# CHAPTER 5

## Environment Bureau
## Electrical and Mechanical Services Department
## Architectural Services Department

# Energy efficiency and conservation in government buildings

**Audit Commission**
**Hong Kong**
**28 October 2020**

*This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.*

Report No. 75 of the Director of Audit contains 10 Chapters which are available on our website at https://www.aud.gov.hk

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# ENERGY EFFICIENCY AND CONSERVATION IN GOVERNMENT BUILDINGS

# Contents

**Appendices** **Page**

# ENERGY EFFICIENCY AND CONSERVATION IN GOVERNMENT BUILDINGS

# Executive Summary

1. In Hong Kong, more than half of the total annual energy use is in the form of electricity consumption, with buildings accounting for about 90% of the city's electricity consumption. Enhancing energy efficiency and conservation in government buildings, being one of the Government's priority tasks, could contribute to the reduction of electricity consumption. The Government has been taking the lead to reduce electricity consumption in government buildings by setting energy saving targets so as to set a good example for the community. The Government has set 4 rounds of electricity saving targets for government buildings for the period from 2003-04 to 2019-20 (with the related targets achieved) and a new green energy target for the 5-year period from 2020-21 to 2024-25. The Environment Bureau (ENB) is responsible for energy efficiency and conservation policy, including setting the Government's energy saving targets, formulating strategies for achieving the targets and monitoring the implementation progress. The Electrical and Mechanical Services Department (EMSD) is mainly responsible for monitoring the progress in achieving the energy saving target, coordinating and overseeing the conduct of energy audits and retro-commissioning (RCx) for selected government buildings, and administering the funding applications of energy savings projects in government buildings under a block vote of the General Revenue Account. The Architectural Services Department (ArchSD) is mainly responsible for administering a block vote for minor building works of the Capital Works Reserve Fund, implementing energy saving projects in government buildings which involve building works and monitoring the implementation progress of such projects. The Audit Commission (Audit) has recently conducted a review to examine the work of ENB, EMSD and ArchSD for energy efficiency and conservation in government buildings.

## Achievement of energy saving targets

2. ***Need to explore measures to complete the compilation and submission of annual reports on achievement of energy saving target as early as possible.*** For the latest electricity saving target, the 2015 Policy Address announced a target of

5% saving in the total electricity consumption of government buildings for the 5-year period from 2015-16 to 2019-20 (2015-20 electricity saving target) under comparable operating conditions in 2013-14 as the baseline. EMSD (through its Energy Efficiency Office (EEO)) is responsible for analysing and aggregating electricity consumption data from government bureaux/departments (B/Ds) to determine the government-wide achievement of the 2015-20 electricity saving target and compile an annual report on achievement of the target for reporting to ENB. According to ENB, the 2015-20 electricity saving target had already been achieved in 2018-19 with an overall electricity saving of 5.7% up to 2018-19. According to EMSD, the final results (i.e. up to the final year of 2019-20) would be available in the first quarter of 2021. Audit noted that: (a) long time was taken by EMSD to compile (including collecting returns from B/Ds) and submit the annual reports to ENB for each year from 2015-16 to 2018-19, ranging from 11 to 13 months after the respective financial year end; and (b) B/Ds submitted returns on the total electricity consumption of the government buildings under their management to EMSD in the form of spreadsheets and EMSD had not made use of an information technology system with programming functions for importing and collating the data from B/Ds for generation of management reports. In Audit's view, EMSD needs to explore measures to complete the compilation and submission of the annual reports on achievement of energy saving target to ENB as early as possible, and make better use of information technology in compiling government-wide energy consumption data (paras. 2.2, 2.3, 2.5 and 2.6).

3. ***Need to continue to take follow-up actions on energy saving performance of B/Ds.*** Audit noted that, in September 2018, EEO took a new and one-off measure to assist B/Ds to improve their electricity saving performance by: (a) conducting an analysis on B/Ds' electricity saving performance (up to 2016-17) and identifying 13 B/Ds whose performance was below the government-wide achievement of electricity saving; and (b) requesting the Electrical and Mechanical Services Trading Fund (the maintenance agent of the concerned B/Ds for electrical and mechanical installations) to provide technical assistance to help the 13 B/Ds improve their electricity saving performance. In Audit's view, there is merit for EMSD to continue to take follow-up actions on the energy saving performance of B/Ds (paras. 2.7 and 2.8).

4. ***Scope for improvement in the normalisation process.*** According to EMSD, for the purpose of evaluating the achievement of electricity saving target, normalisation is applied to the raw electricity consumptions for discounting the effect of activity changes in the calculation of electricity savings under comparable operating conditions in the base year. EMSD selects samples of normalisation calculations of

government venues submitted by B/Ds for checking. Audit examined the 2018-19 normalisation calculations of 15 government venues checked by EMSD and with comments on the calculations provided to the concerned B/Ds. While all the concerned B/Ds had responded to EMSD's comments, Audit noted that, for 4 of the 15 government venues, there might be scope for EMSD to seek further clarifications on the effect of activity changes on normalisation calculations from the concerned B/Ds responsible for managing them. Audit also noted that: (a) there were no detailed guidelines on the procedures for checking normalisation calculations submitted by B/Ds; and (b) regular management information for the checking results of normalisation calculations had not been compiled (paras. 2.14, 2.16 and 2.17).

