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CENTER FOR ENVIRONMENTAL CONSULTANCY AND TECHNOLOGY

Technical assistance for decentralized wastewater treatment and development orientation in Vietnam

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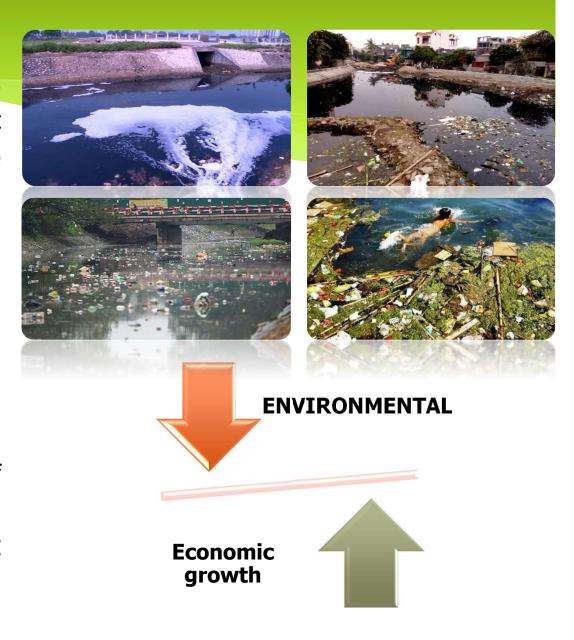
VIETNAM ENVIRONMENT ADMINISTRATION

CONTENT

- Overview of the situation of domestic wastewater treatment in Vietnam
 - Advantages and limitations of decentralized wastewater treatment in Vietnam
 - Objects of the application of decentralized wastewater treatment solutions in Vietnam
 - Criteria for selecting technology to apply decentralized wastewater treatment in Vietnam
 - Technologies applied to implement decentralized wastewater treatment
 - Some recommendations of CECT to develop decentralized wastewater treatment in Vietnam
 - CECT's support in developing decentralized wastewater treatment in Vietnam

Over the past years, Vietnam's economy has important achieved many achievements, surpassed the poverty line and is in the period of growth and development. However, due to the negative side of the development, ENVIRONMENTAL POLLUTION especially WATER POLLUTION in recent years has also increased.

One of the main causes of WATER POLLUTION in Vietnam today is the issue of DOMESTIC WASTEWATER (**DWW**).



Urban WW (Estimate 7,12 mil m³)

Rural WW (Estimate 6,2 mil m³)

Approximately 30% of the total wastewater discharged directly into rivers, streams and lakes

DWW

Occupying a large proportion but most are not treated

At present, in urban areas of type III or higher, only 39% of the centralized wastewater treatment plans are installed (43 WWTPs)

Scattered on a large scale difficult to collect

Total designed capacity of 926,000 m3/day (meeting 13% of demand)

Not having to issue discharge permits makes it difficult for the management work

In big cities: special and grade-I urban areas, the rate of wastewater treated is higher than that of small and medium-sized cities and rural areas but still at a low level that cannot meet the current rate of urbanization

According to a report of the MONRE as of 2018, only 20.62% of the city's domestic wastewater was treated in Hanoi, while in HCMC. In Ho Chi Minh City, the proportion of DWW is treated only about 10%.

The urban drainage system in particular and the drainage system in general of Vietnam still have many shortcomings:



Collection network

- Patchwork, asynchronous
- The total length of the network is too short compared to the length of streets and alleys



Performance of centralized WWTPs

 The collection system is not complete, so many places only operate about 20% of designed capacity



Overloading urban drainage network

 The population density and waste standards in urban areas are much higher than in other areas and therefore often overloaded



Funds for Centralized WWTP investment

- Still too luxurious with 833 large and small cities in Vietnam
- Too difficult for rural, mountainous and other areas



Increasing pressure on the environment in the future

- Population growth
- High speed of urbanization
- Living standards and standards for water discharge have increased



Rural domestic wastewater collection network

 Most do not have a collection network

Centralized wastewater treatment in Vietnam is facing many difficulties and shortcomings as at present

Decentralized wastewater treatment in Vietnam is an appropriate solution today

It is necessary to have appropriate and simple solutions and collection technologies and wastewater treatment with low construction and operating costs and convenience in wastewater collection with Vietnamese conditions.

Currently, the Institute of Environmental Science and Technology of the National University of Civil Engineering, a number of centers under the Ministry of Construction, Center for Consulting and Environmental Technology, VIETNAM ENVIRONMENT ADMINISTRATION, and a number of Japanese and Korean companies etc. have successfully applied and tested a number of models of domestic wastewater treatment at small scale for localities across the country.

