

## Enclosure

**LegCo Panel on Environmental Affairs  
The HKIE Views on the Consultation Paper on  
Future Development of the Electricity Market in Hong Kong  
- Stage II Consultation -**

**Introduction**

1. The Hong Kong Institution of Engineers (HKIE) had organised a Forum on the Consultation Paper (Paper) with representatives from the Economic Development and Labour Bureau, the two power companies, and other interested parties invited to give their views on the subject. Together with expert views received from members of Divisions, the HKIE is pleased to submit this paper for the Administration's consideration.

**Policy Objective**

2. The objective of the Government's energy policy (Objective) for the future electricity market stated in the Paper is *"to ensure that the public can enjoy reliable, safe and efficient energy supplies at reasonable prices, and to minimise the environmental impact caused by the production and use of energy"*.

3. The HKIE agrees that this Objective is commendable and of paramount importance. The followings are to examine in some details how the above Objective could be achieved.

**General**

4. The Paper includes many proposals, seemingly aimed to achieve as many aspirations as desirable or demanded by various stakeholders collected during the Stage I Consultation. The HKIE believes that it is not meant to accomplish all proposals simultaneously to their fullest extent as strict execution on some of them without due consideration of others, would be contrary to a coherent implementation of the underlying Objective.

5. The market operates under the present arrangement is not an open one but it cannot be said that most of the issues covered in the Objective are not

being met. Notwithstanding that, the public argues that reduction of tariff would be possible under a new agreement if rates of return allowed are also reduced. Secondly, the public perceives that the two operators are the principal culprits of emitting pollutants and should be required to contribute more in combating the deteriorating environment.

6. In reality, the Paper does not propose a fundamental change to the philosophy of the present Scheme of Control Agreement (SCA). A similar arrangement is to be extended for a period of 10 plus 5 years but with reduced rates of return and topped up with more stringent criteria and control on emission.

### **Reliable Energy Supply**

7. The reliability of a power system is the ultimate performance in a cascade of many factors, from planning, design to operation and measures taken to minimise extraneous risks. Individual alternation of one factor does not necessarily increase or decrease the overall reliability in the same proportional magnitude. Reliable supply is affected by summation of complex scenarios. The worst scenario is lack of investment. The HKIE would like to point out that the duration of regulatory period together with the permitted return are fundamentals to attract investment to maintain the desirable level of supply reliability.

8. The fuel type chosen, or rather the combination of such, for generation is one of the primal factors to ensure stable generation of electrical power. To guard against the risk of fuel scarcity or worse, total supply stoppage, prudence in selection of fuel mix is essential. The Paper does not clearly outline the Government's policy in this area. Further, fuel supply arrangements and associated contracts are often long-term and capital intensive. A shortened period of agreement may discourage needed commitment and hence ultimately affect the stability of power supply.

9. Generation capacity with appropriate reserve is another crucial rudiment for reliability. The HKIE agrees with the Paper that *it would be prudent at this stage not to predicate the future development of the electricity market in Hong Kong on supply from the Mainland, whether from reliable plants or otherwise.*

10. At present, the generation capacity and the reserve may be adequate and the HKIE agrees excessive capacity should be avoided. On the other hand, erection of a generation plant would take several years from drawing board to its completion and again, the proposed period of 10 + 5 years would be too short for certainty and may discourage timely commissioning. Coupled with the proposal to increase the present penalty on excessive capacity from 50 to 100 percent, the HKIE finds a real risk of eroding reliability should demand grow in a few years' time.

11. Stability of the distribution network calls for sound day to day operation and continuous investment. Sufficient staffing with ongoing training is required for operation. Preventive replacement and addition of new equipment to the network cannot be dispensed with. This is another factor crucial to ensure reliability of power supply. Adequate incentives and clear indication of duration for operation are hence essential for the operators to continue the needed commitment. Regulations with penalty to impose a preset level of reliability had been suggested to minimise outage in the interim. The HKIE, however, cautions that ultimate interconnection with the larger grid in Guangdong would make it difficult to ascertain origin of faults for enforcement.

