

By post and by fax at 2537 7278

25 June 2015

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Secretary for the Environment
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Dear Mr WONG

Public Consultation on the Future Development of the Electricity Market

I sincerely thank for the attendance of your goodself at the HKIE Forum on the captioned subject held on 19 May 2015 sharing and exchanging views with our members.

I am pleased to provide herewith the views and suggestions of the Institution on the captioned subject for your consideration.

Thank you.

Yours sincerely



Ir Victor CHEUNG Chi Kong
President
The Hong Kong Institution of Engineers

Enc

cc: Electricity Reviews Division, Environment Bureau (by fax at 2147 5834)

VCCK/WC/ML

Enclosure

Views from the Hong Kong Institution of Engineers on the Public Consultation on the Future Development of the Electricity Market

Overview

The Hong Kong Institution of Engineers (HKIE) concerns on ensuring and enhancing the living of the people in Hong Kong and the steady development of our economy. We aspire that the Government and the public, through more opinions exchange over the current Consultation, would be able to come up with a strategic energy policy translating into concrete action plans in the mid- and long-term for the electricity market, in particular to the elements of electricity generation and consumption. We would like to elaborate our concerns and views in the ensuing paragraphs for consideration.

Electricity Supply

2. Electricity supply, like water supply, is an essential communal service. The stability of its supply is crucial to ensure the community continuing to develop and prosper in a steady and safe manner. The Administration has since dedicated this obligation of supplying electricity to private entities.
3. A regulation framework was set up by the Administration to achieve the objectives of safety and reliability of supply as well as aiming to contain the tariff rate within the sphere of affordability. Over the years measures for environmental protection were further introduced. The Scheme of Control Arrangement (SCA) was drafted and agreed with respective power companies.
4. The HKIE notes that under the realm of previous SCA the objectives of achieving Safety, Reliability, Affordability and Environmental Protection have been well met and that Hong Kong has enjoyed high quality electricity supply.
5. Even if further enhancement opportunities abound, the current regulatory framework over the supply of electricity by the power companies is considered effective and its merits should never be neglected. Because Hong Kong is a highly vertical metropolitan with some 62,000 lifts and 8,700 escalators as well as numerous other electrical-powered equipment for both normal and emergency operations in our business, information technology, safety and health sectors etc., reliability in electricity supply is a definite requisite for Hong Kong to survive and thrive.
6. The HKIE expects that the future development of electricity market must put the security and high reliability of safe supply in high order.

Electricity Market

7. A market is generally where relatively free trading is conducted. A controlled market is subject to further regulations. While parameters on safety and reliability could be clearly defined in engineering terms, affordability can be controversial and can invite much concern from the community. Where environmental protection at the sources could be delineated in the terms and conditions within an agreement, commitment to combat Climate Change must be a policy decision. With these burdens and the need of ensuring the well-being of the community, the HKIE tends to believe the word “market” for supplying electricity to the public transgresses its intended context.

8. The HKIE views that the electricity supply in Hong Kong is not simply a “sales and purchases” type of arrangement. In the context of the word “market”, as we consider that it is more than purely commercial in setting out the way forward of our future sector of electricity supply, it would set sail to a different horizon in formulating a clearer and more defined goal of this essence. Hence, the HKIE submits the following views along this proposition.

Market Competition

9. The HKIE agrees to the observations in the Consultation Document that overseas experiences are not conclusive that open competition would bring immediate benefits, particularly where privatisation was the underlying goal the transient advantages were more like a drive of capitalising public assets.

10. For Hong Kong, should we take the path of “liberalising” the market, the vertical structure of operators must first be crucially dealt with.

11. The Consultation pried with the notion of introducing power supply from the Mainland as a form of competition whilst acknowledging the difficulties, not the least the proprietary rights of the grid.

12. The HKIE must pause here to revisit the definition of “Fuel Mix”. It appears that the Consultation includes importation of electricity supplies from the Mainland as a form of “Fuel Mix”, currently under the category of nuclear power.

