

## Conference on Economics of Environment and Resources

### Challenges and Opportunities in Creating a Sustainable Environment (Electricity Generation: Air Pollution, Climate Change & Fuel Mix)

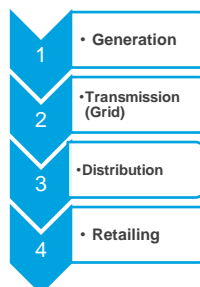


Dr C W Tso  
Adjunct Professor

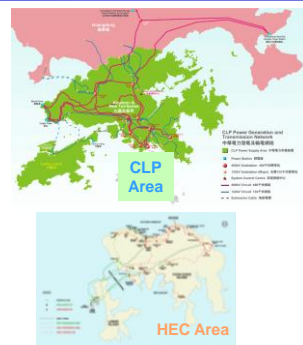
14 June 2013

## 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.



Vertically-integrated

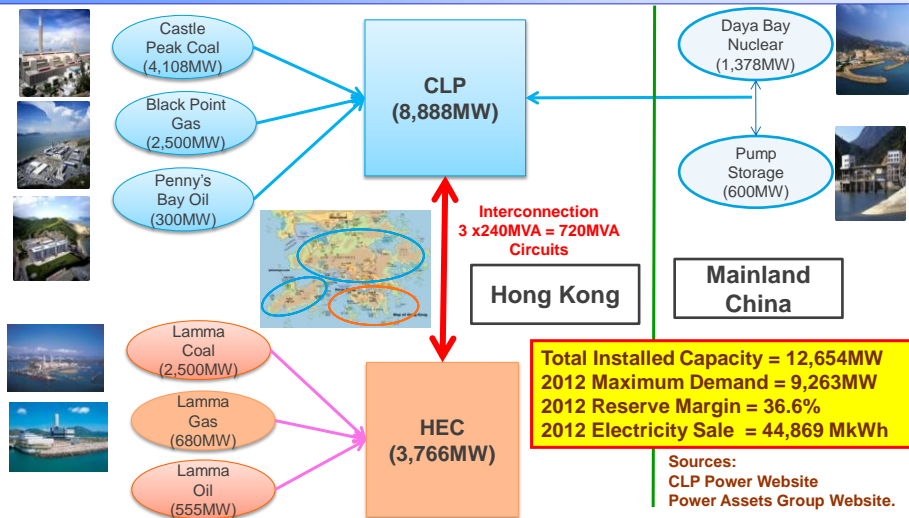


Both power companies do not have a franchise but their operations are regulated by the **Environment Bureau** under Scheme of Control (SOC) Agreements.

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)

(Source: Environment Bureau Website)

## Hong Kong Electricity System - Overview

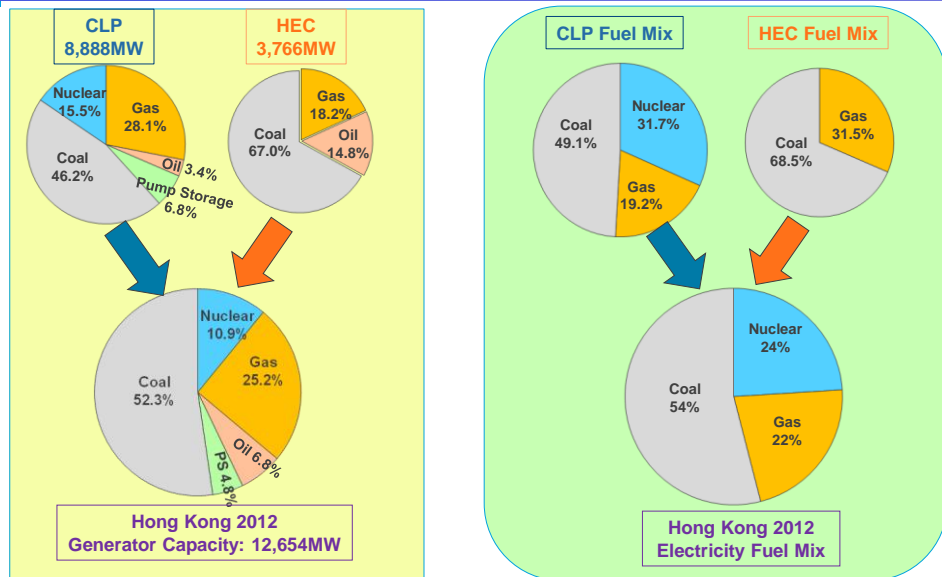


The **720MVA** Interconnector is mainly used for emergency backup and sharing of spinning reserve (**2,000MVA** required for full power transfer with N-1 Contingency).

