

AGREEMENT NO. CE 3/2017 (EM)

**MONITORING OF ELECTRICITY SUPPLY COMPANIES AND
RELATED ASPECTS - FEASIBILITY STUDY**

(Draft)

BRIEF

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BRIEF

1. Introduction

This Brief is to be read in conjunction with the Memorandum of Agreement, General Conditions of Employment for a Feasibility Assignment, Special Conditions of Employment and Schedule of Fees. For the avoidance of doubt but without prejudice to Clause 7 of the General Conditions of Employment, the performance of the Services specified herein shall be subject to Clause 22 of the General Conditions of Employment.

2. Description of the Project

- 2.1 In Hong Kong, electricity is supplied by two investor-owned companies - CLP Power Hong Kong Limited (CLP Power) and The Hongkong Electric Company Limited (HEC).
- 2.2 While the two vertically integrated electricity supply companies have no exclusive rights to supply electricity and do not operate on a franchise from the Government of the Hong Kong Special Administrative Region (the Government), they have concentrated their services in their own geographical areas. CLP Power supplies electricity to Kowloon and the New Territories, including Lantau, Cheung Chau and several outlying islands, whereas HEC supplies electricity to Hong Kong Island and the neighbouring islands of Ap Lei Chau and Lamma.
- 2.3 Hong Kong has a total installed electricity generating capacity of 12,670 MW (including 70% of the capacity of units 1 and 2 of the Guangdong Nuclear Power Station at Daya Bay and 50% of the capacity of units 1 to 4 of Guangzhou Pumped Storage Power Station) as at the end of 2016. More detailed information on the installed capacity for CLP Power and HEC is given in Attachment A.
- 2.4 The CLP Power and HEC systems have been interconnected since April 1981 allowing economy power interchanges, sharing of spinning reserve, and mutual backup of both systems. At present, the interconnection has an installed capacity of 720 MVA.
- 2.5 To safeguard the interests of the consumer, the Government has entered into mutually agreed Scheme of Control Agreements (SCAs) with the electricity supply companies.

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- 2.6 The SCAs set out the obligations and rights of the electricity supply companies and of the Government on behalf of consumers. The electricity supply companies are obliged to ensure a reliable and efficient supply of electricity at reasonable costs to consumers, and at the same time minimize the environmental impact in the production and use of energy. In return, the electricity supply companies are allowed to earn a reasonable return on their investment.
- 2.7 The SCAs enable the Government to monitor the financial planning of the companies. They are required to seek the approval of the Government for certain aspects of their development plans, including the projected tariff levels. They are also required to submit, as part of their development plans, proposals for energy efficiency and conservation programmes and give consideration to the use of alternative energy sources. Their financial, technical and environmental performance and their energy efficiency and conservation programmes are monitored through annual auditing reviews.
- 2.8 The current SCAs with CLP Power and HEC came into effect on 1 October 2008 and 1 January 2009 respectively. Both SCAs will last for 10 years and will expire by 2018. The Government may extend the SCAs for a further period of 5 years until 2023. The possibility of entrance by other electricity supply companies into the electricity market in Hong Kong after 2018 should not be ruled out.
- 2.9 The Government also signed a Memorandum of Understanding (MoU) with the Central People's Government on 28 August 2008 on the continuous supply of nuclear electricity and natural gas to Hong Kong in the coming two decades. In accordance with the MoU, CLP Power extended in September 2009 its existing contract for the supply of nuclear electricity from Guangdong Nuclear Power Station at Daya Bay for another term of 20 years from 7 May 2014 onwards.
- 2.10 The Electrical and Mechanical Services Department (EMSD) of the Government (the Employer) intends to enter into an Agreement with suitably qualified consultants, under which the consultants will be asked, on time-charge basis under individual Assignment, to assist the Government by conducting studies relating to the monitoring of the aforesaid electricity supply companies, the power generation fuel mix review, the review on Hong Kong's future regulatory framework for the electricity market, and other aspects of electricity supply which may arise from time to time.
- 2.11 The Agreement will last for at least one year, and will continue for another two years subject to funding allocation.