13. The HKIE submits that decisions of importation of electricity supply from the Mainland and the fuel composition of power generation are both policy matters. But they are different and separate matters, each requires different set of prerequisite conditions for consideration, control and operation.

14. Simply putting through the vertical operation from generation to retail distribution, the current two power companies have to achieve the laid down objectives of Safety, Reliability, Affordability and Environmental Protection, wrapped in one bundle. The Consultation did not elaborate whether any introduced competition must abide to the same conditions and if affirmative, the method of enforcement.

15. The HKIE has expressed that Hong Kong should not pursue import of energy during the previous consultation on the subject albeit it is noted that power supply from nuclear plant and pump storage was *de facto* imported energy.

16. The HKIE further agrees that segregation of the grid (i.e. between generation and transmission/ distribution) is only one of the options to set scene for competition.

Geographic Consideration

17. The supply sectors in Hong Kong are divided into two geographic areas. Each has different load types and demand patterns. The future market potentials are also different. One has been importing power from the Mainland whilst one operates on an isolated island. But they are operating under similar, if not the same, SCAs.

18. According to the Consultation Document, enhancing interconnection between the two power companies at this stage will increase tariff without bringing concrete benefits to the consumers according to the Administration's assessment. It appears that the Administration has no intention to put up a policy of interconnecting the grid. The HKIE opines that the Administration should continue to carry out feasibility study on the subject and make decision only when the full costs, benefits and risks have been fully assessed.

Scheme of Control Agreement (SCA)

19. Through a commercial contract the power companies are currently discharging some of the duties that the Government should be responsible, for example, in tendering the underprivileged and promoting energy efficiency.

20. The HKIE believes that the spirit of the SCA made with the power companies should be maintained. It may be worthy to consider delineating the terms related to the obligations of the Government, concessions to underprivileged and incentive for investments, from those related to performance and control of normal operation. This would clearly indicate that the agreed rate of return (ROR) is covering two functions.

21. The HKIE understands that power generation and transmission involve significant commitment and risk taking on the part of the power companies. Power companies would need certainty for proper planning and construction of electricity generation and transmission infrastructures. The Consultation also recognised that investment in generation equipment has a lengthy amortisation period.

22. The HKIE notes and agrees with the Administration's decision to extend supply from Daya Bay Nuclear Power Station (DBNPS) for a further term of 20 years in 2014. It follows that for security, contractual agreement in electricity supply must be of longer term.

23. The HKIE hence opines that, for stability of the market and healthy development of electricity supply without affecting the interests of the consumers and the community at large, a term of 10 years duration of the SCA is considered acceptable as a starting mark.

24. The SCA may also make provisions to allow investment by the power companies for initiatives to enhance reliability and environmental performance of electricity supply, such as new pumped storage power stations in peak looping and valley filling to flatten the daily load curve for the electricity demand.

Tariff

25. The HKIE appreciates that the public would expect higher transparency in monitoring the sector and its players. It is hence appropriate to introduce measures that would establish a good mechanism for future tariff reviews. Also, similar mechanism may also be set for monitoring the power companies' arrangements on fuel procurement at competitive fuel price provided that the enhancement of transparency will not compromise the protection of commercially-sensitive information, thereby undermining consumer interest.

26. The HKIE suggests the Government to lay down more benchmarking measures and objectives referencing data for the public to determine other financial matters relating to ROR and cost etc. involved in the negotiation of the SCA. However, to ensure a like-to-like comparison, due care should be taken in making reference to the data of other jurisdictions or industries as there are bound to be differences due to the differences in regulatory regimes. The public should also be cautioned about such disparities when making reference to these benchmarks.

Competition

27. The Consultation concluded that finding sites for new power plants within the territory was not viable. The HKIE only agrees that it would be difficult but would leave this topic at this juncture, and turn to the subject of introducing competition from the Mainland.

28. The Consultation seemed to conclude that power plants from the Mainland are the only viable choices for introducing competition from the neighborhood. The HKIE agrees so. The Consultation also clearly summarised many down sides for such introduction. The HKIE also agrees on these.

