Marine pollution management infrastructure in Da Nang city, Vietnam

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I. Scheme "Building Danang into an Environmental City"

* Danang is a developing urban. Like the other urban cities, Danang is facing pressing environmental issues such as water pollution, waste treatment…

* The city has implemented the scheme "Building Danang into an Environmental City" to set targets and activities for different periods to solve environmental problems.

I. Scheme "Building Danang into an Environmental City"

Main Contents :

The scheme "Building Danang into an Environmental City" is issued by Danang People's Committee in October, 2008 with 3 main contents:

→ Land Environment

→ Water Environment

→ Air Environment

To guarantee health safety of local residents, investors and tourists.

I. Scheme "Building Danang into an Environmental City"

Infrastructure is invested and upgraded to handle issues of urban and marine environmental pollution

II. Environmental projects that are being promoted in Danang city

1. From sustainable sanitary landfills to energy system project - Khanh Son landfill, Danang
2. Solid waste management project
3. Sludge treatment project
4. Wastewater treatment project at Hoa Khanh Industrial Zone

1. From sustainable sanitary landfill to energy system project - Khanh Son landfill, Danang

Project Overview:

- This is a component of the project "Integrated management of natural resources in Asian cities: urban nexus" funded by Ministry of Economic Development and Collaboration of Germany (BMZ).

- The project is built with the reference of the Bantan sanitary landfill model in Chiang Mai city, Thailand to collect landfill gas and produce electricity.

- The project was conducted at Khanh Son landfill, Danang with the land area of 32.4 ha. It is expected that the landfill will be closed in 2020 when the existing waste cells reach a maximum height of 35m.

1. From sustainable sanitary landfill to energy system project - Khanh Son landfill, Danang

- Total investment: $US 1.55 million is estimated for the first year, $US 1.52 million for the 2nd year and $US 1.56 million for the next year
- Investment form: Public-private partnership
- Project components:

  + Renovating existing waste cells and changing garbage collection process to achieve sustainability of landfill

  + Installing the leachate drainage system, biogas collection pipelines, gas collection balloons

  + Building energy production unit from landfill gas collected

1. From sustainable sanitary landfill to energy system project - Khanh Son landfill, Danang

Current status of the project:

The consultants of the project "Integrated management of natural resources in Asian cities: urban nexus" is now completing the study after gathering feedbacks from relevant departments.

It is expected that the final report will be submitted by the end of 2015, based on which the People's Committee will call for investment.

2. Solid waste management project in Danang city

2. Solid waste management project

- Estimated investment capital: $US 152 million
- Implementation period: 2016 - 2020
- Project components:

+ Upgrading facilities to improve the capacity of collecting, transporting and processing domestic waste

+ Upgrading facilities to improve the capacity of collecting, transporting and processing industrial waste, hazardous waste

+ Upgrading facilities to improve the capacity of collecting sludge

+ Upgrading, renovating 8 old hubs and constructing 6 new hubs

+ Capacity building

2. Solid waste management project

On the basis of project proposal, the International Cooperation Agency of Japan (JICA) has supported the city to conduct a feasibility study for the component of solid waste treatment – the final stage in the entire project.

JICA has proposed different treatment technologies with the varieties of capacity and cost that will be introduced in the next slide.

JICA's feasibility study for the component of solid waste treatment

	Option O	Option 1	Option 2	Option 2-1	Option 3
Technology	Direct landfill	MBT (composting)	Waste to Energy (burning to generate electricity)	Waste to Energy (burning to generate electricity)	Recycle + Landfill + burning to generate electricity
Treatment capacity	-	1,000 – 1,500 tons/day	1,000 tons/day	1,500 tons/day	1,000 tons/day, in which 300 tons to be burnt for electricity
Total cost of construction (20 years of operation)	4.2 billion JPY	27.2 billion JPY	21.8 billion JPY	30.5 billion JPY	12.2 billion JPY (122 million USD)
Tipping Fee	130 JPY/ton 13 USD/ton	6700 JPY/ton	5350 JPY/ton 53,5 USD/ton	5350 JPY/ton 53,5 USD/ton	2500 JPY/ton 25 USD/ton

2. Solid Waste Management project

The specialized departments have had comments on the feasibility study of JICA. Currently, the JICA consultants are modifying the study.

The People's Committee is now calling for investment to construct the solid waste treatment plant as well as the entire project under the PPP investment form.

