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Electricity tariff setting mechanism

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1. INTRODUCTION

The mechanism for electricity tariff adjustments is set in accordance with clauses specified in the Scheme of Control (SOC) Agreements which are signed between the Government of the HKSAR and the two local utilities, namely CLP and HEC. The Agreement serves as a regulatory framework to safeguard sufficient facilities are provided by the utilities to meet the demand for electricity over the Terms as specified. On the other hand, return on investment is regulated by means of the rate base known as permitted rate of return. In this article, the mechanism is outlined so as to explain the essential features, components, structure of the electricity tariff setting process. As the electricity generation is one of the major pollutant source, the government would like to propose a cleaner energy fuel mix for enhancing the local air quality of which its impact on the tariff setting is included in the discussion of the article as well.

2. REGULATORY MECHANISM OF THE SOC AGREEMENT

The regulatory mechanism of the SOC Agreement is shown in Figure 1 which shows the various essential features for recognising the net return and the tariff setting. It can be shown that the SOC sales revenue is obtained from selling electricity to the customers. The gross SOC revenue can then be obtained after making transfers to or from the Fuel Clause Account. Through the Fuel Clause Account, the difference between the standard cost of fuels as agreed between the Government and the electricity companies and the actual cost of fuels to the companies is captured and passed on to consumers by way of rebates or surcharges. The standard cost of fuel was set at \$700 per 44 gigajoules (GJ). A fuel clause adjustment will be made from time to time when the composite fuel price is above or below this standard cost. The Fuel Clause Account serves to balance the changes in fuel costs over time and the two electricity companies are not permitted to earn any profits from the account. Net revenue is then obtained by deducting all the operating costs, taxation, and financial liabilities from the SOC revenue. The Tariff Stabilization Fund by name is serving the purpose as stated in Clause 5 to accumulate and provide funds to ameliorate tariff increases or facilitate tariff reduction where appropriate. Hence, the way to manipulate these two funds will directly affect the tariff setting each year.

