

Onre Viet Nam Expert Group Meeting on Sustainable Application of Waste-to-Energy in Asian Region

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Country presentation

Waste generation and Waste-to-Energy development/investment in Vietnam



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Presentation Outlines

- 1. Wastes and waste generation in Vietnam
- 2. Solid waste treatments in Vietnam
- 3. Legal framework on waste management
- 4. Some waste-to-energy development/investment projects in Vietnam
- 5. Conclusions and Recommendations





1. Wastes and waste generation in Vietnam

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WASTES

- Vietnam classify wastes into three main forms/ including solid waste, waste water and aerosol emission.
- Solid waste is normally grouped into four main types based on their generation sources including (i) municipal waste (including household wastes and construction wastes), (ii) industrial wastes and (iii) hazardous wastes (including medical wastes).
- Figures in this presentation mainly focuses on municipal solid wastes-MSW (household and construction wastes)





WASTE GENERATION

There are 3 main types of solid wastes officially presented in legal documents in Vietnam including hazardous, municipal and industrial wastes

- Hazardous wastes which includes medical wastes → 800,000 tons generated yearly;
- Municipal solid wastes (MSW) → 24 million tons generated annually with an average increasing rate of 10-16% per year.
- Industrial solid wastes → around 6,8 million tons generated annually





Urban population and solid waste generated per capital per day in Vietnam and total volume of MSW

	2015	2020	2025
Urban population (million people)	35	44	52
% of the urban in total population	38	45	50
Urban solid waste generation indicator (kg/person/day)	1.2	1.4	1.6
Total volume MSW (tonne/day)	42,000	61,000	83,200

Total hazardous waste collected and treated in Vietnam from 2012 to 2015

No.	Year	Amount collected and	Remark		
		treated (tons)			
1	2012	165.624	Facilities registered with MONRE		
2	2013	186.657	Facilities registered with MONRE		
3	2014	320.275	Facilities registered with MONRE		
4	2015	400.000	Facilities registered with MONRE		

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Urbanization and waste generation



Year	2015	2020	2025
Urban population (million people)	35	44	52
% of the urban in total population	38	45	50

Urbanization
Population growth
Industry and services development

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Rate of domestic waste collected in urban and rural

areas

Urban areas



Rural areas



DSW collection rate of 85% by URENCO, CITENCO and Private companies

DSW collection rate of 40-45% by Selfmanaged collection team/group) **Treatment** of 31,600 ton/day Collection of 14,200 ton/day



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2. Solid waste treatments in Vietnam

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Technology in Urban DSW treatment facilities



Generation of technologies



Assessment of technologies



Vietnamese technologies

- Bring certain efficiency
- Most studied and developed by private companies or individuals
- Practical application and low cost → meet the market demand

Foreign technologies

Encounter some applications due to waste were not sorted at sources, higher water content, unstable supply of wastes; high investment rate (expensive and higher maintenance cost) → reach a small portion of market in Vietnam





3. Legal framework on waste management in Vietnam

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- Law on Environment Protection 2014;
- Decree No. 38/2015/NĐ-CP dated 24 April 2015 of the Government on management of waste and scraps
- National Strategy on Climate Change
- National Strategy on Green Growth
- National Strategy for Integrated Management of Solid Waste
- Vietnam's NDC
- Other policies developed by Ministries and provincial authorities related to waste management





Incentive for waste-to-energy investment in Vietnam

Financial incentives have been approved to boost the generation of electricity from biomass and waste.

- Following the introduction of a feed-in tariff for wind energy back in 2011, Decision No. 24/2014/QDTTg regulating the future planning and development of energy from biomass, grid access, and purchase agreements between energy producers and the network operator came into force on 10 May 2014.
- Feed-in tariffs are also laid down for power generation from the incineration of solid waste in Decision No. 31/2014/QDTTg, which came into force on 20 June 2014. The feed-in tariff is 2,114 VND (US 10.05 cents) per kWh for waste incinerated directly, and 1,532 VND (7.28 Cents) per kWh for generation from landfill gas.
- A number of project using biomass for energy production in Vietnam, for example:
 - Use of rice husk in biomass power plants
 - Use of bagasse for CHP in sugar mills
 - Use of biomass to generate heat in agriculture
 - Biogas for cooking and electricity production





The development strategy of Renewable Energy of Vietnam by 2030 with a vision to 2050

- Improve the percentage of livestock waste treatment for energy purpose (biogas) from around 5% in 2015 to around 10% by 2020, around 50% by 2030, most livestock waste shall be treated by 2050;
- Increase the percentage of livestock waste treatment for energy purpose from the negligible rate for the time being to 30% by 2020, around 70% by 2030 and most of it is utilized for energy purpose by 2050,
- Encourage and provide assistance to the communities in development of model of development and use of renewable energy; in which the majority of energy demand is supplied from the renewable energy, the waste from industrial, agricultural, forestry and livestock production is treated and used rationally for the energy production purpose.