5. ***Need to keep under review the implementation of green energy target.*** The 2019 Policy Address announced a green energy target of 6% improvement in energy performance for the 5-year period from 2020-21 to 2024-25 under comparable operating conditions in 2018-19 as the baseline. The green energy target, being a new initiative, covers certain new areas including electricity consumptions in government infrastructures and other forms of energy (e.g. town gas and liquefied petroleum gas) consumptions in government buildings and infrastructures. Audit noted that EMSD had issued guidelines on applying normalisation to electricity consumption but not for the consumption in other forms of energy. In Audit's view, ENB and EMSD need to keep under review the implementation of measures by B/Ds to achieve the green energy target (in particular the new areas covered by the target) and provide necessary assistance to help B/Ds achieve the target (paras. 2.20 and 2.21).

6. ***Need to complete renewable energy (RE) projects at existing government buildings as early as possible.*** Since 2017-18 and up to 2019-20, a total of $2 billion has been earmarked for installation of small-scale RE systems at existing government buildings and infrastructures. Regarding the small-scale RE project proposals for government buildings submitted by B/Ds from 2017-18 to 2019-20 and implemented by ArchSD, as of June 2020, 67 projects had been approved for implementation, of which 28 projects had been completed and 39 projects were at planning or construction stages. Audit noted that the progress of 9 of the 39 RE projects (at planning or construction stages) were about 3 to 5 months later than their original completion dates. Audit also noted that, as of June 2020, there were 14 project proposals under feasibility study by ArchSD. These proposals were submitted by B/Ds to ArchSD before August 2018 (i.e. about 2 years ago). As the green energy target recognises the contribution of RE, Audit considers that ArchSD needs to

complete the RE projects at existing government buildings as early as possible (paras. 2.22, 2.24 and 2.25).

## Management of energy audits and retro-commissioning for government buildings

7. ***Need to ensure that government buildings meeting the selection criteria are selected for conducting energy audits.*** Energy audit is a systematic review of the energy consuming equipment/systems in a building to identify energy management opportunities (EMOs). A total of 251 government buildings were shortlisted for conducting energy audits between 2020-21 and 2022-23 to identify EMOs for achieving the green energy target. One of the selection criteria is buildings with an annual electricity consumption above 500,000 kilowatt-hours each in 2017-18 and potential for further electricity saving. Audit found that 5 government buildings fulfilling this selection criterion were not shortlisted. After verification by EMSD upon Audit's referral, EMSD advised that it would further review with the B/Ds concerned the need for conducting energy audits for 4 of the 5 government buildings (the other building had been closed for demolition after 2017-18). In Audit's view, EMSD needs to take measures to ensure that government buildings meeting the selection criteria are selected for conducting energy audits and early complete the reviews on the need for conducting energy audits for the government buildings identified by Audit (paras. 3.2, 3.4, 3.6 and 3.7).

8. ***Scope for obtaining information for selected government buildings on implementation of EMOs identified in energy audits.*** According to EMSD, 344 government buildings were selected for conducting energy audits between 2015-16 and 2016-17 under the last energy audit programme for achieving the 2015-20 electricity saving target. Of these 344 government buildings, 136 (40%) buildings were included in the current energy audit programme (between 2020-21 and 2022-23) again for achieving the green energy target. The need to conduct energy audits again for the 136 government buildings within a short period was mainly due to the fact that their electricity saving performance was below average in 2017-18. In fact, Audit noted that the electricity saving performance of 106 (78%) of the 136 government buildings was also below average in 2018-19. In this connection, according to EMSD: (a) an energy audit can achieve energy efficiency and conservation through the implementation of EMOs identified in the audit; and (b) B/Ds are responsible for identifying and prioritising the recommendations for EMOs in the energy audit reports for implementation as far as practicable. However,

Audit noted that there was no requirement for B/Ds to provide information to EMSD on the implementation of EMOs and the related energy savings achieved (paras. 3.4, 3.8 and 3.9).

9. ***Need to keep under review the RCx implementation timetable for government buildings.*** RCx is a systematic and cost-effective process to periodically check an existing building's energy and other performances to identify energy saving opportunities. In 2018, EMSD identified 280 government buildings and invited the pertinent B/Ds to conduct RCx for the government buildings under their management through a 7-year RCx programme from 2019-20 to 2025-26. In the event, RCx would be conducted for 230 (82%) government buildings. According to EMSD, as of September 2020: (a) the RCx study for 44 of the 230 government buildings had commenced; and (b) a tentative RCx implementation timetable for the remaining 186 government buildings had been prepared. In Audit's view, EMSD needs to keep under review the RCx implementation timetable for government buildings included in the RCx programme and confirm the implementation schedule with the concerned B/Ds as early as possible (paras. 3.12, 3.16, 3.25 and 3.26).