- 2.12 If the Government considers that no single consultancy firm has adequate experience to undertake all Assignments likely to be necessary under the Agreement, it may enter into agreements with more than one Consultant in their respective areas of expertise.
- 2.13 This Agreement is to be executed without prejudice to the right of the Employer to appoint any other consultant to undertake Assignments of the same or similar nature during the currency of this Agreement.

3. Objectives of the Assignments

The aim of each Assignment is to provide the Government with appropriate expert advice and information relating to technical, environmental and financial aspects of the electricity supply companies' operation, thereby enabling the Government to assess the appropriateness and reasonableness of the companies' proposals fairly in the interests of both the investors and consumers.

4. Description of the Assignments

- 4.1 The scope of work for each Assignment will be agreed between the Director's Representative (see Clause 12 of this Brief) and the Consultants. Assignments may require feasibility, sensitivity and/or comparative analyses, based on information provided by the Government and the electricity supply companies, Consultant's research involving overseas authorities, utilities, research centres, international organizations and inter-utility organizations.
- 4.2 The scope of these Assignments will cover various areas of engineering/economic study comprising energy conservation; electricity supply market competition; fuel supply; power import; generation, transmission and distribution aspects involved in a modern electricity supply industry. The Assignments will be identified and issued to the Consultants in the form of written instructions as and when the need arises.
- 4.3 The Consultants shall allocate sufficient and experienced staff resources to the Assignments and shall be able to quickly deploy additional staff when required to deal with increased workload.

5. Deliverables

- 5.1 In executing each Assignment, the Consultants will be required to produce inception reports on methodologies and assumptions to be used, draft and final reports on the Assignments. Interim reports and executive summaries shall also be required. The report shall be fully indexed with cross references as appropriate. Each report shall contain a summary section which shall include all the recommendations, with references to their reasons for them and their implications detailed in the main text of the report. Translation of the reports and executive summaries into Chinese shall be required, if needed. Electronic data for the reports and executive summaries, input and output files for technical analyses, schematic diagrams and drawings prepared during the task, and the corresponding licences of computer software and modelling developed for the Assignment shall be required. Presentation materials to the Government, electricity supply companies, the Legislative Council and related bodies as required on the findings and recommendations of the task and electronic files of all presentation materials shall also be required.
- 5.2 Up to six (6) hard copies each of these reports may be required.
- 5.3 In executing each Assignment, the Consultants' findings and recommendations may be disclosed to the concerned government departments, electricity supply companies, advisory boards or other committees/organizations (e.g. Legislative Council) as required.
- 5.4 The Consultants may be required to give presentations to the concerned government departments, advisory boards or other committees/organizations (e.g. Legislative Council). Also, they may be required to provide reports of meetings with the organizations attended by them. If based outside Hong Kong, they may be required to visit Hong Kong for this purpose or for consultations during the course of an Assignment.
- 5.5 The Consultants shall draw to the Employer's attention any Deliverables that are under licence and any pre-existing copyright or patent on any Deliverables and any other restriction whatsoever affecting the Employer's use of the same and, if required by the Director's Representative, establish the existence of any licence, copyright, patent or restriction.

6. Services to be provided by the Consultants

6.1 The Consultants will be called upon to carry out Assignments related to the monitoring of the electricity supply companies (including the existing two power companies and other future power companies, if any) and on various other aspects of electricity supply as and when required. The Consultants should be able to mobilise resources to start work on any Assignment within one week. The scope of study of the Assignments would fall within three major areas :-

(l) Power System Engineering and Planning with respect to:

