

New and Renewable Energy Technologies in HK

Energy Efficiency Office
EMSD, HKSAR Government
Hong Kong, China



Role of EMSD in Promoting EE & RE in Hong Kong

As the executive arm in supporting the Environment Bureau in enhancing energy efficiency and conservation as well as promoting application of renewable energy in Hong Kong, through its Energy Efficiency Office established in 1994.



Development Constrains

- **Population density:6,500 persons/km²**
- **Lack of essential criteria for development of hydro power, geothermal, tidal and wave energies**



Major Considerations

- **Suitable sites for large scale projects**
- **Visual and noise impacts**
- **Relatively high equipment and generation costs**
- **Grid connection and open electricity market consideration**



RE in Hong Kong

- **Potential for wide scale applications**
 - **Solar**
 - **Wind**
 - **Energy-from-waste**



Police 1: Government

- **A technical circular in 2005 encourages all public works projects to have greater adoption of energy efficient features and RE technologies.**
- **Another technical circular in 2009 set the comprehensive target-based green performance framework for new and existing Government buildings.**
- **Undertaking demonstration projects**



Police 2: Utility Sector (A)

- Encourage the power companies to develop and adopt RE technologies.
- In the 2008 Scheme of Control Agreements, the two power companies enjoy a higher permitted rate of return for their investment in RE facilities (i.e. 11% for RE vs 9.99% for other fixed assets).



Police 2: Utility Sector (B)

- **A bonus of 0.01 to 0.05 percentage point in permitted return is also offered in accordance with the extent of RE usage in their electricity generation.**
- **Power companies to formulate standardized arrangements for connection of RE equipment to their electricity grids**



Police 3: Business Sector

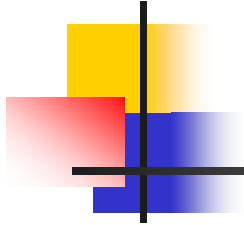
- Tax incentives
- Capital expenditure of the private organization's RE power system in building can be deducted over a 5-year period starting from the year of purchase



Police 4: Financial Incentives

Funding schemes operated by public and private organization

- **Environment and conservation fund from Gov.**
- **R&D funding scheme from ITD targeted for SMEs**
- **Sponsorship funds from power companies**
- **Some other sponsorships listed in HK RE Net**

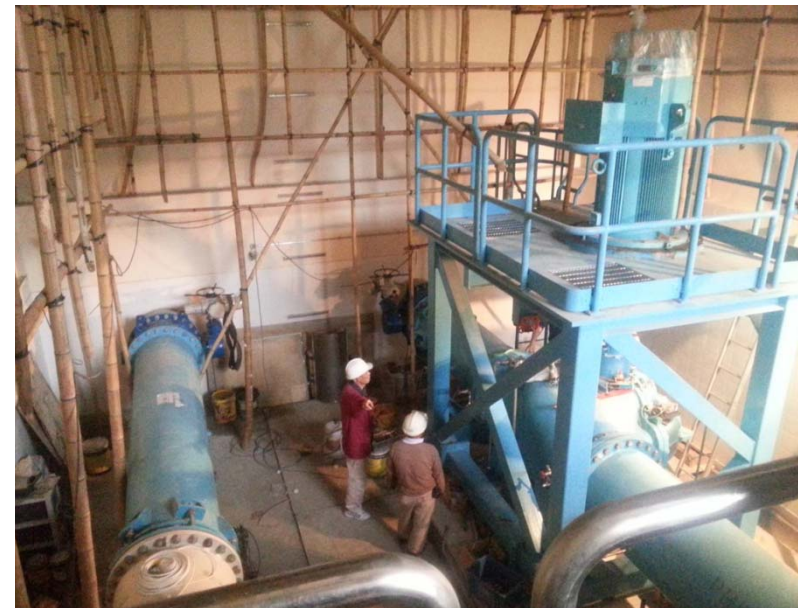
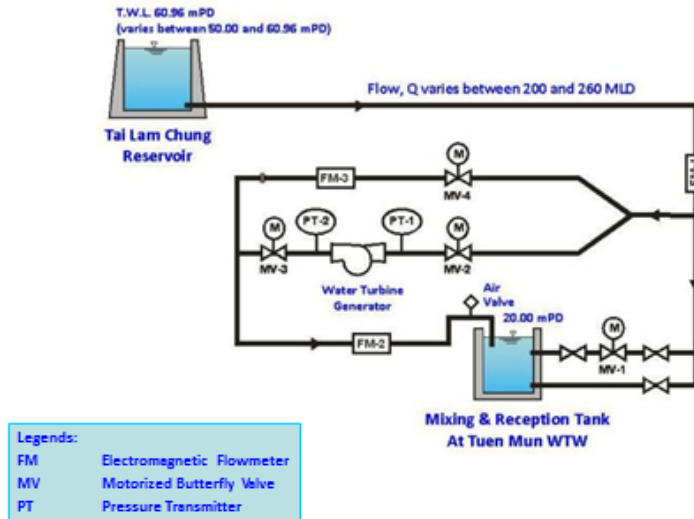