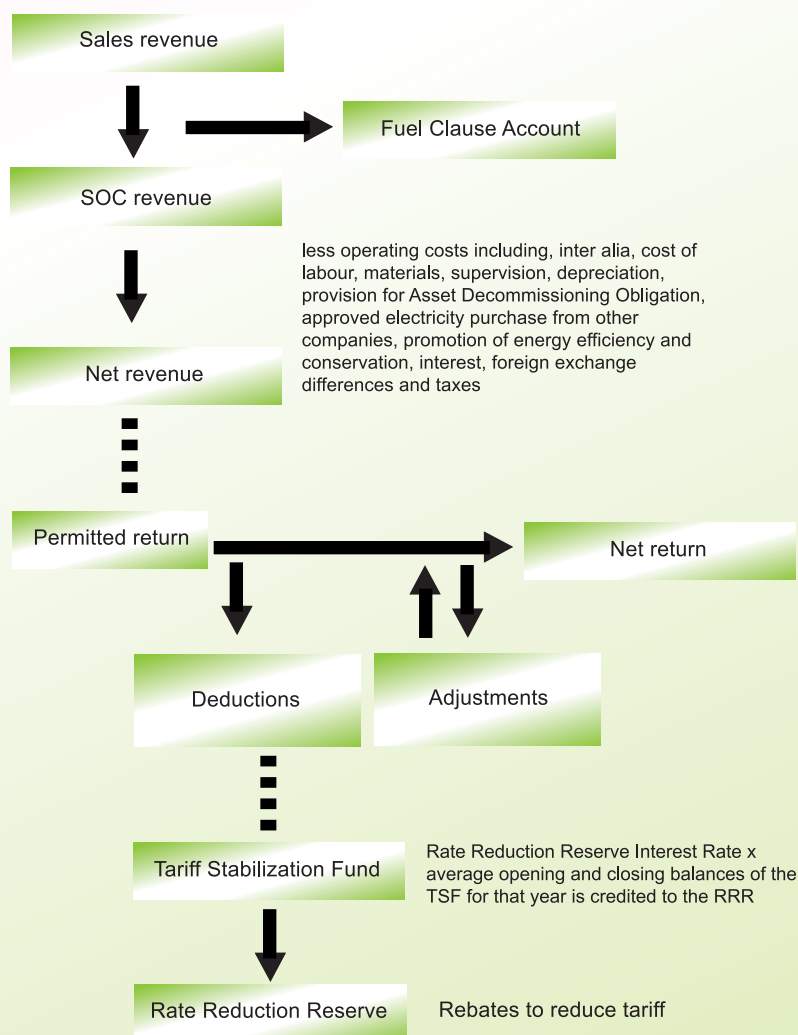


Figure 1 Regulatory Mechanism of the SOC Agreements



3. TARIFF STRUCTURE

A tariff structure involves setting up appropriate cost basis which is used for allocating costs to classes. Designing tariff structures, therefore involves setting the levels of each tariff component for each class of consumers.

There are two types of cost studies that can be used for these purposes: average/embedded costing and marginal costing.

An embedded cost (sometimes called an average historical cost) tariff analysis starts with the total revenue requirement of the utility for a given year and takes the following steps:

- The functionalisation step attributes costs to the different business sectors;
- The classification step defines costs as demand-related, energy-related or customer-related using a variety of classification methods.

A marginal cost approach analyses how the system is planned and operated in order to determine how costs would change if there were a small increase (or decrease) in energy used in a given period, in load in critical hours, in number of customers of a particular type, etc. A marginal cost tariff analysis includes the following steps:

- Unit Cost Estimation: Changes in costs of generation, transmission, distribution and supply costs that vary with level of service (kW; kWh; number of customers) given a sufficient time horizon is estimated. All non-marginal costs are ignored.
- Marginal Cost Revenue: The unit marginal costs per kWh, kW and customer identified in the first step are multiplied by the corresponding units for each customer class to establish category (and total) marginal cost revenue. Because marginal costs are forward-looking, whereas the revenue requirement is largely determined by decisions made in the past, it would be only by coincidence that charging marginal costs would produce the allowed revenue. Consequently, an additional step is required.
- Revenue Reconciliation: The unit marginal costs are adjusted to produce charges that will generate the revenue requirement and meet other tariff objectives

The two power companies in Hong Kong apply an increasing block tariff structure for the residential consumers to promote energy efficiency and conservation. For general non-residential consumers, CLP Power applies a decreasing two-block tariff structure, while HEC applies an increasing two-block tariff structure. For non-residential consumers with high energy consumption and high power demand, both power companies offer a tariff comprising **an energy charge and a demand charge**, both of which are decreasing two-block tariff structure. CLP Power also offers off-peak and on-peak charges to these categories of consumers whereby the former rates are lower to encourage off-peak consumption.

4. TARIFF SETTING PROCESS

The Scheme of Control Agreement stipulates a two-step procedure for setting the applicable tariff for each year. Firstly, the Government conducts Financial Reviews on a 4 to 5 year basis with the two power companies to agree on the Financial Plan prepared by the respective company. The Financial Plan includes the projected basic tariff rates for each year during the Financial Plan period. Then, the Government conducts a Tariff Review with the CLP Power in October and with the HEC in November of each year to determine the basic tariff rate for the following year in the light of the latest financial data. For this purpose, the power companies will provide all the necessary financial information and projections (including sales forecast, capital and operating expenditure) to the Government. The power companies are not required to disclose to the public detailed financial data and projections for tariff setting purposes. Nevertheless, it has been the practices for the power companies to brief the Energy Advisory Committee and the Panel on Economic Services of the Legislative Council on their tariff adjustments. If the tariff rate eventually determined is no higher than 7% of the projected basic tariff rate approved during the Financial Review, the power companies could proceed with the new rates without further approval from the Government.

5. ELECTRICITY TARIFF ADJUSTMENT 2012

CLP Power Hong Kong Limited (CLP) and The Hongkong Electric Company Limited (HEC) announced on 13 December 2011 their tariff adjustment for the coming year. Having regard to the views of the Executive Council, HEC reduced the tariff increase to 6.3% on the same day. (note: This was made possible by further increasing the negative balance in the Fuel Clause Recovery Account). HEC announced further improvement to its progressive tariff structure on 16 December. As a result, the actual net tariff for 90% of HEC's domestic consumers would increase by 4.97% or less, which is lower than inflation.