10. ***Need to encourage the pertinent B/Ds to include the government buildings under their management in the RCx programme.*** There were 50 government buildings for which the pertinent B/Ds had not yet decided whether they would be included in the RCx programme. According to EMSD, some of the 50 buildings might be included for implementing RCx at a later stage. In Audit's view, EMSD needs to take measures to encourage the pertinent B/Ds to include the government buildings under their management in the RCx programme (paras. 3.27 and 3.28).

## Management of energy saving projects and other management issues

11. ***Scope for improvement in monitoring the progress of energy saving projects.*** Funding of about $700 million has been earmarked under a block vote controlled by EMSD (EMSD Block Vote) for the gradual implementation of energy saving projects in government buildings from 2017-18 to 2021-22. As of March 2020, of the 267 energy saving projects funded under EMSD Block Vote, 174 (65%) projects had been completed and 93 (35%) projects were with works in progress. For the 93 projects with works in progress, 18 (19%) projects (all were

with one-year implementation programme) were behind schedule, ranging from 0.9 to 1.9 years (paras. 4.2, 4.5 and 4.6).

12. ***Scope for improving performance measurements for energy saving projects.*** According to EEO, upon completion of an energy saving project funded under EMSD Block Vote, the B/D concerned and/or its works agent are required to conduct performance measurement (i.e. measurement and verification of actual payback period and electricity saving) for the project within the one-year defects liability period. As of March 2020, of the 174 completed energy saving projects funded under EMSD Block Vote, performance measurements for 136 projects had been completed while those for the remaining 38 projects were in progress. Audit noted that, for 3 (8%) of the 38 projects, while the projects had been completed for more than 1 year as of March 2020, the performance measurements were still in progress (para. 4.9).

13. ***Scope for improving accuracy of project estimates.*** When submitting a funding application for energy saving project under EMSD Block Vote, B/Ds and/or their works agents for building services installations are required to provide a project estimate on the funding application form. Audit examination found that, of the 267 energy saving projects funded under EMSD Block Vote as of March 2020, 121 (45%) projects had changes in approved project estimate (APE), comprising 47 projects with an increase in APE (ranging from 4% to 300% of the original APE of each project, averaging 48%) and 74 projects with a decrease in APE (ranging from 2% to 96% of the original APE of each project, averaging 41%) (para. 4.11).

14. ***Scope for improvement in monitoring the progress and cashflow of energy saving projects.*** Apart from the funding under EMSD Block Vote, funding of about $200 million has also been earmarked under a block vote controlled by ArchSD (the Minor Building Works Block Vote) for the gradual implementation of energy saving projects in government buildings from 2017-18 to 2021-22. As of March 2020, there were 204 energy saving projects funded under the Minor Building Works Block Vote controlled by ArchSD. To avoid funds being tied up by projects which are not yet ready for implementation, ArchSD will only consider B/Ds' proposed energy saving projects with at least 10% to 20% of the estimated cashflow to be incurred in the year of approval. However, Audit examination found that: (a) 58 (28%) of the 204 projects had not incurred any expenditure in the year of approval; and (b) of the 58 projects, 17 (29%) projects (with a total APE of $19 million) had not incurred any

expenditure in subsequent year after the year of approval as of March 2020 (paras. 4.2 and 4.17 to 4.19).

15. ***Need to require the B/Ds concerned or their works agents as appropriate to provide information on estimated payback periods and anticipated electricity savings of proposed energy saving projects when submitting funding applications.*** Audit noted that while EMSD had required B/Ds to provide information regarding estimated payback period and anticipated electricity saving on the funding application form for energy saving projects funded under its block vote, ArchSD had not required the B/Ds concerned or their works agents as appropriate to provide such information when submitting funding applications for proposed energy saving projects funded under the Minor Building Works Block Vote (para. 4.21).

16. ***Scope for enhancing the participation in green building certification.*** The Building Environmental Assessment Method (BEAM) Plus is a comprehensive assessment tool to certify green buildings in Hong Kong. All new government buildings of construction floor area above 5,000 square metres ($m^2$) with central air conditioning or above 10,000 $m^2$ should aim to obtain the second highest grade or above under BEAM Plus. From January 2015 to July 2020, ArchSD had completed 34 government building projects for which the green building certification requirement was applicable. Audit noted that, as of July 2020, 15 (44%) of the 34 projects had not yet obtained final green building certification. In addition, regarding existing government buildings, in June 2017, ENB informed the Legislative Council that it would encourage B/Ds to apply for BEAM Plus certification for such buildings to showcase the Government's commitment to green buildings. Audit noted that, as of July 2020, only 5 existing government buildings had obtained final BEAM Plus certification (paras. 4.28 to 4.30 and 4.32).