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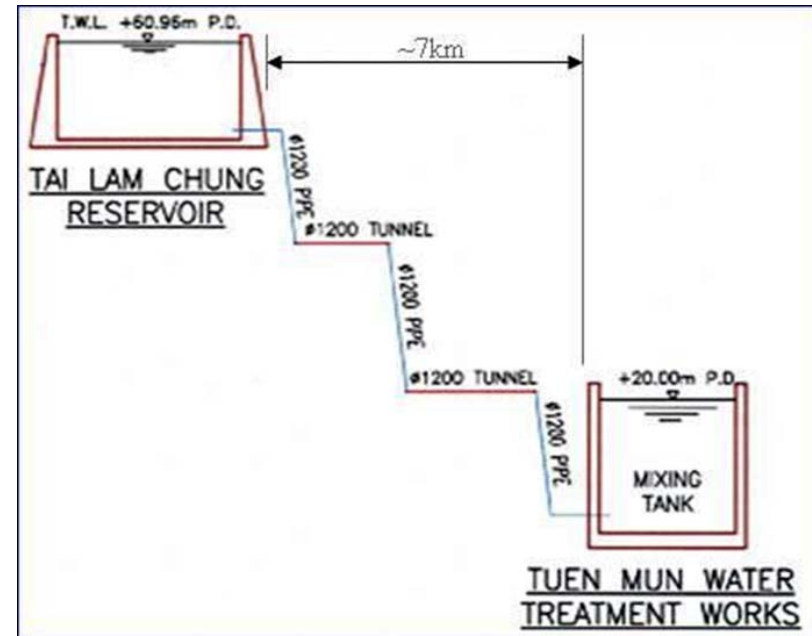
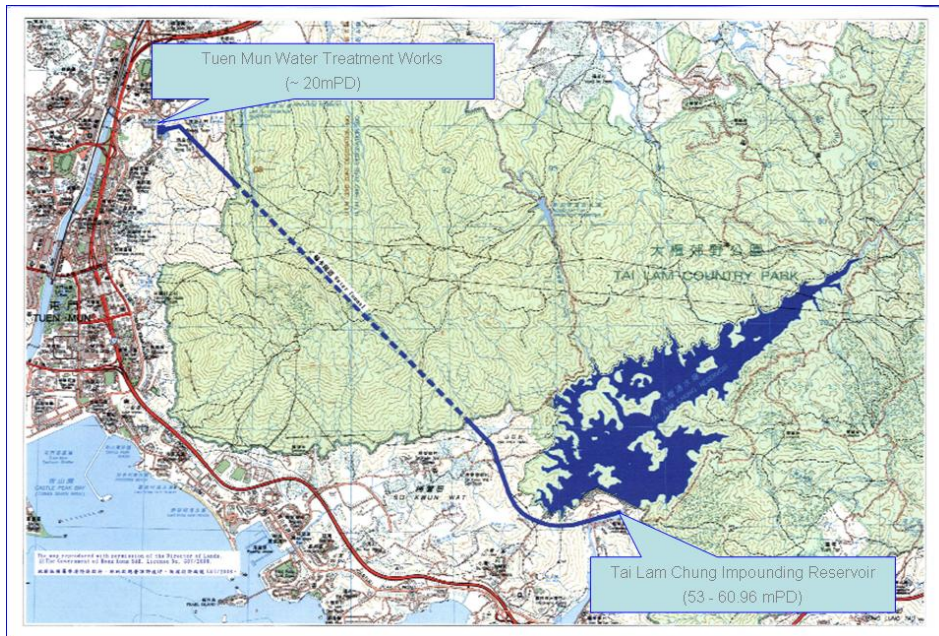
Example 1

Hydropower Plant at Water Treatment Works

Schematic of Tuen Mun WTW Hydropower Plant



Example 1





Example 1

- **Stage 1: 180kW in mid 2013;**
- **Stage 2: another 180kW in 2016;**
- **Estimated annual electricity generation about 2.9 million kWh after completion**