On the other hand, CLP announced the net tariff increase of 9.2% on 13 December. The Legislative Council, the Energy Advisory Committee, many organisations and the community at large expressed grave concern over the tariff increase. CLP revised downwards the tariff increase to 7.4% on 21 December. However, at both the meetings of Legislative Council on the same day and the Panel meeting on 23 December, Members remained discontent with the revised tariff increase. The Panel also passed a motion, requesting for the deferral of tariff increase by two months. CLP was also requested to lower the tariff increase by reducing the operating costs, taking out the capital investment projects not agreed by the Administration and making use of the Tariff Stabilisation Fund (TSF); and lower the tariff immediately upon receipt of rent and rates refund. In the ensuing week, the Environment Bureau continued the negotiation with CLP and requested CLP to respond positively to the requests made by Members and the Administration. CLP announced the revised tariff increase on 30 December. The Net Tariff increase is further reduced from 7.4% to 4.9%. The Basic Tariff increase is lowered from 6.3% to 5.3%.

As seen from the above status quo for adjustment of the electricity tariff in 2012, both CLP and HEC continue to enjoy more or less guaranteed returns on their investments through transfers from or to the Tariff Stabilization Fund and the Fuel Clause Account and other safeguards under the SOC Agreements. Fuel Clause Surcharges (or Rebates) are charged (or given) to customers by increasing (or reducing) the Basic Tariff rate to a Net Tariff rate payable by customers and are credited (or debited) to the Fuel Clause Account. The balance on the Fuel Clause Account at the end of a financial year represents the difference between Fuel Clause Rebates (or Surcharges) and Fuel Clause Transfers during the year, together with any balance brought forward from the prior year. Any debit balance is carried forward as a deferred receivable to be recovered from Fuel Clause Transfers or Fuel Clause Surcharges and any credit balance is carried forward as a deferred payable to be cleared by Fuel Clause Transfers or Fuel Clause Rebates. For instance, CLP attributed the adjustment as shown in Table 1 by:

- Savings from the removal of planned capital expenditure on additional generating capacity, and further efforts to reduce operating costs.
- A deeper draw-down on the Tariff Stabilisation Fund (TSF).
- A Rent and Rates Special Rebate.

Table 1 Breakdown of CLP's tariff adjustment in 2012

Components (¢/u)	2011	Changes	Effective Jan 2012
Average Basic Tariff	80.0	+ 4.2	84.2
Fuel Clause Charge*	14.1	+ 3.7	17.8
Rent and Rates Special Rebate		- 3.3	- 3.3
Average Net Tariff	94.1	+ 4.6 (+ 4.9 %)	98.7

6. TARIFF ADJUSTMENT SINCE 2004

Under the prevailing SOC Agreement, one crucial element affecting tariff setting is on the approved development plans of the two utilities by the SAR Government. In this connection, the Government approved the five-year Development Plan of CLP and HEC on 23 September 2008 and 16 December 2008 respectively. According to CLP's Development Plan which lasts from 1 October 2008 to 31 December 2013, the capital project expenditure will amount to \$39.9 billion, and the projected average annual increase in basic tariff for the period is below the forecast inflation of Government's Medium-Range Forecast. For HEC's Development Plan lasting from 1 January 2009 to 31 December 2013, the capital project expenditure will amount to \$12.3 billion, and it projects on average a decrease in basic tariff per annum during the period. With these, the Government conducted tariff reviews with the two power companies annually and the average net tariffs charged by HEC and CLP since 2004 are set out as shown in Table 2.



