

# Review of Electricity Price Setting Mechanisms

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## EXECUTIVE SUMMARY

- 1 IPA Advisory Limited (IPA), formerly known as IPA Energy + Water Economics Limited, was commissioned by the Environment Bureau of the Hong Kong SAR Government (ENB) to produce a study of different price setting mechanisms (PSMs) commonly adopted in electricity markets around the world, as well as PSMs utilised by other local Hong Kong utilities, in order to understand their applicability to regulating Hong Kong's electricity market.

### Hong Kong's current regulatory approach

- 2 The electricity sector has always been privately owned and operated in Hong Kong. The Government of the Hong Kong Special Administrative Region (the Government) currently regulates the sector through the Scheme of Control Agreements (SCAs). These SCAs allow the two incumbent utilities (i.e. CLP Power Hong Kong Limited and Castle Peak Power Company Limited (collectively: CLP); and the Hongkong Electric Company, Limited (HEC)) to recover all operating costs and make a maximum return of 9.99% on their average non-renewable net fixed assets (the permitted rate-of-return for average renewables fixed assets is 11%). The present SCAs are due to expire in 2018, and the Government is in the process of deciding whether alternative methods of regulating the electricity market could be more appropriate for Hong Kong in the post-2018 period.
- 3 The ENB is tasked with monitoring the power companies under the SCA regime, by assessing Development Plans (DPs) relating to the provision and future developments of the electricity supply systems of HEC and CLP to ensure the investments made are not excessive, premature and unnecessary. Each DP is subject to review and approval by the Executive Council. ENB also performs annual Tariff Reviews jointly with the power companies to ensure tariff adjustments are reasonable and to agree on changes from those approved in the Development Plans if applicable. In addition, an annual Auditing Review is also performed to monitor the financial, technical and environmental performance of the power companies.

### Suitability of PSMs for Hong Kong post-2018

- 4 There are broadly four main PSMs for regulating prices and profits of utilities:
  - **Rate-of-return regulation** – prices are set to cover the utility's costs of production and include a rate-of-return on capital that is sufficient to maintain investors' willingness to replace or expand the utility's assets;
  - **Cap regulation** – establishes a diminishing price or revenue ceiling, reflecting expected productivity gains by the utility, and incentivises cost efficiencies as profits depending on its ability to keep costs below the determined cap;
  - **Sliding scale regime** – a hybrid of the first two, where if profits rise above (or fall below) an agreed level then prices are adjusted downwards (or upwards) immediately so as to share some of the additional profit (or losses) with consumers; and
  - **Yardstick regulation** – requires several firms operating in the market, and benchmarks them against each other to determine relative performance and efficiency, against which utilities are evaluated and remunerated.

- 5 The key strengths and weaknesses of each of these four PSMs in the context of the electricity policy goals of Hong Kong is summarised in the table below:

Suitability of different Price Setting Mechanisms in Hong Kong				
Hong Kong policy goal	Rate-of-return	Cap regulation	Sliding scale	Yardstick
Safety and reliability	✓ Incentives for investments help maintain current safety standards and reliability of supply	✗ Incentive to cut costs may result in reduction in safety and maintenance budget	✗ Increased risk profile due to variable rate-of-return decreasing attractiveness of investments	✗ Difficult to set with so few market participants
Affordability	✗ Tariffs linked to investment, which in theory could lead to higher tariffs, but can be mitigated through monitoring	✓ Tariffs may fall in real terms if efficiency gains are being made, given no changes in circumstances	✓ Incentives for efficiency gains, whilst protecting both consumers and companies from supernormal profits/losses	✗ Would not necessarily improve current tariffs due to lack of comparators
Environmental Impact	✓ Linking environmental targets directly with the rate-of-return can help achieve environmental objectives	✗ Requires additional incentive regulation and may increase regulatory burden	✗ Requires additional incentive regulation and may increase regulatory burden	✗ Requires additional incentive regulation and may increase regulatory burden

Source: IPA analysis

## Recommendations

- 6 IPA recommends that Hong Kong continues using its current rate-of-return regulatory framework post-2018. Given Hong Kong's need for secure supplies and its emphasis on reliability criteria, rate-of-return regulation provides the necessary incentives and protection from market risks. The current regime also helps to deliver Hong Kong's policy of reducing the environmental impact of the electricity sector, by incentivising performance in energy savings and conservation.
- 7 We suggest a few modifications to additional incentives to help meet Hong Kong's policy goals:

### Allowed return on assets

- 8 We recommend continuing to derive the rate-of-return from a Weighted Average Cost of Capital (WACC) calculation. This is a commonly used method internationally, which would provide a justified and fair rate-of-return that would adequately cover the cost of capital of the companies.

