

# Advanced & post treatments for WWTP projects in Taiwan

FOREST WATER

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2018.03.16 R2

## Subject:

### Advanced & post treatment for WWTP project in Taiwan

- Abstract:
- By the end of year 2017, there are more than 110 public WWTP in Taiwan. The concept of process design, construction standard and quality, O&M technic are all well known and skillful.
- Recently, facing the land application, environmental impact, the O&M cost reduction and the resource of water supply, we share the experience regarding the following items:
  - 1: Underground facility
  - 2: Nitrification and denitrification
  - 3: Sludge anaerobic digestion and drying
  - 4. Reclaimed water.

# 1. UNDERGROUND FACILITY

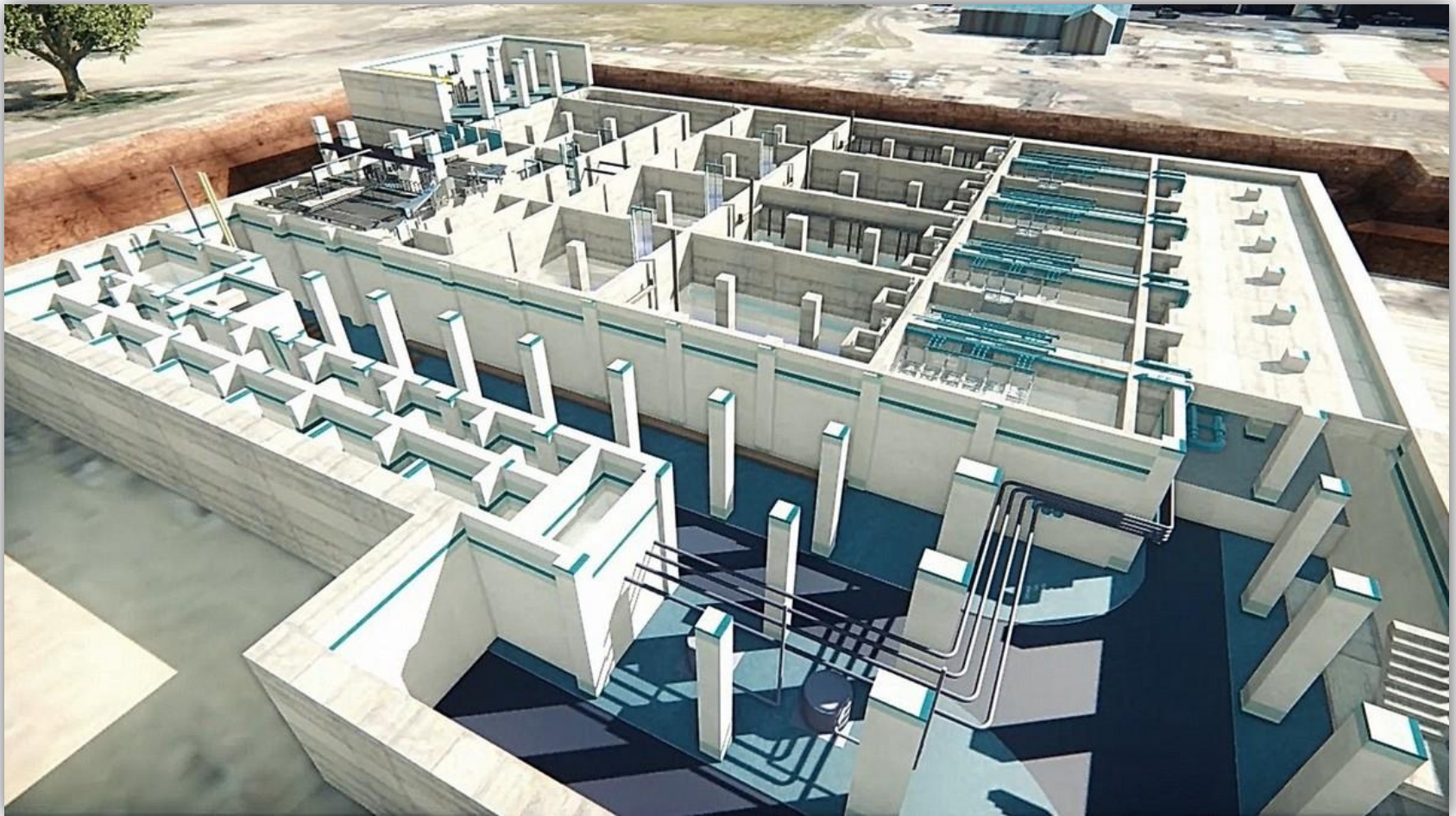
# Reference project



- Project Name: SN 水滸
- Design capacity: 23,400 CMD
- Construction cost:
  - 674Mio NTD = 1,200 Mio PHP
- Duration: 675 Day
- Major item
  - Civil and Arch. : 43%
  - M&E: 44%
  - Others:13%