## Audit recommendations

17. **Audit recommendations are made in the respective sections of this Audit Report. Only the key ones are highlighted in this Executive Summary. Audit has *recommended* that the Director of Electrical and Mechanical Services should:**

*Achievement of energy saving targets*

(a) **explore measures to complete the compilation and submission of the annual reports on achievement of energy saving target to ENB as early as possible and make better use of information technology in compiling government-wide energy consumption data (para. 2.10(a) and (b));**

(b) **continue to take follow-up actions on the energy saving performance of B/Ds (para. 2.10(c));**

(c) **take measures to improve the normalisation process (para. 2.18);**

*Management of energy audits and RCx for government buildings*

(d) **take measures to ensure that government buildings meeting the selection criteria are selected for conducting energy audits and early complete the reviews on the need for conducting energy audits for the government buildings identified by Audit (para. 3.10(a) and (b));**

(e) **consider taking measures to collect information on the implementation of EMOs and the related energy savings achieved for selected government buildings as far as practicable (para. 3.10(c));**

(f) **keep under review the RCx implementation timetable for government buildings included in the RCx programme and confirm the implementation schedule with the concerned B/Ds as early as possible (para. 3.29(c));**

(g) **take measures to encourage the pertinent B/Ds to include the government buildings under their management in the RCx programme (para. 3.29(d)); and**

*Management of energy saving projects and other management issues*

(h) **in administering energy saving projects in government buildings and funded under EMSD Block Vote:**

(i) **closely liaise with the B/Ds concerned or their works agents as appropriate to request them to monitor the progress of energy saving projects (para. 4.14(a)); and**

(ii) **remind the B/Ds concerned or their works agents as appropriate to closely monitor the progress of performance measurements for completed energy saving projects and make more accurate project estimates for energy saving projects as far as practicable (para. 4.14(b)).**

18. **Audit has *recommended* that:**

*Achievement of energy saving targets*

(a) **the Secretary for the Environment and the Director of Electrical and Mechanical Services should keep under review the implementation of measures by B/Ds to achieve the green energy target and provide necessary assistance to help B/Ds achieve the target (para. 2.26(b)); and**

*Management of energy saving projects and other management issues*

(b) **the Secretary for the Environment should take measures to encourage B/Ds to apply for green building certification for the existing government buildings under their management (para. 4.34(b)).**

19. **Audit has *recommended* that the Director of Architectural Services should:**

*Achievement of energy saving targets*

(a) **complete the RE projects at existing government buildings as early as possible (para. 2.27);**

*Management of energy saving projects and other management issues*

(b) **in administering energy saving projects in government buildings and funded under the Minor Building Works Block Vote:**

(i) **remind the B/Ds concerned or their works agents as appropriate to make more accurate cashflow forecasts for energy saving projects, and inform ArchSD of the project status and cashflow regularly (para. 4.22(a)); and**

(ii) **require the B/Ds concerned or their works agents as appropriate to provide information on the estimated payback periods and anticipated electricity savings of proposed energy saving projects when submitting funding applications (para. 4.22(b)); and**

(c) **closely monitor the progress in making assessment submissions for green building certification for new government buildings (para. 4.36).**

## Response from the Government

20. The Secretary for the Environment, the Director of Electrical and Mechanical Services and the Director of Architectural Services agree with the audit recommendations.

# PART 1: INTRODUCTION

1.1 This PART describes the background to the audit and outlines the audit objectives and scope.

## *Background*

1.2 In Hong Kong, more than half of the total annual energy use is in the form of electricity consumption (Note 1), with buildings accounting for about 90% of the city's electricity consumption. Electricity is mainly generated by burning of fossil fuels (e.g. coal and natural gas). The process of electricity generation emits air pollutants (e.g. sulphur dioxide, nitrogen oxides and suspended particulates) and greenhouse gases (e.g. carbon dioxide, which is the main driver of climate change) (Note 2).

1.3 The Government is one of the major electricity consumers in Hong Kong, accounting for more than 6% of Hong Kong's electricity consumption (Note 3), with which it provides a range of essential public services. In each year from
2013-14 to 2019-20, its total annual electricity consumption was about 2.7 billion

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**Note 1:** *According to the Hong Kong Energy End-use Data 2020 issued by the Electrical and Mechanical Services Department, 55% of Hong Kong's total annual energy use in 2018 was in the form of electricity consumption, 28% in the form of oil and coal products, and 17% in the form of town gas and liquefied petroleum gas.*

**Note 2:** *Human activities (such as electricity generation, transport operation, waste disposal, industrial processes, etc.) produce greenhouse gas emissions. These gases act like a blanket in the atmosphere, trapping heat and keeping the Earth warm. However, excessive ambient concentration of greenhouse gas causes climate change, which is disrupting national economies and affecting lives given the significant impacts arising from changing weather patterns, rising sea level, and more extreme weather events. Among the different types of greenhouse gas, carbon dioxide is the most common type released to the atmosphere.*

**Note 3:** *The MTR Corporation Limited, the Hospital Authority, the Hong Kong Housing Authority and the Airport Authority Hong Kong are also major electricity consumers in Hong Kong, each accounting for about 1% to 4% of Hong Kong's electricity consumption.*

kilowatt-hours (kWh), more than half of which was used in government buildings (Note 4) with the remaining used in government infrastructures (Note 5) (see Table 1). Enhancing energy efficiency and conservation (Note 6) in government buildings, being one of the Government's priority tasks, could contribute to the reduction of electricity consumption (Note 7).