Table 2 Tariff adjustments since 2004

Year	HEC (cents/k Wh)	CLP (cents/kWh)
2004	103.3	87.2
2005	110.0 (+65%)	87.3
2006	117.4 (+6.7%)	87.1
2007	120.2 (+2.4%)	87.2
2008	127.4 (-6.0%)	91.1 a (+4.5%)
2009	119.9 (-5.9%)	88.4 b (+3%)/89.2 b
2010	119.9	91.5 (+2.6%)
2011	123.3 (+2.8%)	94.1 (+2.8%)
2012	129.4 (+4.97%) ^c	98.7 (+4.9%)

(source: LC Paper No. CB(1)554/11-12(05))

Note:

a – from January to September 2008

b – from October 2008 to December 2009 during which the Rate Reduction Reserve rebate of 0.8 cents/kWh ceased from 6 May 2009 with the depletion of the Rate Reduction Reserve

c – actual net tariff for 90% of HEC's domestic consumers

7. IMPACT OF FUEL COSTS ON ELECTRICITY TARIFF

As seen from the prevailing mechanism shown in Figure 1, the basic electricity tariff is set via the Scheme of Control Agreement with the fuel costs passing through directly with no profit to the utility and return on the associated investment is regulated. Seeing that the electricity generation in Hong Kong is still relying heavily on coal, the government has required all new generation capacity to use natural gas and suggests adopting a more environmental fuel mix in the future, say, 50% on nuclear, 40% on gas and the remainder on coal and others. Along the line for a cleaner energy future, the government has signed the Memorandum of Understanding (MoU) with the National Energy Administration of China to extend the supply of nuclear and gas supply to Hong Kong for 20 years. As a result, 70% of the nuclear electricity supply generated from Daya Bay will continue to be supplied to Hong Kong till 2034 and the gas supply from the China National Offshore Oil Corporation (CNOOC) beyond 2015 and up until 2035. Effectively it supports the government's plan for a cleaner Hong Kong. However, it has to be noted that the supply agreement has to be worked out based on commercial principles between the relevant enterprises.

With reference to the emission level as shown in Table 3, for each kilowatt hour of electricity generated with natural gas instead of coal in a multi-fuel facility such as the Castle Peak with Flue Gas Desulphurization [FGD] in place, Particulate Matter (PM) falls by 83%, NO_x falls by 33%, SO₂ falls by 86% and CO₂ falls by 31%. When natural gas is used in a far more efficient combined cycle plant such as the ones at Black Point, the percentage reductions are even more striking: PM falls by 89%, NO_x by 57%, SO₂ by 91%, and CO₂ by 56%. Since the power sector in Hong Kong is the largest emitter of particulate matter, sulphur dioxide, nitrogen dioxide and carbon dioxide, it is clear that any reduction in the availability of gas for power generation compared to what it might have been will have a major impact on Hong Kong's total pollutant emissions. In other words, electricity consumers will have to pay for the gas bill to help meet the emission goals set on the clean energy policy.



Table 3 Fossil Fuel Emission Levels (Pounds per Billion BTU of Energy Input)

Pollutant	Natural Gas	oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Carbon Monoxide	40	33	208
Nitrogen Oxides	92	448	457
Sulfur Dioxide	1	1,122	2,591
Particulates	7	84	2,744
Mercury	0.000	0.007	0.016

Source: EIA - Natural Gas Issues and Trends 1998

As stated in the MoU, the price of the gas will not be set by the government agencies who signed the MoU, but by the seller and buyer of the gas on the basis of commercial principles – a reflection on the trend of the international market. The actual price Hong Kong will pay for the gas supplies will likely be set, at least in part, through political considerations depending on whether the Hong Kong LNG buyers were renters of the Mainland terminal's facilities or more likely part owners. Either way, in the end the costs would need to be reflected in the price passed on to consumers of electricity in Hong Kong.

8. SUMMARY

In summary, pressure for upward electricity tariff adjustment in the coming years will not be reducing as reviewed from the tariff setting mechanism and the clean energy policy discussed in the article. The up-rising trend of the fuel cost and the adoption of cleaner fuel mix will boost increase of asset investment and by means of the return on the prevailing investment model which entails the return to be borne by its customers. Since Hong Kong is regarded as an economically developed society, we are expected to secure our own energy supplies at market prices which is clearly embedded in the energy policy in China in respect of the contractual supply of nuclear energy and gas to Hong Kong. Via the tariff setting mechanism, we would be expected to shoulder up a wider responsibility to conserve energy resources, promote energy efficiency, ensure fair competition and keep an eye on facilitating new technology that will help Hong Kong's transformation to a clean, circular and low-carbon future.

