SEWERAGE DEVELOPMENT IN INDONESIA

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Conference on Watershed Management for Controlling Municipal Wastewater in South East Asia

CURRENT CONDITIONS AND FUTURE TARGETS

<table>
<thead>
<tr>
<th>Year</th>
<th>Off-site System</th>
<th>On-site System with Regular Desludging</th>
<th>On-site System without Regular Desludging</th>
<th>Basic Sanitation</th>
<th>No Access</th>
<th>Open Defecation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td>31.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
<td></td>
<td>6.9</td>
<td></td>
<td></td>
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<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Improved Sanitation</th>
<th>Basic Sanitation</th>
<th>Without Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>61.8</td>
<td>6.9</td>
<td>31.1</td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2019 Universal Access

WASTEWATER SERVICE

100%

Urban 100%
Rural 100%

Off-site System: 15%
On-Site System: 85%

On-Site System: 100%

ISSUES AND CHALLENGES

Up-stream

• > 95% of domestic wastewater is managed by on-site system (septic tank and septage treatment), with low quality
• Low awareness of hygiene and sanitation in communities
• Low quality of sanitation facility
• Low access to sanitation facility
• Limited land availability in slum urban area

Down-stream

• Polluted water sources
• Low effluent quality from on-site system
• High cost of investment, operational and maintenance for off-site system
• Non-functional existing sanitation facility

• Low priority on sanitation investment, both at government and community level (land availability, planning, commitment)
• Stronger regulation and enforcement is needed !!!
SANITATION DEVELOPMENT PLANNING

City Sanitation Strategy (SSK) &
WASTEWATER MASTERPLAN/OUTLINE PLAN

Primary Study (EHRA, etc)
Existing Condition
Determination of Risk Area

Strategic Plan:
Program, Activity, Investment
Implementation –
Monitoring & Evaluation

Formulation of sanitation system development strategies:
on-site & off-site

Integrated sanitation services

SANITATION DEVELOPMENT SCHEME

URBAN/RURAL - DENSITY

URBAN
LOW DENSITY
HIGH DENSITY

RURAL
LOW DENSITY
HIGH DENSITY

WASTEWATER SYSTEM

On-site system

On-site
Communal Off site

Off-site system (communal, decentralized, city scale)
Latrines Septic tanks (basic Sanitation)
Community Lead to Total Sanitation ((CLTS))
MANAGEMENT APPROACH

Approach
- Community Based
  - Neighborhood
    1. Pro-Poor
    2. Slum area
  - Institutional Based
    Demand Responsive Approach
    - Metropolitan & Large City
      Off-site system
    - Medium & Small City
      - Integrated on-site and off-site systems with focus on Septage Treatment Management
    - Old City
      - Shallow/small bore sewer or small scale sewerage integrated to municipal sewage system to support revitalization
    - New City
      - Small sewerage system for Low Cost Housing area
      - Encourage sewerage development for new town

Level
- City Wide
- Regional/National

WHAT DO WE DO ???

Develop:
- On-site System
  • Individual Septic Tank
  • Communal Septic Tank
  • Septage Transport Vehicle
  • Septage Treatment Plant
- Off-site System
  • City Scale
  • Small Scale
  • Specific Area

Encourage:
1. Campaign, Education, and Promotion
2. Advocacy to Local Governments
3. Management Technical Assistance
4. Updating City Sanitation Strategies
5. Cross Sectoral Synchronization
6. Human Resources Development
Prior to 2015
- Strengthening provincial government roles
- Improving quality cities sanitation strategic plan
- Promoting awareness of and proper attitude towards sanitation and hygiene at users and management

2015 onwards: focusing on implementation
- Full support from the central national
- More than 350 districts/cities with sanitation strategic plan

100% coverage of basic infrastructure, including sanitation in 2019
- Continuing Open Defecation Free Program
- Improving quality of septage management
- Increasing coverage of off-site system in urban areas

ESTIMATION OF INFRASTRUCTURES NEEDED FOR UNIVERSAL ACCESS

<table>
<thead>
<tr>
<th>OFF SITE SYSTEM</th>
<th>ON SITE SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target by 2019: 2 million Household</td>
<td>Target by 2019: 20 million Household</td>
</tr>
<tr>
<td>- House Connection Construction in existing city scale WWTP (exclude MSMHP and MSMIP): 150.000 HC</td>
<td>- Septage Treatment Plants Construction: 337 cities/regencies</td>
</tr>
<tr>
<td>- House Connection Construction in City Scale WWTP (Jambi, Pekanbaru, Makassar, DKI Jakarta, Medan, Yogyakarta): 150.000 HC</td>
<td>- Septage transport vehicle supporting: 337 units</td>
</tr>
<tr>
<td>- Small Scale WWTP Construction: 2.400 unit (@200 – 1000 HC): 1,2 million HC</td>
<td>- Septic tank construction: 10 million HH</td>
</tr>
<tr>
<td>- Community based WWTP Construction: 5.000 unit (@100 HC): 500 ribu HC</td>
<td>- Public Toilet Construction (Communal septic tank): 50.000 unit (@50 KK): 2,5 million HH</td>
</tr>
</tbody>
</table>
- Latrine (Basic Sanitation): 7,5 million HH
SEPTAGE MANAGEMENT SYSTEM

