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On behalf of:  
 Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety  
 of the Federal Republic of Germany


General Directorate of Energy  
 Ministry of Industry and Trade

**Applications of solid waste treatment technology in Vietnam:  
 Challenges in Grid-connected waste-to-energy project**

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HCM City, 20/11/2014

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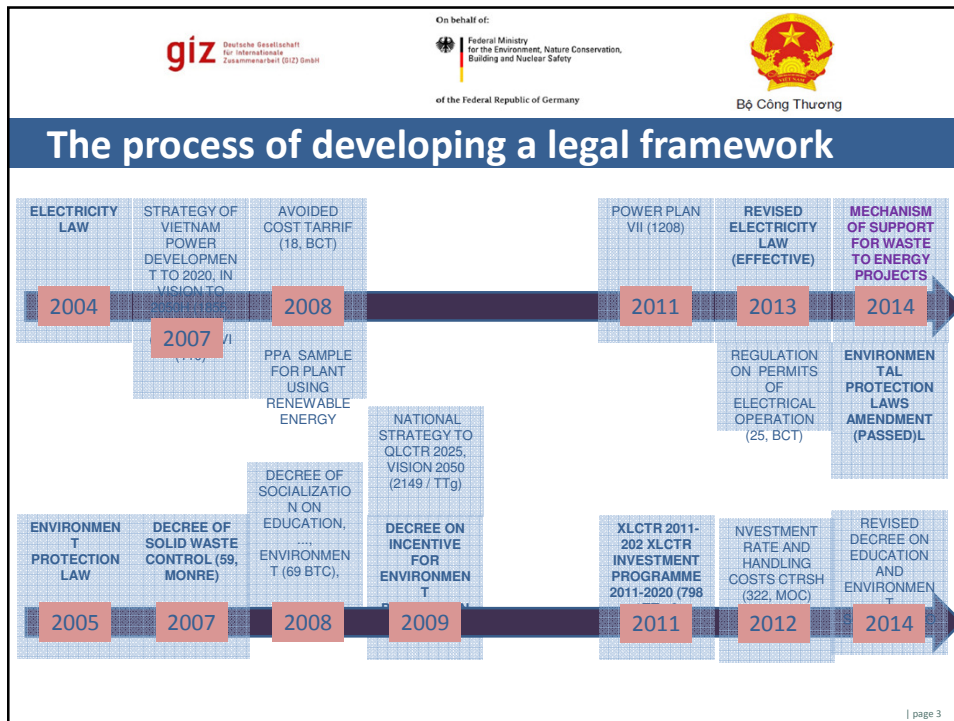
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Bộ Công Thương

**CONTENT**

- 1. Point through the development process of legal framework:  
 Renewable Energy and Solid Waste Management**
- 2. Market structure**
- 3. Situation "investment" in the "Project" Grid-connected Waste to Energy**
- 4. Typical example: Go Cat landfill gas Power station**
- 5. The challenge in developing the Waste to Energy Project in Vietnam**

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**Preliminary assessment of the implementation of Strategy 2149**

“3.a). The overall objective for 2025: "... solid waste is separated at source, collection, reuse, recycling and thoroughly treated by advanced technology and accordingly, minimizing the amount of waste to be buried to save land resources and limit environmental pollutants "


3b). Specific objectives: By 2015, 85% of the total solid waste generated in urban centers will be collected and treated to ensure the environment, of which 60% is recycled, reuse, energy recovery or organic fertilizer production

"Current status: (Source: MONRE, 05/2014)

- 85% solid waste being processed by landfill on 458 landfills nationwide
- Only 16 Disposal areas are considered sanitary landfills in total of 98 landfills in large cities (16%, calculated across the country only 3.5%!)
- Nationwide there are 25 composting plants but there is no complete model of technical, economic, social & environmental, composting quality is not high and hard to find outlets
- There are about 30 small-scale incinerators solid waste for rural areas (without heat recovery, no generator)



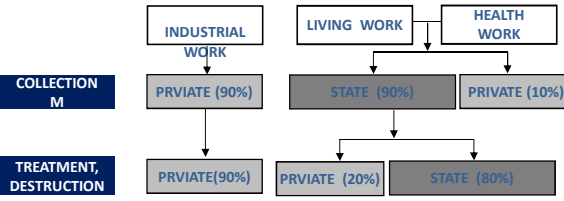
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## Market structure