3. Sludge treatment project

Foundations for the project proposal

- Current technology for sludge treatment is limited, such as rudimentary system, old facilities, which affect the operation of landfills and cause environmental pollution
- Outdated facilities that are incompatible with the current infrastructure of the city and demands of the citizens
- Private enterprises operate illegally and the authorities can not control their operation, especially the way they dispose the sludge collected.
- Clearing septic tanks and collecting sludge are now spontaneous, not periodically planned → Septic tanks are not periodically dredged and the water from the tanks flows into the drainage system of the city

→ ***There should be reasonable and effective management regulation for the sludge collection from design and construction stages to the collection, transportation and processing***

→ ***The International Finance Corporation assisted the city to conduct business plan with the fund from the World Bank***

Scale and process technologies

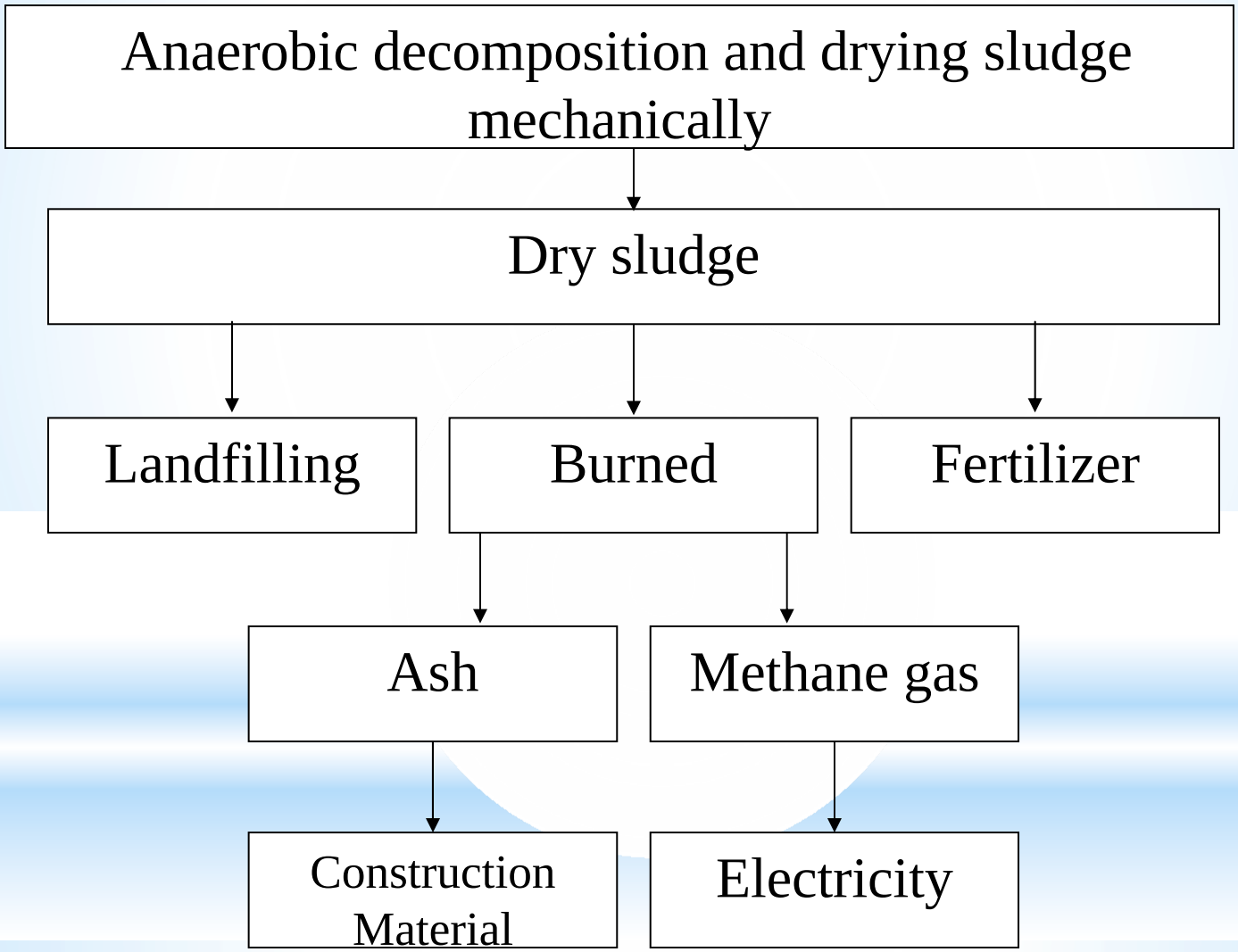
Option 1: Collecting, transferring, treating sludge from septic tanks with the capacity of 300m^3/day