For Onsite & Small scale sewerage, beside expanding the access we are now also focusing on IMPROVING the QUALITY of SEPTAGE MANAGEMENT

Wastewater Treatment:
- Individual Septic Tank
- Communal Septic Tank
- Small Scale Sewerage

Septage Transport Vehicle

Septage Treatment Plant
Only 170 out of 517 cities/regencies owned STP

On Call Basis Desludging / Regular Desludging

CITY SCALE SEWERAGE IN INDONESIA

<table>
<thead>
<tr>
<th>No</th>
<th>City</th>
<th>Units</th>
<th>System</th>
<th>Capacity (CMD)</th>
<th>Idle Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Medan</td>
<td>1</td>
<td>UASB</td>
<td>10.000</td>
<td>43.5%</td>
</tr>
<tr>
<td>2</td>
<td>Parapat</td>
<td>1</td>
<td>Aerated Ponds</td>
<td>2000</td>
<td>94.25%</td>
</tr>
<tr>
<td>3</td>
<td>Batam</td>
<td>1</td>
<td>Oxidation Ditch</td>
<td>2.852</td>
<td>97.37%</td>
</tr>
<tr>
<td>4</td>
<td>Jakarta Zone 0</td>
<td>1</td>
<td>MBBR</td>
<td>38.880</td>
<td>98.19%</td>
</tr>
<tr>
<td>5</td>
<td>Tangerang</td>
<td>1</td>
<td>Aerated Ponds</td>
<td>2.800</td>
<td>94.74%</td>
</tr>
<tr>
<td>6</td>
<td>Bandung</td>
<td>1</td>
<td>Lagoons</td>
<td>80.835</td>
<td>0%</td>
</tr>
<tr>
<td>7</td>
<td>Cirebon</td>
<td>4</td>
<td>Lagoons</td>
<td>20.500</td>
<td>53%</td>
</tr>
<tr>
<td>8</td>
<td>Surakarta</td>
<td>3</td>
<td>Biofilter &amp; Lagoons</td>
<td>14.000</td>
<td>56.38%</td>
</tr>
<tr>
<td>9</td>
<td>DI Yogyakarta</td>
<td>1</td>
<td>Aerated Ponds</td>
<td>15.500</td>
<td>64.5%</td>
</tr>
<tr>
<td>10</td>
<td>Denpasar &amp; Badung</td>
<td>1</td>
<td>Aerated Ponds</td>
<td>51.000</td>
<td>37.2%</td>
</tr>
<tr>
<td>11</td>
<td>Balikpapan</td>
<td>1</td>
<td>Aerated Ponds</td>
<td>800</td>
<td>20%</td>
</tr>
<tr>
<td>12</td>
<td>Banjarmasin</td>
<td>7</td>
<td>RBC</td>
<td>18.000</td>
<td>85.55%</td>
</tr>
<tr>
<td>13</td>
<td>Manado</td>
<td>1</td>
<td>RBC</td>
<td>2.000</td>
<td>90%</td>
</tr>
</tbody>
</table>
**BIG QUESTIONS:**
**HOW TO UTILIZE THE IDLE CAPACITY??**

Problems: Low Awareness of the Households Owners, Low Budget for house connections from Local Government, No law enforcement

**ON GOING DEVELOPMENT OF CITY SCALE SEWERAGE IN INDONESIA**

Banda Aceh → National Budget
Jambi, Pekanbaru & Makassar → ADB Loan & National Budget
Palembang → IndII Grant & National Budget
Batam → EDCF Loan
UPCOMING OPPORTUNITIES OF SEWERAGE IN INDONESIA

Bandar Lampung, Bogor & Surabaya ➔ Masterplan, Feasibility Study & Detailed Engineering Design (DED) already available
DKI Jakarta ➔ Masterplan & Feasibility Study for Zone 1 & 6 available, DED for Zone 2,3,4,5,7,8,10 are on process
Greater Bandung ➔ Preparation of Study for WWTP upgrading & coverage expansion
Denpasar ➔ DED for WWTP upgrading and urgent area are on process
Ternate ➔ Land Preparation are on Process

CHALLENGES ON EXPANDING CITY SCALE SEWERAGE COVERAGE

• Land Availability
• High CAPEX & OPEX vs Limited Budget on Central & Local Budget
• Limited Human Resources on Sanitation Sectors
• Needs of Regulation & Law Enforcement
• Awareness of the Community
EXPECTED TECHNOLOGIES