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**Note 4:** *Government buildings refer to all covered non-infrastructure venues and facilities occupied and/or managed by the Government, which include their associated open space or other facilities that support the main function of the venues and facilities, but exclude: (a) open space with separate energy meter (e.g. country parks, parks and playgrounds, sitting-out areas, beaches, amenities, soccer pitches, natural and artificial turf pitches, and tennis courts); (b) premises rented or on loan to non-government agencies who pay the energy bills themselves; and (c) staff quarters where individual tenants pay the energy bills. According to the Joint Circular on "Green Government Buildings" issued by the Development Bureau and the Environment Bureau in April 2015, there were some 8,000 buildings managed by the Government.*

**Note 5:** *Government infrastructures include: (a) facilities, services and installations occupied and/or managed by the Government to meet basic needs of the community such as water supplies, drainage services, land/passenger/marine/air transportation and road safety; and (b) venues and facilities in open space with separate energy meter.*

**Note 6:** *Energy efficiency relates to the minimisation of energy input in the processes of delivering a particular type of service while energy conservation relates to avoiding or reducing the use of energy in various situations. To achieve higher energy savings, both energy efficiency and conserving energy are relevant.*

**Note 7:** *Pursuant to the Paris Agreement (a legally binding global deal to combat climate change adopted by 195 countries including China) that came into effect in November 2016, Hong Kong Special Administrative Region (as part of China) was required to draw up its own long-term carbon emissions reduction strategies up to 2050 by 2020. In January 2017, the Government promulgated the "Hong Kong's Climate Action Plan 2030+". As local electricity generation is by far the biggest contributor to carbon emissions making up about 70%, promotion of energy efficiency and conservation in buildings, which could contribute to reduce electricity consumption, is one of the initiatives included in the Action Plan to reduce carbon emissions for combating climate change.*

**Table 1**

**Government's electricity consumption and expenditure (2013-14 to 2019-20)**

| Year | Electricity consumption | | | Electricity expenditure (Note 1) |
|---|---|---|---|---|
| | Buildings (million kWh) | Infrastructures (million kWh) | Total (million kWh) | ($ million) |
| 2013-14 | 1,420 (54%) | 1,194 (46%) | 2,614 (100%) | 2,795.5 |
| 2014-15 | 1,460 (54%) | 1,252 (46%) | 2,712 (100%) | 2,975.3 |
| 2015-16 | 1,476 (54%) | 1,246 (46%) | 2,722 (100%) | 2,976.6 |
| 2016-17 | 1,467 (54%) | 1,260 (46%) | 2,727 (100%) | 2,977.9 |
| 2017-18 | 1,449 (53%) | 1,286 (47%) | 2,735 (100%) | 2,888.7 |
| 2018-19 | 1,455 (52%) | 1,331 (48%) | 2,786 (100%) | 3,113.3 |
| 2019-20 | (Note 2) | | | 3,195.2 |
| Total | 8,727 (54%) | 7,569 (46%) | 16,296 (100%) | 20,922.5 |

*Source:* *Electrical and Mechanical Services Department and Treasury records*

*Note 1:* *The breakdown of electricity expenditure by government buildings and infrastructures is not available as government bureaux/departments are not required to submit the relevant information to the Electrical and Mechanical Services Department (see para. 1.6(a)).*

*Note 2:* *The electricity consumption data in government buildings and infrastructures in 2019-20 was not yet available as of August 2020. The Electrical and Mechanical Services Department called returns from government bureaux/departments in late June 2020 (see para. 1.6(a)(ii)). The returns were originally due for submission by mid-August 2020, which was extended to end-August 2020 as a result of the outbreak of the third wave of coronavirus disease (COVID-19) in July 2020.*

## *Energy saving policy and strategy*

1.4 In May 2015, the Government promulgated the "Energy Saving Plan for Hong Kong's Built Environment 2015～2025+" (hereinafter referred to as the Energy Saving Plan). Being the first-ever energy saving blueprint for Hong Kong, the Energy Saving Plan, among others, sets out the Government's energy saving policy and strategy, takes stock of past efforts and details the gaps and challenges with

a view to engaging the community to discuss the way forward (Note 8). Hong Kong's energy saving policy is to drive energy saving through a combination of educational, social, economic and regulatory means, especially for buildings and inhabitants to become highly energy efficient by 2025. The energy saving strategies include the Government taking the lead and improving building energy efficiency for both new and existing buildings (Note 9). Key actions include leading the energy saving and green building transformation through government buildings and public sector development, and achieving 5% electricity saving target for government buildings by 2019-20 under comparable operating conditions in 2013-14 as the baseline.