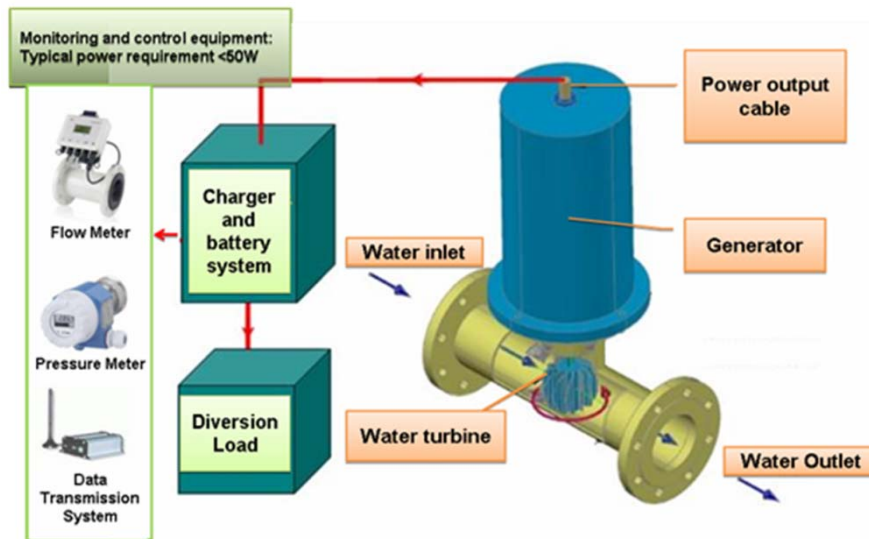
Example 2

Mini in-line hydropower generators

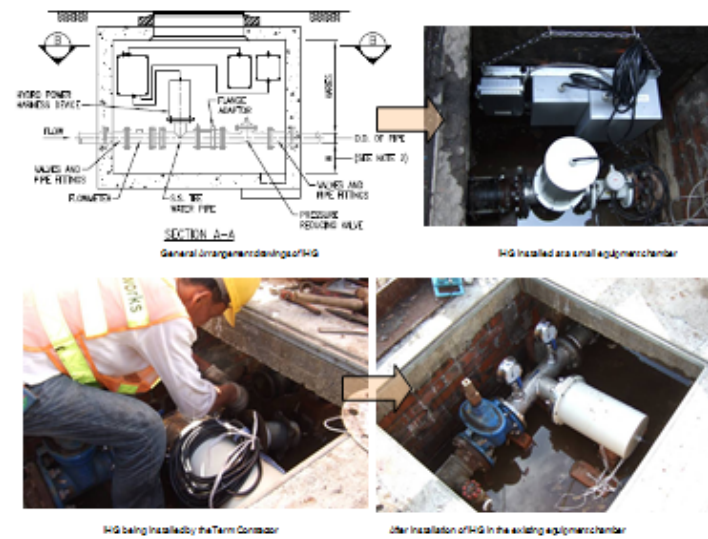
- **Jointly developed with a university (HK Polytechnic University)**
- **for underground district metering and pressure management instruments**
- **4 nos. of 80W in-line hydro-power installed**
- **another 20 nos. to be installed by end 2013**

Example 2

Schematic Diagram for Use in District Metering



Typical Arrangement at Site



Example 3

Wave Cleaning Intake Screen





Example 3

- **Environmental friendly**
- **Energy saving**
- **Man-power saving**
- **Cost saving**
- **Minimal Maintenance**



Example 4

Biogas utilization in sewage treatment

- **Biogas (~65% methane) generated during sewage treatment**
- **as fuel for water boilers keeping optimal process temperature of 35 deg. C**
- **As fuel for CHP, direct driving of air blowers etc.**
- **CHP capacity reaching 3.6MW in 2013**



Example 5

Promotion of Electric Vehicles

- **Waiver of first registration tax for a period of 5 years**
- **100% profit tax deduction for capital expenditure in the 1st year**
- **Infrastructure: over 1,000 chargers in 18 districts**



Example 5

Promotion of Electric Vehicles

- **18 EV models, more than 430 units on road**
- **Government fleet 75 units, another 150 units being delivered in 2013**
- **Government fully fund (~HK\$180 million) for procurement of 36 electric buses**
- **Approved trial scheme for 14 electric taxi, 11 electric coaches & 18 electric goods vehicles**

Example 6

Solar Lamps in Government projects

- to achieve 15% in new parks and swimming pools
- Government projects to adopt RE





Example 7

Energy from Waste

- **Sludge Treatment**
 - incineration
 - capacity 2000 t/day
- **Integrated Waste Treatment Facilities**
 - incineration of municipal solid waste
 - could export about 480 million kWh/year (~1% of HK electricity consumption)

Example 7

Energy from Waste





Example 8

Town Island Renewable Energy Project

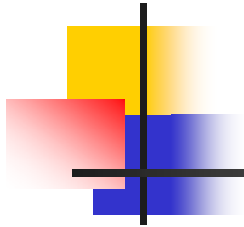
- **Power company to supply electricity to a remote island**
- **Submarine cable / overhead line: uneconomical & adverse environmental impact**
- **Stage 1 & 2 – 180kW PV & 2x 6kW wind turbines**
- **Equipped with batteries capable of storing over 1,000 kWh**



Example 8

Town Island Renewable Energy Project





Thank You!!