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For discussion
On 2 March 2000

LEGISLATIVE COUNCIL
PANEL ON ENVIRONMENTAL AFFAIRS

Organisation of Energy Efficiency Office of
Electrical & Mechanical Services Department with respect to Energy Efficiency

PURPOSE

1. At the Panel meeting of 10 February 2000, Members were briefed on the Government's proposed new energy efficiency and conservation initiatives. Members asked for more information and this paper provides Members with details of the existing organisation and work of the Energy Efficiency Office (EEO) and justifications for the proposed resources to be allocated to implement the new initiatives.

BACKGROUND

2. The EEO of Electrical and Mechanical Services Department (EMSD) was established in August 1994 to assist the then Planning, Environment and Lands Branch in planning and implementing energy efficiency and conservation programmes. It also assists the Economic Services Bureau on matters related to the two electricity power companies.

3. The EEO, headed by the Assistant Director/Energy Efficiency, is organised into two divisions. The Energy Efficiency Division led by a chief engineer has four sub-divisions which are each headed by a senior engineer. The four sub-divisions cover Building Energy Codes, energy management, energy efficiency labelling and energy end-use database. A summary of the existing energy efficiency programme was included in the Environmental Affairs Panel paper considered by Members on 10 February 2000. An organisation chart of EEO is at Annex A.

Annex A

EXISTING ESTABLISHMENT AND TASKS OF THE ENERGY EFFICIENCY DIVISION

BUILDING ENERGY CODES SUB-DIVISION[1]

4. This sub-division manages the development, implementation and promotion of a series of Building Energy Codes (BEC) and Guidelines covering lighting, air conditioning, electrical, and lifts & escalators installations. The BECs provide technical information to assist and encourage designers and developers to adopt energy efficient designs of buildings services in new buildings. The BECs were implemented on a voluntary basis under the Energy Efficiency Registration Scheme for Buildings (EERSB) launched on 29 October 1998. When the last BEC on lifts and escalators is published and implemented this year, efforts will be focused on promoting greater use of the BEC amongst developers and designers, vetting applications for EERSB registration and reviewing registration scheme in mid 2000. In 2000/01, the Sub-division will examine whether it is appropriate to make the BECs mandatory, and review whether there is a need to change to a more comprehensive control method, such as a performance-based building total energy budget approach.

5. The above measures will mainly improve energy efficiency in new buildings which amounts to only a small percentage of the total building stock each year. We plan to encourage greater awareness of the potential for energy efficiency improvements amongst building management and owners. For example, energy efficiency seminars, campaigns, competitions and award programmes will be held at the district level. We will consult the District Councils shortly on how best to proceed.

6. The sub-division supports the work of the Hong Kong Building Environmental Assessment Method (HKBEAM), a private sector initiative developed by The Real Estate Developers Association of Hong Kong. The HKBEAM lays down a

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[1] The existing establishment of Building Energy Codes sub-division consists of 1 Senior Building Services Engineer and 2 Building Services Engineers.

wide range of criteria on environmental issues including energy efficiency requirements similar to those of the Energy Efficiency Registration Scheme for Buildings. The sub-division is examining suggestion from HKBEAM to enhance the relationship between government's and the HKBEAM's initiatives.

7. The sub-division continues to participate actively in energy related international activities including those organised by the Asia-Pacific Economic Co-operation. The exchange of information with overseas authorities and experts on new development in energy efficiency technologies, global trend and energy policies, is important for the development of local energy efficiency initiatives.

ENERGY MANAGEMENT SUB-DIVISION[2]

8. This Sub-division focuses on implementing energy management opportunities (EMO) in existing government buildings. Energy Audits have been conducted in public sector buildings since 1994 and significant energy savings were achieved through identifying and implementing EMOs such as adjusting equipment settings, operational procedures and routines. Table 1 shows the amount of direct energy savings achieved in the past few years through implementing EMOs.