# SN WWTP 23,400CMD





# Project FAC in 2017.4.20



2018/03/16

## 2. NITRIFICATION & DENITRIFICATION

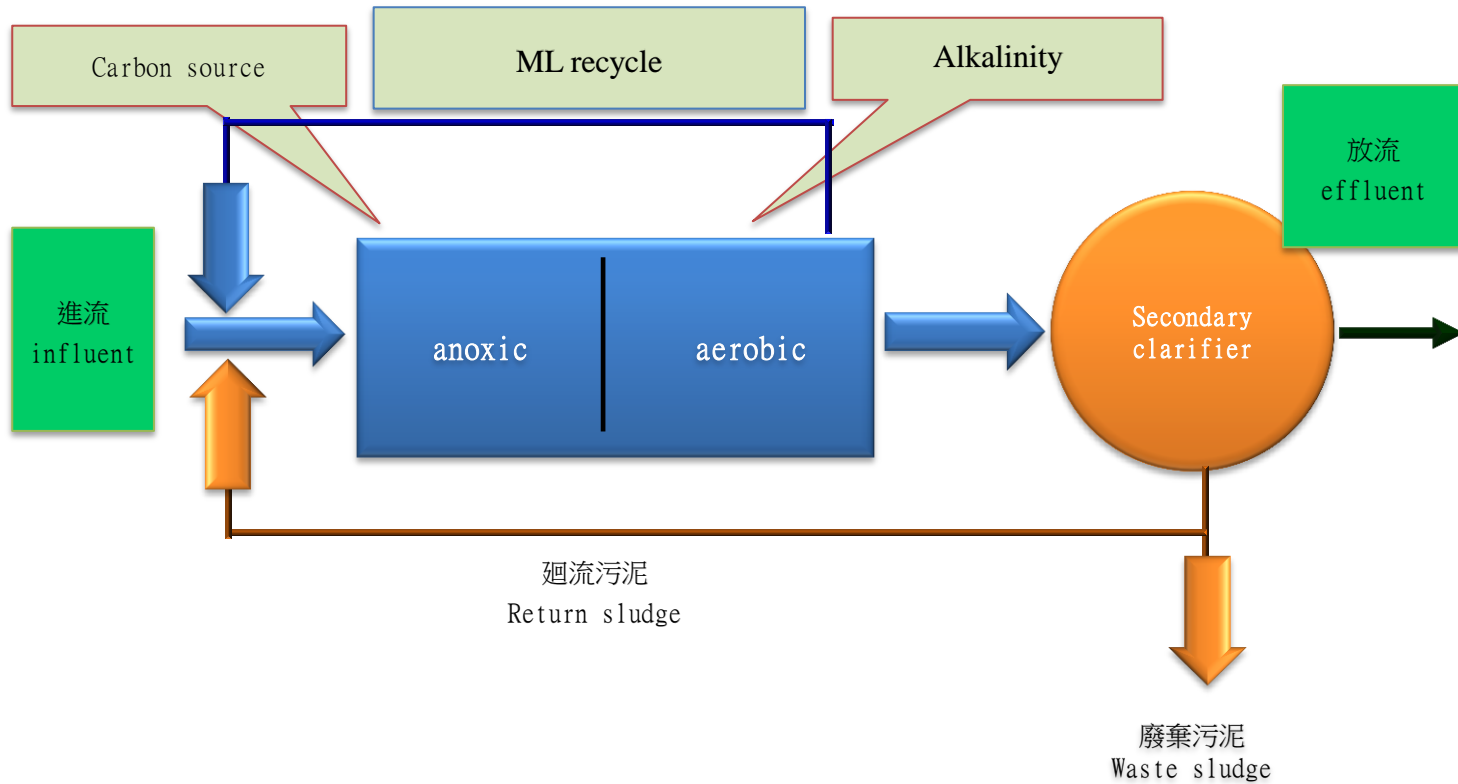
硝化脫氮

# Nitrification & denitrification

- Nitrification cause:
  - Consume oxygen
  - Eutrophication
  - Toxic when high conc.
- USA, Germany, Japan, Korea & China have focused on Ammonia Nitrogen limits in effluent water.
- From 2017, the effluent standard in Taiwan has been limited in 20-30 mg/l.