- (a) load forecasts produced by the companies;
- (b) generation, transmission and distribution development plans produced by the companies, in particular the financial, technical and environmental implications of the plans;
- (c) reliability and planning criteria of the companies' generation, transmission & distribution systems (such as LOLP modelling and estimation, reserve capacity assessment, etc);
- (d) the companies' energy efficiency and conservation programmes, use of renewable energy and emissions reduction facilities;
- (e) the technical performance of the companies, including such aspects as availability, reliability and efficiency of their generation, transmission and distribution equipment and the cost-effectiveness of their operations;
- (f) the companies' interconnections with, and imports from and sales of electricity to, neighbouring supply areas within and outside Hong Kong;
- (g) the development of customised computer software for modelling the companies' expansion plan proposals and production costs;
- (h) the safety of the companies' operations;
- (i) the compilation of data on companies outside of Hong Kong, for comparative purposes in the context of regulatory matters and auditing of the companies' technical performance;

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- (j) the financial, technical and environmental aspects of technologically advanced methods of electricity generation and/or arrangements (such as electricity purchases from China, delivery agreement/contract, etc.), whether these involve the use of nuclear, fossil fuels or other sources of energy;
 - (k) the financial, technical and environmental aspects of technologically advanced methods of electricity transmission and/or arrangements (such as GIL, HVAC, HVDC, reactive compensation of long submarine cables, electricity wheeling and delivery agreement/contract, etc.) and the possible connections to Mainland China's supergrids or transmission systems;
 - (l) the financial, technical and environmental aspects of the fuel supply and related facilities and/or arrangements (such as gas pipeline, LNG Terminal, gas supply agreement/contract, etc.) and the price trend of various fuels or other sources of energy;
 - (m) regulatory regimes (whether statutory or voluntary) applicable to Hong Kong; and
 - (n) other financial, technical, environmental or safety aspects of electricity supply as directed by the Government.
 - (II) Power generation fuel mix review with respect to:
 - (a) benchmarking of fuel price and security;
 - (b) tariff impact of various fuel mix options; and
 - (c) environmental impact of various fuel mix options.
 - (III) Electricity Supply Market with respect to:
 - (a) assessment and evaluation of existing and alternative market structures and related arrangements;
 - (b) means of introducing and/or promoting competition;
 - (c) means of promoting more efficient use of available generating capacity; and
 - (d) regulatory arrangements associated with competition and different market structures.

- 6.2 Prior to the commencement of each Assignment, the Consultants need to submit detailed proposals to indicate how they will approach the Assignment. Generally, it is expected that the Consultants would :-
- (a) study and review all information already available to the Government;
 - (b) acquire a general appreciation of the operations and practices of the electricity supply companies concerned;
 - (c) review all relevant statistical data and records pertaining to the electricity supply companies concerned;
 - (d) gather all relevant technical data and information required to establish the basis for the studies; and
 - (e) carry out site inspections where necessary.
- 6.3 The Consultants shall have the obligation to provide time-log record to the Director's Representative at weekly interval for progress monitoring.
- 6.4 The Consultants shall comply with all reasonable instructions of the Director's Representative and with all relevant circulars, standing instructions and technical memoranda as directed by the Director's Representative.
- 6.5 The Consultants shall take cognisance of the government policies, ordinances, documents, data, studies, reports and interface issues relevant to the Assignment and in this connection shall consult the relevant government bureaux, departments and organizations via Director's Representative.
- 6.6 The Consultants shall consult the following utilities for any views and information that are relevant and useful for the satisfactory completion of the Assignment via Director's Representative. The Consultants are also required to consider any relevant comments put forward by the utilities in respect to the draft reports which would be provided to the utilities for their perusal and comment :-
- (a) The Hongkong Electric Company, Limited
 - (b) CLP Power Hong Kong Limited
 - (c) Castle Peak Power Company, Limited

- 6.7 The Consultants shall consult the steering group and any other organizations or persons as considered necessary by the Director's Representative.
- 6.8 During their studies, the Consultants shall analyse their findings, giving references for sources of information, comment on their reliability, provide detailed calculations where appropriate, as well as analysis of their decision making processes and elaboration of justification and reasoning in arriving at the recommendations.
- 6.9 The Consultants shall compare and advise fully on accepted methods currently practised within the electricity supply industry in other developed countries, stating their merits and demerits, and reasons for recommending their applicability or otherwise to Hong Kong.