9. By the end of 2001, 145 major Government and public buildings will have been audited, accounting for 77% of the total electricity consumption of the government building stock. In the next few years, we will have achieved the maximum potential for implementing EMOs without involving major capital investments for retrofitting. We are at an advance stage in examining the feasibility of introducing energy performance contracting using Energy Service Companies (ESCOs). EEO has set up the ESCOs Task Force with membership from professional organisations, local institutions with experience in adopting performance contracting and ESCOs. We intend to recommend conducting pilot schemes involving energy performance contracting projects for five similar buildings. In March 2000, we will consult the Energy Efficiency & Conservation Subcommittee of the Energy Advisory Committee.

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[2] The existing establishment of Energy Management sub-division consists of 1 Senior Building Services Engineer, 3 Building Services Engineers, 1 Senior Technical Officer and 1 Technical Officer.

Table 1: Energy Savings Through EMO

	1994	1995	1996	1997	1998	1999	Total
Estimated Energy Savings from Energy Audit Programme for that year (TJ / *million HK$*)	24 / *5.0*	46.7 / *10.0*	52 / *11.5*	54 / *12.0*	55 / *12.2*	44 / *9.8*	275.7 / *60.5*
Estimated Energy Savings from Pilot EMO Implementation Programme for that year ($6M 1996-1999) (TJ / *million HK$*)	----	----	----	----	1.5 / *0.33*	3 / *0.67*	4.5 / *1.0*
Cumulative Savings up to that year (TJ / *million HK$*)	24 / *5.0*	70.7 / *15.0*	122.7 / *26.5*	176.7 / *38.5*	233.2 / *51.03*	280.2 / *61.5*	280.2 / *61.5*

10. Efforts to introduce new types of energy efficient equipment both within the government and the commercial sector are often hampered by the lack of local performance information and high initial costs. The sub-division has been investigating the performance of new energy efficient equipment and disseminating the test results to the public. In 1999, the sub-division completed a three-year programme to install and test the performance of electronic ballasts for fluorescent lamps and variable speed drives for air conditioning installations. The programme results were disseminated to developers and professionals through seminars and also made available to the public via pamphlets and the internet. This equipment is now widely used and payback periods are reducing because of market competition and increased volume driving prices lower. For example, prices for electronic ballasts have fallen from $500 in 1995 to about $150 in 1999. The annual energy savings in lighting in the office segment by adopting electronic ballasts can amount to 500 Terajoules per year (about HK$ 125 million).

11. We have started a two-year programme in May 1999 to test innovative energy efficient lighting, air-conditioning, and lifts and escalators equipment for their effectiveness and applicability in Hong Kong. We have installed an “Energy Optimiser” for an escalator in the North Point Government Offices. This is designed to save energy when the escalator is not fully loaded. The technology, if successful, can be applied to all

escalators and travellators in Hong Kong. An 'intelligent' lift dispatching system called "Miconic 10", which has the potential to improve lift traffic and energy efficiency, will be installed in the Mongkok Government Offices. For lighting installations, new T-5 fluorescent tubes, which are slimmer and have longer service life and much less mercury content than the conventional fluorescent tubes, will be tested. Wide adoption of T-5 fluorescent tubes will further improve energy efficiency and cause less environmental pollution at the end of their life.

ENERGY EFFICIENCY LABELLING SCHEMES SUB-DIVISION[3]

12. The major task of this sub-division has been to design, develop and monitor the Energy Efficiency Labelling Scheme (EELS) for household electrical appliances. Registered appliances are given an energy efficiency label to inform customers of the product's energy consumption and efficiency. The EELS, first introduced in 1995, now covers refrigerators, room coolers, washers, compact fluorescent lamps and cloth dryers, with over 400 labels issued.

13. We have recently completed preparation to extend the scheme to cover office equipment. The first office equipment labelling scheme EELS for photocopiers is expected to be launched by end 2000. We plan to launch at least one new labelling scheme each year for both the household appliances and office equipment categories for the foreseeable future.

ENERGY END-USE DATABASE SUB-DIVISION[4]

14. The Hong Kong Energy End-use Database (HKEEUDB) was established in 1998. The database helps to identify energy use patterns and thus areas for cost-effective improvements, estimate potential energy cost and savings, and assess the effectiveness of energy efficiency measures. The original HKEEUDB contained data

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[3] The existing establishment of Energy Efficiency Labelling Scheme sub-division consists of one Senior Electrical & Mechanical Engineer, three Electrical & Mechanical Engineers, one Senior Electrical Inspector and one Air Conditioning Inspector.