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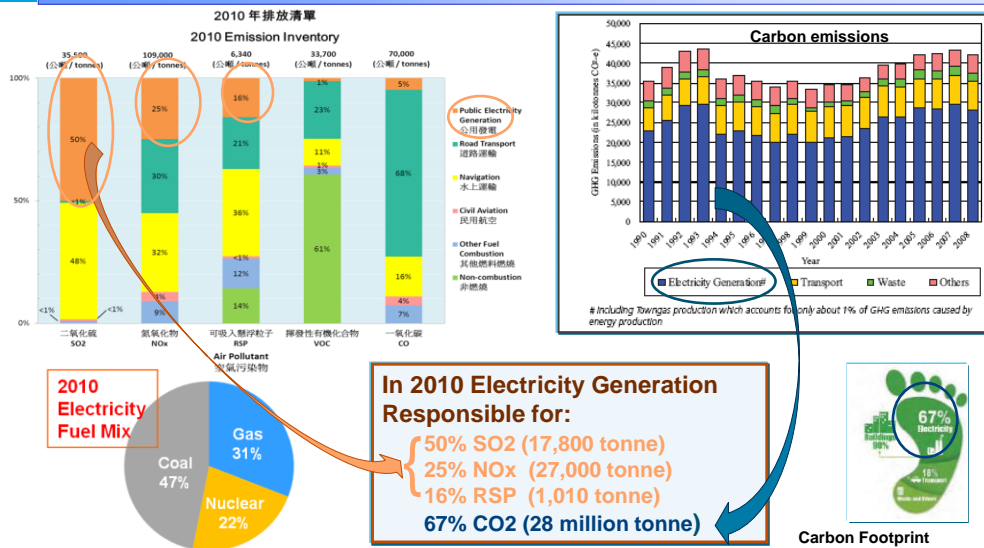
## 2012 Generator Capacity & Electricity Fuel Mix



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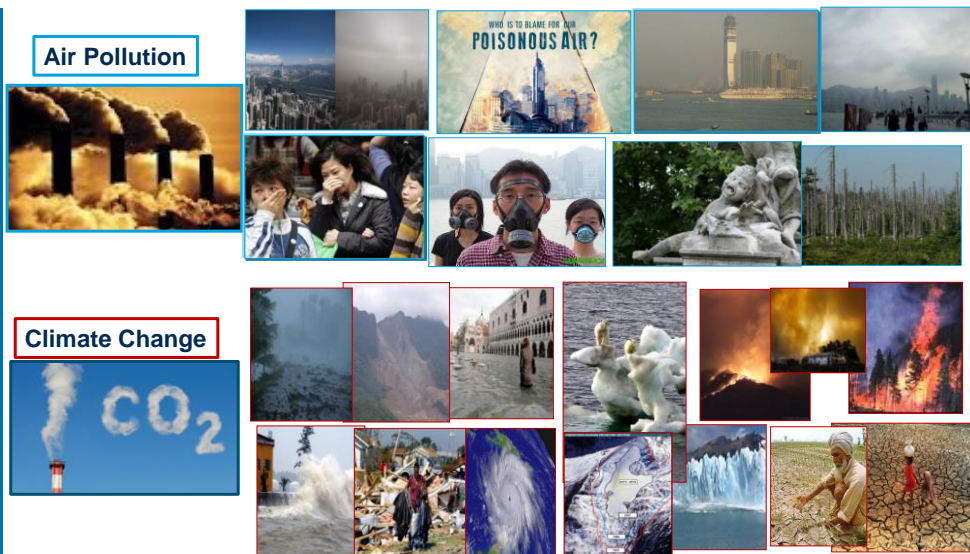
## Emissions from Electricity Generation