In 2012, the Ministry of Construction issued Decision No. 322 / QĐ-BXD on publication productivity of capital construction investment and the cost of solid waste disposal activities: Providing referenced index of capital productivity and the cost of disposal of municipal solid waste for the technology and equipment research and manufacturing in the country.  
**Cost for solid waste treatment is as Decision No. 322/2012/QĐ-BXD**




Technology type	Minimum Price (VNĐ/ton)	Maximum (VNĐ/ton)
Processing technology of microbial fertilizer: - Capacity of 100 tons / day to less than 300 tons / day - Capacity of 300 tons / day to 500 tons / day	220.000 160.000	270.000 220.000
Fuel Members Processing Technology : Capacity from 50 tons / day to 100 tons / day	180.000	240.000
Firing technology: capacity from 50 tons/day to 300 ton/day	320.000	410.000

Currently there is no fee level for solid waste treatment for investment projects using imported technology and equipment

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## "investments" Situation

**Come and go ...**

Investor	location	Capacity	Investment capital (mil US\$)	Treatment cost (US\$/ton)	Power tariff (US cent/kWh)	Year
<i>Group Malakoff</i>	<i>HCMC</i>	<i>3,000 tpd, 50 MW</i>	<i>385</i>	<i>"QĐ322"</i>	<i>-</i>	<i>2014</i>
<i>Trisun (Plasma)</i>	<i>HCMC</i>	<i>2,000 tpd, 66 MW</i>	<i>400</i>	<i>-</i>	<i>12</i>	<i>2012</i>
<i>KMDK + REE (LFG)</i>	<i>HCMC</i>	<i>6-8 MW</i>	<i>30</i>			<i>2009</i>
<i>Keppel Seghers</i>	<i>HCMC</i>	<i>2000 tdp, 20 MW</i>	<i>150</i>	<i>32</i>	<i>-</i>	<i>2007</i>
<i>IEE</i>	<i>HCMC</i>	<i>1,000 tpd, N/A MW</i>	<i>150</i>	<i>23-26</i>	<i>6-9</i>	<i>2007</i>


**Coming into operation**

Investor	location	Capacity	Investment capital (mil US\$)	Power tariff (US cent/kWh)	Year
Vietnam Waste Solution (LFG, Đa Phước)	HCMC	11.28 MW	27.5	TBD	2014

**In operation**


Project Owner	location	Capacity	Investment capital	Power tariff (US)	Year
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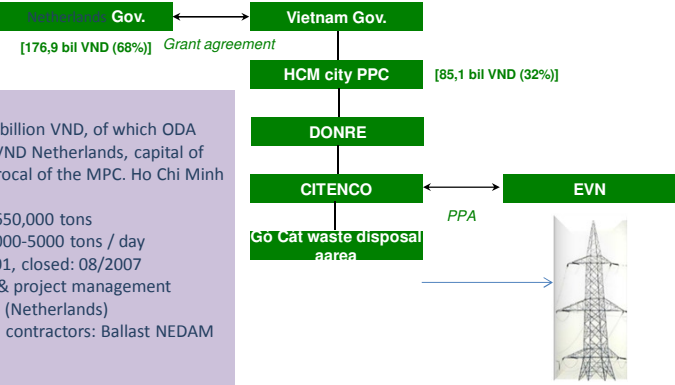


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## Typical example: Go Cat Power station

1. Area: 25 hectares
2. Total investment: 260 billion VND, of which ODA grant of 176.9 billion VND Netherlands, capital of 83.1 billion VND reciprocal of the MPC. Ho Chi Minh City
3. Receiving capacity: 3,650,000 tons
4. Maximum capacity: 4000-5000 tons / day
5. Landfill operation: 2001, closed: 08/2007
6. Development, design & project management consultancy : Vermeer (Netherlands)
7. The main construction contractors: Ballast NEDAM (Netherlands)
8. Design:
9. 5 x 3.5-hectare landfill cell / cell x 7.5 m deep
10. Leachate treatment plant
11. Biogas collection system (22 600mm steel tube gas wells) and 2:43 MW generator.
12. Management and operation of landfills and power stations: Urban Environment Company


*(Source: CITENCO)*



**Power station:**


- a. Capacity: 2.43 MW, including 03 generators (2 x 755 kw + 1 x 920 kw)
- b. Start operation: 08/2005
- c. Electricity tariff: 4 US Cents / kWh (fixed)