Waste and biomass for renewable energy development in Vietnam

No.	RE	2009	2010	2011	2012	2013	2014	2015	2020	2025
1	Small hydro	1,195	1,222	1,402	1,594	,1721	1,930	1,988	2,684	3,249
2	Biomass	157.7	170.7	197.7	219.7	234.7	247.7	316.2	400.7	462.7
3	Biogas	0	0.5	1	2	3.5	7	8	11	12
4	Solar energy	1.654	1.654	1.654	1.654	1.654	1.654	2.65	3.25	3.25
5	Wind energy	9	89.5	89.5	89.5	109.5	109.5	217	484	556
6	Geo-thermo	0	0	0	0	18	36	51	214.1	259.1
7	Bio-fuel	0	0	0	0	0	0	0	0	0
8	Tidal wave	0	0	0	0	0	0	0	5	15
9	Garbage	7.4	11.9	11.9	15.4	15.9	15.9	20.4	57.4	232.4
,	Total (MW)	1,371	1,496	1,703	1,922	2,104	2,348	2,603	3,859	4,790

Source: Strategy for Renewable Energy Development in Viet Nam for period up to 2015, with outlook to 2025.







Wind power Potential: 8% country area Measured technical potential: 1,800 MW Current dev.: 1.25 MW



Solar Potential: 4 -5kWh/m²/d Current dev.: 1.2 MW



SHPs: (<30MW) **Potential:** >4000 MW **Current dev.:** >300 MW



Biomass Potential: >800 MW Current dev.: 150 MW



Wastes Potential: 350 MW Current dev.: 2.4 MW



Biogas Potential: >150 MW Current dev.: 2 MW



Geothermal Potential: 340 MW Current dev.: 0 MW

Source: MoIT, 2009

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Key government agencies involved in waste management in





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4. Some waste-to-energy development/ investment projects in Vietnam

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1- Nam Son Waste-to-Energy project funded by NEDO operated since 12/2016 With a total burning 75 tons solid wastes per day to produce *1930kW of electricity*

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2- Can Tho converting domestic solid wastes to produce electricity invested by Everbright International (China) in 5.5 hectare, burning 400 tons of wastes to produce *150.000 kWh of electricity* per day with a total investment of around US\$ 50 million.

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3- Other project of Wastes-to-Energy

- JICA current proposed a project in Khanh Son, Da Nang city with an investment of US \$122 million for 20 year.
- The cost for treating solid wastes in this project is expected as high as US\$ 25/ton compared to the domestic investor of US\$ 8/ton.
- This project will burn solid wastes for electricity generation with an amount of 1,000 tons per day.
- JICA will support US\$25 million through JMC





Examples of Biogas development in Viet Nam (1)

- Biogas is considered as an **important source** of renewable energies in Viet Nam.
- According to Draft Strategy and Plan for Renewable Energy Development in Viet Nam (2015 with an outlook to 2025) indicates that in a base scenario biogas can contribute **12 MW** per year by 2025 in the total of 3,709 MW from RE.
- Biogas brings triple benefits: people living (provide energy), economy (reduce cost for energy) and environment (reduce GHG emission & pollution)





Examples of Biogas development in Viet Nam (2)

- The contribution of biogas total potential renewable energies in Viet Nam is small, however, biogas can be considered as a low cost and easy to disseminate the technology to endusers which is very important to a developing country like Viet Nam.
- In Viet Nam, biogas projects are distinguished by two levels: at households (small scale system) and at industry (large and commercial system).





Small scale and conventional biogas system







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Large scale and innovated biogas system







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4. Conclusions and Recommendations

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Conclusions (1)

- Using direct burning technology for solid waste treatment on project development and contracts power sale model.
- The target set by the government of Vietnam is clearly presented in the policy documents; the question now is how to achieve these targets → Concrete actions are necessary to bring more stakeholders into the business by creating more favourable investment condition.





Conclusions (2)

- Vietnam could soon become a big market for wasteto-energy technologies as the limited landfill and environment issues occur around the landfill sites.
- Reducing greenhouse gas emissions from wastes is also a priority of the government of Vietnam in contributing to its Nationally Determined Contribution (NDC) to the Paris Agreement on climate change





Conclusions (3)

- Its important to raise public awareness of consequences of disposal wastes improperly and its necessary to contribute finances to the waste management system for a better environment → meaning that "polluter pays principle" should be applied effectively.
- Policies to attracting more investors in waste treatment, including waste-to-energy in Vietnam should be formulated, in which Electricity Purchase Price (FIT) should be strengthen and reviewed.





Recommendations (1)

- Data collection and information updates should be carried by country's network member annually or biannually.
- Study in validating waste generation data and generation factors should also be conducted in different urban areas in order to estimate volume of wastes generated annually per capital.
- Awareness raising activities should be promoted in the region, particularly for the developing countries.





Recommendations (2)

- Innovation events should also be organised in order to promote application/expansion of emerging technologies in waste treatment, including waste-to-energy development.
- **Training to community** and young group leaders should be prioritised and initiatives proposed by communities should be supported and replicated.
- A report of current status of Waste-to-Energy in the Asian Region should be prepared in order to provide reliable and update-to- date information to the governments and business sector.







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