29. The HKIE wishes to add that competition should not be gauged only and purely with tariff reduction. There are four Energy Policy objectives that we have to meet. Moreover, there are corporation commitments to the community, and pledges of environmental protection.

30. Outright purchase of energy from the Mainland would just shift our Climate Change Strategy and Action Agenda abroad. It would also shift part of the Government's obligation currently covered by the SCA.

31. From the aspects of security of supply, engineering training, and employment opportunities, the HKIE urges that the majority of electricity generation should stay within the territory.

32. At present the ROR set with the power companies is based on the investment of assets. The investment should be in Hong Kong to earn the revenues.

33. Liberalisation of market seems an on-going process and no country or market has yet achieved optimal results. Sustainability and security of supply may not always fit neatly with a liberalised market. It requires further regulatory scrutiny. Contingency/ fall back measures should be prepared if such competition fails to achieve the objectives as planned.

34. The overseas experience shows that introducing new market competitor would not guarantee lowering the tariff. There may also be further concerns on ensuring the supply reliability and safety with the new entrant to the market.

Fuel Mix

35. The HKIE agrees to the increase in using natural gas for local power generation and further proposes that we should always leverage on engineering technologies to pursue other sources of clean and efficient electricity generation, with the driving aim of better environmental protection and energy efficiency.

Natural Gas

36. To meet the 50% target of natural gas in the fuel mix by 2020, it may require new gas-fired generation units, and the power companies may also need to build the required number of Combined-cycle Gas Turbines (CCGT). With continual improvement in technologies in last decade, new CCGT completed with Selective Catalytic Reduction can achieve an energy efficiency of natural gas to about 60%, generally better than the existing one, and extremely high environmental performance of Nitrogen Dioxide (NO_x) concentration level of 5 mg/Nm³ in flue gas. This further helps to improve air quality by reducing emissions.

37. With respect to the use of natural gas for electricity generation, the HKIE is concerned that striving for stable gas supply at reasonable price is essential in order not to drastically affect the affordability of the consumers.

38. Unless it is a policy decision, the HKIE regrets that the earlier proposal to set up a Liquefied Natural Gas (LNG) terminal did not meet the Administration's approval. The project could have provided options for Hong Kong in sourcing natural gas from various sources and opportunities for a workforce to be trained with unique plant and equipment. The HKIE suggests the Government to revisit seriously into construction of LNG terminal to help manage the stable supply of natural gas which is essential and more critical for Hong Kong future electricity generation.

Renewable Energy (RE), Distributed Power Generations and Other Options

39. Report from Hong Kong Baptist University¹ shows that if Hong Kong aimed at adding 5% of RE to its energy mix, the tariff implication could be minimal – an annual increase of 1% in electricity bills per household working out to about HK\$50 on average annually. Electricity generated by RE would also be welcomed by commercial sector since many companies with their high performance in corporate

¹ Sparks fly: Hong Kong's power dilemmas examined, HKBU Horizons, 2012-13 Issue 3
http://cpro.hkbu.edu.hk/online_pub/nh_1213_3/p12-17.pdf

social responsibilities are particularly interested in purchasing green electricity to neutralise their carbon emissions due to operations.

40. In many places overseas, RE generation is encouraged and often subsidised by the government. The HKIE opines that the present arrangements in Hong Kong of an increase of ROR to power companies and to promote the use of RE at retail ends are not entirely satisfactory. Nevertheless, in light of the economies of scale and the well-established expertise in the development, construction, operation and maintenance of commercial RE facilities, engaging local power companies to explore the feasibility of further developing commercial-scale RE in Hong Kong is a pragmatic and cost-effective option to further promote the deployment of RE.

41. Generation of RE should be a commitment. The Administration should offer incentives to those who generate RE whilst the retail tariff remains the same. With a flat aggregate ROR the present zero-sum arrangement only penalises those being prohibited, either financially or circumstance-wise, from installing RE facilities.

42. For charting the way forward, in-depth studies shall be carried out to examine the technical feasibility, cost-effectiveness and other issues (e.g. social implications) for different electricity generation options and the feasibility/ appropriateness for further interconnection of the various grids.