12. A large grid is a double-edged sword. It offers alternative routes for uninterrupted power supply or load sharing but at the same time subject to risks of more disruption as more equipment and protective mechanism are involved.

13. In expanding the present supply and distribution grid system in Hong Kong, the consistency between the generation and transmission system should be considered. The stability of the transmission system is closely related to the status of load and generation performance and the swift exchanges of information of their latest status for prompt output adjustment. In the US/Canada saga, the affected area and level of disruption could be much reduced should local generation operators were informed in time to make responding contingency action.

14. If inter-connection with Guangdong remains as a goal in future, however distant, preparation work should begin within the SAR region as soon as possible. The HKIE does not find concrete proposal from the Paper even on inter-connection between the two local operators.

15. That said, grid access by others would be vital to formulate the future electricity market.

16. Before connecting our smaller network to that of the Mainland, hence exposing to risks of possible lesser power quality and multiple influence from a more massive system of which no data and information area currently available, the HKIE suggests that basic work on technical issues and codes should commence with the new SCA for more experience for the purpose of converging a successful interconnection operation. The HKIE would also like to point out the existing connection between Daya Bay and CLP system is really more like a dedicated transmission line within the CLP system, a model worthwhile to adopt for medium term solution.

### **Safe Energy Supply**

17. The HKIE concurs that safety of electricity supply should remain to be regulated by the existing legislature and codes, both of which are found adequate. Where power plants not registered within the SAR region and where transmission network transcends across the geographical border, the HKIE opines compatibility or jurisdiction issue might have to be addressed to extend our regulating codes to ensure an overall safe supply.

18. The HKIE would like to further point out that the public perception on Safe Supply includes the element of an unflinching supply of power to consumers through equipment, associated gears and back up services of good quality. Therefore, safe supply, at consumer level, suggests uninterrupted power and is an alter ego of reliability. Where reliability is assured, additional essential supplies for back up purposes would not be critically needed. Since reliability, therefore safety, of the system requires prompt and continuous maintenance, the HKIE considers that the suggestion of less incentive for investment in transmission and distribution would hinder the attainment of this element of the Objective.

19. The HKIE is also of the view that safety begins at power plant and its operation. The two operators excel in this regard in term of safety at plant sites. The HKIE proposes other future power suppliers should also meet our safety standards including safety at work places.

20. To take the safety issue again back to its association with reliability, the HKIE reiterates a good selection of fuel mix is crucial in this context.

### **Efficient Energy Supply**

21. The efficiency of conversion of other forms of energy to electricity hinges on several factors. The first is the original form of energy, that is, the fuel chosen for conversion. The second is the state of art of the plant and equipment at the time of installation. The third is the routine maintenance and upgrading of fixed assets and human resources. The fourth is the location of load centres.

22. The first two factors would be largely determined at the design stage, albeit subsequent technology advancement could improve the efficiency somewhat. The third factor demands on-going investments. The last requires an integrated network to bring out its full benefit.

23. The HKIE notes that the Paper does not specify whether the efficiency desired would be based on the present fuel mix or a combination to be determined in future. Nor it states whether efficiency of the existing equipment at status quo suffice or subject to future target, aging notwithstanding. Nor there is concrete indication that efficiency by load sharing is to be enhanced by interconnecting the present two systems. The HKIE has reservation that an increased interconnection between the two existing operators would be as cost effective as perceived, at least in the short term, because of up-front costs and, more importantly, the absence of load diversity between them. The HKIE, therefore, finds it difficult to comment further on this element.

### **Reasonable Price**

24. Reasonableness and price embrace very wide context. Reasonableness is relative and can be subjective. The HKIE would like to refrain commenting on it. Price paid includes cost of opportunity lost, to name one constituent. It is well known to the public that black out causes not only inconvenience but also incurs loss in commercial revenues. It is lesser known that unclean power supply also disrupts.