# Nitrification and Denitrification



# Reference plant: STSP WWTP 40,000CMD







# Aerobic stage





# Anoxic stage



# 3. SLUDGE ANAEROBIC DIGESTION AND DRYING

## 3.1 Sludge anaerobic digestion

	Plant	Capacity	Use of methane gas 沼氣利用
1	DiHua 迪化	500,000 CMD	Digester temp. holding, sludge drying 消化槽保溫、污泥乾燥
2	Futein 福田	152,000 CMD	Digester temp. holding 消化槽保溫
3	NanZi 楠梓	75,000 CMD	Digester temp. holding, sludge drying 消化槽保溫、污泥乾燥
4	Lodong 羅東	30,000 CMD	Digester temp. holding, sludge drying 消化槽保溫、污泥乾燥

# Nanzi WWTP 75,000CMD





# Nanzi WWTP 75,000CMD



# Loudong WWTP 15,000CMD

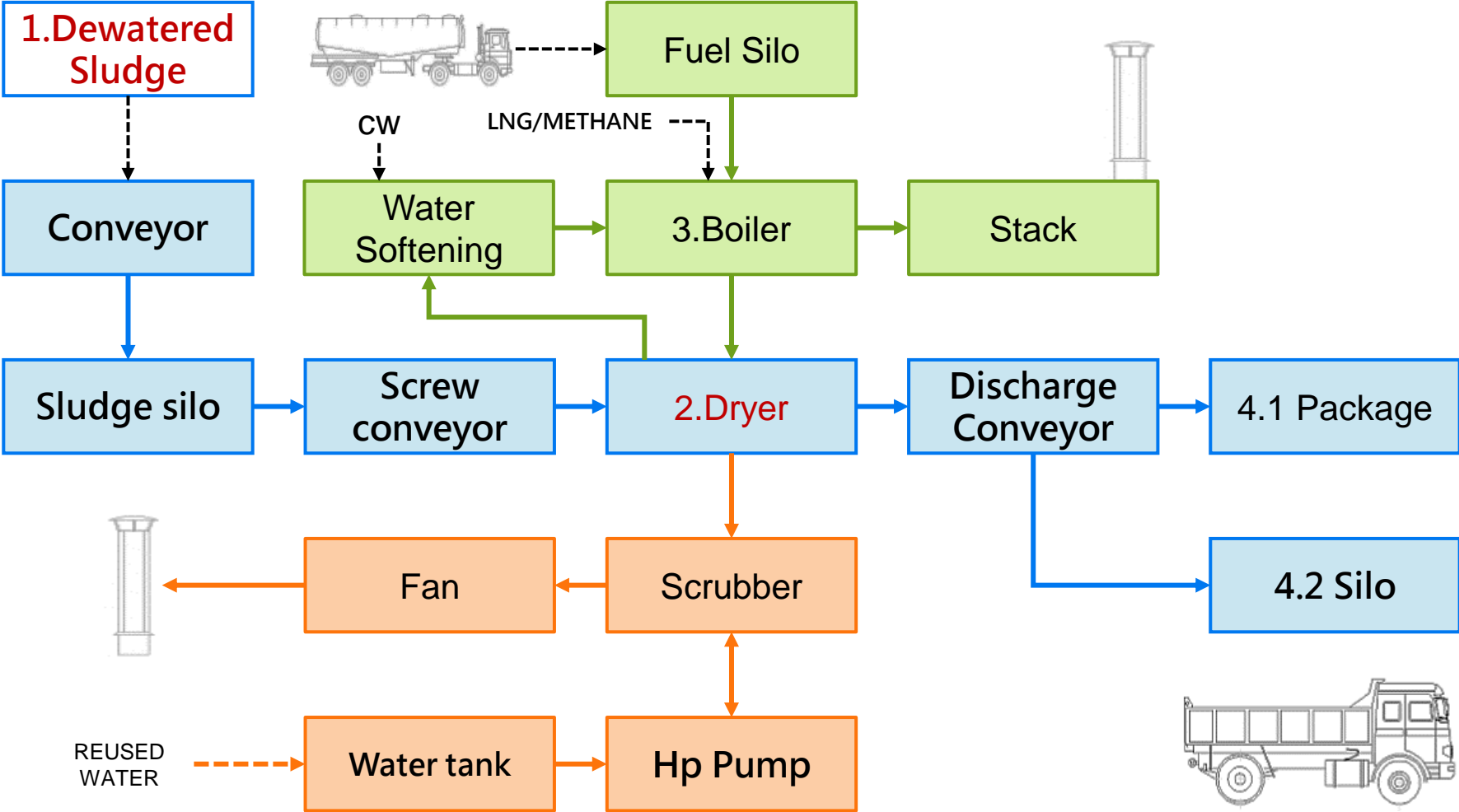




## 3.2 Sludge drying

NO	Plant	Processing wt.	Water contain after drying 乾燥後含水率	Heat source 熱源
1	Dihua 500,000CMD 迪化	500 T/M	< 15%	Methane
2	Loudong 45,000CMD 羅東	160 T/M	15%	Methane
3	Nanzi 75,000CMD 楠梓	105 T/M	20%	Methane
4	Yilan 30,000CMD 宜蘭	150 T/M	10%	LNG boiler 2,500NTD/T-water

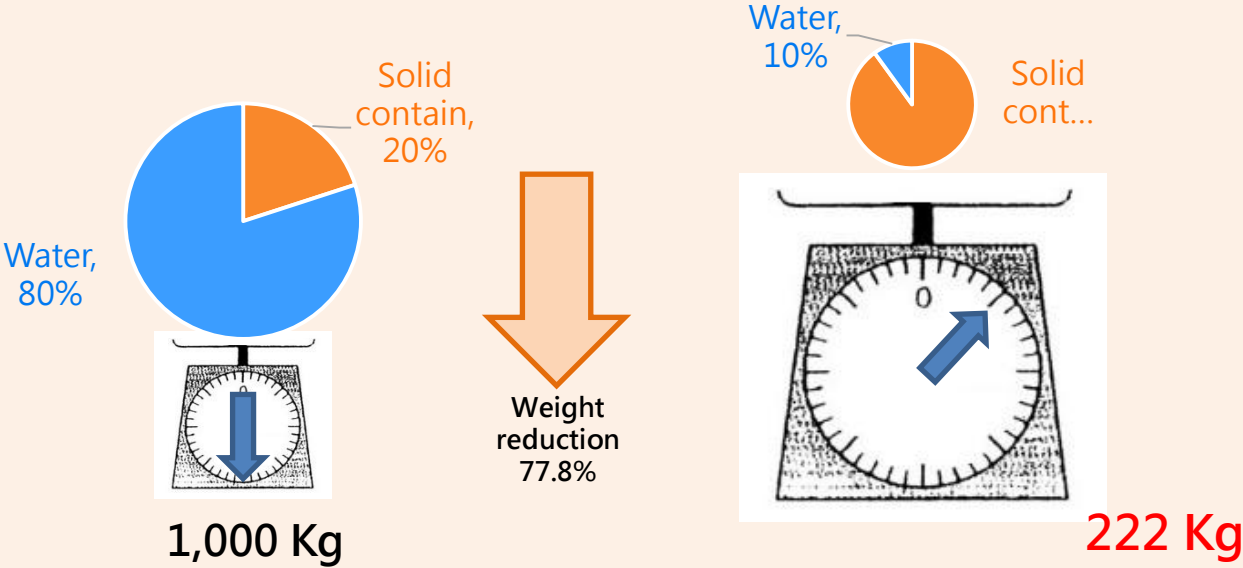
# Flow chart (SLUDGE DRYING)





# Reference case 4: Sludge drying

Case 4  
BFP  
sludge  
to dry