43. The Government and the power companies should actively develop closer fruitful partnerships with local and overseas research institutes in order to bring innovation in RE generation and supply. However, the intermittent and less stable nature of power supply by RE may also require back-up and stand-by arrangements, which could lead to concern of resources redundancy.

44. The Government should further study the practicability of installing co-generations and tri-generations at public facilities (such as hospitals and government offices). However, this should meet applicable standards to ensure safety and environmental performance.

45. Distributed power generations could be a balance between the value of electricity and thermal output produced, and the capital and fuel costs used to produce them, compared with natural gas and electricity. The Government should also take the lead in giving more impetus for the power companies to enhance infrastructures to facilitate reflux of electricity generated from both distributed power generations and RE.

46. The HKIE understands that there is still much to do on that as it will involve clarification and agreements on the technical, regulatory and financial arrangements.

47. The HKIE suggests serious study for the introduction of Feed-in Tariffs (FITs). The FITs can encourage investment by creating a long-term financial incentive in RE, distributed power generations and all other potential sustainable energy resources for utility customers through selling back to the grid. With the introduction of smarter grid apps and innovative aggregation models, the business and economic benefits associated with RE and distributed power generations could be increased.

48. But it is aware that the cost to maintain the transmission network may be absorbed by the consumers not having RE/ distributed power generation facilities in the long term if more and more users adopt own RE/ distributed power generation in future.

49. The Government should also look for other ways in tandem with other environmental measures, such as waste to energy generation. It also worths considering how to convert retired coal-fired plants for waste to energy generation.

Demand Side Management (DSM)

50. The HKIE opines that the demand side of power should not be overlooked when speaking of our future electricity market. In overseas, DSM may often be a product of political decisions where it would be ‘cheaper’ for the government to provide incentives to the end users than building new plants.

51. Hong Kong is different in this aspect and we should have appropriate measures of demand-side management which would be essential to not just relieve the pressure on electricity reserves and supply reliability during peak hours, but also address the imminent issue of sustainable development with due concern on the environmental protection.

52. The HKIE aspires that there can be more measures launched by the Government to drive for better demand-side management of electricity. While affordability of consumers is one of the major concerns, the HKIE believes that the consumers should also be allowed to access more options in respect of their use of electricity. This is not necessarily a matter of introducing competition, as the HKIE believes that the introduction of smart meters could offer new and different choices to consumers.

53. At present, like water charges, tariff is based on household consumption, not per capita. Smart meters could pick out those unnecessary wastages. The HKIE therefore supports the early deployment of Advanced Metering Infrastructure (AMI) and other related metering facilitates.

54. The HKIE however notes that there are concerns on information collected via this, but this should be governed under a separate framework.

55. As buildings account for 90% of energy used in Hong Kong, endeavours should be made to motivate closer partnerships between the property developers and power companies to enhance higher energy efficiency and demand-side management facilities in buildings.

56. For the electricity consumers, the Government should encourage the power companies to study the feasibility of more electricity use options (such as differential tariff for peak/non-peak hours and alternative option for consumers to purchase the electricity generated from RE).

Energy Policy

57. The HKIE always agrees that reliability, safety, environmental protection and affordability are the four major policy objectives that Hong Kong should observe in the future electricity market development. However, the HKIE further opines that Hong Kong should develop a holistic vision that can properly and effectively put these four objectives into tangible actions for the long-term benefits of society, recognizing that there are tensions among them.

58. Under the SCA, Hong Kong has since kept to have very high reliability and safety in electricity supply. The Energy Policy should strive to maintain this.

59. It is noted that the power companies have complied with the Energy Policy objectives and fulfilled the World Energy Trilemma by World Energy Council of maintaining reliable electricity, protecting the environment and providing affordable electricity by completing the emissions control projects on schedule with assisting Hong Kong to overachieve the emissions targets for 2010 among the surrounding regions in the Pearl River Delta.

60. Especially for environmental protection, our Energy Policy should endeavor to align with “A Clean Air Plan for Hong Kong” presented by the Environment Bureau in 2013, which sets out environmental objectives and targets to reduce emissions of Sulfur Dioxide (SO₂) by 35-75%, Nitrogen Dioxide (NO_x) by 20-30% and Respirable Suspended Particulate (RSP) by 15-40% by 2020 when compared to 2010.

