616B00061

616B00061

Response Form
Public Consultation on Future Fuel Mix for Electricity Generation for Hong Kong

Please send this response form to us on or before **18 June 2014** by one of these means:

mail: Environment Bureau, Electricity Reviews Division, 15/F, East Wing, Central Government Offices, 2 Tim Mei Avenue, Tamar, Hong Kong

e-mail: fuel_mix@enb.gov.hk

fax: 2147 5834

Part 1 (See Notes)

This is a ☐ corporate response (representing the views of a group or an organisation) or

☑ individual response (representing the views of an individual)

by 大利五金公司
(name of person or organisation)

at _____ (telephone) and _____ (e-mail)

Part 2

Fuel Mix Options

FUEL MIX		IMPORT		NATURAL GAS	COAL (& RE)
		NUCLEAR (DBNPS)	GRID PURCHASE		
Existing (2012)		23%	-	22%	55%**
OPTION 1*	**Importing more electricity through purchase from the Mainland power grid**	**20%**	**30%**	**40%**	**10%**
		Total : 50%			
OPTION 2*	**Using more natural gas for local generation**	**20%**	**-**	**60%**	**20%**

* The above fuel mix ratios aim at providing a basis for planning the necessary infrastructure for electricity supply. Flexibility should apply to actual deployment of each fuel type, having regard to the circumstances happening on the ground.

** Inclusive of a small percentage of oil

Part 3

Specific Questions for Consultation

Q1: How do you view each of the two fuel mix options with regard to safety, reliability, cost, environmental performance and other relevant considerations? (Please indicate your view on **EACH** of the two options.)

Option	Support	Not Support	Reason for NOT supporting (You can tick more than one box)
1	☐	☑	☑ **Safety** ☑ **Reliability** ☑ **Affordability** ☑ **Environmental performance** ☑ **Others (please specify):** _____
2	☑	☐	☐ **Safety** ☐ **Reliability** ☐ **Affordability** ☐ **Environmental performance** ☐ **Others (please specify):** _____

Q2: Which of the two fuel mix options do you prefer? Why? (Please tick **ONLY ONE** box)

Option 1 ☐

Option 2 ☑

Reasons: (You can tick more than one box below)

Safety ☑

Reliability ☑

Affordability ☑

Environmental Performance ☑

Others ☑ **Please specify:** _____

Part 4

Other Comments and Suggestions

Safety, reliability ,綠電認證，即用戶直接向可再生能源認購電力，再經電網輸送電力至用戶使用，當中用認證的方式去證明購買的電力為真正的可再生能源。

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Annex

Response Form
Public Consultation on Future Fuel Mix for Electricity Generation for Hong Kong

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☑ individual response (representing the views of an individual)

by 捷北工程公司
(name of person or organisation)

at _____ (telephone) and _____ (e-mail)

Part 2

Fuel Mix Options

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		NUCLEAR (DBNPS)	GRID PURCHASE		
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** Inclusive of a small percentage of oil

Part 3

Specific Questions for Consultation

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2	☑	☐	☐ **Safety** ☐ **Reliability** ☐ **Affordability** ☐ **Environmental performance** ☐ **Others (please specify):** _____

Q2: Which of the two fuel mix options do you prefer? Why? (Please tick **ONLY ONE** box)

Option 1 ☐
Option 2 ☑

Reasons: (You can tick more than one box below)

Safety ☑
Reliability ☑
Affordability ☑
Environmental Performance ☑
Others ☑ **Please specify:** _____

Part 4

Other Comments and Suggestions

Safety, reliability ,綠電認證，即用戶直接向可再生能源認購電力，再經電網輸送電力至用戶使用，當中用認證的方式去證明購買的電力為真正的可再生能源。

稻苗學會
Institution of Dining Art

616B00063

檔案: IDA/OL/2343

環境局局長黃錦星先生, JP

尊敬的黃局長：

就未來發電燃料組合公眾諮詢發表意見

就未來發電燃料組合的公眾諮詢，本會代表飲食業界及本會約 3,000 間會員食肆特此致函表達意見。

餐飲業是高用電量的行業，電費佔成本份額極高，電費的上調對整體經營成本有著極大的影響。過往幾年，電費的不斷上調已對業界構成打擊。在諮詢問件中提及的兩個方案，發電成本增幅相若約為一倍。就電費增幅的考慮上，對方案一或二，業界未能作出傾向取態。政府應就每個方案再給予具體的數據給業界及市民作比較，及分析各方案的利弊。

本會致力推動環保，認同政府此舉目的為香港減少污染。但為此發電成本需增加一倍，增幅驚人，而成本增加最終轉嫁用家，這將對市民及業界造成沉重負擔。本為認為政府應為推動環保就發電成本增加幅度先諮詢公眾及業界，提供多個不同發電成本/電費加幅的環保組合建議方案給市民及業界選擇，評估社會可接受電費加幅(合理價格)的程度，在環保及市民的承擔兩者取得平衡。

就方案一從內地電網進口 30%能源，只會將碳排放由香港轉移內地，香港政府亦難監管內地使用再生能源、天然氣或是煤產生供港的電力，而內地鄰近地區產電排放的污染物，有機會隨氣流漂回香港，無助改善整體區內空氣質素。

不論最終方案如何，穩定的供電及平穩的電價對營商至為重要，也是飲食業界認爲電力服務必須達到的基本要求。香港經濟發展及繁榮，成為國際級城市，有賴穩定可靠的供電，而可靠的電力供應對於本港飲食業維持日常運作十分重要。現時供電的穩定性相當高，使廚房得以處理和烹調食物、食客又能享受舒適的用膳環境，有助飲食業提升服務素質。而電費是飲食業界主要成本之一，未來發電燃料組合對電費造成的影響是業界的主要關注。政府在推出新方案時，也需考慮是否能有效監控未來電費的升幅至社會可接受的水平。同時政府不應在現階段倉猝決定十年後的燃料組合。燃料價格在未來仍有升跌，科技亦不斷演化，所以政府應保持靈活彈性，現在應先做好詳細研究，分析及預測未來用電增長，提出實踐新概念的具體步驟和時間表，讓市民評估香港的需要、能源價格、內地電網表現等，方於適當時間決定採納那個方案。

