



Policy and Effort on Decentralized Domestic Wastewater Treatment in Vietnam

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OUTLINE

- **Brief review on domestic wastewater management**
- **DEWATS development in Vietnam**



BRIEF REVIEW ON DOMESTIC WASTEWATER MANAGEMENT



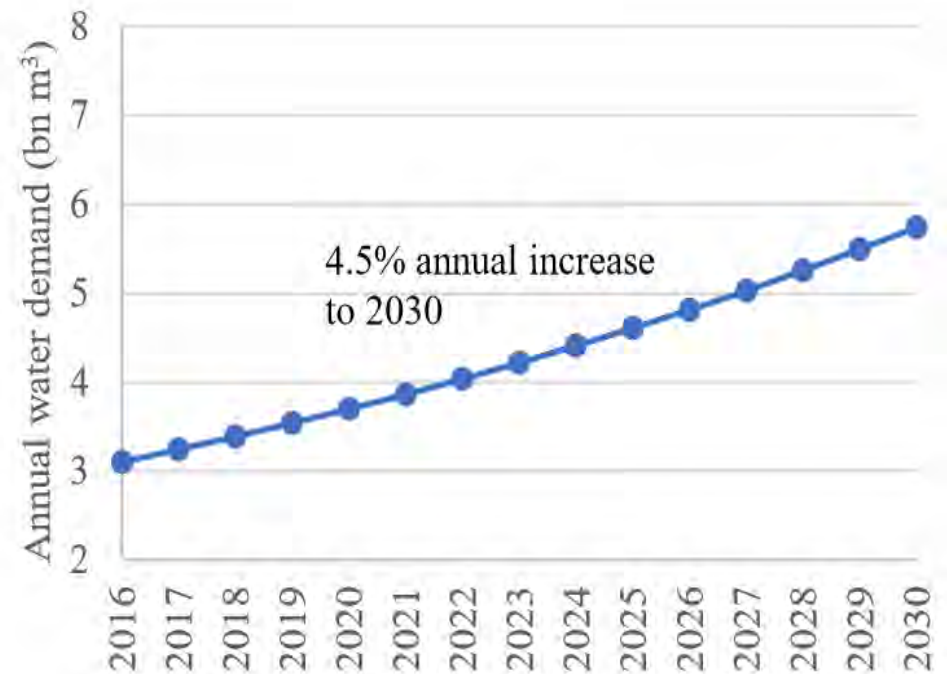
Background

- Total population by 2017: 93.7 million, in which: urban: 31.4 million, rural: 60.3 million.
- 804 cities/towns.
- Viet Nam has one of the fastest rates of urbanization in the world, with almost 43% of the country's population expected to be living in cities by 2030.
- Over the past 20 years, the Govt. of Vietnam has made considerable effort to develop urban sanitation policies, legislations and regulations and to invest in urban sanitation including wastewater treatment systems.

Background

Highlights:

- Water demand (2016): 3 bn m³/yr
- Water demand (2030): 5.7 bn m³/yr
- One of the fastest urbanisation rates in the world
- Currently water treatment meets less than 70% of the urban water demand



Municipal water demand highlights

Assumed municipal water demand to 2030

Source: Viet Nam: Hydro-Economic Framework for Assessing Water Sector Challenges 2030WRG (2017)

Urban Wastewater Management

QCVN 14:2008/BTNMT

National Technical Regulation on Domestic Wastewater

No	Parameters	Column A ^(a)	Column B ^(b)
1	pH	5 - 9	5 - 9
2	BOD ₅ (20°C), mg/l	30	50
3	TSS, mg/l	50	100
4	NH ₄ -N, mg/l	5	10
5	NO ₃ ⁻ , mg/l	30	50
6	PO ₄ ³⁻ , mg/l	6	10
7	Total Coliforms, MPN/100 ml	3,000	5,000

(a) - Maximum allowable values for wastewater discharged to water bodies serving domestic water supply purpose.