[4] The existing establishment of Energy End-use Database sub-division consists of one Senior Electrical & Mechanical Engineer, two Electrical & Mechanical Engineers, one Senior Technical Officer and one Assistant Electrical Inspector.

from 1984 up to 1994. To maintain its usefulness, it needs to be updated constantly. In the past few years, the sub-division had been updating the Database to include 1995 and 1996 data. Work for updating up to 1997 and 1998 is in progress and would be completed by end 2000. Further updating work would be carried out on a regular basis every year.

15. To enhance the accuracy and thus the usefulness of the Database updating work, the sub-division plans to carry out energy consumption surveys for different sectors/segments of the economy in the coming years. In 2000, this sub-division will conduct a major "Household Energy Consumption Survey" to collect up-to-date domestic household energy consumption information. Other mini-surveys for specific segments will also be done in-house.

16. Accurate information on energy use is important for commercial and academic purposes. To enable the public to better understand the energy end-use patterns and to stimulate public awareness and discussion of energy issues, the sub-division makes available and maintains a set of basic historical energy end-use data for public reference which is accessible free of charge through the internet at EMSD's Homepage. In addition, the sub-division also handles specific data requests from within the Administration, researchers, consultants and individuals.

EXPANSION OF THE EEO

17. On 10 February 2000, we briefed Members on the proposed energy efficiency initiatives for 2000/01. Paragraphs 4 – 16 above explained that EEO remains fully committed to existing important initiatives. To ensure timely and effective implementation of the new initiatives, Director of Electrical and Mechanical Services (DEMS) considers that the proposed new posts are the minimum requirement. Annex B shows the new organisation chart. The following paragraphs outlines the proposed duties of the proposed new sub-divisions.

Annex B

ENERGY EFFICIENCY AND CONSERVATION LEGISLATIONS SUB-DIVISON[5]

18. We believe we have achieved most the realistic energy efficiency gains available from voluntary measures. If we are to make significant improvements in future, we need to examine whether to introduce mandatory measures. The main duties of the engineer will include –

- collating relevant overseas experiences on implementing energy efficiency legislations;
- assessing the technical and practical issues involved;
- consulting the professional organisations, trade associations, interest groups, the public and other government departments;
- formulating a framework for the legislation;
- preparing draft drafting instructions;
- overseeing implementation of new statutory arrangements as they are phased in.

RENEWABLE ENERGY SUB-DIVISION[6]

19. We indicated in the 1999 Policy Objectives that we will study the feasibility of using renewable energy for small-scale power generation. Whilst this will not be sufficient to replace the fossil fuel based power generation to meet the growing demand for electricity, it would help to reduce the reliance on traditional fuel sources and emission of air pollutants including greenhouse gases.

20. The main task of the senior engineer will include –

- providing advice on the technical feasibility and economic benefits of renewable energy technologies and their applicability in Hong Kong now and in future;

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5 The proposed establishment of the Energy Efficiency and Conservation Legislations sub-division consists of one engineer.

6 The proposed establishment of the Renewable Energy sub-division consists of a senior engineer.

- examining and preparing design standards and guidelines for adopting renewable energy technologies in future government projects;
- managing a consultancy study on renewable energy together with a pilot project for photovoltaic panel installation in Government building(s) in 2000 and 2001 respectively.
- arranging publicity and organising technical seminars, workshops, public forums for different target groups in order to raise awareness of the general public in the use of renewable energy and to encourage their use and development by the private sector;
- replying to public enquiries on technical aspects and implementation of renewable energy technologies;

TRANSPORT & COMMERCIAL SECTORS SUB-DIVISION[7]

21. The transport and commercial sectors are the two main energy users. Improving their energy efficiency will contribute significantly to reducing emissions that adversely impact on local and regional air quality as well as enhancing Hong Kong's economic efficiency. The sub-division will –

Energy Efficiency Labelling Scheme for Vehicles

- collate and examine overseas experiences in implementing energy efficiency labelling schemes (EELS) for vehicles;
- consult the vehicle importers trade on a proposed EELS;
- formulate, implement and promote a new energy efficiency labelling scheme for vehicles appropriate to local conditions;
- assess applications, conduct compliance monitoring, inspect the registered vehicles and maintain a database of the registration records for public inspection.

