Waste Management in Vietnam
Potential for power generation

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1. Solid waste management

- In the period from 2003 to 2010, solid waste generation increases 200% and keep rising in the near future;

- In the forecast of the year 2015, the generation is estimated about 44 million tons/year;

- The most rapidly generation is in urban areas and industrial zones
# Solid waste management

## Solid waste Generation in 2012

<table>
<thead>
<tr>
<th>No.</th>
<th>Region</th>
<th>Total generation (ton/day)</th>
<th>Domestic waste in urban area</th>
<th>Industrial waste</th>
<th>Industrial Hazardous waste</th>
<th>Medical waste</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>The Red River Delta</td>
<td></td>
<td>9346.13</td>
<td>7249.12</td>
<td>1366.68</td>
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<td>2</td>
<td>The Northern Midland and Mountain</td>
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<td>1077.75</td>
<td>1314.57</td>
<td>188.63</td>
<td>11.96</td>
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<td>3</td>
<td>The North Central and Central Coast</td>
<td></td>
<td>4,146.37</td>
<td>5,447.12</td>
<td>1,137.17</td>
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<td>4</td>
<td>The Central Highlands</td>
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<td>1,268.66</td>
<td>459.51</td>
<td>65.24</td>
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<td>5</td>
<td>The East Southern</td>
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<td>7,567.46</td>
<td>1,583.15</td>
<td>14.7</td>
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<td>6</td>
<td>The Mekong River Delta</td>
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<td>3625.82</td>
<td>2163.12</td>
<td>352.03</td>
<td>7.49</td>
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<tr>
<td><strong>Whole Country</strong></td>
<td><strong>28,446.08</strong></td>
<td><strong>24,200.90</strong></td>
<td><strong>4,692.90</strong></td>
<td><strong>70.23</strong></td>
<td></td>
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</tbody>
</table>
1. Solid waste management

- SW generated in Urban areas is 28,400 tons/day, in which, Organic solid waste is account for 54-77% of waste, Recyclable waste: 8-18%

- SW Generation Coefficient in some cities are:
  - Ha Noi city: 0.9 kg/person/day
  - Ho Chi Minh city: 0.98 kg/person/day
  - Da Nang city: 0.83 kg/person/day
  - Hai Phong city: 0.70 kg/person/day
1. Solid waste management

Recycling for Industrial Solid waste (ISW)

- ISW collecting and recycling activities are spontaneous and in small scale

- The activities are mainly in small-medium private facilities and in scraft villages (recycling for plastic, paper, copper, aluminum ...) or in household scale (coconut fiber, cocopeat, cashew shell...)

- Low-tech and obsolete recycling technologies make potential of environment pollution

- Lack of ISW concentrated treatment complex, especially large-scale hazardous ISW facilities
1. Solid waste management

Recycling for Domestic Solid waste (DSW)

- The main treatment method is burying (account for about 85% of total collected DSW)

- There are 25 composting facilities invested in Vietnam. But there is no effective model for treating and recycling DSW in the fields of techniques, economy, society and environment. Product quality is not enough to meet the market requirement.

- There are 30 small-scale incinerators installed in rural areas in Vietnam
1. Solid waste management

- There are 458 operating landfills with various scales in Vietnam.

- 98 large-scale landfills are in big cities, in which 16 sanitary ones. The remaining small-scale ones are temporary and opening; without any leachate collection and treatment system. This method of DSW treatment makes environment pollutant and waste the land for burying.

- Emission from landfills makes pollution and contributes 5.3% total of greenhouse gas generation in Vietnam (UNFCCC’s report, 2000).
2. Legal documents

**Solid waste management:**

- Law on Environment Protection 2005;
- Decree No.59/2007/ND-CP dated 09 April, 2007 by the Government on Solid waste management
- Decree No.04/2009/ND-CP dated on 14 Jan, 2009 by the Government on stipulating incentives and supports for environmental protection activities
- Decree No.69/2008/ND-CP dated on 30 May, 2008 by the Government on incentive policies for the socialization of educational, vocational, healthcare, cultural, sports and environmental activities
2. Legal documents

**Solid waste management:**

- Decision No.2149/2009/QD-TTg dated December 17, 2009 by the Prime Minister on approving the national strategy for integrated management of solid waste up to 2025, with a vision to 2025
- Decision No.1440/QD-TTg dated October 06, 2008 of the Prime Minister approving the Planning on construction of solid waste treatment facilities in three northern, central Vietnam and Southern key economic regions up to 2020;
- Decision 1216/QD-TTg dated 05 September, 2012 on the National Strategy on Environment Protection to 2020, with Visions to 2030
2. Legal documents

**Landfills Management**

Joint Circular No. 01/2001/ TTLT-BKHCNMT-BXD dated January 18, 2001 by the Ministry of Construction and the Ministry of Science, Technology and Environment on guiding the regulations on environmental protection for the selection of location for, the construction and operation of, solid waste burial sites.