7. Response to Queries

The Consultants shall respond to queries under Clause 20 of the General Conditions of Employment raised prior to a date 3 months after the final submission of the Deliverables required under the Agreement. Such date will be confirmed in writing to the Consultants by the Director's Representative.

8. Programme of Implementation

- 8.1 The commencement of the Agreement would be tentatively in August 2017.
- 8.2 The Consultants shall commence work on each Assignment as soon as practicable and in no case later than 14 days after the issue of written advice to proceed, otherwise, the Employer shall have the right to employ other Consultants and sue for damages.
- 8.3 Assignments will be issued as and when required, and the Consultancy Agreement shall not bind the Employer to a specific number of Assignments during the Agreement period.
- 8.4 The Director's Representative will discuss with and seek advice from the Consultants on their relevant programme and estimate before each new Assignment is formally placed with the Consultants. Each Assignment shall then be completed expeditiously in accordance with the time scale and programme of work already mutually agreed.

8.5 Pursuant to Clause 26(B) of the General Conditions of Employment, the Consultants shall submit the draft programme and revised draft programmes and the Directors Representative shall agree, or instruct, within the following periods :-

Submission of the draft programme : Within 2 weeks of the due date for commencement of the Agreement or each Assignment

Agreement of the draft programme : Within 2 weeks from receipt of the draft programme or instruction for submission of the revised draft programme

Submission of revised draft programme : Within 3 days from the instruction of the Director's Representative

8.6 The draft programme and revised draft programmes shall detail the activities to be carried out, target dates for particular tasks and any decision dates that may be required for the uninterrupted progress of the Assignment. The Consultants shall discuss with the Director's representative during the above periods to agree the timing of submission of reports, other documents and plans for each of the main elements of the Assignment, for inclusion in the draft programme and revised draft programme.

8.7 The key dates referred to in Clause 8.5 of this Brief shall include but not be limited to :-

(a) The date of submission of the Draft Reports.

(b) The date of submission of the Final Draft Report.

8.8 The Consultants shall endeavour to ensure that each Assignment is carried out in accordance with the programme and shall submit regular programme reviews as part of the progress reports referred to in Clause 9 of this Brief. The Employer shall have the right to claim for damages due to delay of work caused by the Consultants.

9. Progress Reports

The Consultants shall submit to the Director's Representative progress reports at weekly intervals on all aspects of the Services relating progress to the Programme referred to in Clause 8 of this Brief. The reports shall include a list of those parts of the Services the execution of which is behind the Programme, together with proposals to expedite

progress, so as to complete the work on time. The reports shall also include updated expenditure forecasts in accordance with Clause 10 of this Brief.

10. Financial Management

At monthly intervals or at such other intervals as the Director's Representative may require, the Consultants shall submit a report on the current and forecast expenditure on the Assignments and the fees due to the Consultants, in a form to be agreed by the Director's Representative.

11. Standards and Specifications

The Consultants shall adopt such technical & design standards and specifications as are in current use by the Electrical and Mechanical Services Department and Environmental Protection Department of the Government or, if non-existent, international standards accepted by the Director's Representative. Should instances arise for which suitable standards or specifications do not exist or for which the current standards or specifications appear to require modification or if by the adoption of current standards the Consultants would incur additional expenses not within reasonable contemplation, the Consultants shall submit recommendations on appropriate alternatives to the Director's Representative for agreement.

12. Director's Representative

12.1 The Director's Representative as defined in the General Conditions of Employment shall be the Chief Electrical and Mechanical Engineer / Electricity Team or such other person as may be authorised by the Director in writing and notified to the Consultants. The Director's Representative may delegate any of the powers and functions vested in him to other officers. If the Consultants are dissatisfied with a decision or instruction of any such officer, the matter shall be referred to the Director's Representative for a ruling.

