



Town Island Project and HKU testing

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Power systems in Hong Kong

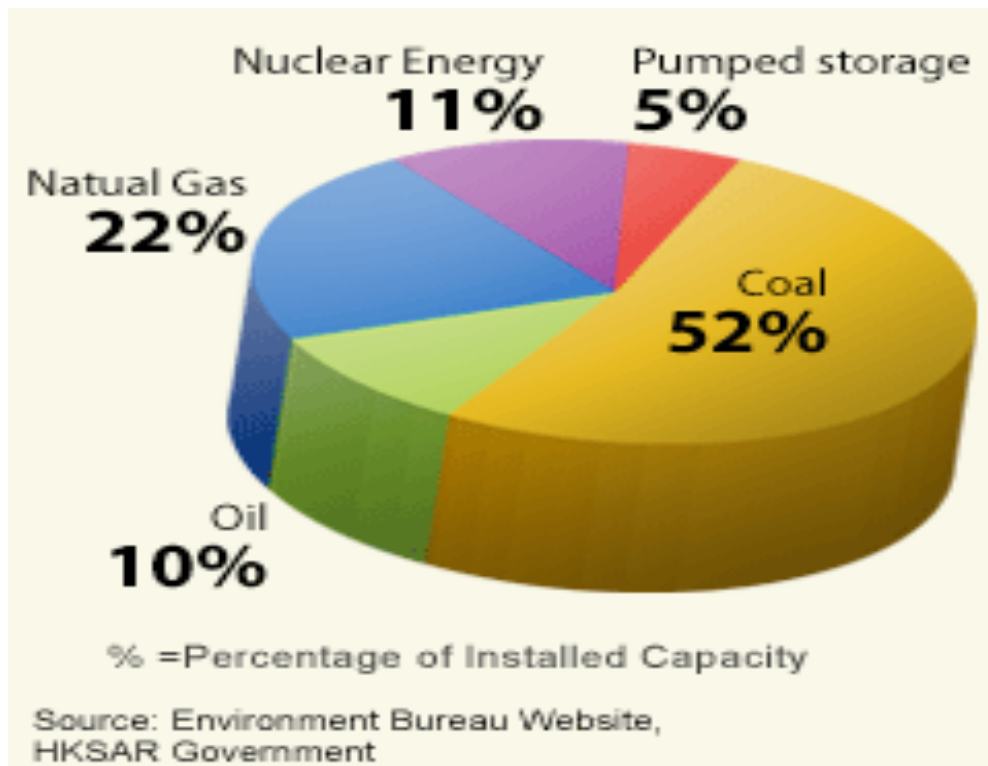


- Two power companies
 - CLP Power supplies electricity to Kowloon and the New Territories, and several outlying islands. It employs a fuel mix strategy of coal, gas, nuclear and oil.
 - Hong Kong Electric (HEC) supplies electricity to Hong Kong Island and the neighboring islands. It uses a combination of coal, liquefied natural gas and wind energy.

Fuel mix of power generation in HK by 2006



- Total installed capacity: 12,644 MW
 - This data includes part of the capacity of units 1 & 2 of Daya Bay nuclear power plant and Guangzhou pump storage station.
- Fuel mix



Renewable energy in HK



- Lamma island wind power, 800 kW, 2004
- Solar power system, 550 kW, 2010



Source: Hong Kong Electric

Town island renewable energy microgrids

- Town Island (Dawn Island) is a remote island. One hour trip from Sai Kung Ferry Pier.
- Operation Dawn operates a non-profit drug rehabilitation centre.