25. The HKIE would like to point out a lower tariff offered from an alternate supply, say from the Mainland, might not be necessarily resulting in a lower price, should the supplying source is to match our prevalent standards.

26. Limiting to the issue of tariff alone, the Paper does not clearly examine this in any details except by proposing several reduced figures for rate of return without explanation on how they were formulated. Perhaps there was a presumption that reduced rate of return at the supply side would lead to reduced tariff at the consumer level, hence more reasonable. The HKIE fails to see that as a nature consequence. A package of different rates of return on different types of assets could distort investment priority and optimal planning of the system as a whole, let alone the associated burden of additional administrative costs on classification and its potential contentions created, all would affect the tariff, if not the price.

27. In line with the Paper, HKIE would like to offer the following for further consideration: That tariff chargeable to end-users can be said to comprise of three categories.

- a. The first is those volatile element with fluctuating market prices that risk directly taken by the end-users would be more cost effective, ridding the conservative approach likely to be liberally exercised by a commercial entity, for example the present practice of fuel charge variations.
- b. The second is the guaranteed rate on investment commensurate with the characteristic of electricity market where investment would be massive and system is of long life span to retain the attractiveness of investment.
- c. The third could be tied to the managerial efficiency of the operators to penalise poor performance or to reward corporate success. Tying to general economic climate may also be considered to reflect no business venture is totally fail-safe and regression proved.

28. The electricity infrastructure is very capital intensive which requires a long period for investment recovery, allowing amortisation over a longer duration

would lower chargeable tariff during the period, albeit not necessarily at a lower price.

### **Environmental Impact due to Production of Energy**

29. Some fuel burns cleaner than others; some cheaper and some more expensive; some more abundant and its supply more reliable. But none comes in a package of all the desirable parameters.

30. The Paper sets a cap for emission reduction in percentage but without detailed data for assessment. The Paper sets a date to meet the cap but without delineating whether the cap is the beginning or the end, come 2010 and beyond.

31. Emission can be reduced by either switching to different fuels or by commissioning a new plant or by adding reduction devices to the existing ones. The choice of fuel, new plant and technology and the deployment of the proportional mix of these options have to take into account the cost and reliability of the technology, diversification of fuel mix and the economy of abandoning plant currently in operation. Without a clear energy policy from the Government it would not be possible to strike a balance amongst these factors for optimal planning.

32. The HKIE is of the opinion that proposing a different rate of return for emission reduction facilities is not a solution. Equally, the HKIE finds it difficult to understand the proposal of exploring "*options to avoid the costs of installing the (emission reduction) facilities being passed onto consumers as far as possible.*" A higher rate of return effectively passes the costs onto consumers ab initio.

33. Environmental improvement creates social benefits. In this respect, the whole society has to accept that there is an additional cost for having a better environment. It appears the Paper anchors the cost to the operators through the continuation of mandatory licensing arrangement vide Air Pollution Control Ordinance which imposes statutory penalty on failure to meet emission level. The Paper also proposes contractual penalty by reducing the allowed rate of return on the same non-compliance.

34. The HKIE is surprised to note the suggestion in the Paper: “*We have also asked the power companies to use natural gas for power generation as much as possible.*” Indeed commissioned coal fired units could be converted to gas fired for lower emission, at the expense of efficiency. But there is a danger that existing coal fired units would be shut down, not only because of the difficulty to meet the Cap set for 2010 and the fear to meet those set beyond but also because of the lack of a clear and balanced fuel-mix strategy for the future.

35. Immediate supply from the Mainland to gap the shortage is not viable as stated in the Paper to which HKIE agrees. To avoid uncertainty, the HKIE maintains a clear set of goals of progressive targets and dates is essential. The operators should be given sufficient time to meet the emission cap, which have to be technically and economically viable and effectively contribute to improve the air quality on regional basis. The HKIE also maintains environmental regulations should be integrated into the overall energy policy to ensure consistency and compatibility.