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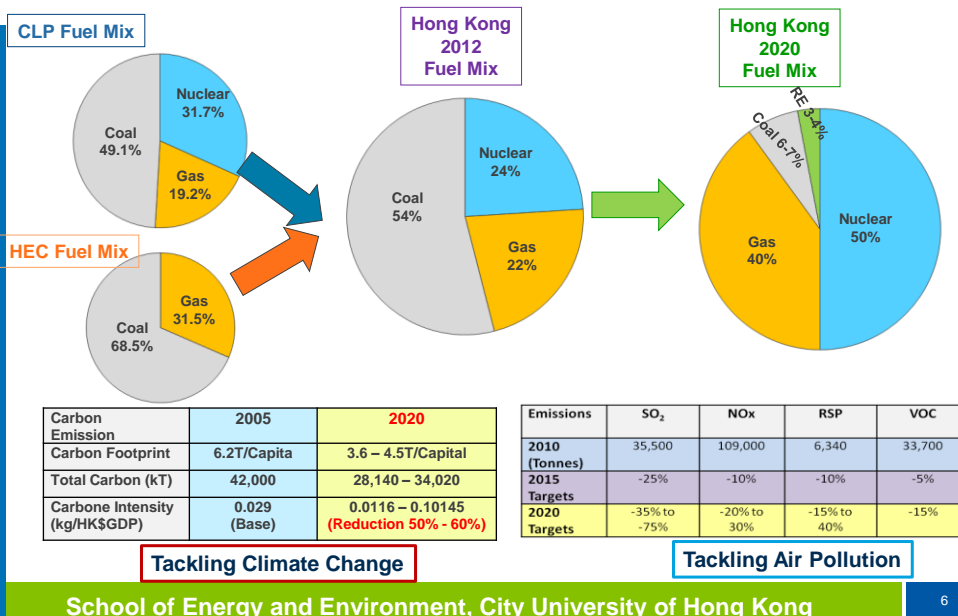
## Air Pollution & Climate Change



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## Revamp Fuel Mix in 2020



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

Year	Electricity Local Consumption (billion kWh)	System Maximum Demand (MW)	GDP (Current Price (HK\$million))	Population
2006	40.33	9,032	1,503,351	6,857,100
2007	40.85	8,836	1,650,756	6,916,300
2008	40.94	9,338	1,707,487	6,957,800
2009	41.50	8,926	1,659,245	6,972,800
2010	41.86	9,278	1,846,505	7,024,200
2011	42.06	9,200	1,936,083	7,071,600
2012	43.03	9,263	1,965,153	7,173,900
Change from 2006 to 2012	+6.7%	+2.6%	+30.7%	+4.6%

(Sources: LegCo Paper LCQ15 (2011), HK Annul 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).

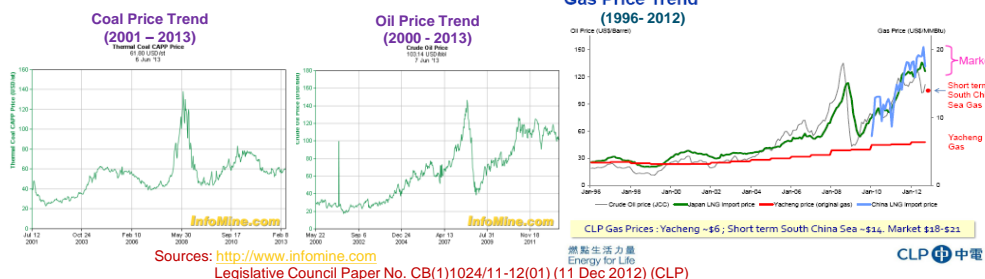
**Projected increase in Electricity Consumption => Level of Emission Reduction**

## Electricity Tariffs (2005 – 2013) & Fuel Cost Trend

	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change 2005 to 2013 (8 Yrs)
<b>CLP (HK\$ ¢/kWh)</b>										
Av. Basic Tariff	-	-	-	-	77.4	80.0	80.0	84.2	84.2	
Fuel Clause Charge	-	-	-	-	11.8	11.5	14.1	17.8	22.4	
Rebate								-3.3	-2.1	
Av. Net Tariff	87.2	87.3	87.1	91.1	89.2	91.5	94.1	98.7	104.5	+19.8%
<b>HEC (HK\$ ¢/kWh)</b>										
Av. Basic Tariff	-	-	-	116.9	94.5	94.5	93.1	94.1	94.7	
Fuel Clause Charge				10.5	25.4	25.4	30.2	37.0	40.2	
Av. Net Tariff	103.3	110.0	117.4	127.4	119.9	119.9	123.3	131.1	134.9	+30.6%

{Sources: LegCo Papers LCQ15 (2011), CB(1)297/12-12 (01)(2012) & CB(1)1024/11-12(01) (2012)}

### Gas Price Trend (1996-2012)



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## 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?

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**Thank You !**