**Power production from SW**

Decision No. 1030/QD-TTg dated 20 July 2009 approving “Proposal for the Development of Vietnam Environmental Industry up to the year of 2015, vision to 2025”.

2. Legal documents

*Power generation from SW*

- Decision No. 249/QD-TTg dated 10 Feb, 2010 by the Prime Minister on approving the "service project development environment 2020"

- Decision No. 18/2008/QD-BCT dated July 18, 2008 of the Ministry of Industry and Trade on promulgation of regulation on avoided cost tariff and standardized electric power purchase agreement for small renewable energy power plants

- Decision No. 31/2014/QD-TTg dated May 05, 2014, on supporting mechanism for development of electric power generation projects using solid waste in Vietnam
2. Legal documents

**Climate change**

- Decision No.2139/QD-TTg dated 5 Dec, 2011 by the Prime Minister on approving the national strategy for climate change
- Decision No.130/2007/QD-TTg dated 02 Aug, 2007 by the Prime Minister on several financial mechanism and policies applied to investment projects on clean development mechanism
- Decision No.1775/QD-TTg dated 21 Nov, 2012 by the Prime Minister on several financial mechanism and policies applied to investment projects on clean development mechanism
Incentives on Power production from SW

- To exempt or reduce fee on land rent or land use;
- To exempt import tax on equipment;
- To exempt or reduce enterprise income tax;
- To be supported on interest rate and applied on CDM;
- To be supported on electricity price: the buyer is responsible for purchasing the entire power generated from projects treating solid waste.

- For power generating directly from burning solid waste, price is 2,114 VND/kWh (equivalent to 10.05 US cents/kWh);
- Gas fired power generation projects recovered from solid waste landfills is 1,532 VND / kWh (equivalent to 7.28 US cents/kWh);
3. Status and Potential for power generation

The Master Plan for Power Development VII:

Effectively utilize the national energy resources for electricity development in combination with the reasonable import of electricity, fuel, diversification of primary energy sources for electricity production, conservation of fuel and energy security for the future

Prioritize the development of renewable energy sources for electricity production, increasing the percentage of electricity produced from these energy sources from 3.5% of total electricity production in 2010 up to 4.5% in 2020 and 6.0% in 2030
Invested Projects on Energy recovery from Waste Treatment

- Go Cat facility has operated since 7 years ago, but the amount of electricity produced from using gas recovered in landfills to run the electric generators is small and ineffective.

- Project “Electricity generation from Industrial waste Treatment” in Nam Son waste treatment complex - installed capacity is 75 ton/day of treatment (of industrial and hazardous waste) and 1930 kW of electric generation – is expected to complete in the end of 2014.

- The progress of implement of two projects on using gas from landfills to generate electric in Phuoc Hiep and Dong Thanh landfills (follow the Clean Development Mechanism - CDM) is quite slow. Ho Chi Minh government may are considering to recover the investment license.
3. Status and Potential for power generation

Expected Projects:

- Electric Generation from burning waste in the key economic zones in the South and the North of Vietnam
- Others in Ha Noi, Hai Phong, Ho Chi Minh cities...

In the period from 2015 to 2020, the amount of waste from big cities will be the stable resource for electricity power plants with the capacity about 500 tons/day (8MW)
3. Status and Potential for power generation

- Gas recovery system for burning installed in landfills will contribute to reduce emission about 0.25t CO2e/ton of waste or 7.8 million tons CO2e/year.
- Recycling activities will lead gas recovery system operate more effective. This will contribute to reduce emission about 0.68t CO2e/ton of waste.
4. Challenges and barriers

- Low effective on economic aspect: high investment capital but low profit and long return of rate (10-20 years)
- Lack of financial resource because of the global economic crisis
- Price of electricity from waste treatment is not appropriate
- Waste separation at source is not implemented so characteristics of waste is not appropriate technology with the Waste-electricity generation technology.
- There’s no regulations for waste collection for Waste-electricity generation plant
5. Suggestion

- To review and evaluate programs and projects on Solid waste treatment using power generation to propose solutions for further processing operations of energy recovery from solid waste treatment;
- To develop relating standards, national technical regulations on environment;
- To issue the investment ratio, price of waste-electricity generation;
- To research, select and transfer the technology in accordance with the conditions of Vietnam.
5. Suggestion

- To develop master plan for development of energy recovery plants from solid waste treatment;
- To establish loans and fund directly supporting for electricity-waste projects;
- To integrate electricity-waste projects with CDM (sell Certified Emission Reduction-CER);
- To develop specific regulation for waste collection for electricity-waste projects;
- To develop specific incentives to attract domestic and foreign investors in this sector.