## *Energy saving targets*

1.5 According to the Energy Saving Plan, the Government has been taking the lead to reduce electricity consumption in government buildings by setting energy saving targets so as to set a good example for the community. Since 2003, the Government has set 5 rounds of energy saving targets, comprising 4 electricity saving targets and 1 green energy target, as follows:

(a) ***Electricity saving targets.*** For the period from 2003-04 to 2019-20, the Government set 4 rounds of electricity saving targets for government buildings under comparable operating conditions in the base year and achieved the related targets (see Table 2); and

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**Note 8:** *The Energy Saving Plan also sets out a new target of reducing Hong Kong's energy intensity (i.e. energy demand per unit of gross domestic product) by 40% by 2025, using 2005 as the base. According to the Electrical and Mechanical Services Department, Hong Kong's energy intensity had decreased by 32.8% from 2005 to 2018.*

**Note 9:** *Other energy saving strategies are enabling companies, institutions and residents to make energy efficiency choices when they invest in electrical appliances and vehicles, and promoting energy saving practices and lifestyle for the people of Hong Kong.*

**Table 2**

**Electricity saving targets and achievements (2003-04 to 2019-20)**

| Period (Note 1) | Base year | Electricity saving | |
|---|---|---|---|
| | | Target | Achievement |
| (a) 2003-04 to 2006-07 | 2002-03 | 6.0% | 6.9% |
| (b) 2006 | 2005 | 1.5% (Note 2) | 2.9% |
| (c) 2009-10 to 2013-14 | 2007-08 | 5.0% | 9.2% |
| (d) 2015-16 to 2019-20 | 2013-14 | 5.0% (Note 3) | 5.7% (up to 2018-19 — Note 3) |

*Source:* *Electrical and Mechanical Services Department records*

*Note 1:* *The first round of electricity saving target was set by the Government in 2003. The other three rounds of electricity saving targets were announced in the relevant Policy Address.*

*Note 2:* *The electricity saving target took place in parallel with the 6% target for 2003-04 to 2006-07.*

*Note 3:* *The electricity saving target of 5% was a key action under the Energy Saving Plan (see para. 1.4). The overall electricity saving was 5.7% up to 2018-19. As of August 2020, the electricity saving data up to 2019-20 was not yet available. The Electrical and Mechanical Services Department called returns from government bureaux/departments in late June 2020. The returns were originally due for submission by mid-August 2020, which was extended to end-August 2020 as a result of the outbreak of the third wave of coronavirus disease (COVID-19) in July 2020.*

(b) ***Green energy target.*** According to the Energy Saving Plan, it would be possible for the Government to consider setting further energy saving targets in 2020, 2025 and to continue up until 2035. As announced in the 2019 Policy Address, the Government has set a green energy target of 6% improvement in energy performance for the 5-year period from 2020-21 to 2024-25 under comparable operating conditions in 2018-19 as the baseline. The green energy target covers not only government buildings but also infrastructures, and requires not only saving in the consumption of electricity but also other forms of energy (e.g. town gas and liquefied

petroleum gas). The energy contribution of renewable energy (RE) projects will also be taken into account as achievement in improving energy performance.

## *Responsibilities of government bureaux/departments relating to energy saving target*

1.6 The Environment Bureau (ENB — Note 10) is responsible for energy efficiency and conservation policy, including setting the Government's energy saving targets, formulating strategies for achieving the targets and monitoring the implementation progress. The responsibilities of other government bureaux/departments (B/Ds) relating to energy saving target are as follows:

(a) ***Electrical and Mechanical Services Department (EMSD).*** The Energy Efficiency Office (EEO) of EMSD (see Appendix A for an extract of EMSD's organisation chart as at 31 July 2020) is responsible for:

(i) providing professional advice and administrative support to ENB through promotion, development and implementation of energy saving initiatives, and providing guidelines on housekeeping measures and best practices for energy savings;

(ii) monitoring the progress in achieving the energy saving target and providing the government-wide statistical information for planning, monitoring and reference purposes by calling returns from B/Ds on the total energy consumption, analysing energy consumption data from B/Ds, and aggregating energy consumption data from B/Ds to determine the government-wide achievement of the energy saving target for reporting to ENB;

(iii) coordinating and overseeing the conduct of energy audits and retro-commissioning (RCx) for selected government buildings. Energy audit and RCx are the tools to help B/Ds identify

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**Note 10:** *In July 2007, ENB was formed to take over the policy responsibility for environmental matters. From July 2002 to June 2007, the policy responsibility rested with the then Environment, Transport and Works Bureau, which is referred to as ENB in this Audit Report for simplicity.*

opportunities for reducing energy consumption in government buildings so as to achieve the energy saving target;

(iv) administering the funding applications of energy saving projects in government buildings under a block vote of the General Revenue Account (see para. 1.8(a)) and monitoring the project expenditure of such projects; and

(v) coordinating the Government's efforts in promoting energy efficiency and conservation, and providing technical advice and support to B/Ds on energy efficiency and conservation to facilitate the implementation of energy saving measures and projects (e.g. providing guidelines on housekeeping measures and best practices for energy savings, and organising seminars, briefing sessions and workshops).