順頌　政安

主席

黃傑龍　謹上

二零一四年六月十五日

同心展關懷 2012-14
caringorganisation
Awarded by The Hong Kong Council of Social Service
香港社會服務聯會頒發
新界火炭坳背灣街 13 號 VTC 稻苗學院 3 樓 309 室
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Tel: (852) 39897030 Fax: (852) 39897130

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Annex

Response Form
Public Consultation on Future Fuel Mix for Electricity Generation for Hong Kong

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Part 1 (See Notes)

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- [x] corporate response (representing the views of a group or an organisation) or
- [ ] individual response (representing the views of an individual)

by Hong Kong Nuclear Society
(name of person or organisation)

at _____ _____ and _____
(telephone) (e-mail)

Part 2

Fuel Mix Options

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Specific Questions for Consultation

Q1: How do you view each of the two fuel mix options with regard to safety, reliability, cost, environmental performance and other relevant considerations? (Please indicate your view on **EACH** of the two options.)

Option	Support	Not Support	Reason for NOT supporting (You can tick more than one box)
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2	☐	☑	☐ **Safety** ☐ **Reliability** ☑ **Affordability** ☐ **Environmental performance** ☑ **Others (please specify):** The supply of natural gas is not reliable

Q2: Which of the two fuel mix options do you prefer? Why? (Please tick **ONLY ONE** box)

Option 1 ☐

Option 2 ☐

Reasons: (You can tick more than one box below)

Safety ☐

Reliability ☐

Affordability ☐

Environmental Performance ☐

Others ☐ **Please specify:** _____

Part 4

Other Comments and Suggestions

We propose the Option N to increase nuclear energy import from a specified generation source through dedicated transmission lines.

香港核學會
Hong Kong Nuclear Society

Response of Hong Kong Nuclear Society to Future Fuel Mix for Electricity Generation Consultation Document
June 2014

The Future Fuel Mix for Electricity Generation Consultation Document put forth two future fuel mix options to achieve the Government's carbon intensity and air pollution reduction targets as well as to meet projected demand growth. Option 1 is to import more electricity through purchase from the Mainland power grid while Option 2 uses more natural gas for local generation.

Hong Kong Nuclear Society (HKNS) supports the Government's commitment to achieving a 50 – 60% carbon intensity reduction by 2020. As electricity generation is a major source of carbon emissions in Hong Kong, considering a change in our fuel mix is both timely and necessary.

Nevertheless, we are of the view that both of the Government's options are far from desirable. Although in neither option did the Government explicitly propose expanding the proportion of nuclear energy, it is by logical deduction that the electricity purchased from China Southern Power Grid (CSG) under Option 1 will be at least partly generated by nuclear, as hydro and wind resources local to Guangdong are limited.

Thus, in reality, Option 1 will see an increase in nuclear power in Hong Kong's actual fuel mix for electricity generation. As described in the consultation document, nuclear energy is a "readily available and highly reliable energy source with low emissions and medium price". While HKNS supports using more nuclear energy, we view that purchasing electricity from the CSG power grid does not provide the desirable level of reliability, environmental performance and cost efficiency for Hong Kong. Hong Kong will also lack monitoring capability and control under this option.

As an alternative, HKNS proposes a new Option N under which the 30% electricity import will come from a designated nuclear power plant (estimated to require up to three 1,000 MW nuclear reactors units) and via dedicated transmission lines, mirroring the current arrangement made with Daya Bay Nuclear Power Station (Daya Bay). We believe Option N will offer comparable, if not greater, benefits with regard to energy policy objectives as detailed in the following analysis.

1. Reliability

HKNS is concerned about the impact on Hong Kong's supply reliability if we are to import electricity from CSG which has a lower reliability performance than Hong Kong. According to CSG's Corporate Social Responsibility Report 2013, the unplanned power outage experienced by its customers in Shenzhen, Guangzhou and other urban areas ranged from 0.83 to 2.31 hours per year. This is compared to less than 2.3 minutes experienced by their counterparts in Hong Kong (see Table 1).

	Unplanned customer power interruption	Source
CLP	2.3 min (2011-13)	2013 CLP Annual Report
HEC (PAH)	<1 min (2008-13)	2013 PAH Annual Report
Guangzhou	1.47 hours (2013)	2013 CSG CSR Report
Shenzhen	0.83 hours (2013)	2013 CSG CSR Report
CSG urban	2.31 hours (2013)	2013 CSG CSR Report

Table 1 – Electricity reliability in Hong Kong and CSG-supplied areas

With the gap between Hong Kong and CSG-supplied areas in terms of reliability, the consultation document does not say how the grid-to-grid interconnection under Option 1 will ensure the current reliability level in Hong Kong can be maintained in the event of blackouts or network problems at CSG. HKNS also considers the reliability level of Macau grid import not the most suitable reference for Hong Kong because of the differences between the two SARs in terms of market size and economic characteristics.

In comparison, under the Daya Bay transmission model, we have the ability to disconnect from the Guangdong power grid in an emergency grid outage situation whilst ensuring that the output from the station is safely transmitted to customers in Hong Kong.

2. Affordability

The consultation document estimated that both Options 1 and 2 will double the unit generation costs over the five years from 2008 to 2012 with a large degree of cost uncertainties. It should be noted that under Option 1, it will be difficult to predict the final price payable by Hong Kong customers, since the Mainland authorities will amend fuel costs, on-grid pricing, transmission charges and other costs from time to time.

The cost of importing nuclear power from Daya Bay to Hong Kong has been stable and affordable over the past years. But we noted the concern that as the Mainland nuclear industry moves towards third generation technology, the cost of nuclear power will increase significantly, so much so that it may become more expensive than natural gas and grid purchase.