今期我們很榮幸邀請到香港理工大學電機工程系顏漢榮教授深入淺出介紹中電和港燈的利潤管制計劃，以此分析去年兩電釐定2012電費一波三折的始末，希望讀者共同關注這個與行業和民生關係密切的課題。

因篇幅所限，恕不刊登中文譯本。



已舉辦之活動 Past Events

爐峰・張保仔古道行 Hiking – From the Peak to Cheung Po Tsai Traditional Path

共有廿多位會員在2012年1月8日(星期日)參加本會【福利及康樂-行山組】安排之<爐峰・張保仔古道行>

Over 20 members participated at the “Hike on the Cheung Po Tsai Path” organized by the hiking team on January 8, 2012.



壬辰年春節團拜日期 2012 Chinese New Year Gathering

壬辰年春節團拜於2012年1月30日（年初八）在商會會址舉行。本年度之【春節聚餐】亦於當晚在東園酒家宴會廳舉行，共設席五圍。



註冊電業工程人員持續進修計劃課程 CPD Seminar for REW

本會與香港理工大學電機工程同學會合辦:註冊電業工程人員持續進修計劃講座已於2012年2月29日及4月13日舉行。反應十分熱烈。第三場已定於6月13日舉行。

The seminars jointly organized by the Electrical Engineering Alumni Association (EEAA) of Poly U and Hong Kong Electrical Contractors' Association (HKECA) were successfully held on 29 February and 13 April 2012. Due to overwhelming response, the additional course is scheduled to be held on 13 June 2012.



The 2012 Lunar New Year members gathering was held on 30 January 2012 (Monday) at the Association's premises. Spring dinner was held afterwards at Tung Yuen Golden Court Seafood Restaurant. Over 60 members joined this function.

已舉辦之活動 Past Events

增輝集團盃高爾夫球會盃賽事
Junefair group golf cup

本年度的第一場賽事增輝集團盃，已於三月三十日在觀瀾湖高爾夫球會維傑球場舉行，在此多謝增輝工程有限公司的慷慨贊助，隊員的支持和參與，令比賽能順利完成。當天比賽氣氛熱烈，大家都樂而忘返。

The first golf competition, Junefair Group Cup, for the "Year of Dragon" was held successfully on 30 March 2012. We would like to express our appreciation to Junefair Engineering Co. Ltd. for the kind sponsorship and the keen participation of team members and guests, all of you have made the tournament successfully held.

增輝集團盃

2012年3月30日

深圳觀瀾湖高爾夫球會 - 維傑球場

冠軍 區文煥先生
亞軍 楊榮基先生
季軍 許純光先生
最低杆 張偉儒先生
最佳前九 區文煥先生
最佳後九 郭錫君先生
最近洞獎:第3洞 何焯堅先生
最近洞獎:第8洞 陳強先生
最近洞獎:第12洞 羅柱香先生
最近洞獎:第16洞 陳理誠先生
最遠發球獎:第6洞 陳強先生
最遠發球獎:第14洞 馬振邦先生
嘉賓組冠軍 張潤雄先生

2012 Junefair Group Cup

30-Mar-2012

Mission Hills Golf Club, Shenzhen - Vijay Course.

CHAMPION Mr Au Man Woon
1ST RUNNER UP Mr. Ted Yeung
2nd RUNNER UP Mr. Gary Hui
BEST GROSS Mr Cheung Wai Yue
Best Front Nine Mr Au Man Woon
Best Back Nine Mr. Kwok Sheck Kwan
Close to Pin #3 Mr. Ho Cheuk Kin
Close to Pin #8 Mr. Chan Keung
Close to Pin #12 Mr. Law Chu Heung
Close to Pin #16 Mr. William Chan
Longest Drive #6 Mr. Chan Keung
Longest Drive #14 Mr. Ma, Chun Pong
Guest Winner Gary Cheung

