Stepping Up to the Water - Energy Nexus Challenges at Tai Po Water Treatment Works

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Content

• Introduction
• Features in Water Management
• Features in Energy Use
Introduction
Introduction of Water Supplies Department

• Functions and services
  (i) plan and manage water resources
  (ii) implement waterworks projects
  (iii) operate and maintain waterworks facilities
  (iv) control quality of water supply to customers
  (v) provide customer services and enforce Waterworks Ordinance
Master plan for 3 parallel streams

Stream I - 400 MLD (commissioned since 2003)

Stream II - 800 MLD (under construction)

Stream III - 1,200 MLD (future)
Tai Po WTW Water Supply Zones

Existing 400 MLD supply zone

After Expansion - 800MLD supply zone

Tai Po WTW

Exhibition & Convention Centre
Features in Water Management
High Water Treatment Efficiency

Raw Water

About 95% Treated Water

Less than 0.3%:
Taken out from treatment process as water sample for water quality control purpose

About 4.7%:
1. removed together with sludge
2. used for filter backwashing
Most will be returned to inlet via sludge treatment process
Sample Water Recycling System

RETURN TO
TREATMENT
PROCESS

EXCESS OR UNUSED
SAMPLE WATER
(a)

SAMPLE WATER FROM
PROCESS

SAMPLE WATER PUMP

USED SAMPLE WATER
(b) = (c) + (d) + (e) + (f)

MANUAL SAMPLE
SINK

UNCONTAMINATED
SAMPLE WATER
(e)

WATER QUALITY ANALYZER WITHOUT USE OF
CHEMICALS

WATER QUALITY ANALYZER USING
REAGENTS OR CHEMICALS

Atlantic (AI)

AI=

NON POTABLE USE
(f)

NON POTABLE USE
(d)

PROPER DISPOSAL
(c)

CONTAMINATED SAMPLE WATER

RECYCLE TO
INLET CHAMBER
(e)
Sample Water Recycling System

System A

System B
Rainwater Harvesting System

- **DAF Roof** (5,000 m²)
- **SRGF Roof** (3,000 m²)

**System A**
**System B**
Minimize Potable Water Use

- Irrigation – 30% greenery area

- Flushing
  - Annual saving of Potable Water
  ~ 12,000m³
Features in Energy Use
Efficient Layout – Gravity Driven

Raw water

Treated water

1. +107.3 m
2. +106.5 m
3. +104.1 m
4. +99.9 m
5. +94.8 m
Other Energy Saving/Efficient Features

• Light Emitting Diodes (LED) lighting

• Variable Speed Pumps for different types of pumps

• Photovoltaic system

• Zone and dimming control for area and security lighting

• Building and Energy Management System for Building Services
Comparison

- Compare with *"Electricity Use and Management in the Municipal Water Supply and Wastewater Industries"* (i.e. EPRI report 2013)

- Jointly prepared by
  - Electric Power Research Institute
  - Water Research Foundation

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<thead>
<tr>
<th></th>
<th>Saving of Tai Po WTW</th>
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<tbody>
<tr>
<td>Treated water pumping</td>
<td>23%</td>
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<tr>
<td>Processes</td>
<td>30%</td>
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<tr>
<td>Building Services</td>
<td>67%</td>
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Thank you