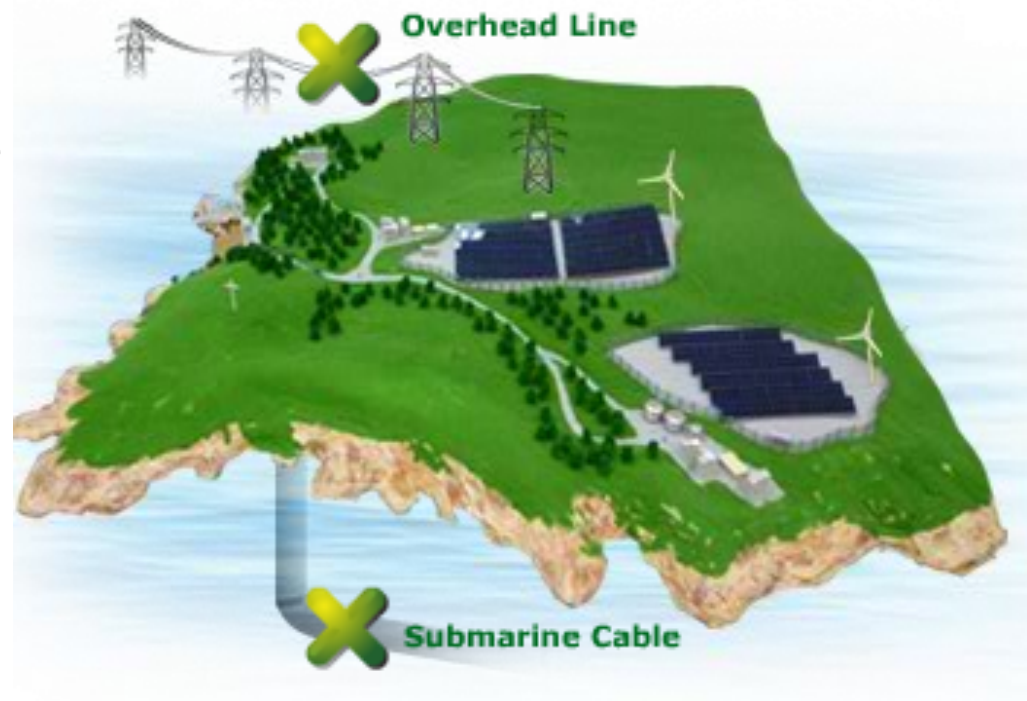


Source: CLP Power

Town Island RE microgrids



- Town Island is currently powered mainly by three diesel generators with fuel transported there by boat.
- Overhead line and submarine cable were considered not applicable due to scenery and ecological concerns, as well as high cost.