A city scale sewerage system requires high investment cost, the needs for appropriate technology for tropical climate with a relatively low in operation and maintenance costs have never been more urgent.
The acceleration process of Jakarta Sewerage (to support NCICD) shift the priority of WWTP Zones

<table>
<thead>
<tr>
<th>Zone</th>
<th>Location of WWTP</th>
<th>Priority on Masterplan</th>
<th>Priority on Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1</td>
<td>Waduk Pluit Short</td>
<td>Short</td>
<td>1</td>
</tr>
<tr>
<td>No.2</td>
<td>Muara Angke Long</td>
<td>Long</td>
<td>2</td>
</tr>
<tr>
<td>No.3</td>
<td>Srengseng City Forest Park</td>
<td>Long</td>
<td>2</td>
</tr>
<tr>
<td>No.4</td>
<td>Tebet Mid</td>
<td>Mid</td>
<td>5</td>
</tr>
<tr>
<td>No.5</td>
<td>Danau Sunter Mid</td>
<td>Mid</td>
<td>3</td>
</tr>
<tr>
<td>No.6</td>
<td>STP Duri Kosambi Short</td>
<td>Short</td>
<td>1</td>
</tr>
<tr>
<td>No.7</td>
<td>Kamal - Pegadungan Long</td>
<td>Long</td>
<td>2</td>
</tr>
<tr>
<td>No.8</td>
<td>Marunda Mid</td>
<td>Mid</td>
<td>5</td>
</tr>
<tr>
<td>No.9</td>
<td>Rotoran Long</td>
<td>Long</td>
<td>5</td>
</tr>
<tr>
<td>No.10</td>
<td>STP Pulo Gebang Long</td>
<td>Mid</td>
<td>5</td>
</tr>
<tr>
<td>No.11</td>
<td>Bendi Park &amp; Waduk Ulujami Long</td>
<td>Long</td>
<td>3</td>
</tr>
<tr>
<td>No.12</td>
<td>Ragunan Land Long</td>
<td>Long</td>
<td>3</td>
</tr>
<tr>
<td>No.13</td>
<td>Waduk Kp. Dukuh Long</td>
<td>Long</td>
<td>4</td>
</tr>
<tr>
<td>No.14</td>
<td>Waduk Ceger RW 05 Long</td>
<td>Long</td>
<td>4</td>
</tr>
</tbody>
</table>

- Detailed Design for Zone 2,3,4,5,7,8,10 are now done by PDPAL JAYA
- Zone 1 Detailed Design using JICA loan IP-565 are on Tender Process
- Zone 1 Construction & Zone 6 Detailed Design-Construction already on the Blue Book

WWTP moved to Pluit Ponds
WWTP Zona 6 (Duri Kosambi – 6 ha)

Status:

- Pre-Fact Finding Mission for DKI Jakarta Sewerage Zone 6 at 28 Sept – 9 Oct 2015
- WWTP will be located at Duri Kosambi (6 Ha)
- Already Include in Blue Book 2015-2019
- Supplemental Study for Jakarta Sewerage Development Project Zone 6 will be held around September 2016

Coverage: ± 282,000 m³/day
Divided into 4 phases:

- Phase 1: 1,183 ha (20%)
- Phase 2: 1,904 ha (32%)
- Phase 3: 1,421 ha (24%)
- Phase 4: 1,367 ha (24%)

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DENPASAR SEWERAGE DEVELOPMENT PROJECT (DSDP)

1. Service Area (2008-2014)
   - DENPASAR, SANUR and KUTA
   - Coverage Area:
     - DSDP-I: 1,145 ha
     - DSDP-II: 971 (815) ha
     - DSDP-III: 2,013 ha
     - Total: 4,129 ha (Overall)

2. Service Area Expansion:
   - Before: 4,129 ha (Overall)
   - After: 7,098 ha (Overall)
   - Design population: Approx. 327,000 person
   - Design Upgraded WWTP: Approx. 81,000 m³/day


4. Detail Design for WWTP and urgent area DSDP III will be finished on May 2016

WWTP (51,000m³/day)
For DSDP-I & II

DENPASAR, SANUR and KUTA
Phase I: On-going Area
Phase II: Urgent Area In JICA M/P
Phase III: Future Expansion Area

BENOA BAY LEGIAN KUTA BEACH SANUR BEACH
SANUR
KUTA SEMINYAK
SERANGAN ISLAND
BALI ISLAND
WASTEWATER TREATMENT PLANT PUMPING STATION
LEGEND
SEWER PIPE
SERVICE AREA
Phase I : On-going Area Phase II : Urgent Area In JICA M/P Phase III : Future Expansion Area FORCE MAIN BOUNDARY OF SEWERAGE

DENPASAR, SANUR and KUTA
Coverage Area:
   - DSDP-I: 1,145 ha
   - DSDP-II: 971 (815) ha
   - DSDP-III: 2,013 ha
   - Total: 4,129 ha (Overall)
ありがとうございます
(Arigatou gozaimasu)

THANK YOU