12.2 During the course of the Agreement, the Consultants shall report direct to the Director's Representative.

13. Control of the Project and Assignment

In executing each Assignment, the Deliverables that the Consultants shall produce in order to reflect the progress of the Assignment, shall be in accordance with the requirements as stated in Sub-clauses 5.1, 5.3 & 5.4 and Clause 9 of this Brief. Furthermore, during the course of the Agreement, the performance of the Consultants shall be subjected to a quarterly review in conjunction with a report to be completed by the Director's Representative.

14. Information and Facilities Provided by the Employer

All available information relevant to the Assignment will be provided to the Consultants. The Consultants shall indicate for guidance those documents which they currently hold and those of which a copy may be needed, should the Assignment be awarded to them. A copy of each of the documents indicated as needed will be supplied free of charge by the Director's Representative on request from the Consultants, except those currently available from the Sales section of the Information Services Department. In the case of plans and drawings, two prints of each plan or drawing shall be provided free of charge ,if requested, by the Consultants.

15. Consultants' Office and Staffing

- 15.1 The Consultants shall assign a Project Director, in the capacity of a project team leader, to facilitate effective communication between the Director's Representative and the project teams, and to provide quick response to the enquiries raised by the Director's Representative. He shall have adequate authority and sufficient professional, technical and administrative support staff in all relevant disciplines to ensure progress to the satisfaction of the Director's Representative. He shall be available for direct communication with the Director's Representative at any time during the term of this Agreement.
- 15.2 The Consultants shall provide the staff and manpower input in accordance with the Technical Proposal which was submitted with the Consultants' tender for the Assignments of this Agreement. The Consultants shall provide qualified specialists in the relevant engineering disciplines for the execution of each Assignment. The Director's Representative shall have the right to check the time-log record of the Consultants' staff deployed for the Assignment.
- 15.3 If the Director's Representative considers that the performance of the Consultants is not satisfactory due to inadequate staffing and manpower input allocated to the

Assignment, the Consultants shall, upon the request of the Director's Representative, forthwith submit to the Director's Representative the time-log record of the staff deployed for the Assignment for the Director's Representative to check against the Technical Proposal.

- 15.4 The Consultants' failure to adhere to their staffing proposal, in particular the employment of core personnel of the Consultants, thus causing an adverse impact on the performance of the Services, shall be duly reflected in the Employer's performance report on the Consultants.
- 15.5 If the Consultants are unable to maintain any of the core personnel specified in the Technical Proposal, the Consultants shall as soon as possible report this to the Director's Representative and propose, for the Director's Representative's approval, a revised personnel arrangement which is equivalent to or better than the existing personnel arrangement, in terms of qualifications, experience and competence.
- 15.6 All personnel including the Project Director, proposed to be engaged in the project, shall be approved by the Director's Representative before they are appointed. The Director's Representative may without stating any reason, withdraw with immediate effect their agreement to any one or all of the team members including the Project Director. The Consultants are required to replace him and/or them within a reasonable time with another suitable member on the pre-agreed list of selected personnel without cost to the Employer. The Employer agrees to act responsibly in such cases and in general to refrain from such action without prior agreement with the Consultants.
- 15.7 The Consultants are required to submit a list of their proposed staff for each Assignment giving full details of each personal curriculum vitae, their availability during the course of the Agreement and to advise the Director's Representative of the liaison services or facilities they require from the Director's Representative. The minimum qualification and experience requirements for each rank of staff to be deployed for the Assignments are stipulated in Attachment B to this Brief.

16. Specialist and Sub-consultant Services

The Consultants shall provide all specialist and sub-consultant services required for the satisfactory completion of each Assignment. No additional fees or expenses for the provision of such services rendered locally or overseas shall be payable by the Employer except as otherwise provided for in the Schedule of Fees.

17. Surveys

Not used.