To this end, HKNS has undertaken an analysis of the future price of nuclear electricity in China to provide a cost reference for Option N (See Appendix 1). Our analysis shows that 10 years from now the on-grid price of third generation nuclear electricity will stand below RMB 0.48 per kWh (or HKD 0.60 at the current exchange rate). Coupled with an estimated inter-provincial electricity transmission cost of HKD 0.25 per kWh, we project the price of delivering nuclear electricity to Hong Kong to be HKD 0.85 per kWh in 2024. This is compared to HKD 0.80 per kWh that CEM is

currently paying to import electricity from CSG. In other words, it will take 10 years for the price of Option N to catch up with today's level of grid purchase by CEM.

The on-grid price of nuclear electricity will increase at roughly 1.1% per annum during the first 40 years of operation of a new third generation nuclear power plant. Fuel cost - a major source of price volatility - generally accounts for only 13% of on-grid price in the case of nuclear power as compared to at least 50% of the price in thermal power generation. The price of nuclear electricity is therefore subject to less volatility and more predictable compared to other energy sources. As a result, purchasing additional nuclear power can be an effective measure in mitigating tariff pressure in the long term.

3. Environmental performance

The consultation document asserted that importing electricity from CSG as in Option 1 will result in low level of local emissions. However it is worth noting that the 2013 fuel mix of the Guangdong electricity grid was composed of 58% fossil fuels (mainly coal), 8% hydro, 10% nuclear, 1% wind and solar and 23% import from outside of Guangdong. If the 15 billion kWh of electricity purchased by Hong Kong each year will be generated by a similar fuel mix, we will actually create significant environmental footprint in Mainland southern provinces and affect regional air quality.

Nuclear energy produces minimal amount of lifecycle greenhouse gas and air pollutant emissions. Importing additional nuclear power from a specified power plant under Option N will give us certainty that the impact on the environment will be minimal whether from a local or regional point of view.

4. Safety

CSG is a power network operator rather than an electricity producer. Should Hong Kong just purchase electricity from the CSG grid, we will have no means of knowing which plant generates the share of electricity supplied to Hong Kong. Hence we will be unable to monitor the plant's operation and safety performance.

CLP's investment in Daya Bay and its involvement in the plant's operation has given us access to information and a monitoring channel. The establishment of an enhanced public notification mechanism on non-emergency Licensing Operational Events at Daya Bay in 2011 amply demonstrated such advantages. HKNS believes it is in the public's interest to have Hong Kong's involvement in the nuclear power plant that supplies to the territory.

Furthermore, the consultation document pointed out that after the Fukushima nuclear accident, "the State Council conducted comprehensive and extensive safety checks on all nuclear facilities and strengthened China's nuclear safety plan. In October 2012, the State Council announced plans to enhance nuclear safety and to further develop nuclear electricity. All new reactors shall meet the highest

international safety requirements." As the Chinese nuclear industry moves towards third generation reactor technology, continual improvements on safety standards can be expected.

Conclusion

Using nuclear power can bring significant advantages in terms of reliability, affordability and environmental performance. In fact, countries that have chosen to phase out nuclear power are faced with tremendous challenges in maintaining a cost-effective and low carbon electricity supply (see Appendix 2).

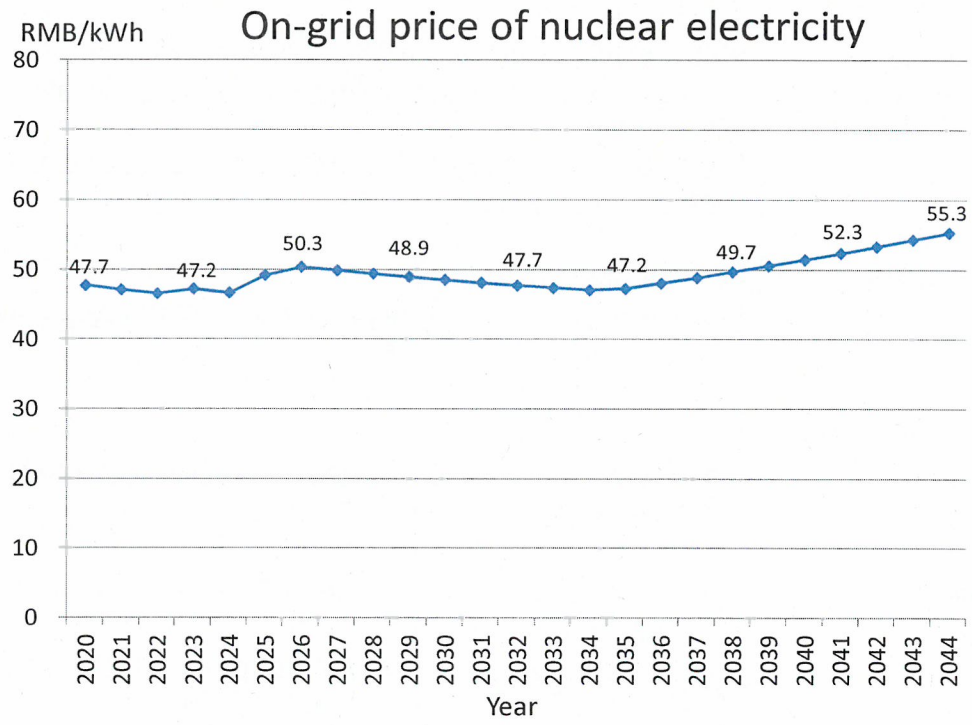
HKNS views that if we were to increase nuclear import to Hong Kong, it should be arranged in a way that gives us the highest reliability and safety assurance with Hong Kong's participation. We sincerely believe Option N should be amongst the choices for the public's consideration. We urge the Environment Bureau to deliberate on the merits of Option N to enable the formulation of a truly informed decision on the future fuel mix for electricity generation in Hong Kong.

Appendix 1

Projected on-grid price of nuclear electricity supplying Hong Kong

As required by the State Council after the Fukushima accident, all new nuclear projects in China will use the latest third generation reactor technology and currently six reactor units are under construction. This analysis made reference to the cost of the more popular design among these nuclear power units, namely AP1000 of Westinghouse being built in Shandong, and has factored in an additional cost margin for prudence.

The analysis made use of the prevalent cost of uranium and operation allowing for escalation effects. There are certain long term provisions for spent nuclear fuel and plant decommissioning which are referenced to current regulation or practice. The analysis is based on a net profit to give a return marginally higher than that for a typical nuclear project in China as well as standard rates for profit tax and value added tax.