36. To better protect the environment, the Paper proposes 1 to 2 percent energy supplies would be of Renewable Energy (RE) by year 2012. This proposal is not mandatory. The HKIE realises that the targeted percentage might not be readily achievable but considers more proactive measures should be introduced rather than just tempting the operators to consider RE production by incentives, the net economic benefit of which is largely unknown. The HKIE believes the development and use of RE is an overall social commitment of the community and that the costs should be absorbed by the community.

37. Wind Farm is not yet a viable option in Hong Kong considering the magnitude of the size of the farm needed and its obstruction to topography even if venue is available.

38. Energy-from-Waste, comparatively, is less obtrusive and has been found satisfactory in other urbanised developments, more so in congested and dense area aboard like Hong Kong. The HKIE believes investment on this alternative supply is not purely for power generation, but also serves as an endowment to improve the environment. It is advisable to explore a timely implementation of application of introducing advanced environmental-friendly incineration plant to treat municipal solid waste with electricity as the by-product.



39. Given its lack of operation experience, no allowed rate of return could be accurately set before operation. Availability and collection of waste would also complicate the issue. The HKIE hence suggests either the SCA signatories are asked to operate such plant with cost of production spread across the general tariff or allowing other expert operator to operate and sell back to the SCA signatories. Cost of energy is high but the need of landfill and other measures handling waste diminishes. The HKIE is of the view that these provisions would not compromise the simplicity nature of the SCA.

40. Further down the supply chain, Solar Panels could be installed at consumers' premises as commitment to improve the environment. In certain cases grid access and buy back proviso would be necessary. In all events, the gain is not with a lower energy cost.

41. Similarly, with advancement in technology other forms of RE may emerge. The HKIE suggests the same philosophy in arrangement of grid access and buy back should prevail. The HKIE finds that the Paper is not committing enough to this cause.

42. Some have suggested the future of RE lies with import from the Mainland. The HKIE considers this is not a viable option in the near future as the state of development and extent of availability are not known. The HKIE would like to add the output of RE is often fluctuating and largely uncontrollable and therefore not suitable as a primary source of supply.

43. To allow RE developing in a healthy and steady manner, the HKIE opines that both environmental and reliability issues must be carefully taken into account. This calls for a holistic and visionary energy policy. To ensure meeting the community aspiration, imported RE should comply with the same prevailing standard of reliability, safety and environmental control. Nevertheless, the need of transmission infrastructure remains the same. Grid access to the present system must be allowed.

44. It is now demonstrated grid access to the present system came in two categories. The first is from the consumer level employing RE of which HKIE sees no serious objection from all involved parties in pursuance of a good cause of protecting our environment. The second level is more involved where the third

parties would be allowed to make access for business ventures. The scale of the latter is larger and would be more technical involved as explained earlier in this submission.

45. The Paper does not actually envisage grid access for open market is imminently viable. The HKIE would like to add where private properties are involved, and exceptional massive in electricity market, the negotiation would be lengthy. The HKIE agrees the underlying principle stated in the Paper that open grid access must be fair and equitable to all parties.

46. The HKIE would also like to point out the electricity generation in Hong Kong accounts for about half of emission locally produced. This is about 10 to 15 percent of the total on a worse day the community suffers. The HKIE endorses continual work in reaching agreement to cap emission in River Pearl Delta with Guangdong administration. The HKIE also wishes to reiterate that emission trading with neighbouring regions is still premature.

#### **Environment Impact Caused by the Use of Energy**

47. Much has been said in the Paper with proposals to address impact caused by the production of energy but it is noted that the Paper does not propose adequate policies on how to minimise such caused by the use of it. The HKIE considers the pollution emission is the by-product of the energy usage. Every energy user, and not the energy producer alone, shall be responsible for the emission and its reduction.