Figure 2: Some decentralized wastewater treatment technologies are applied in Vietnam

2. ADVANTAGES AND LIMITATIONS OF DECENTRALIZED WASTEWATER TREATMENT IN VIETNAM

Consistent with the characteristics of Vietnam's natural conditions and terrain

The drainage pressure is uneven due to the density of the population

Due to many lakes, rivers and streams, the drainage system is often divided into many small partitions, suitable for decentralized treatment

Advantages

Consistent with the financial capacity of the urban, concentrated residential areas of Vietnam

Reduce construction investment cost of wastewater collection system

Reduce initial costs due to possible divergence of investment in accordance with urban development

In accordance with the urban development planning, rural residential areas of Vietnam

Asynchronous development over space and time

High urbanization speed (35%)

2. ADVANTAGES AND LIMITATIONS OF DECENTRALIZED WASTEWATER TREATMENT IN VIETNAM

Construction is usually within the inner city or near residential areas

Decentralized wastewater treatment is usually discharged into rivers, lakes, urban ponds or a common drainage

Difficulties in land fund for building wastewater treatment plans in the inner city

system

Easy to impact the view if designed inconsequential

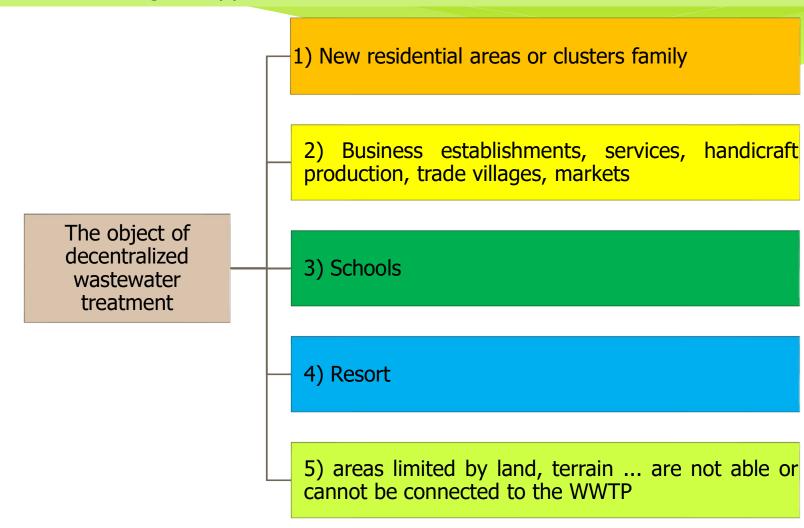
Design, operation does not meet technical requirements that can cause bad odors affecting the surrounding people

May cause eutrophication in urban ponds and lakes if the N and P content in wastewater is still high

Limitations

3. OBJECTS OF THE APPLICATION OF DECENTRALIZED WASTEWATER TREATMENT SOLUTIONS IN VIETNAM

In Vietnam, according to the current provisions of Circular 04/2015 / TT-BXD, decentralized drainage is applied to:



3. OBJECTS OF THE APPLICATION OF DECENTRALIZED WASTEWATER TREATMENT SOLUTIONS IN VIETNAM

Decentralized wastewater treatment solutions in Vietnam are divided into 03 categories:

On site
Decentralized
wastewater
treatment

- Applies to individual drainage households.
- Q< 50m³/ day.

Decentralized wastewater treatment in clusters

- Apply to the drainage households near each other.
- Q: 50- 200 m³/ day.

Decentralized wastewater treatment by region

- Applied in an administrative boundary.
- Q: 200-1000 m³/ day.

4. CRITERIA FOR SELECTING TECHNOLOGY TO APPLY DECENTRALIZED WWT IN VIETNAM

To select decentralized wastewater treatment technology, the following criteria should be applied:

- 1. Capacity of WWTP
- 2. Components and nature of wastewater, load-bearing capacity, location of discharging sewage after generating wastewater
- 3. The level of energy use required for collection and treatment
- 4. Requirements according to standards and standards on the quality of treated waste water
- 5. Technical, financial and managerial conditions for management and operation of WWTPs
- 6. Climatic conditions, topography, engineering geology and hydrogeology
- 7. The ability to expand or increase capacity and the ability to connect to the centralized wastewater treatment system in the future
- 8. Other environmental factors are involved

5. TECHNOLOGIES APPLIED TO IMPLEMENT DECENTRALIZED WASTEWATER TREATMENT

Depending on the construction planning or drainage planning conditions, the specific local conditions and the above criteria that the technology applied to decentralized wastewater treatment will have different options between locations. methods and works.