→ **Total investment: $US 3 million**

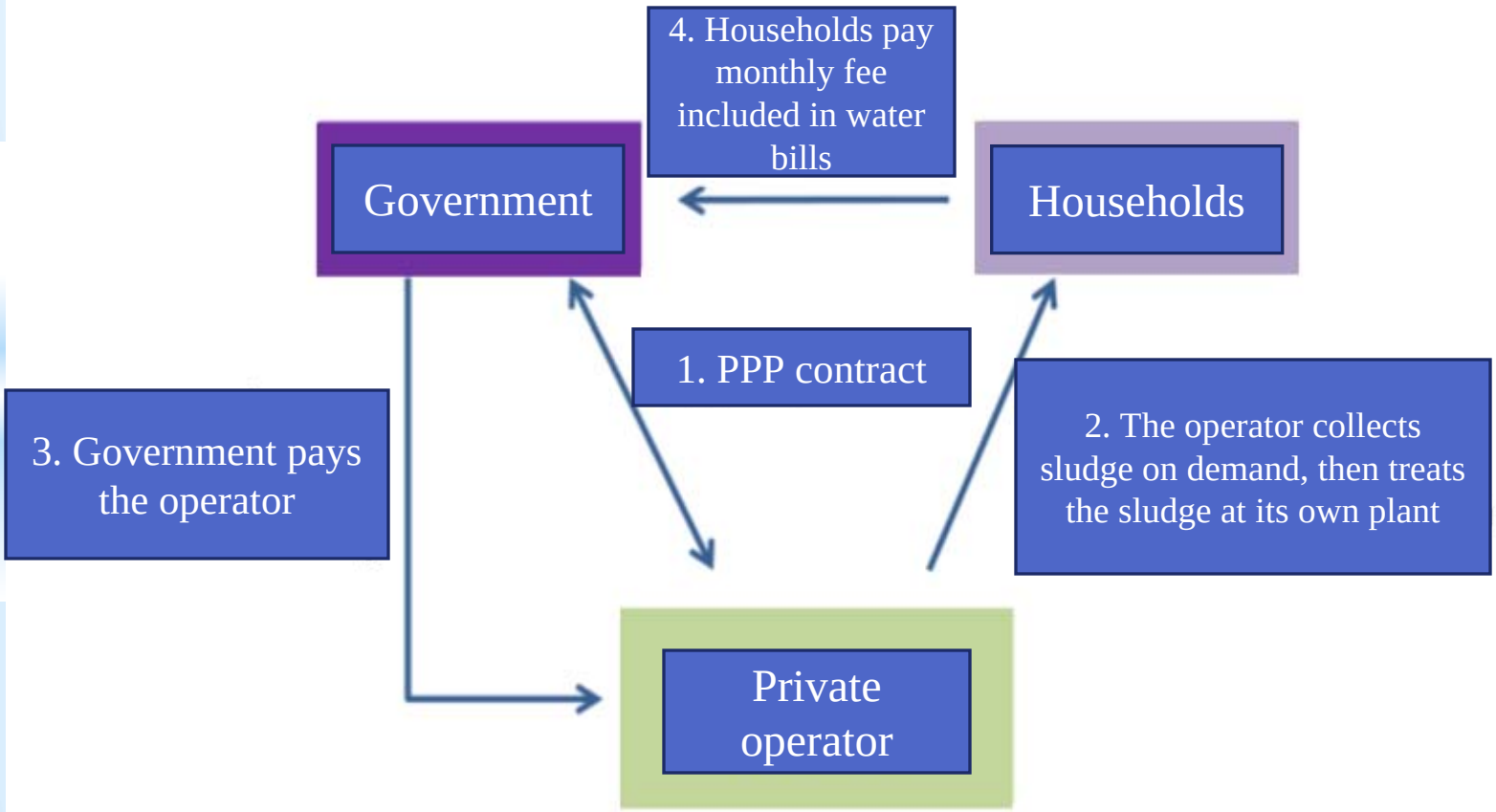
Option 2: Collecting, transferring, treating sludge from septic tanks with the capacity of 300m^3/day and treating organic waste with the capacity of 300m^3/day