Source: CLP Power

Solar and wind generations



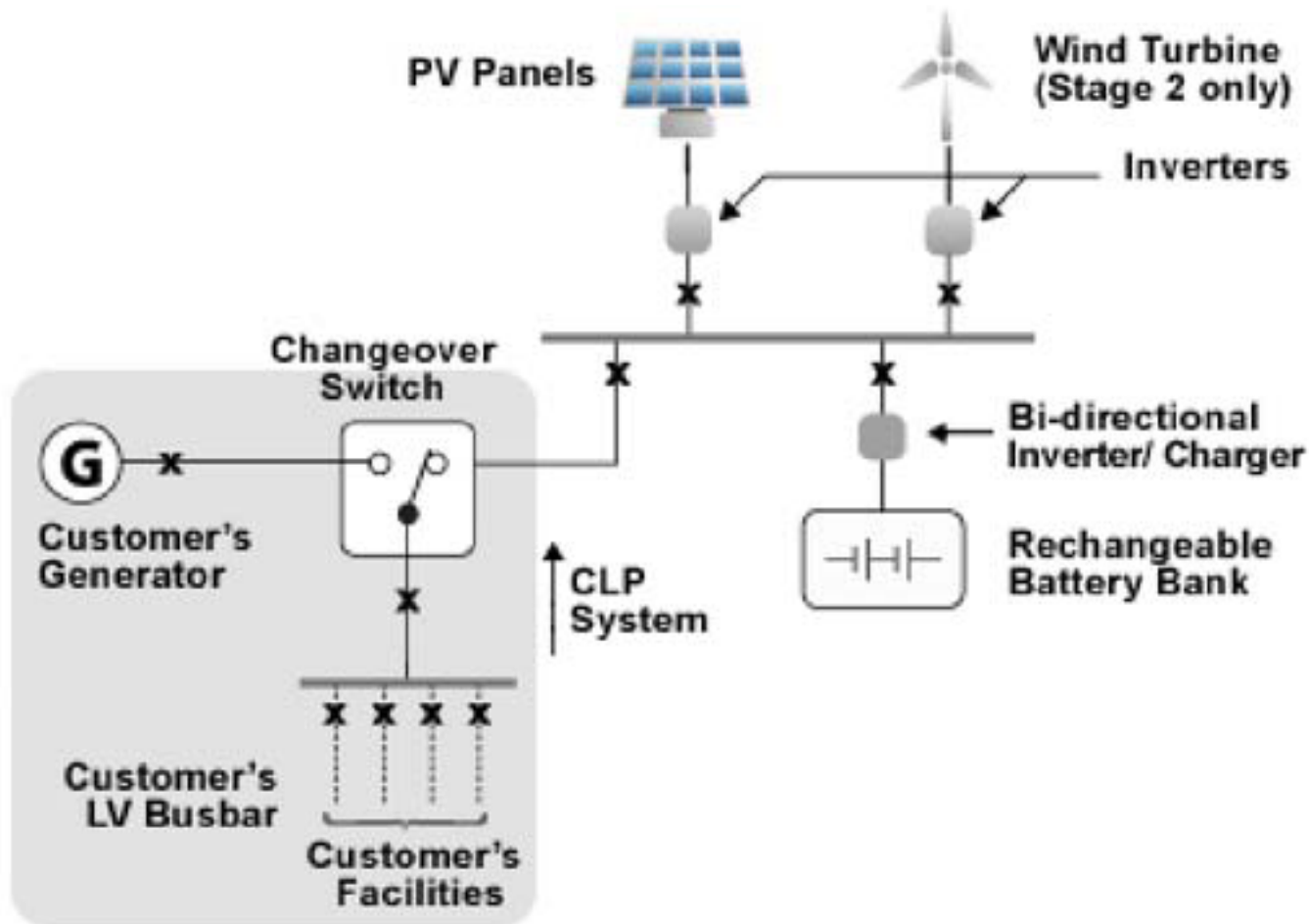
- In 2008, CLP decided to use renewable energy to supply electricity to the Island using solar panels and wind turbines.
- Average daily solar radiation: 14.07 MJ/m²
- Average wind speed: 23.4 km/h
- Good enough for building a renewable energy based microgrid.

Two stage project – in total 192 kW



- Stage 1: 20 kW PV panels
 - Provides power to the existing Carmel Hostel, chapel, kitchen and farming area.
- Stage 2: 160 kW PV and 12 kW wind turbine
 - Provides power to new facilities, hostels and visitor center.
- Co-generation scheme: solar + wind
- Battery for excessive energy
- Original diesel units are kept for back-up purpose.

Microgrid



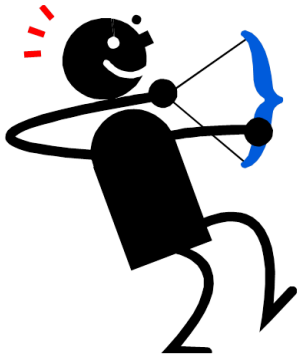
Source: CLP Power

HKU-CLP collaboration on Town Island project

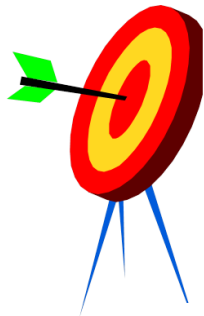
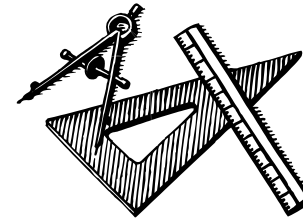


- CLP and HKU research collaboration on Town Island renewable energy project
- Town island data
- Test the system in HKU smart grid laboratory