18. Insurance

The amount of insurance cover to be maintained in accordance with Clause SCE9 of the Special Conditions of Employment shall be equal to the lump sum fee of the consultancy subject to a minimum of HK\$1 M and a maximum of HK\$25 M.

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Attachment A**Generating Capacity and Maximum Demand of
CLP Power Hong Kong Limited**

Company	Power Station	Unit (MW)/Primary Fuel (Secondary Fuel)	Installed Capacity (MW) at end 2016	
CLP Power	Castle Peak 'A' Coal-fired Units	4 x 350 MW/Coal (ULSD)	1,400	
	Castle Peak 'B' Coal-fired Units	1 x 677 MW / Coal (ULSD) 1 x 677 MW / Coal (Gas / ULSD) 1 x 677 MW Coal (Gas / ULSD) 1 x 677 MW/Coal (ULSD)	2,708	
	Black Point Combined Cycle Units	7 x 312.5 MW / Gas (ULSD) 1 x 337.5 MW / Gas (ULSD)	2,525	
	Penny's Bay Gas Turbine	3 x 100 MW / ULSD	300	
	Guangdong Nuclear Power Station in Mainland China	2 x 985 MW x 70% (CLP Power receives about 70% of the total annual output)	1,380	
	Guangzhou Pumped Storage Power Station in Mainland China	4 x 300 MW x 50% (CLP Power has the right to use 50% of the generating capacity)	600	
	<i>Total Installed Capacity</i>			<i>8,913MW</i>
	<i>2016 Local Maximum Demand = 6,841 MW</i>			

**Generating Capacity and Maximum Demand of
The Hongkong Electric Company, Limited**

Company	Power Station	Unit (MW)/Primary Fuel (Secondary Fuel)	Installed Capacity (MW) at end 2016	
HEC	Lamma Coal-fired Unit	3 x 250 MW/Coal (ULSD) 5 x 350 MW/Coal (ULSD)	2,500	
	Lamma Combined Cycle Unit	1 x 335 MW/Gas (ULSD) 1 x 365 MW/Gas (ULSD)	700	
	Lamma Gas Turbine	1 x 55 MW / ULSD 4 x 125 MW / ULSD	555	
	Lamma Wind Turbine	1 x 1MW / Wind	1	
	Lamma Thin Film Photovoltaic System	1 x 1 MW / Solar	1	
	<i>Total Installed Capacity</i>			<i>3,757 MW</i>
	<i>2016 Local Maximum Demand = 2,428 MW</i>			

Attachment B**Minimum Qualification and Experience Requirements for Staff**

Grade	Minimum Academic/Professional Qualification Required	Minimum Experience Required
Partners/ Directors	Corporate Member of Hong Kong Institution of Engineers (MHKIE) or equivalent in an appropriate discipline; and A partner, or a company director who is a member of the Board with voting power at Board meetings	15 years relevant post qualification experience
Chief Professional	MHKIE or equivalent in an appropriate discipline	12 years relevant post qualification experience
	University degree or equivalent in an appropriate discipline for specialist trades, such as geology, transport, environmental science or other trades where appropriate professional institutions are not commonly in existence	17 years relevant post-qualification experience
Senior Professional	MHKIE or equivalent in an appropriate discipline	5 years relevant post qualification experience
	University degree or equivalent in an appropriate discipline for specialist trades, such as geology, transport, environmental science or other trades where appropriate professional institutions are not commonly in existence	10 years relevant post-qualification experience
Professional	MHKIE or equivalent in an appropriate discipline	No additional requirement
	University degree or equivalent in an appropriate discipline for specialist trades, such as geology, transport, environmental science or other trades where appropriate professional institutions are not commonly in existence	5 years relevant post-qualification experience
Assistant Professional	Degree in an appropriate discipline from a Hong Kong university or equivalent	No additional requirement
Technical	Diploma or Higher Certificate or equivalent in an appropriate discipline	No additional requirement

(Note : Post qualification experience is the experience after obtaining the specified professional qualification.)