→ **Total investment: $US 5 million**

Proposed technology



PPP structure for option 1



PPP structure for option 2

The structure is similar to the PPP structure for Option 1, except stages of collecting and classifying organic waste

→ Collecting, transferring and classifying solid waste can be performed by the current state-owned company (the Urban Environment Company) or the private operator of sludge treatment stage or outsourcing

→ Collecting cost can be paid by the government and partly compensated by the monthly garbage fee paid by households and corporates

Current situation of the project:

IFC only supports the city to build the business plan.

Currently, the People's Committee is calling for support to conduct the project feasibility study and the project implementation.

4. Wastewater treatment project at Hoa Khanh Industrial Zone

Hoa Khanh Industrial Zone

-Established in 1996
-Area of 395 ha
-Occupancy rate: 95%
-178 enterprises with over 35,000 employees in industries such as electronics, services, chemical, pharmaceutical, textile manufacturing, packaging, assembly, construction materials and heavy engineering.

Current wastewater treatment status

Wastewater treatment plant in Hoa Khanh Industrial Zone

- Design capacity: 5,000 m^3/day
- Cost of treatment: 0.14 to 0.5 USD/m^3 (depending on the quality of input wastewater)
- Actual input amount: 2,922 m^3/day (wastewater collected from Hoa Khanh, expanded Hoa Khanh and extended Thanh Vinh industrial zones)
-The quality of the output reaches level B of Vietnamese standards 40: 2011/ Ministry of Natural Resources and Environment
- Rate of connection: 85% (in which, only 53.2% of companies actually use the system).

Current wastewater treatment status

- Operating unit: Hanoi Urban Environment company is the operator of Hoa Khanh wastewater treatment plant who pays annual land use to Danang Industrial Zone Infrastructure Company (DAIZICO).

- Through the approved wastewater treatment price, DAIZICO signs contracts with companies and collects money by two ways: payment bill measured by the meter of sewage discharge and payment in % of the water bill.

- In 2013, the city adjusted the wastewater treatment price to match the quality of input wastewater and DAIZICO started to boost connection and collection. The company has earned profit since then.

Current wastewater treatment status

- Wastewater collection system is built by centrifugal concrete pipes (7,825m) and HDPE pipes (9,859m).

- Wastewater is not completely collected because of some broken and deteriorated centrifugal concrete pipes.

- The wastewater treatment plant has been deteriorated with outdated processing technology as it has long operated (since 2007) => **Unstable capacity.**

Priority projects and implementation progress

Section	Investment capital		Operating costs		Deployment	Progress (month)
	Million dong	**USD**	**Million dong**	**USD**		
1. Hoa Khanh wastewater treatment plant	**39,367**	**1,897,205**	**3,936**	**234,795**		
a. Upgrading current wastewater treatment plant	9,367	451,422	936	45,108	2016	6 - 8
b. Expanding capacity	30,000	1,445,783	3,000	189,687	2025	12
2. Collection works	**77,688**	**3,744,000**	**777**	**37,440**		
a. Diameter of main sewer : 500 mm, length: 2,188m; 4th road	42,594	2,052,723	426	20,527	2016	6
b. Diameter of Secondary sewer: 300mm, length 2,093 m; 2,7,8,9 roads	13,472	649,253	135	6,493	2019	6
c. Diameter of Secondary sewer: 300mm, length 3,336m; 3,10 roads	21,622	1,042,024	216	10,420	2020	9

Source: Pre-FS Study of CDIA, Data collected in 2011

PPP Bidding Options

Options	Wastewater treatment plant	Collecting system
Option 1: Maintain current status	PPP	DAIZICO
Option 2: 2 PPP contracts	PPP	PPP
Option 3: 1 PPP contract that combines wastewater treatment plant and collecting system		

Source: CDIA

Operation and Management

Activities	Description
Wastewater charging	CDIA proposes DAIZICO because this provides additional leverage and law pressure. Charges can be included in tax expenses bill
Contract management	DAIZICO
Controlling wastewater and the compliance to wastewater standards	Management Unit of Industrial and Processing Zones, DONRE, DAIZICO

Current status

The People's Committee is calling for support to conduct project feasibility study and project implementation.

THANK YOU FOR LISTENING!