As of July 2020, EEO, led by two Chief Engineers, had a staff establishment of 111, of which 6 had duties relating to energy efficiency and conservation in government buildings on a part-time basis (Note 11). In addition, the Electrical and Mechanical Services Trading Fund (EMSTF), i.e. the trading arm of EMSD, also provides operation and maintenance services to B/Ds on electrical and mechanical installations, and monitors the implementation progress of energy saving projects;

(b) ***Architectural Services Department (ArchSD).*** ArchSD is responsible for:

(i) the design and construction of government buildings, including the building services installations in the buildings;

(ii) planning and implementing minor building works and minor alterations, additions and improvement works (including furniture

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**Note 11:** *The other duties of the 6 staff mainly include publicising the energy end-use data for Hong Kong, assisting ENB in setting energy saving targets and organising the annual "Energy Saving for All" campaign (which is a major community engagement programme on energy saving). According to EMSD, as EEO's staff are multi-tasked, it is not feasible to provide a breakdown of staff resources solely for the work on energy efficiency and conservation in government buildings.*

and equipment replacement incidental to such works) for government buildings through its Property Services Branch;

(iii) administering a block vote of the Capital Works Reserve Fund (see para. 1.7) for which the Director of Architectural Services is the Controlling Officer (Note 12). Items to be funded under the block vote include energy saving projects in government buildings; and

(iv) implementing energy saving projects in government buildings which involve building works and monitoring the implementation progress of such projects. In carrying out its projects for new and existing buildings, ArchSD will incorporate energy-efficient features for building services installations where appropriate (Note 13); and

(c) ***Individual B/Ds.*** Individual B/Ds, through their Green Managers (Note 14), are responsible for formulating and implementing energy saving and improvement measures for government buildings under their management having regard to their operational constraints and the results of energy audits and RCx, including the implementation of energy saving projects (see paras. 1.7 and 1.8) and the adoption of housekeeping measures

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**Note 12:** *For administering the block vote, ArchSD: (a) calls for bids from individual B/Ds for items to be funded under the block vote; (b) proposes the estimates; (c) administers funding applications; and (d) monitors and controls expenditure from the block vote to keep the total expenditure and the level of over-commitment strictly within approved limits.*

**Note 13:** *According to ArchSD, it does not have a dedicated team for the work on energy efficiency and conservation in new and existing government buildings. The application of energy-efficient features to ArchSD's projects would be considered by different project teams when they implement the projects. There is no separate record on staff headcount and resources solely for the work on energy efficiency and conservation in government buildings.*

**Note 14:** *The Government introduced in 1993 a Green Manager Scheme in which Directors/Heads of B/Ds are required to appoint Green Managers to promote green management in their B/Ds. The Green Managers, who should preferably be at directorate level, provide a focal point for introducing and reviewing initiatives to improve the performance of their B/Ds in green management. The responsibilities of Green Managers include: (a) implementing a programme of green housekeeping within the B/D; (b) introducing measures to enhance staff consciousness and involvement in relation to environmental issues; and (c) publicising the commitment to protecting the environment, formulating action plans and recording achievements.*

and best practices for energy savings. B/Ds should monitor their progress in achieving the energy saving target and submit annual returns (e.g. total energy consumption) to EMSD (Note 15). As for B/Ds which do not have government buildings under their management, these B/Ds are encouraged to adopt the energy saving measures published by EMSD, as well as the recommended housekeeping measures and best practices for energy savings.

## *Energy saving projects in government buildings*

1.7 For energy saving projects in government buildings, B/Ds could submit funding applications for such projects to ArchSD under a block vote for minor building works (Head 703 (Buildings), Subhead 3101GX — Note 16) of the Capital Works Reserve Fund. The energy saving projects funded under this block vote are minor building works involving building services installations in government buildings, subject to a maximum ceiling of expenditure not exceeding $30 million per project.

1.8 To assist the relevant B/Ds in the implementation of energy saving projects in government buildings, as announced in the 2017 Policy Address, the Government has earmarked at least $500 million for the gradual implementation of such projects from 2017-18 to 2021-22. The earmarked funding provision was later increased to about $600 million in 2018-19 and further increased to about $900 million in 2019-20, of which:

(a) about $700 million was earmarked under a block vote for energy saving projects in government buildings (Head 42 (EMSD), Subhead 696) of the General Revenue Account. The energy saving projects funded under this block vote controlled by EMSD merely involve installation or replacement

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**Note 15:** *For buildings managed by the Government Property Agency, the Government Property Agency is responsible for reporting to EMSD on behalf of user B/Ds of the buildings.*

**Note 16:** *Subhead 3101GX is for minor building works, fitting-out works and minor alterations, additions and improvement works (including furniture and equipment replacement incidental to such works), and slope inspections and minor slope improvement works, subject to a maximum ceiling of expenditure not exceeding $30 million per project.*

of electrical and mechanical equipment/facilities (e.g. chiller plant) with energy saving potential where the estimated project cost is over $0.2 million but not exceeding $10 million; and

(b) about $200 million was earmarked under a block vote (Subhead 3101GX) controlled by ArchSD (see para. 1.7).