# Sludge drying facility (DH 3T/Hr)



# Case 1: Sludge drying (heating boiler-dryer-discharge)





# Sludge drying



**Dewatered**



**Drying**



**Compact**



# 4. RECLAIMED WATER



	Filtration	Precision Filtration	Desalting
<b>Remove material</b>	rust, ss	Particle, Colloidal particles, Microorganism	
<b>Process</b>	<ul style="list-style-type: none"> <li>Sand filtration</li> <li>Activated carbon</li> <li>Surface filtration</li> </ul>	<ul style="list-style-type: none"> <li>MF</li> <li>UF</li> <li>MBR</li> </ul>	<ul style="list-style-type: none"> <li>NF</li> <li>RO</li> <li>MD</li> <li>CDI</li> </ul>
<b>User</b>	Secondary industrial water supply	General industrial water supply	High-level industrial water supply

# Expect target

	Plant	Design capacity CMD	Supply Q'ty of reclaimed water CMD	Remarks
1	FS 鳳山溪	156,000	25,000/45,000	Industrial park
2	FT 福田	152,000	130,000	Industrial park
3	YK 永康	29,000/87,000	15,000	Science park
4	AP 安平	128,760	60,000	Science park
5	LH 臨海	20,000/80,000	10,000	Industrial park
6	SN 水湳	23,400	10,000	Science park

# Q&A