However, in theory, decentralized wastewater treatment technologies can be classified into four categories as follows:

WWTP by mechanical methods

WWTP by anaerobic biological methods

WWTP by aerobic biological methods

WWTP by chemical methods

5. TECHNOLOGIES APPLIED TO IMPLEMENT DECENTRALIZED WASTEWATER TREATMENT

Currently, some of the technologies currently being guided by the Ministry of Construction in Circular 04/2015 / TT-BXD to apply decentralized wastewater treatment are as follows:

- 1 Septic tank
 - 2 Anaerobic filter tank with partition
 - Improved septic tank with baffles and anaerobic filter compartment upstream
 - 4 Anaerobic lakes, anaerobic lakes, stable lakes
 - 5 constructed wetlands
 - 6 Batch reactor
- Other technology

6. SOME RECOMMENDATIONS OF CECT TO DEVELOP DECENTRALIZED WWT IN VIETNAM

Closely coordinate at central level between MOC, MOST and MONRE on developing management mechanisms, policies and technologies for decentralized wastewater treatment solutions. Early promulgating "Technical regulation on wastewater discharged into urban drainage systems" and "Technical regulation on decentralized treatment wastewater discharged into receiving sources" under Decree 80 / ND-CP; Middle Mechanism and policy for decentralized wastewater treatment Encouragement and incentive mechanisms are needed to attract participation in drainage, decentralized wastewater private treatment. Other technologies in Circular 04/2015 / TT-BXD need to be issued the order of verification, inspection, testing and replication techniques when applied in practice; For urban areas, it is necessary to review and consider the continued use and improvement of centralized drainage systems or the application of decentralized systems for suburban areas, new urban areas and rural areas; Local Compulsory regulations (and implementation of Information Education - Communication and financial support programs) for

drainage households must be connected to the collection network.

6. SOME RECOMMENDATIONS OF CECT TO DEVELOP DECENTRALIZED WWT IN VIETNAM

Requirements for decentralized wastewater treatment technology

In accordance with weather conditions, wastewater characteristics of Vietnam

Meet the discharge standards, requirements of the receiving source

Suitable for site conditions in Vietnam

It is necessary to easily upgrade and expand to meet the rapid urbanization speed in Vietnam

Supplies, machinery and equipment need to be easily supplied and replaced in Vietnam

The size is suitable for the narrow area of urban

Cost of the entire life cycle of acceptable works in Vietnam (Initial investment costs, operation, maintenance, maintenance)

Urban aesthetic

Operational and management techniques

6. SOME RECOMMENDATIONS OF CECT TO DEVELOP DECENTRALIZED WWT IN VIETNAM

It is necessary to be verified and appraised for other technologies in Circular 04/2015/TT-BXD before applying

Environmental procedures should be implemented in accordance with the regulations of the Vietnamese Government before implementation

Construct synchronously the system of collection network and WWTPs to ensure connectivity and reduce waste in investment

The supplier in Vietnam is capable of maintaining and replacing equipment for emergency treatment when an incident occurs.

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Reduce investment, operation and maintenance costs in accordance with Vietnam's economic conditions

Low energy consumption, alternative supplies

High localization rate

Maximize use of Vietnamese human resources in construction, installation and maintenance

Production, installation and transfer in the country

Spare parts and materials are easily replaced by materials in Vietnam

7. CECT'S SUPPORT IN DEVELOPING DECENTRALIZED WASTEWATER TREATMENT IN VIETNAM

GENERAL INTRODUCTION

Establishment decisions

Functions and powers



- Center for Environmental Consultancy and Technology (CECT) is a unit under the Vietnam Environment Administration, established under Decision No. 2465/QD-BTNMT dated November 26th, 2008 of the Minister of Natural Resources and Environment.
 - Functions, tasks, powers and organizational structure according to Decision No. 1313/QĐ-BTNMT dated April 26th, 2018 of the Minister of Natural Resources and Environment.

FIELD OF OPERATION OFCECT

CECT operates in the fields of:
Environmental protection consultancy;
Research, Application and Technology
Transfer for Environmental Pollution Treatment.



- Organizing applied research, implementing scientific and technological advances in the field of environment;
- Building and organizing the implementation of key projects on application of environmental science and technology achievements;
- Participating in evaluation and assessment of environmental pollution treatment technology, waste treatment facilities and equipment prior to operation.
- Organizing the implementation of international cooperation programs and projects as assigned by the Director General.

1. Project: XLYON and CTMT for urban residential areas in the Nhue-Day river basin





Location Tay Mo Ward, Nam Tu Liem District, Hanoi

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2. Project:

Preventing pollution and improving Cau river's water source by controlling and treating highly durable organic substances in leachate by means of advanced oxidation combined with biology







Location Xuan Hoa Ward, Phuc Yen city, Vinh Phuc province

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3. Projec: Building a model to treat Mixed waste water - processing of agricultural products and foodstuffs rich in organic matter (brewing wine, making tofu, making rice cakes, rice vermicelli, raising animals ...) at low cost, applicable to residential areas in the Nhue-Day river basin



Location Chau Giang commune, Duy Tien district, Ha Nam

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4. Project:

Overcoming pollution, improving the landscape of Cau River basin by pilot domestic wastewater treatment by anaerobic filtration technology combined with underground filtration yards to plant trees



Location Song Cong town, Thai Nguyen province

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THANK YOU FOR LISTENING!