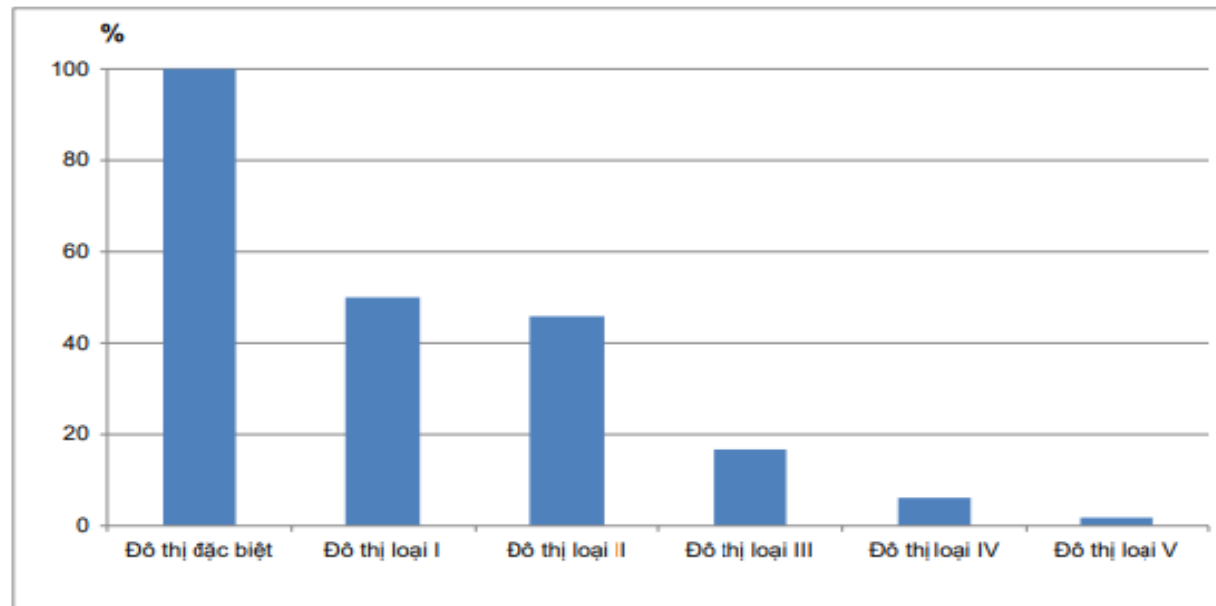
(b) - Maximum allowable values for wastewater discharged to water bodies serving another purposes (irrigation, water transport, etc.).

Urban Wastewater Management

- In the big cities there has been investment in construction of centralized collection and treatment facilities.
 - In 2017, there were 39 centralized WWTPs built in urban areas of grade III or higher.
 - Total design capacity of 907,950 m³/day.
 - 5.3% WWT systems which reach standard.

- In peri-urban areas, the countryside do not have separate collection systems, domestic wastewater and are still discharged together with rainwater drainage systems.

Urban Wastewater Management



Source: National Environmental Report (2017)

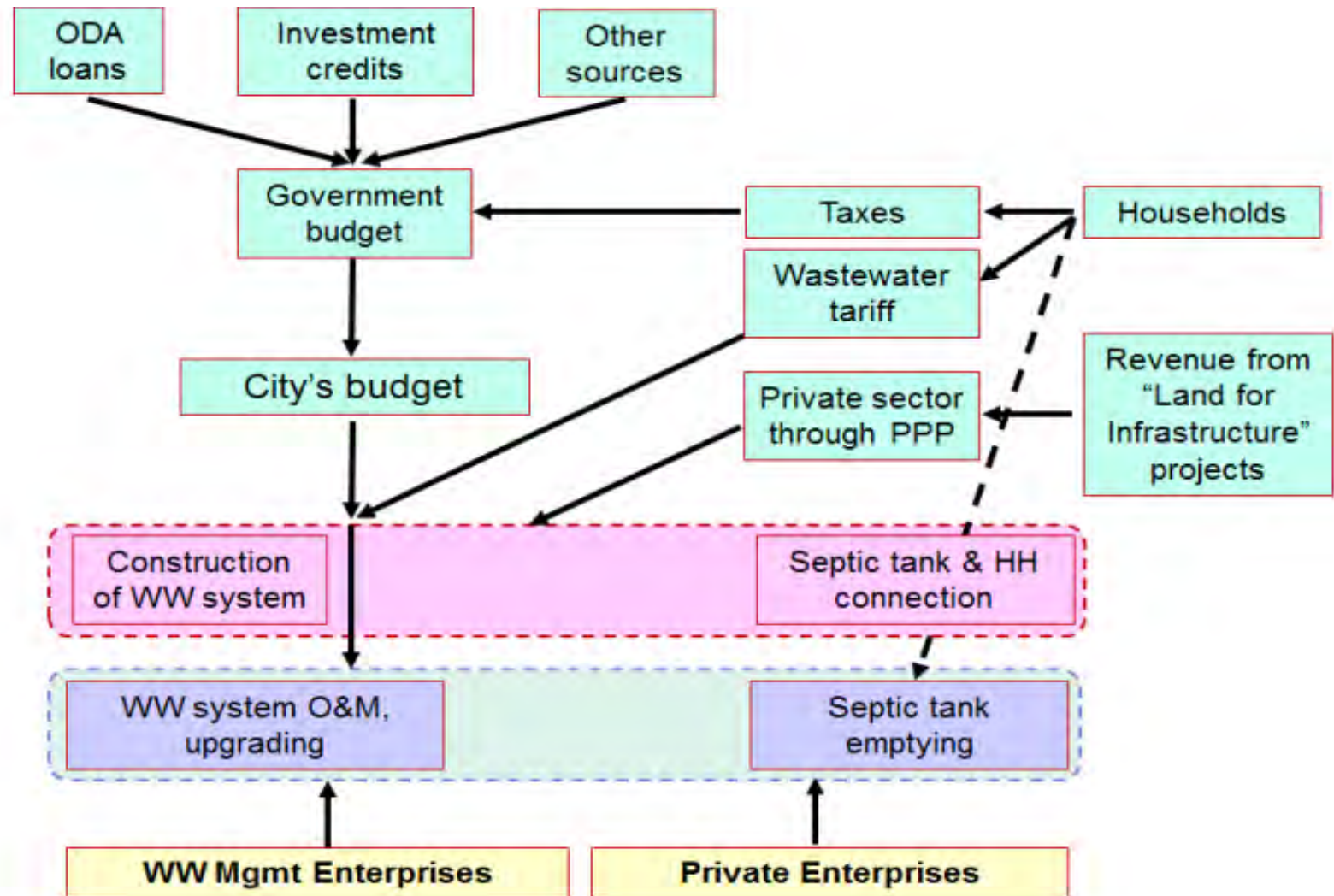
Proportion of cities with WWT process meets the standards