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Key cost parameters

Item	Cost
Construction	2 X 1250 MW AP1000 nuclear power station, at RMB 40 billion plus 15% margin, to be built over 60 months http://www.csrc.gov.cn/pub/zjhpublic/G00306202/201405/P020140504595144218412.pdf
Operation	86% capacity factor http://www.csrc.gov.cn/pub/zjhpublic/G00306202/201405/P020140504595144218412.pdf
Nuclear Fuel	Natural uranium price at USD 50 per lb and a 3.0% annual escalation http://www.wise-uranium.org/nfcc.html
Spent fuel	RMB 0.26 per kWh, exempted for the first 5 years http://www.mof.gov.cn/zhengwuxinxi/caizhengwengao/2010nianwengao/wengao6/201009/t20100903_337280.html
Operations & maintenance	RMB 490 million per year and a 3.4% annual escalation http://www.iea.org/publications/freepublications/publication/name,43546,en.html http://www.pwc.com/gx/en/issues/economy/global-economy-watch/may-2014.jhtml
Depreciation	40 years of depreciation period http://www.csrc.gov.cn/pub/zjhpublic/G00306202/201405/P020140504595144218412.pdf
Decommissioning	10% of project cost http://www.csrc.gov.cn/pub/zjhpublic/G00306202/201405/P020140504595144218412.pdf
Financial	Interest rate at 6.55% based on PBOC long term loan rate and repayable in 14 years http://www.pbc.gov.cn/publish/zhengcehuobisi/629/2012/20120706182054758117206/20120706182054758117206_.html http://en.cgnpc.com.cn/n1511/n1512/index.html
Net profit	Net profit to yield an internal rate of return at 10%
Taxation	25% income tax at a lower rate for the first 6 years; 17% value added tax, not including lower rate for the initial years of operation and potential for partial rebate and hence lower cost for export to Hong Kong http://www.csrc.gov.cn/pub/zjhpublic/G00306202/201405/P020140504595144218412.pdf

Inter-provincial transmission charge	http://doc.mbalib.com/view/2b0050f3a4e6c5e5ff0b15028e4c41cf.html

Appendix 2 Challenges in lowering nuclear power supply in Germany and Japan

Germany

Following the Fukushima accident in 2011, Germany decided to restate its nuclear phrase out programme with the immediate shutdown of eight nuclear power units and the remaining nine to be shut by 2022, reducing nuclear electricity contribution to the overall power supply from 22% in 2010 to 15% in 2013.

At the same time, Germany is promoting the development of renewable energy, and the construction of electricity transmission lines to deliver wind power that is produced mainly in the north to the load centres mainly in the south. The *Energiewende* project is estimated by the government to cost EUR 1 trillion with 2/3 of the amount providing payment for renewables. Renewables grows from 16% in 2010 to 24% in 2013, but meanwhile, electricity generation in Germany increased reliance on coal, which contributes 45% in 2013 compared to 42% in 2010, and leads to a 2.4% increase in CO2 emissions in 2013 over 2011.

Renewable power generation in Germany is highly uneven. Capacity factor in 2010-2012 for wind power averages at 17.8% and for solar averages at 8.6%, and yet in the afternoon on 16 June 2013 they generated 61% of the power, causing a momentarily negative spot price in the regional electricity market.

The cost of the German programme is largely supported by the household consumers. The resulting discontent has led to a new law approved by the cabinet in April 2014 to keep down cost and slow down renewable growth. In 2012, a German household is charged EUR 0.268/kWh and an industrial user EUR 0.130/kWh, compared respectively with EUR 0.145/kWh and EUR 0.079/kWh in France which has 75% of its power from nuclear.

Japan

Japan had 54 nuclear power units before the Fukushima accident in 2011, contributing to some 30% of the electricity generation. With the damage of four power units in the accident, and the planned decommissioning of the two remaining units at the site, there are now 48 power units which have been completely shut down in May 2012 pending regulatory safety review after a regulatory reform before they may apply for restart. The review process is slow and is expected to take several years but nevertheless, Japan will continue with nuclear power which is regarded as an important energy source.

The loss of nuclear electricity supply since 2011 has been met by a national effort to reduce electricity consumption that lowered summer peak electricity demand by 18% in 2011, and to import more thermal coal and LNG for electricity generation. Japan reduced overall electricity generation by 5% from 2010 to 2012, but with a corresponding 7.1% increase in CO2 emissions.

With the need to import over 80% of its energy, the additional import of fossil fuel has a cost of ¥ 3.8-4.0 trillion per year (USD 40 billion). National trade deficit was ¥ 6.9 trillion (USD 70 billion) in 2012 and ¥ 11.5 trillion (USD 112 billion) in 2013, comparing to a smaller surplus before 2011.

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AUSTCHAM
HONG KONG & MACAU
A MEMBER OF AUSTCHAM GREATER CHINA

16 June, 2014

Mr KS Wong, JP, Secretary for Environment
Environment Bureau, Electricity Reviews Division
15/F, East Wing, Central Government Offices
2 Tim Mei Avenue, Tamar, Hong Kong

Dear Mr Wong

Response to Public Consultation on Future Fuel Mix for Electricity Generation

The Australian Chamber of Commerce Sustainable Development Committee welcomes the opportunity to respond to the Government's Fuel Mix consultation paper.

For the purposes of this consultation we assume that issues such as:

- Green Buildings and Demand Management
- Options for future regulatory regime for the Hong Kong electricity market
- Climate Change (Including Carbon Pricing)

will in due course be integrated with the Fuel Mix consultation to form an overall long-term and sustainable Energy Strategy for Hong Kong.

Since it is difficult to respond to the Fuel Mix debate in isolation, the members of the Australian Chamber of Commerce would like to respond by outlining its suggestions for Hong Kong's future electricity supply.

Any future arrangement should consider:

1. Climate Change. The latest IPPC report has reconfirmed the importance to address climate change as a priority issue. We have to be certain that whatever fuel mix is adopted, CO_2 emissions will drop significantly as time goes on. As we all share one planet, it doesn't matter which side of the border the emissions are discharged.