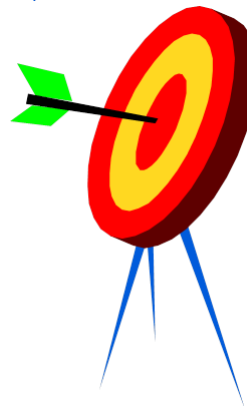
Objectives of HKU-CLP Joint Research



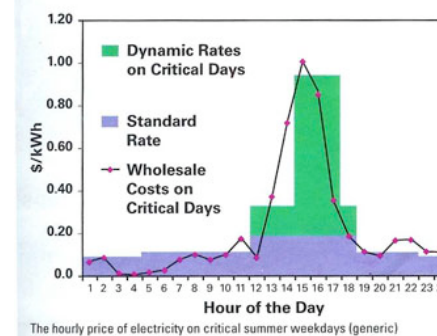
Town Island System model development



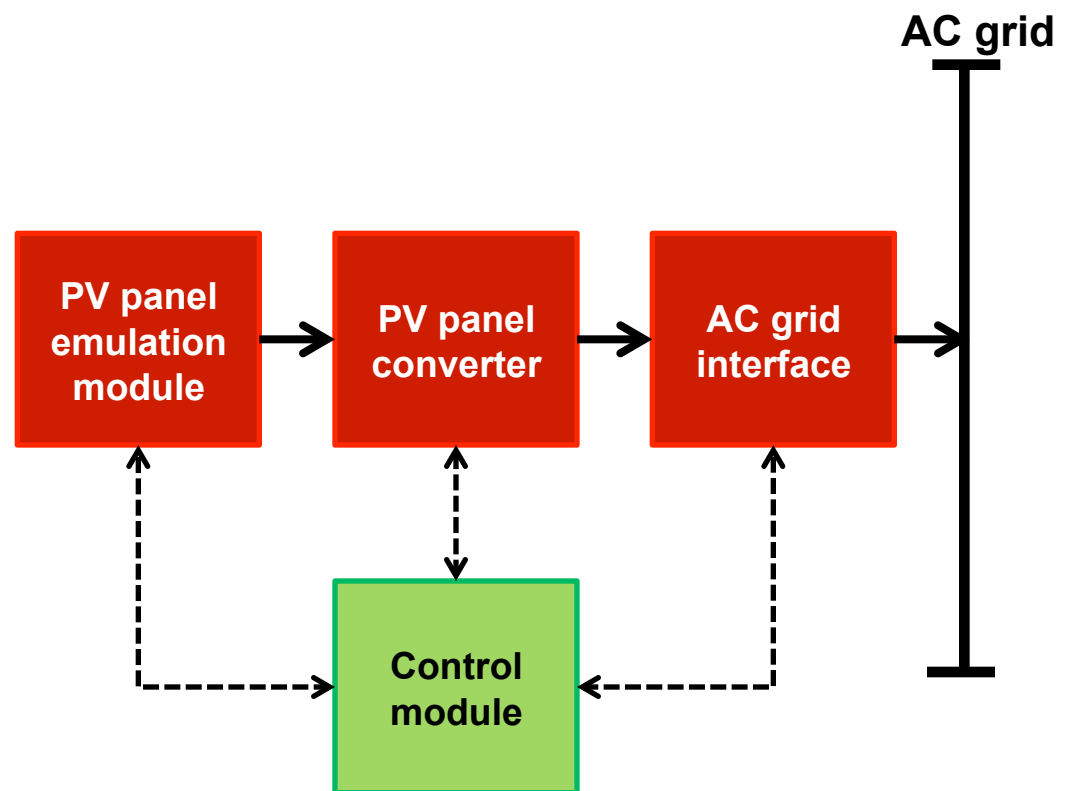
Optimal sizing of wind turbine, PV panel and storage



Study of demand management



Test the system in HKU smart grid lab



Some results of the project



- Data analysis
 - Solar radiation
 - Load
 - Battery SOC, etc.
- Model the town island stage 1 system in the lab.
- Further study the future stage 2 system base on historical data.
- Suggestions to the configuration and others.