Recent Situation of the Wastewater Treatment in Vietnam

	Centralized Wastewater Treatment system (Ex: Sewer system)	Middle scale or cluster type wastewater treatment system	Decentralized wastewater treatment system (Ex: Septic tank, johkasou, pit latrine)	Without any wastewater treatment
Definition of each treatment system in your country	<ul style="list-style-type: none"> - HHs + Collection + WWTP for city scale serving basin or sub-basin catchment area - Septic tanks at HHS as preliminary treatment are in most cases 	<ul style="list-style-type: none"> - Serving towns, townlets, development areas with sewers 	<ul style="list-style-type: none"> - Non-sewered areas, or short distance sewer lines (resorts, individual apartments, shops, restaurants, hospitals, factories, etc) 	<ul style="list-style-type: none"> - Sewered + direct discharge - Non-sewered areas
Installed plant number	<ul style="list-style-type: none"> - <u>39 WWTPs</u> in >20 cities 	<ul style="list-style-type: none"> - 10% of 4,000 urban development areas = <u>400 WWT stations (WWTS)</u> in paper, 50% of them are functioning in reality = <u>200 WWTS</u> such as 2 in Phu My Hung, 1 in Ecopark, 1 in Royal city, 1 in Dang Xa, etc 	<ul style="list-style-type: none"> - Country: 90% of 13,600 medical points (hospitals, clinics, etc) = 12,250 WWTS, among which 35% are in good operation condition. - 1,000 WWTS in factories - 200 WWTS in restaurants, shops, resorts - 1,000 WWTS in hotels - <u>Total: 14,500 WWTS</u> 	
Number of Population using each wastewater treatment systems	<ul style="list-style-type: none"> - 17% of urban population = <u>5.5 million</u> persons 	<ul style="list-style-type: none"> - 200 WWTS x 50% of design capacity x 500 m³/d or 3,000 persons = <u>30,000 persons</u> - Handcraft villages: just few 	<ul style="list-style-type: none"> - <u>Besides: 25,000 systems</u> with Septic tanks only - Livestock farms: 400,000 m³/d x 30% with biogas digester - Hospitals: <u>1,012,500</u> persons are served - Hotels, resorts: <u>1,260,000</u> p. served - Factories: <u>300,000</u> p. 	

Source: Prof. Dr. Nguyen Viet Anh, IESE, HUCE

Financing Mechanism for Wastewater Management



Source: Prof. Dr. Nguyen Viet Anh, IESE, HUCE

Barriers and Challenges in Urban Wastewater Management

- **CSS** (Combined sewerage and drainage system) is dominating in most of existing urban areas in Vietnam. Most of wastewater projects in these areas prefer to stay with CSS, **due to limited budget**. SSS (Separate sewerage system) is compulsory in new urban development projects.
- **Low C/N in incoming flow to WWTP from CSS** is a challenge for biological wastewater treatment processes.
- **Fecal sludge management** is among hot issues, but not well handled in all cities, so far.
- **Lack of capital investment** and low wastewater tariff are among key financial barriers.

Barriers and Challenges in Urban Wastewater Management

- About 35% WW will be treated (based on treatment capacity) as of 2020.
- Another 80 WW projects are under call-for investment or waiting-for-approval.
- About \$6 billion dollars will be needed to invest in this sector towards 2025.
- Reduce from 90% to 85% ODA loan for WW projects.