2. A long term "Sustainable Energy Strategy" for Hong Kong should be the first priority. Fuel Mix is only one component that needs to be integrated with many others.

3. In addition to Reliability, Affordability, Safety and Environment, we need:
   - "Flexibility" to modify the fuel mix for continuous reduction of CO_2 emissions through the adoption of new technologies and End-of-Line generation.
   - The community must be continued to be encouraged to play a key role in reducing the pollution and improving energy conservation in Hong Kong.

18 JUN 2014

AUSTCHAM
HONG KONG & MACAU
A MEMBER OF AUSTCHAM GREATER CHINA

In summary we support the concept of the longer term interconnection of the Hong Kong and Southern China power grids, and the future opportunities that this could bring for Hong Kong to tap into genuine low carbon energy, whilst not undermining the reliability of supply essential for our city. As the Mainland's fuel mix becomes less dependent on fossil fuels, this interconnectivity could serve as an important factor for reducing emissions, given the relatively limited potential for the local production of renewable energy.

At the same time, however, we consider that an appropriate volume of local generation capacity should be retained, both to support reliability and to ensure that Hong Kong is not in a weak negotiating position with respect to the price to be paid for imported power.

We understand Government's view of the potential it could create for a greater diversification in generation sources and the flexibility to scale up renewable energy use – for Hong Kong's future energy profile. However, we feel that the consultation document has not yet provided the necessary information to demonstrate that it will indeed achieve energy security, affordability and sound environmental performance for Hong Kong. To give confidence to the wider community, we suggest the government publish a more detailed feasibility study and provide further opportunities for the business community to review and comment before committing to the interconnector.

Yours faithfully

Chris Knop
Chair, Sustainable Development Committee
Australian Chamber of Commerce in Hong Kong and Macau

CC: Ms Christine Loh Kung Wai, JP
Under Secretary for the Environment

Ms Anissa Wong Sean Yee, JP
Permanent Secretary for the Environment

Mr Donald Ng Man Kit
Principal Assistant Secretary for the Environment (Electricity Reviews)

Mr Philip Har Mung Fei
Assistant Secretary for the Environment (Electricity Reviews)

香港工業總會
Federation of Hong Kong Industries

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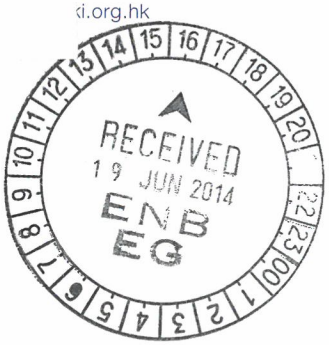

香港特別行政區環境局局長
黃錦星先生，JP

黃局長鈞鑒

未來發電燃料組合公眾諮詢

香港特區政府就香港未來發電燃料組合展開公眾諮詢，提出兩個發電燃料組合方案，即網電方案和本地發電方案，對此香港工業總會的意見如下：

1. 總則

1.1 香港作為國際大都會，也是國際金融、航運、商貿中心，維持安全、穩定和可靠的供電對香港的國際地位和未來發展至為重要。隨著自動化、電腦化和科技應用日漸普及，不單只工商業廣泛應用，與市民的日常生活也息息相關，一旦電力出現問題，影響可能非常嚴重。因此，政府有責任確保香港有穩定可靠的電力供應。工總認為，在研究採用任何發電燃料組合時，首要考慮必須為安全、穩定和可靠的電力供應，要保持目前極高可靠程度的供電，讓香港社會、整體經濟繼續享有優越的發展條件。

1.2 電費亦直接關係到民生及企業經營，政府有責任確保電力公司收費合理。由於電廠是香港空氣污染其中一個主要源頭，工總認同有需要逐步收緊電廠的排放上限，不過政府在減排和維持電費穩定之間，要有適當平衡，不能只顧減排不理整體社會所要負擔的成本，否則由之引起的電費加幅會超出普羅市民和中小企的負擔能力。

1.3 此外，近年節能科技有很大躍進，不少電氣產品都有能源標籤，節能減排的推廣宣傳也略見成效，市民大眾和企業的節能省電意識大幅提升，可能會令家居和工商業的用電量增幅

放緩。因此，工總建議政府應盡快檢討及修訂未來用電量的預測，從而調整未來所需的發電量和規劃未來的發電機組數量。

2. 兩個發電燃料組合方案以外的選擇

2.1 從可靠性、價格和環保表現，建議中的兩個發電燃料組合方案均未如理想。由於能源組合對香港未來長遠的電力基建投資規劃這個重要課題，以至電費有重大影響，工總認為政府只提供兩個方案作出諮詢未免過於狹窄，政府應該提出其他方案供香港市民大眾考慮。

2.2 我們認為隨著科技和管理制度的演進，核能發電安全程度愈加提升，核能發電不失為一個價格較穩定，而又有效的減排方法。相對於天然氣，核能發電接近完全不會產生溫室氣體，而且營運的成本相對固定，有助維持電費穩定。

2.3 香港提出的減碳目標為於 2020 年將碳強度自 2005 年水平下降 50%-60%。在 2010 年特區政府展開「香港應對氣候變化及策略行動綱領公眾諮詢」，諮詢文件提出，為控制溫室排放必須更改發電燃料組合，當中措施包括增加輸入核電，令核能在發電組合中佔約 50%。然而，今次的未來發電燃料組合公眾諮詢卻沒有任何提高核能份額的建議選擇。

2.4 事實上，增加核能發電已是國家能源政策的既定方針，今年年初國家能源局宣布，將適時啟動核電重點項目審批，穩步推進沿海地區核電建設。據報，中國廣東核電集團 2014 年將新投產五臺機組。無論香港使用與否，相信廣東省本身亦會因應用電需要，興建更多核電廠。

2.5 工總認為特區政府宜盡早與國家有關部門商討，爭取大亞灣提高向香港供電的比例，亦爭取香港參與投資在廣東省內正在籌建的核電廠，該核電廠將來投產後，部分產能可以長期合約方式，供電給香港。這個合作方式的好處是，香港可以投資者的身份參與核電廠的管理，增加安全管理的透明度，香港市民的安全會有更大保障。

