Electricity Supply in Hong Kong

Electricity in Hong Kong has always been supplied by two vertically-integrated power companies: The Hongkong Electric Company Ltd (HEC) which was incorporated in 1890, and CLP Power Hong Kong Ltd (CLP) which was incorporated in 1901.

Both power companies do not have a franchise but their operations are regulated by the Environment Bureau under Scheme of Control (SOC) Agreements.

(Source: Environment Bureau Website)

The HKSAR Government entered into two 10-year term Scheme of Control Agreements (SCAs) in January 2008, one with CLP and another with HEC. The SCAs are valid till 2018 with a 5-year interim review in 2013 (now underway)
Hong Kong Electricity System - Overview

- **CLP (8,888MW)**
  - Castle Peak Coal (4,106MW)
  - Black Point Gas (2,500MW)
  - Penny’s Bay Oil (555MW)
- **HEC (3,766MW)**
  - Lamma Coal (2,500MW)
  - Lamma Gas (680MW)
  - Lamma Oil (555MW)
- **Interconnection** 3 x240MVA = 720MVA Circuits

The **720MVA** interconnector is mainly used for emergency backup and sharing of spinning reserve (**2,000MVA** required for full power transfer with N-1 Contingency).

Total Installed Capacity = 12,654MW
2012 Maximum Demand = 9,263MW
2012 Reserve Margin = 36.6%
2012 Electricity Sale = 44,869 MWh

Sources: CLP Power Website, Power Assets Group Website.

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2012 Generator Capacity & Electricity Fuel Mix

- **CLP Fuel Mix**
  - Coal 52.3%
  - Gas 25.2%
  - Nuclear 10.9%
  - Oil 1.6%
  - Pump Storage 0.6%
- **HEC Fuel Mix**
  - Coal 46.2%
  - Gas 26.1%
  - Oil 18.1%
  - Nuclear 10.3%

**Hong Kong 2012 Generator Capacity: 12,654MW**

- **CLP Fuel Mix**
  - Coal 52.3%
  - Gas 26.1%
  - Nuclear 10.9%
  - Oil 0.6%
- **HEC Fuel Mix**
  - Coal 46.2%
  - Gas 26.1%
  - Nuclear 10.9%

**Hong Kong 2012 Electricity Fuel Mix**

School of Energy and Environment, City University of Hong Kong
Emissions from Electricity Generation

In 2010 Electricity Generation Responsible for:
- 50% SO2 (17,800 tonne)
- 25% NOx (27,000 tonne)
- 16% RSP (1,010 tonne)
- 67% CO2 (28 million tonne)

Carbon emissions graph:

Sources: EPD Web Site
Hong Kong’s Climate Change Strategy and Action Agenda Consultation Document (Sept 2010)

Air Pollution & Climate Change

Air Pollution

Climate Change

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Revamp Fuel Mix in 2020

**CLP Fuel Mix**
- Coal: 49.1%
- Gas: 31.7%

**HEC Fuel Mix**
- Coal: 68.5%
- Gas: 31.5%

**Hong Kong 2012 Fuel Mix**
- Coal: 24%
- Gas: 23%
- Nuclear: 54%

**Hong Kong 2020 Fuel Mix**
- Coal: 40%
- Gas: 40%
- Nuclear: 20%

### Carbon Emission

- **Carbon Footprint (2005)**: 6.21/ capita
- **Total Carbon (Kt)**: 42,000
- **Total Carbon (Kt)**: 28,140 – 34,020
- **Total Emissions (Reduction 50% - 60%)**
  - SO₂: 35,500 – 10,900
  - NOx: 6,340
  - RSP: 33,700
  - VOC: -5%

### Electricity Consumption (2006-2012): 1% per year

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity Local Consumption (billion kWh)</th>
<th>System Maximum Demand (MW)</th>
<th>GDP (Current Price (HK$million))</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>40.33</td>
<td>9,032</td>
<td>1,503,351</td>
<td>6,857,100</td>
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<tr>
<td>2007</td>
<td>40.85</td>
<td>8,836</td>
<td>1,650,756</td>
<td>6,916,300</td>
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<tr>
<td>2008</td>
<td>40.94</td>
<td>8,938</td>
<td>1,707,487</td>
<td>6,957,800</td>
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<td>2009</td>
<td>41.50</td>
<td>8,926</td>
<td>1,859,243</td>
<td>6,972,800</td>
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<tr>
<td>2010</td>
<td>41.86</td>
<td>9,278</td>
<td>1,846,505</td>
<td>7,024,200</td>
</tr>
<tr>
<td>2011</td>
<td>42.06</td>
<td>9,200</td>
<td>1,936,083</td>
<td>7,071,600</td>
</tr>
<tr>
<td>2012</td>
<td>43.03</td>
<td>9,263</td>
<td>1,965,153</td>
<td>7,173,900</td>
</tr>
<tr>
<td>Change from 2006 to 2012</td>
<td>+6.7%</td>
<td>+2.6%</td>
<td>+30.7%</td>
<td>+4.6%</td>
</tr>
</tbody>
</table>

(Sources: LegCo Paper LCQ15 (2011), HK Annual Digest of Statistics 2012 and CLP/HEC 2012 Annual Reports)

- HK's increase in Electricity Consumption is 6.7% (~1%/year) over a period of 6 years did not follow the trend of GDP increased by 30.7% (~4%/year) (current price).

**Projected increase in Electricity Consumption => Level of Emission Reduction**
### Fuel Mix Strategy for Hong Kong

Setting **Fuel Mix** for electricity generation should take due consideration of a number of factors:

- Electricity Market Structure & Size
- Projected Electricity Consumption
- Service/Residual Life of existing Electricity Generation Infrastructure
- Maturity and Safety of Green/Clean-Energy Technology
- Fuel Sources, Security & Prices
- Levels of Air Pollutants & Carbon Emissions Reduction
- Time Line for implementation
- Impact on Tariff

**Fuel Mix Strategy** is part of Energy Policy which should maintain a balance among the fundamental goals of Economic Growth, Fuel and Energy Security, Affordability and Environmental Quality which are competing with times.

Is the Government’s proposed Fuel-Mix (50% Nuclear; 40% Gas, 6 - 7% Coal and 3 - 4% RE) for electricity generation a well-thought policy?
Thank You!