### Depreciation

- 9 Depreciation is allowed for fixed assets. These costs are non-controllable by the electricity companies, as the treatment of depreciation is clearly defined within the SCAs. We recommend that the current method of depreciation is applied in the new SCAs post-2018.

### *Operating Expenditure (Opex)*

- 10 Under current SCA arrangements, Opex are passed through and ultimately borne by consumers. Opex items can generally be broken into two main categories:
- **Non-controllable Opex** – includes government rent and rates, insurance and fuel costs. This is outside the control of the electricity companies, and is therefore beyond the scope of this study.
  - **Controllable Opex** – includes staff hires, materials and services. A fair price structure could be calculated by determining a starting pass-through cost based on historical costs, then subjecting it to an appropriate inflation index minus a productivity factor over the SCA period. However, apart from the difficulty in selecting an appropriate inflation index, this will only have limited impact on the tariff adjustment as controllable non-fuel Opex in Hong Kong currently constitutes only a small portion of the Net Tariff.

### *Fuel charging arrangements*

- 11 Fuel costs account for a significant portion of the regulated tariff and have been the primary cause of tariff adjustments in recent years, mainly due to the replacement of long-term gas contracts upon expiry with new ones at current market prices which are much higher, coupled with the increased use of gas-fired generation to displace coal power plants for better air quality. The SCAs should ensure that the electricity companies are appropriately incentivised to procure fuel inputs at a competitive rate, and minimise volatility of fuel costs. In order to incentivise this, we recommend that the SCAs contain the following provisions:
- **Companies must demonstrate that fuel is procured economically** – companies must prove that they have procured fuel at a competitive market rate, for verification by an independent energy consultant. This form of regulatory oversight will ensure that companies are incentivised to minimise the cost of fuel and hence also electricity supplied to consumers. It is observed that measures have been taken in Hong Kong to ensure that companies demonstrate their fuel has been procured economically in the Tariff Review and Development Plan assessment, through the verification by independent consultant.
  - **Companies should minimise their fuel cost volatility** – Companies may also be able to minimise fuel cost volatility through the purchase of long and short term forward contracts, or other means such as hedging. By reducing market exposure and uncertainty, hedging has both upside and downside risks and cannot guarantee a net benefit in fuel savings: if market prices increase more than expected, it will result in savings to consumers; conversely, if market prices fall greater than expected, additional costs will be incurred in the procurement of fuel. The administrative costs of hedging, from setting up future trades, broker fees and the formulation and implementation of a hedging strategy, need to be taken into account and considered against the benefits when deciding whether hedging is an appropriate choice for fuel procurement.

### *Environmental performance*

- 12 In order to improve energy efficiency, demand side management or use of policies such as Revenue-neutral Energy Efficiency Feebates (REEF) would increase administrative costs but may improve the environmental impact of energy consumption in Hong Kong.

**SCA duration**

- 13 We recommend for the SCA duration to be kept at ten years with a regular review during the tenure. Although shorter regulatory periods may improve the ability for ENB to monitor and adjust the SCA where deemed necessary, reducing the regulatory periods will result in an increase in uncertainty for investors, thus raising the cost of capital. Balancing these considerations, we consider that the current regulatory period of ten years, with regular reviews during the term, should be appropriate.

**Tariff approval mechanism**

- 14 One possible SCA amendment is that Executive Council approval should be sought if the Net Tariff increase is more than a certain percentage compared to DP forecast. Imposing a requirement on power companies to explain significant fuel price discrepancy to the Executive Council should provide pressure on the companies to make more accurate fuel price forecast.

**Reliability standards**

- 15 Supply reliability is one of the obligations of the power company under the SCA. As such, the positive incentive adjustment of performance above the Average Service Availability Index (ASAI) target could be deleted. However, we recommend the penalty adjustment is maintained to ensure reliability performance, with the penalty level to be revisited based on recent actual performance.

**Test for Excess Generating Capacity**

- 16 The penalty for an additional unit of generating capacity failing the Test for Excess Generating Capacity two years in a row is that a 50% portion of the asset's mechanical and electrical equipment (M&E) costs will not attract Permitted Return for the shareholders of the companies, until it passes the test. This may need further consideration as, if the unit is deemed excessive, disallowing a higher proportion of the asset's M&E costs from earning Permitted Return may be more appropriate until it achieves the criteria to pass the Test for Excess Generating Capacity.