48. The promotion of RE generation only addresses one side of the pollution problem. Energy conservation and improving efficiency of usage will be equally important in sustaining continuous development. Whilst energy producers should be responsible for enhancing efficiency of the production process, the users should be responsible for efficient use and conservation of energy. Such demarcation of responsibility should be clearly spelt out.

49. It is well known the polluting problems faced by Hong Kong and PRD region are not mainly due to power generation in the region alone. Large energy users are also major contributors.

50. To address the use of energy, the Paper mentions Demand Side Management (DSM). A successful DSM program would limit the growth of demand and defer the need of new generation facilities. As a result, there is less emission.

51. The HKIE considers that the Administration should take up the role to promulgate DSM instead of letting the operators to do the role. Granted, the power companies as a corporation citizen should help to promote energy efficiency to the users, but they should not be held accountable. DSM is actually in conflict with what a commercial entity of power generation would strive for.

52. Whether DSM should come with incentive and/or penalty is just a matter of methodology. The HKIE opines that it is also paramount to address the issue at the users level, and perhaps more impetus would be needed for those users operating immediately across the border in the region.

### **The Public**

53. The Objective aims to serve the Public in Hong Kong. It is now the Public the HKIE turns to address by reiterating its views made in its submission to the Economic Development and Labour Bureau in 2003 to the Administration below:

“Given the importance of the production and use of energy in relation to sustainable development of Hong Kong, it is essential that the Government should have a clear policy direction on energy and the policy must be implemented with good coordination among the concerned Bureaux, Departments and Offices. The Government should study the need of formulating a comprehensive energy policy with the following objectives:

- a. To ensure a safe, secure, reliable and cost effective energy supply for the HKSAR’s economic prosperity;
- b. To ensure that supply of energy will be consistent with commitment to a safe, clean and sustainable environment; and
- c. To formulate strategies for energy supply, market monitoring and incentive to provide affordable energy to consumers without unwarranted control to discourage investment of energy suppliers.”

54. With the forth goings, the HKIE believes the best interest of the Public will be ensured by attending to the following:

- a. A clear energy policy of fuel mix is essential to secure reliability and stability not only for power generation but also for the community as a whole.
- b. A long-term policy on emission reduction and the use of RE for Hong Kong should be established so that various stakeholders have sufficient time to react and plan for their investment.
- c. It is not realistic to merely call for reducing environmental impact without due consideration of the impact on assuring reliable supply as well as its economic viability. The policies on energy usage and environmental protection must be clear and compatible with each other. A long-term vision is necessary to achieve the aforesaid objective.
- d. The environmental problem is not a local issue. As stated in the HKIE's submission to LegCo Panel on Environmental Affairs in September 2005, the Government should make the best endeavour to ensure that the Mainland could meet the mutual governmental agreed emission reduction targets whilst they are planning to impose stringent emission caps on the two local operators.
- e. In the longer term, if the Government would like to open up the electricity market, a clear vision and careful planning preparation is necessary before introducing the option in the electricity sector. It is important that a long-term policy must be formulated to allow a fair and level-playing ground for the existing and new players.
- f. Open market must be across the territories and not segregated. Suitable operational and control mechanism must be employed to ensure supply reliability. It should not be jeopardised by selective trading activities and interests of the smaller customers must not be sacrificed for the benefits of the larger customers, and that the environmental objectives will be fulfilled.

- g. Grid access is prerequisite to an open market, interconnection together with the communication between systems should be studied carefully when the market structure is changed.
- h. Power generation is practically the last major heavy industry remaining in Hong Kong. It has provided opportunities not only for the employment of thousands of jobs but also valuable grooming ground for many professionals in engineering and other practices. This is a totally localised industry with assets and jobs that are not meant to be re-allocated. A disarrayed market, in the short term will put many jobs at risk, and, in the long-term, will deny our professions an opportunity to keep abreast with the international arena. Due consideration of these employment prospects and exposure of acquiring competitive edge for Hong Kong must be taken in considering the future development of the electricity market.
- i. An independent institution to plan, integrate and coordinate the future electricity market as a regulatory body should be set up.