality standard
- **Wastewater must not be diluted**
- Wastewater standard for every activities is determined by MoE, however the province may add the parameters and applied the stricter one

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**Government Regulations no. 20/1990**

- Eff. Standard (Conc. and flow rate/product) must not be exceeded; it **may be exceeded** if only it is below the maximum pollution load
- Specific Industries having eff. Standard, namely: Caustic base, Metal coating, Tannery, Refinery, Palm oil, Pulp and paper, Rubber, Sugar, Flour, Textile, Fertilizer, Ethanol, MSG and Plywood industry (14 industries)
- Other industries must comply to general eff. standard

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**Decree of Ministry of Environment no. KEP-03/MENKLH/II/1991**

- Eff. Standard (conc & flow rate/product) and pollution load should be strictly obeyed
- Specific Industries having eff. Standard, namely: Industries mentioned in 1991 **except** Refinery; plus Milk-based product, Snacks, Soap and vegetable oil-based product, Beer, Dry cell battery, Paint, Pharmacy and Pesticide industry (21 industries)
- However along with the years, the number of industry having the specific effluent standard is increasing... under the different MoE Decree no.

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**Decree of Ministry of Environment no. 51/1995**

- Specific Industries having eff. Standard, namely: Industries mentioned in 1995; plus processing of Fruit and vegetable, Fish, Seaweed, Coconut, Soybean, Traditional medicine (Jamu), Cows and pigs husbandry, Frying oil, Cigarette, Electronic, Coffee processing, Rafinated sugar, Upstream petrochemical, Rayon, Ceramic, Tereftalat acid, and Basic oleochemical industry (36 industries)

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**Decree of Ministry of Environment & Forestry no. 5/2014**

- Basicly, it is an integration of MoE Decrees on the Eff. Standard (except for Mining and Energy industries are still seperated)

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Government Regulations no. 82/2001
Guidelines for local government on water pollution management (just a few points)

Regulated on Decree of Ministry of Environment no. 01/2010

- Mayor of a city (or Head of regency) need to identify and quantify the source of water pollution in its city or regency, and the result of identification need to be reported at least once a year to the governor.
- Governor recapitulating and analyze the source of water pollution and report it to the Ministry of Environment at least once a year.

Aspects to be considered in formulating the effluent standard, if the province government will to amend the national standard:

- **Practical Aspect**: must be able and easy to achieve
- **Technological Aspect**: can be fulfilled by available technology
- **Key Parameters**: generally focus on parameters that are easily monitored, but represent the quality of the water.
- **Pollution load concept**: controlling both the quantity and quality of the wastewater by considering the capacity of the receiving water.

The local government may have their own guideline to monitor the industries’s compliance on wastewater management, although the general guideline are provided by the MoE.
INDUSTRIAL RATING PROGRAM (PROPER)

BASIC PRINCIPAL OF PROPER CRITERIA

ENVIRONMENTAL EXCELLENCE

- Enviromental Management System
- Energy Efficiency
- Emission Reduction
- Water Conservation
- 3 R of Hazardous Waste
- 3 R of Solid Waste
- Biodiversity Protection
- Community Development

Best Practices; Best Available Technology;
Best Corporate Social Responsibility

BEYOND COMPLIANCE AREA

SEA POLLUTION CONTROL REGULATION
HAZARDOUS WASTE REGULATION
AIR POLLUTION REGULATION
WATER POLLUTION REGULATION
EIA REGULATION

COMPLIANCE TO REGULATIONS

- COMPLY
- INCOMPLIANCE
- NO EFFORT

COLOR CODE:
- GOLD: Passing Grade
- GREEN: Passing Grade
- BLUE: Comply
- RED: Incompliance
- BLACK: No Effort
Programme for Environmental Performance Rating (PROPER)

5 Class of Performance Rating

<table>
<thead>
<tr>
<th>Class</th>
<th>2015 (Participating Companies)</th>
<th>2016 (Participating Companies)</th>
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<tbody>
<tr>
<td>Blue</td>
<td>1406 companies (2015)</td>
<td>1422 companies (2016)</td>
</tr>
<tr>
<td>Black</td>
<td>21 companies (2015)</td>
<td>5 companies (2016)</td>
</tr>
</tbody>
</table>

- 76.92% compliance on wastewater - Effluent Standard in 2015
- 78.26% compliance on wastewater - Effluent Standard in 2016
Issues address in the WEPA workshop

- **Industrial wastewater quality monitoring methods (e.g. self-monitoring by industries, monitoring by public entities)**
  - Every industry has to do the self-monitoring at least once/month and send to a registered laboratory. The report is usually submitted every 6 month to the local authorities and cc to the MoE.
  - Certain industries (usually big and polluted ones may have other obligation, such as daily monitoring of pH and other parameters).
  - The local/national authorities have a right to have an access and collect the effluent anytime.
Challenges in monitoring:

- The access to the industry site, if without notice, sometime it is challenging.
- Limited the registered laboratory, especially outside Java Island.
- The man-power and budget from the local or national authorities to do the monitoring is limited.
- To find out that the industry do not do a ‘trick’, either to the WWTP facilities or to the compliance point (sometime there is a ‘hidden’ pipe for a number of purposes).
- The industry has sometime another trick to discharge the effluent, for example: in the night time or during the flooding.
- The self-monitoring data: either it is a true one or a cheated one?
Impact to the environment of wastewater emitted from the respective industry

Please noted that the industries may not the biggest contributor to the water pollution.
The reason for non-compliance of the respective industry and the problematic pollutant(s)

- **Economic reasons:** some industries are trying to reduce the environmental cost, for this reason; difficulty in access to finance to get the funding for WWTP.

- **The capacity of the operators** of Wastewater treatment plant is low: usually the best operators do not assign in a WWTP unit.

- **WWTP do not meet the load capacity** of wastewater generated by the industries.

- **Wrong WWTP design,** namely: cheated by the consultants, designed by an inexperienced consultant, the inexperience consultant endorsed by the local authority (for a certain case).

- **A tight effluent standard** for a certain parameter for a certain industry.
Current mitigation measures and the problems therein:
It has been initiated by MoEF for certain rivers
Part of materials of this presentation is belong to **Dr. BUDI KURNIAWAN**, Head of Sub Directorate of Inventory and Pollution Load Allocation, Directorate of Water Pollution Control, Directorate General of Environmental Pollution and Degradation Control, Ministry of Environment and Forestry of Indonesia.