 **Financial constrains!**



Stronger Promoting DEWATS as a cheaper approach for treatment of WW (in some potential cases)



DEWATS DEVELOPMENT IN VIETNAM

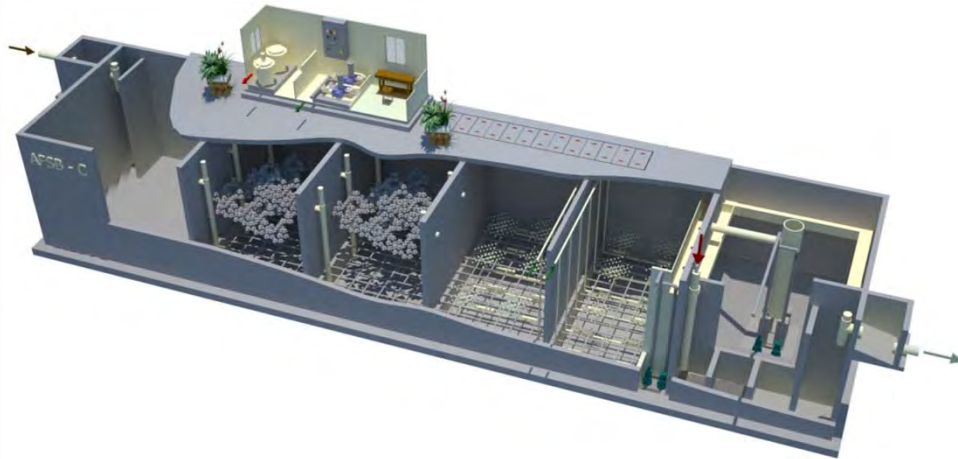
DEWATS IN VIETNAM

Advantages

- More affordable
- Less investment and O&M costs
- On-site reuse
- Encouraging participation
- Low-cost technologies
- Step-wise approach...

DEWATS IN VIETNAM

- ❑ **Main current applications:** office buildings, public toilets, hotels, factories, hospitals, new communities, trade villages, etc. ($Q < 1000 \text{ m}^3/\text{d}$)
- ❑ **Thousands of DEWATS Projects:** –by DESA group, IESE – projects of GIZ and KfW, ADB –BORDA (about 20 projects in Vietnam) –private investors and firms



DEWATS IN VIETNAM



Hanoi –
new living quarter



Hanoi - village



Bac Ninh – living quarter



Bac Kan – small town



Hanoi - school

DEWATS IN VIETNAM

POLICY ADJUSTMENT IN DEWATS PROMOTION

- **Decree No 80/2014/ND-CP** dated **06 August 2014** on **drainage, sewerage and wastewater treatment**
 - Article 4. Issue National Technical Regulations (NTR) on Wastewater
 - Article 7. Local regulations on wastewater management
 - Article 23. Provisions on decentralized wastewater treatment
- **Circular No 04/2015/TT-BXD** dated **03 April, 2015** on **implementation guideline of Decree 80/2014/ND-CP**
 - Article I. Management of decentralized wastewater treatment
- **Decision No 589/QD-TTg** issued on **06 April, 2016** on **Amended Orientation on Urban and Industrial Development towards 2025 and vision 2050**
 - Combination between Centralization WWT (CWAT) and Decentralization WWT (DEWATS) to improve the rate of WW treatment before discharging to the environment.
 - Application of DEWATS or improved ON-SITE treatment for areas without WW collection system and CWAT.

DEWATS IN VIETNAM

BARRIERS FOR APPLICATION DEWATS

- No incentives
- Lack of knowledge of decentralized options
- Low rate of household connection
- Traditional acceptance of untreated wastewater disposal by most of people
- There are still very few decentralized technical options developed and applied.

DEWATS IN VIETNAM

BARRIERS FOR APPLICATION DEWATS

- Lack of detail guidelines for DEWATS
- Quality of design and construction, associated with – consultants' competency, –administrative appraisal procedures.
- Capacity building component during project implementation is poor.

DEWATS IN VIETNAM

SOLUTION FOR IMPROVEMENT

- Early decision making, integration of DWWM options into urban planning.
- Design standards are to be issued.
- Effluent standards are to be reviewed, especially on N, and pathogens removal in DWWM systems, and to avoid double investment.
- Testing and Certification for technology, equipment, operation of w/w systems, sludge management services is needed.

DEWATS IN VIETNAM

SOLUTION FOR IMPROVEMENT

- Household connection should be compulsory. All components should be considered in a whole chain: HH facilities – collection network – wastewater treatment – disposal or reuse.
- Professional O&M service providers are needed, on-site or outsourced. Branch of provincial sewerage and drainage company is one among options.
- Promotion center(s) with strong networking is needed.



**THANK YOU VERY MUCH
FOR YOUR ATTENTION!**

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