即將舉辦之活動 Upcoming Events

2012年度亞洲太平洋電氣工事協會聯合會議-香港
2012 FAPECA Conference Hong Kong

2012年度亞洲太平洋電氣工事協會聯合會議 (FAPECA)由香港輪任主辦。並已落實於2012年6月4至5日假香港會議展覽中心舉行，與Build4Asia 2012 - 四合一可持續發展建築、設計、建設服務及電氣工程展覽會同場舉行。會議主題:探討電氣工程人力資源狀況。

會員可以從商會網站下載參加表格。

HKECA will host the The Federation of Asian Pacific Electrical Contractors Association (FAPECA) 2012 Conference. Theme of the conference is "Human Resources Issues in the Electrical Contracting Industry". For details please refer to our website www.hkeca.org

2012年永遠會長方宏浩盃羽毛球賽

2012 Badminton Competition – The Life President Martin Fong Cup

2012年永遠會長方宏浩盃羽毛球賽將於2012年7月10,17,24,26及31日於小西灣體育館舉行。

廣州國際照明展覽會

Guangzhou International Lighting Exhibition

廣州國際照明展覽會定於2012年6月9日至12日在廣州中國進出口商品交易會展館舉行。商會將組團參加，歡迎會員參加。

會員可以從商會網站 www.hkeca.org 下載參加表格或致電商會 25720843 查詢。

Guangzhou International Lighting Exhibition will be held on 09-Jun-12 to 12-Jun-12 at China Import and Export Fair Complex Guangzhou, China. HKECA will organise a tour to visit the show. For details please contact 25720843 or visit our website www.hkeca.org

會員動態 Members' News

香港電器工程商會 1/2012 - 3/2012年度新會員名單

入會日期 Join Date	申請會員名稱 Applicant Name	會籍 Membership Status	代表人 Representative
1/2012	瑞典洋行有限公司 Swedish Trading Company Limited	永遠會員 Life Member	劉枝多先生 Mr. LAU Chi Dor Caleb
1/2012	盈豐工程公司 Harvest Engineering Company	永遠會員 Life Member	梁偉強先生 Mr. LEUNG Wai Keung Albert
3/2012	創科綜合工程有限公司 Technica Integrated Engineering Company Limited	永遠會員 Life Member	黃浩堯先生 Mr. Ricky WONG

入會日期 Join Date	申請會員名稱 Applicant Name	會籍 Membership Status	代表人 Representative
3/2012	藝高國際有限公司 Acecode International Limited	普通會員 Ordinary Member	楊濤先生 Mr. YANG Tao Anton
3/2012	戴志高先生 Mr. TAI Chi Ko	永遠會員 Life Member	
3/2012	提領物流有限公司 Corry Links Logistics Limited	贊助會員 Associate Member	梁榮生先生 Mr. LEUNG Wing Sang Kenneth
3/2012	盈富電業有限公司 Fortune Electrical Company Limited	永遠會員 Life Member	何國勝先生 Mr. HO Kwok Shing

可持續發展建築、設計、建設服務及電氣工程四合一展覽會

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4 - 6 June 2012

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- 10,000 款創新科技及產品
Innovative Technology Products

行業龍頭參展商 Leading Exhibitors:



同場重點活動 Featured Event:

2012年度亞洲太平洋電氣工事協會聯合會議 FAPECA Conference
亞太區電氣工程業的年度會議再度回歸香港並首次於Build4Asia舉行，以「探討電氣工程人力資源狀況」為題，120位與會人士將討論當今業界的熱門話題，並透過同場的交流聚會擴闊網絡及知識。

The industry-renowned annual conference in Asia is returning to Hong Kong at Build4Asia to discuss one of the sector's hottest topics, "Human Resources Issues in the Electrical Contracting Industry". Together with various networking functions, it will be a prime opportunity for 120 regional delegates to build on industry knowledge while gaining valuable networks.

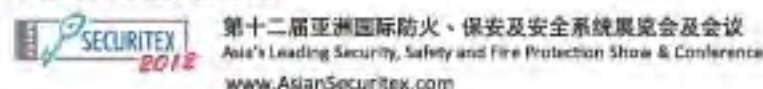
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