2.6 工總也理解市民對核能發電有所顧慮，因此，政府應就市民對核電安全的擔憂作出回應，加強對核電設施的安全監察、制訂好周全的應變措施，以及爭取對核能發電設施有較大的監管角色；更重要的是把過程盡量透明，讓市民對核電的安全系數有信心。

2.7 此外，無論輸入更多核電，或從南方電網買電，均涉及跨境輸電設施的建設，所費不菲，若由商業機構承擔有關的建設費用，必會令到電價大幅上升。因此，工總建議由特區政府出資，承建有關跨境輸電基礎設施，設施建成後交兩間電力公司營運管理，這樣將可確保未來的電價維持在市民能夠負擔的水平。

3. 建議中兩個發電燃料組合方案各有弊端

3.1 政府建議的方案一為通過從內地電網購電，以輸入更多電力。就這方案，我們有以下的憂慮：

(i) 工總不少會員企業在珠三角設廠，多年來飽受停電、限電之苦。就南方電網過往的表現，其供電可靠性未能達至本港的極高穩定可靠水平；也有港商擔憂，香港向南網購電，電價定必較內地為高，因此南網可能會首先撥備電力輸港，港商的內地工廠可能要面對更嚴峻的缺電之苦。

(ii) 澳門與南方電網合作已超過 10 年，現有超過九成的電力是向該電網購入。不過，澳門不少大型企業均自設後備電源，這可能顯示該地企業對供電的穩定性存疑，預先作好準備。在諮詢文件中，特區政府以澳門作為例子，指當地通過技術方案，以及商業協議和政府間的承諾以確保供電穩定，卻未提供實質數據。因此，希望特區政府能提供相關數據，說明未來南網和香港兩電現時供電的穩定性的比較。

(iii) 雖然在詳細研究和搜集更多數據之前不宜完全否定購買網電，但若果香港過份依賴境外網電，將失去議價能力，長遠而言必然受制於賣方，穩定電價難以得保證。

(iv) 南網現在的發電燃料組合包括火電、水電、核能及風能，從南網買電根本無法確保發電的來源或燃料組合，與現時大亞灣透過「專線輸電」的方式不同，如香港從內地買電，或許只是將碳排放轉至內地，無助紓緩全球暖化，並加重內地污染。南方電網亦有可能以核電提供電力給香港，但香港無權參與或監察有關核能發電設施的管理，與現時適用於大亞灣的安排有所不同。

3.2 政府建議的方案二為利用更多天然氣作本地發電。現時全球天然氣價格由市場主導，價格波幅很大，加上近年不少國家均加大以天然氣發電，推高了全球天然氣價格。由於天然氣價格較高，相信未來一段長時間亦會維持高價位，利用更多天然氣作本地發電必然會導致本地電費持續上漲。諮詢文件估計，燃料成本及發電機組的設置，將令燃氣發電成本較2008至2012年間增加一倍，這將對企業經營和民生做成重大負面影響。

3.3 由於燃煤價格相對於天然氣較為穩定，而且科技進步，使用環保煤在排放方面可能亦較以往有所改善，工總建議政府調整未來發電燃料組合時也應考慮此因素。

<u>總結</u>

工總認為就香港未來發電燃料組合不應只有兩個方案可供考慮，尤其是兩個建議方案的單位成本相差不大。工總建議，政府廣泛徵詢能源專家的意見，審視會否有其他適合香港自然環境和基建條件而單位成本又較低的發電燃料組合，提出更多建議方案讓社會考慮；同時也應提供較足夠數據，讓社會大眾和各階層的持份者充分瞭解不同方案的利弊，才能判斷哪一個方案會切合香港的需要。

香港工業總會主席
劉展灝 謹啟

2014年 6 月 16 日

616B00068

Richard R. Vuylsteke (Ph.D.)
President

The American Chamber of Commerce in Hong Kong
1904 Bank of America Tower
12 Harcourt Road, Hong Kong

June 18, 2014

Wong Kam Sing, JP
Secretary for the Environment
Environment Bureau
15/F & 16/F, East Wing, Central Government Offices
2 Tim Mei Avenue, Tamar, Hong Kong

Dear Secretary Wong,

Future Fuel Mix for Electricity Generation

The American Chamber of Commerce in Hong Konghas been closely following the extensive discussions on the future fuel mix for electricity generation after the release of the Public Consultation document by the Environment Bureau on March 19, 2014. We would like to take this opportunity to make a detailed submission on this issue, given the importance of a safe, reliable, affordable and environmentally responsible supply of electricity to Hong Kong's economy. Our views have been considered carefully, following a program of three events in which our Chamber has been able to listen to the views of the Under Secretary for the Environment, Academics, Industry Experts and Hong Kong's two Power Companies.

In determining our response, we have adhered to three key principles:

- The world-class reliability of Hong Kong's electricity supply is critical for both the wellbeing and safety of our community as well as to business success. It should under no circumstances be compromised and, at this stage, we do not believe that the 'untested' Option 1 proposed by Government can give this certainty;

- The Chamber does not believe that simply transferring responsibility for our emissions to the Mainland, envisaged by Government under Option 1 where imported grid power is said to have zero-carbon/zero emissions so as to claim improved environmental performance for Hong Kong, is acceptable to business;

- The consultation document provides insufficient details on which to enable the Hong Kong community to make an *informed* decision besides the general pros and cons of each option, on an issue which will set the direction for electricity generation & supply for the next 20-30 years.

On this basis, we are unable to give our support to immediate and full implementation to either of the two, somewhat limited, choices which Government has set out in the consultation document. Specifically, we are unclear about more precise implications on the two options in respect of cost, reliability and environmental performance. Further information on our rationale is set out in the annex to this letter. However, the Chamber supports the Government's endorsement of a 2020 target to reduce the carbon intensity of Hong Kong's economy and to improve air quality, jointly with Guangdong. For this reason, the Chamber is supportive of making an early start on practical steps for

progress in Hong Kong with the addition of a *limited* quantity of local gas generation, so that this is available before 2020, well ahead of the commissioning of any new interconnector with the Mainland.