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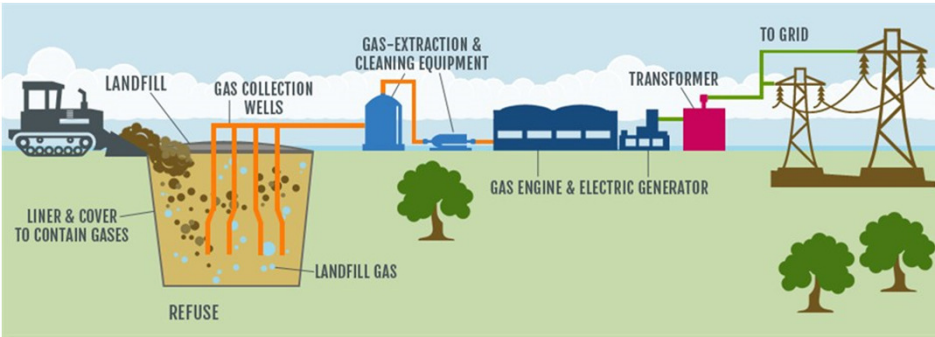
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## Typical example: Go Cat Power station


### Project Technology



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Typical example: Go Cat Power station









(Hình ảnh: ENERTEAM)

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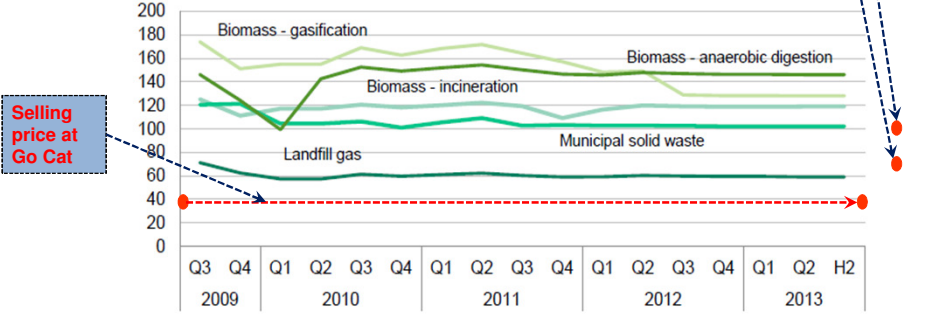


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Typical example: Go Cat Power station

**Power generation cost for full life cycle of bioelectric projects  
(Levelized Cost of Electricity (LCOE))**

Decision 31/2014/QĐ-TTg:  
USCent 10.05/kWh for incineration  
USCent 7.28/kWh for landfill gas



Year	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	H2
2009	180	140	120	100	140	120	100	100	100	100	100	100	100	100	100	100	100
2010	160	140	120	100	140	120	100	100	100	100	100	100	100	100	100	100	100
2011	160	140	120	100	140	120	100	100	100	100	100	100	100	100	100	100	100
2012	160	140	120	100	140	120	100	100	100	100	100	100	100	100	100	100	100
2013	160	140	120	100	140	120	100	100	100	100	100	100	100	100	100	100	100

(Source Bloomberg New Energy Finance, 2014)

**KEY ISSUES:**

1. Low and fixed electricity selling prices are not compensated enough for operational & maintenance cost
2. The amount of gas collected was less than expected, usually only operate 1/3 capacity

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### The challenges of developing waste –to-energy projects in VN

- There is a nature of "interdisciplinary": Just related to solid waste management, and related to the development of renewable energy. **Multiple overlapping mechanisms and policies not clear how to apply in practice.**
- **Waste treatment fee mechanism** is unclear causing delay the project development process.
- The legal documents related to the implementation of Decision 31/2014 / QĐ are **in completed, there is no plan for developing waste-to-energy. project..**
- Demand for investment attractiveness in waste management from local is unclear, it is rarely seen a project calling for investment with fully documents prepared by the local, but it is often projects prepared proposals and documents by investors themselves.
- Technological and financial capability of local investors and project developers in the country is limited. **The project development is not subject to the international standards that limits access capability to international financing.**
- For ODA projects: The project owner is often not the professional project developer, then the bidding process, construction, operation is often difficult. Specially, **there is no requirement for operating revenues must be used to pay ODA debt / interest, so project owners often do not care operation and maintenance in an efficient way.**

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### Thank You!



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