Energy Consumption Indicator & Benchmarking

- manage a consultancy study in late 2000 to develop energy consumption indicators and benchmarks for selected segments in the transport and

[7] The proposed establishment of the Transport and Commercial Sectors sub-division consists of one senior engineer and one engineer.

commercial sectors;

- advise on setting future targets, track changes, compare with other countries and identify opportunities for new energy efficiency improvements;
- disseminate the information to respective energy consuming groups so that they can also use it to assess their performance, improve their energy efficiency and achieve cost savings;
- update and maintain the indicators/benchmarks; and
- develop indicators/benchmarks for other segments/sectors.

WATER-COOLED AIR CONDITIONING SYSTEMS (WACS) SUB-DIVISIONS[8]

22. We have submitted a separate paper together with this paper explaining the justifications and the scope of the different WACS studies. In the paper we explain the role of the sub-division in managing consultancy studies, implementing the WACS master development plan and managing the registration and licensing system for freshwater cooling towers.

NEW ENERGY EFFICIENCY DIVISION[9]

23. The Director of Electrical and Mechanical Services (DEMS) considers that, having regard to the scope, volume and complexity of the work arising from the new initiatives in paragraphs 18 – 22, the existing management structure of the EEO is no longer adequate. The existing Chief Engineer of EEO is already fully occupied with existing energy efficiency responsibilities and will in addition, supervise the work arising from the new initiatives on energy consumption indicators and energy efficiency in transport. He would be unable to devote sufficient attention to the other new initiatives.

24. DEMS proposes to establish a new Division, the Energy Efficiency

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8 The proposed establishment of the Water-cooled Air Conditioning Systems sub-divisions consist of two senior engineers and three engineers.

9 The proposed Energy Efficiency Division B consists of the Renewable Energy, the Water-cooled Air Conditioning Systems and the Energy Efficiency and Conservation Legislations sub-divisions.

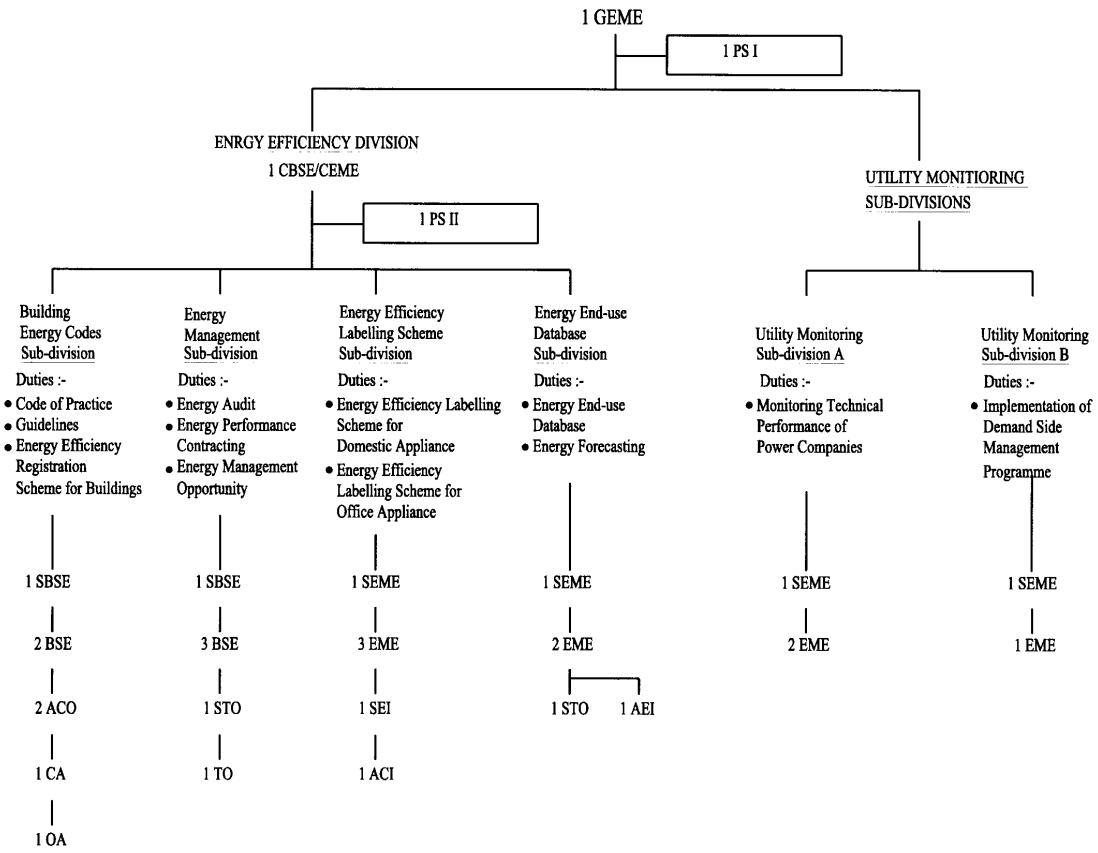
Division B, within the EEO to undertake responsibility for all matters relating to WACS, renewable energy, and energy efficiency and conservation legislation. In view of the significant role of the new Division and the substantial engineering expertise required, DEMS considers that it should be led by a Chief Building Services Engineer of appropriate experience and seniority. Subject to Members' advice, we will apply to the Establishment Subcommittee for the creation of the proposed Chief Building Services Engineer (D1) post in April 2000.