In closing, the Chamber welcomes the opportunity to continue further dialogue on these issues with Government in order to help with the formulation of sustainable and practical policies that will be mutually beneficial for both business and the wider community. We believe that the business community can offer useful assistance, insight, and expertise on the fuel mix issue and we look forward to the opportunity of working with the Government in the years ahead.

Yours sincerely,

For and on behalf of
The American Chamber of Commerce in Hong Kong

Enclosure: Submission on Future Fuel Mix for Electricity Generation - Annex

THE AMERICAN CHAMBER OF COMMERCE IN HONG KONG

Submission on Future Fuel Mix for Electricity Generation – Annex

June 18, 2014

The American Chamber of Commerce in Hong Kong has been closely following the extensive discussions on the future fuel mix for electricity generation after the release of the Public Consultation document by the Environment Bureau on March 19, 2014.

The consultation presents a simple choice from two options for the community to consider on a planning horizon up to 2023:

- Option 1 - to rely on the Mainland for meeting around 30% of Hong Kong's electricity needs, through the purchase of Grid Power from China Southern Grid. Local generation would account for around 50% of demand, (40% gas and 10% for coal and Renewable Energy (RE), with the remaining 20% being met from the existing nuclear power contract with Daya Bay;

- Option 2 - to maintain the current level of local generation in Hong Kong, but to move towards a fuel mix of 60% gas and 20% for coal and RE, with the remaining 20% being met from the existing nuclear power contract with Daya Bay.

The Chamber strongly supports the determination of the Hong Kong Government to tackle climate change with the renewal of the commitment originally made in 2010 to reduce the carbon intensity by 50-60% per unit of GDP by 2020, compared to 2005, together with a drive to reduce the emission of air pollutants in the Pearl River Delta by working with the Guangdong authorities, with targets to cover both 2015 and 2020.

Climate change is a global issue and we must continue to examine alternatives to reduce carbon emissions, both locally and in support of the national commitment to a reduction in carbon intensity made in November 2009. Although electricity generation in Hong Kong now only accounts for around 20% of the six key air pollutants monitored locally by the Environment Protection Department (Navigation and Road Transport each emitting more), the Chamber believes more can and should be done to lower these over time through the gradual replacement of coal by cleaner gas in local generation. This will also help reduce carbon emissions, as gas emits around half the carbon content of coal when used in generating electricity.

The Chamber notes that this public consultation primarily looks at options to change the fuel mix for electricity generation (so-called supply-side measures) and that policy initiatives for energy efficiency and conservation (demand-side measures), which are equally important, are to be discussed in a separate public policy discussion exercise, expected later this year.

When looking at the choice between the two options offered, the Chamber would like to make the following observations:

Reliability of Supply

- Hong Kong is a densely populated urban environment, and the security and reliability of supply is paramount to both the wellbeing and safety of our community as well as to business success. *Supply reliability should not be compromised.* As the consultation document acknowledges, Option 1 is 'untested' in this respect, whereas Option 2 has delivered world-class electricity supply reliability for many years. The Chamber does not accept that reliability in Macau is a reasonable comparison for Hong Kong as the consequences of failure would be much more severe for public safety and business in Hong Kong. We therefore have reservations on the reliability of supplies if Option 1 were to be adopted within the planning horizon advocated.

- However, in the longer-term, as the reliability of the Mainland's grid further improves and infrastructure integration with the Pearl River Delta increases, the future construction of a new interconnector, say, near the end of the next decade at a reasonable cost and with appropriate back up from modern gas units located in Hong Kong could provide additional low-carbon options for Hong Kong. More information is urgently required by the community to allow closer evaluation of this potential approach.

Environmental Performance

- For Option 1, although we understand Government intends to count all grid imports as carrying zero emissions to help Hong Kong achieve the local climate change target, we all share the same planet and the Chamber does not accept that we should simply transfer our air and CO2 emissions to China, which has pressing environmental challenges of its own to meet. We therefore believe that proper consideration should be given to the actual generation sources used in the production of any electricity that would be purchased for use in Hong Kong.

- The Chamber understands that the electrical connection would likely be made in Guangdong, where around three-quarters of local generation is from fossil fuels (mostly coal). Even if the whole of China Southern Grid is considered, where around 60% of electricity is from fossil fuels, the marginal fuel for the extra power to be produced for Hong Kong will be coal. This is because most RE will be sent to the grid as soon as it is available, since it cannot easily be stored and may be seasonal in nature, and nuclear operates continuously as base-load power generation.

- For this reason, the Chamber would strongly suggest that any significant new interconnection should be used to bring in designated sources of low-carbon energy from the Mainland, from projects which would meet the concept of 'additionality.' In other words, they would be developed especially for Hong Kong, creating opportunities for local businesses to help in creating new low carbon energy sources on the Mainland for export to Hong Kong.

- It is noted that Government did not include the option to increase the import of additional nuclear power to Hong Kong, although the Daya Bay supply arrangement has worked well for Hong Kong over many years.

- For Option 2, the Chamber welcomes the move from coal to more gas generation, since this will both reduce air and CO2 emissions. To reach the 60% level expected under this option, additional combined cycle gas turbine units are likely to be needed in Hong Kong. Such new units can give good fuel and emission reductions as they are more efficient than the existing gas units currently in service, thus resulting in lower gas costs.

- In the consultation document, the Government highlights that a new interconnector may not be in service until at least 2023. As the local air emissions caps already stipulate the maximum use of local gas capacity from 2015 onwards, to continue improving Hong Kong's environment significantly between now and the completion of the interconnector, the first few gas units would need to be commissioned well before 2023.

- The Chamber notes that Government does not believe that there are significant local opportunities for the economic development of significant volumes of RE in Hong Kong, given existing available technologies. However, the Chamber suggests that the Government should continue to examine closely all practicable and cost-effective options, including the development of waste to energy projects designed to reduce landfill waste, which this Chamber supports.