61. Our ambitions on reduction of emissions and carbon intensity should tightly link up with the Energy Policy.

62. Certainly, there should be better and clearer alignment of Hong Kong Energy Policy with electricity sector development and the regulatory framework for the power companies.

63. Under the backdrop of these concerns and for active pursuit of excellence for Hong Kong in sustaining world-class electricity supply quality, the HKIE would like to put forward our recommendations as follows for consideration.

Recommendations

64. The HKIE regards that Hong Kong should take the opportunity to conduct in-depth studies to explore the feasibility of various initiatives taking into account of Hong Kong specific objectives, needs and constraints, such as:

- giving more impetus for the power companies to enhance infrastructures to facilitate reflux of electricity generated from distributed power generations
- joining with power companies to leverage on new engineering technology in actively increasing the proportion of electricity generated from RE

- encouraging the power companies to study the feasibility of wider electricity use options for the consumers (such as differential tariff for peak/non-peak hours, and an alternative for consumers to purchase the electricity generated from RE) and how these might be implemented, using smart meters or other devices
- encouraging the power companies to study in collaborating with relevant sectors the feasibility of distributed power generation and demand-side management options
- reviewing the performance indicators to reinforce not just reliability but also the capacity of the power companies to adopt more energy efficient options for the benefits of the environment and the community at large

65. The Government should further study the practicability of installing co-generation and tri-generation at public facilities (such as hospitals and government offices). The Government should also take the lead in working with professional bodies and institutions in looking for ways for designing and implementing energy efficient and demand-side management options on the use of electricity, such as constructing feasible energy storage plants to facilitate more electricity usage in off-peak hours. Waste to energy generation should be pursued.

66. As a separate note, as Hong Kong is aiming for better air quality, we support the promotion of use of electric vehicles (EV). While we support the deployment of AMI, and with the smart grid technology, it would enable the charging and discharging of EVs to be used for load shifting in the power grid. To prepare for large scale use of EVs, the Government should encourage and facilitate the development of a charging and payment infrastructure to allow convenient and cost effective charging by general users at the parking places.

67. In looking forward to the future, the HKIE believes that Hong Kong may explore other possible steps in the electricity sector development without compromising the present outstanding performance in respect of safety, reliability, affordability and environmental protection. For instance, in the future green field and new development areas, the Government should progressively add in more RE and distributed power generation. However, we opine that Hong Kong should take creative steps in the electricity sector development more for the purpose of enhancing environmental performances rather than just focusing on competition.

68. The Government and power companies should actively develop partnership with local and overseas research institutions for innovation in low cost renewable energy and developing mitigation measures on environmental impact from power generation.

69. The Government should subsidise more pilot schemes for new sources of energy efficiency measures or new energy generation. However, as coal in the coming years is still one of the sources for power generation, Hong Kong needs to explore recent new technology to minimise its environmental impact, such as technology in converting coal to synthesis gas for electricity generation, as well as carbon capture and sequestration (CCS) technology.

70. The HKIE understands that the issues of demand-side management, RE and other new sources of power generation would require more public awareness and understanding. The public would need more information to realise the overall impact of RE to the long-term benefit of the community. Also, successful demand-side management would also mean behaviour change of the public in energy saving. The HKIE therefore believes that it is the responsibility of the Government to promote and educate on these issues.

71. Above all, the HKIE would like to invite the Government to provide more information, data, and grounds for the public to deliberate on the future electricity sector development so that informed decisions and agreements can be reached to meet the expectations of all stakeholders.

72. The HKIE welcomes any constructive initiatives in enhancing the market environment for electricity, and believes that sound rationale and further data should be made available to facilitate deeper understanding of the situation and deliberation by the stakeholders, especially the public. For development of electricity market, we trust that Hong Kong should trek prudently and avoid drastic change in market regulation, and that competition should only serve to enhance the objectives of Energy Policy.