Energy Efficiency Office
Electrical and Mechanical Services Department
February 2000

Legends :-

GEME	GOVERNMENT ELECTRICAL & MECHANICAL ENGINEER
CBSE	CHIEF BUILDING SERVICES ENGINEER
CBSE/CEME	CHIEF BUILDING SERVICES/ELECTRICAL & MECHANICAL ENGINEER
SE	SENIOR ENGINEER (MULTI-DISCIPLINE)
SEME	SENIOR ELECTRICAL & MECHANICAL SERVICES ENGINEER
SBSE	SENIOR BUILDING SERVICES ENGINEER
EME	ELECTRICAL & MECHANICAL ENGINEER
BSE	BUILDING SERVICES ENGINEER
E	ENGINEER (MULTI-DISCIPLINE)
STO	SENIOR TECHNICAL OFFICER
TO	TECHNICAL OFFICER
SEI	SENIOR ELECTRICAL INSPECTOR
ACI	AIR-CONDITIONING INSPECTOR
AEI	ASSISTANT ELECTRICAL INSPECTOR
ACO	ASSISTANT CLERICAL OFFICER
CA	CLERICAL ASSISTANT
OA	OFFICE ASSISTANT
PS I/II	PERSONNAL SECRETARY I/II

Existing Organisation Chart for Energy Efficiency Office



As at 15.11.1999

Establishment Rank	No.
GEME	1
CBSE/CEME	1
SEME	4
EME/AEME	8
SBSE	2
BSE/ABSE	5
PS I	1
PS II	1
STO	2
TO	1
SEI	1
ACI	1
AEI	1
ACO	2
CA	1
OA	1
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ANNEX A

Proposed Organisation Chart for Energy Efficiency Office

Legends : -

GEME	GOVERNMENT ELECTRICAL & MECHANICAL ENGINEER
CBSE	CHIEF BUILDING SERVICES ENGINEER
CBSE/CEME	CHIEF BUILDING SERVICES/ELECTRICAL & MECHANICAL ENGINEER
SE	SENIOR ENGINEER (MULTI-DISCIPLINE)
SEME	SENIOR ELECTRICAL & MECHANICAL SERVICES ENGINEER
SBSE	SENIOR BUILDING SERVICES ENGINEER
EME	ELECTRICAL & MECHANICAL ENGINEER
BSE	BUILDING SERVICES ENGINEER
E	ENGINEER (MULTI-DISCIPLINE)
STO	SENIOR TECHNICAL OFFICER
TO	TECHNICAL OFFICER
SEI	SENIOR ELECTRICAL INSPECTOR
ACI	AIR-CONDITIONING INSPECTOR
AEI	ASSISTANT ELECTRICAL INSPECTOR
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