Costs

- There are some difficult choices to be made. Transparent and clear information is essential to secure the acceptance of increased fuel and infrastructure costs by both the public and business communities. The consultation document has limited information on the costs of the two options, other than to say that they are broadly the same. Cleaner fuels are generally more expensive and if the community's demand for cleaner, more climate friendly electricity generation is to be met, these costs must be understood and accepted.

- For Option 1, it seems that Hong Kong is expected to buy from a single seller and that the costs of imported grid power are likely to be beyond the control of Hong Kong customers as most of the relevant inputs such as fuel costs, on-grid prices, transmission charges, and other imposts such as VAT are set by Mainland authorities. This may not be in Hong Kong's longer-term interest as it affects the city's international competitiveness. For Option 2, we need to ensure that Hong Kong has free access to supplies of natural gas from world markets to avoid over-dependence on a limited number of pipeline suppliers from the Mainland. For that reason, Hong Kong should reconsider an LNG terminal, perhaps using the new FSRG (Floating Storage and Regasification Unit) technology already in use by many leading energy companies.

In Summary

In considering the two options put forward by Government, the Chamber does not find it easy to support immediate and full implementation for either option proposed by Government. Our own preference is not to rule out either at this stage, instead seeking to preserve optionality and flexibility for Hong Kong in the choice of fuels and how these are purchased over the longer term, potentially by ensuring that infrastructure elements of both options can be delivered at the right time. Such flexibility and optionality in fuel or power purchase arrangements will provide the people of Hong Kong with long term value, as these costs represent a significant proportion of electricity tariffs and offer some protection against future market volatility.

For the short term, there is a need to continue to replace coal in local generation with new gas units before 2020, since this will help to further reduce local air pollution and make progress in the carbon reductions targeted by Government for that date.

For the longer term, we should closely examine the possibilities for stronger interconnection, perhaps by the end of the next decade, if there are additional supplies of genuinely low-carbon electricity which could be imported into Hong Kong. This would need to take place as the Mainland's own generation fuel mix moves away substantially from today's dependence on coal and, in this way, we will not only support lowering our own carbon footprint with genuinely low carbon energy but do so in a way which helps our own neighbour to also lower their own footprint.

As ever, the Chamber welcomes the opportunity to continue further dialogue on these issues with Government in order to help with the formulation of sustainable and practical policies that will be mutually beneficial for both business and the wider community. We believe that the business community can offer useful assistance, insight and expertise on the fuel mix issue and we look forward to the opportunity of working with the Government in the years ahead.

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Annex

Response Form
Public Consultation on Future Fuel Mix for Electricity Generation for Hong Kong

Please send this response form to us on or before **18 June 2014** by one of these means:

mail: Environment Bureau, Electricity Reviews Division, 15/F, East Wing, Central Government Offices, 2 Tim Mei Avenue, Tamar, Hong Kong

e-mail: fuel_mix@enb.gov.hk

fax: 2147 5834

Part 1 (See Notes)

This is a ☑ corporate response (representing the views of a group or an organisation) or ☐ individual response (representing the views of an individual)

by Voith Turbo Limited
(name of person or organisation)

at _____ (telephone) and _____ (e-mail)

Part 2

Fuel Mix Options

FUEL MIX		IMPORT		NATURAL GAS	COAL (& RE)
		NUCLEAR (DBNPS)	GRID PURCHASE		
	Existing (2012)	23%	-	22%	55%**
OPTION 1*	Importing more electricity through purchase from the Mainland power grid	20%	30%	40%	10%
		Total : 50%			
OPTION 2*	Using more natural gas for local generation	20%	-	60%	20%

* The above fuel mix ratios aim at providing a basis for planning the necessary infrastructure for electricity supply. Flexibility should apply to actual deployment of each fuel type, having regard to the circumstances happening on the ground.

** Inclusive of a small percentage of oil

Part 3

Specific Questions for Consultation

Q1: How do you view each of the two fuel mix options with regard to safety, reliability, cost, environmental performance and other relevant considerations? (Please indicate your view on **EACH** of the two options.)

Option	Support	Not Support	Reason for NOT supporting (You can tick more than one box)
1	☐	☑	☑ **Safety** ☑ **Reliability** ☐ **Affordability** ☑ **Environmental performance** ☐ **Others (please specify):** _____
2	☑	☐	☐ **Safety** ☐ **Reliability** ☐ **Affordability** ☐ **Environmental performance** ☐ **Others (please specify):** _____

Q2: Which of the two fuel mix options do you prefer? Why? (Please tick **ONLY ONE** box)

Option 1 ☐
Option 2 ☑

Reasons: (You can tick more than one box below)

Safety ☑
Reliability ☑
Affordability ☐
Environmental Performance ☑
Others ☐ **Please specify:** _____

Part 4

Other Comments and Suggestions

Additional Cost for the infrastructure for the wiring from China to Hong Kong.
Maintenance the local engineering job market for the future university graduate.
A unstable electricity supply can cause heavy damage to the financial market trading system and affect Hong Kong's position as Asia financial center.

616B00070

註冊小型工程承建商簽署人協會有限公司
Registered Minor Works Contractor Signatory Association Ltd.

致 環境局

劉明光副秘書長

香港未來能源組合建議書

本人出席2014年6月9日灣仔會展由經濟民生聯盟舉辦未來能源組合座談會。

在整個座談會中出席人士主要提問核心，最大疑慮是南網供電穩定性，但局方未能就龐大計劃提供詳盡數據，而跟據電力公司估計未來如符合香港用電需求，要增加5至6台發電機組。未來機組會採用潔淨能源為主，而在世界市場採購選擇不多，2電過往經驗購買天然氣，只可以收單向報價，沒有議價能力，恰恰與香港市民面對着2間電力公司同一處境。本會對環境局提出南網供電組合是支持，建基於3點理據，(1)增加機組需要土地及用家須支付機組費用 (2)減排目標下須採用天然氣為主價格較高及浮動 (3)建議增加多1個供電途徑，平衡市場有利用家及市民。

本會在總結整體意見參考下，支持環境局提出南網供電建議，希望時間如許可下將咨詢期延長，能讓多一些資料給市民了解局方對未來能源組合建議，謝謝。

委員會主席
2014年6月11日