EMSD and ArchSD will invite B/Ds to submit funding applications for energy saving projects annually. Depending on the nature of energy saving projects, B/Ds may submit funding applications for such projects to EMSD or ArchSD.

## Audit review

1.9 In May 2020, the Audit Commission (Audit) commenced a review to examine the work of ENB, EMSD and ArchSD for energy efficiency and conservation in government buildings. The audit review has focused on the following areas:

(a) achievement of energy saving targets (PART 2);

(b) management of energy audits and RCx for government buildings (PART 3); and

(c) management of energy saving projects and other management issues (PART 4).

Audit has found room for improvement in the above areas and has made a number of recommendations to address the issues.

## Acknowledgement

1.10 During the audit review, in light of the outbreak of coronavirus disease (COVID-19), the Government had implemented various special work arrangements and targeted measures for government employees, including working from home. Audit would like to acknowledge with gratitude the full cooperation of the staff of ENB, EMSD and ArchSD during the course of the audit review amid the COVID-19 epidemic.

# PART 2: ACHIEVEMENT OF ENERGY SAVING TARGETS

2.1 The Government completed the implementation of 4 rounds of electricity saving targets for the period from 2003-04 to 2019-20 and has started the implementation of the green energy target for the 5-year period from 2020-21 to 2024-25 (see para. 1.5). This PART examines the Government's work in implementing the latest electricity saving target and the new green energy target, focusing on:

(a) electricity saving target for 2015-16 to 2019-20 (paras. 2.2 to 2.13);

(b) normalisation process (paras. 2.14 to 2.19); and

(c) green energy target (paras. 2.20 to 2.30).

## Electricity saving target for 2015-16 to 2019-20

2.2 As announced in the 2015 Policy Address, the Government has set a target of 5% saving in the total electricity consumption of government buildings (Note 17) for the 5-year period from 2015-16 to 2019-20 (hereinafter referred to as the 2015-20 electricity saving target) under comparable operating conditions in 2013-14 as the baseline. In March 2015, ENB issued Circular Memorandum No. 2/2015 "Electricity Saving in Government Buildings" (hereinafter referred to as the 2015 Circular Memorandum) to B/Ds announcing the arrangements for implementing the 2015-20 electricity saving target. According to ENB, the 2015-20 electricity

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**Note 17:** *Government buildings are classified into six categories, as follows: (a) health facilities, which include premises used for providing health services, excluding hospitals under the purview of the Hospital Authority; (b) office type buildings, which include venues primarily for office usage, excluding offices classified under venues managed by disciplined services departments; (c) venues and facilities managed by disciplined services departments; (d) recreational and cultural buildings/venues, which include venues and facilities where the main functions are for leisure, recreational and cultural activities, including those offices within the premises; (e) schools and educational buildings, which include venues intended for educational purpose; and (f) miscellaneous, which include venues and facilities not classified under the above five categories (e.g. stores, depots, workshops, markets, crematoriums, and municipal services buildings/complexes).*

saving target had already been achieved in 2018-19 (i.e. 4 years after implementation and a year ahead of schedule) with an overall electricity saving of 5.7% up to 2018-19. According to EMSD, the final results (i.e. up to the final year of 2019-20) of the achievement of the 2015-20 electricity saving target would be available in the first quarter of 2021 (see Note to Table 3 in para. 2.3).

## *Need to explore measures to complete the compilation and submission of annual reports on achievement of energy saving target as early as possible*

2.3 EMSD (through its EEO) is responsible for monitoring the progress in achieving the 2015-20 electricity saving target by calling returns from B/Ds on the total electricity consumption of the government buildings under their management on an annual basis, analysing electricity consumption data from B/Ds, and aggregating electricity consumption data from B/Ds to determine the government-wide achievement of the 2015-20 electricity saving target and compile an annual report on achievement of the target for reporting to ENB. Audit noted that long time was taken by EMSD to compile (including collecting returns from B/Ds) and submit the annual reports to ENB for each year from 2015-16 to 2018-19, ranging from 11 to 13 months after the respective financial year end (see Table 3).

**Table 3**

**EMSD's compilation of annual reports on achievement of the 2015-20 electricity saving target (August 2020)**

| Period | Calling of returns from B/Ds by EMSD | Deadline for submission of returns to EMSD | Submission of annual report to ENB | Time elapsed between financial year end to submission of annual report |
|---|---|---|---|---|
| 2015-16 | Jul 2016 | Aug 2016 | Mar 2017 | 12 months |
| 2016-17 | Jul 2017 | Sep 2017 | May 2018 | 13 months |
| 2017-18 | May 2018 | Aug 2018 | Feb 2019 | 11 months |
| 2018-19 | Jun 2019 | Aug 2019 | Mar 2020 | 11 months |
| 2019-20 | Jun 2020 (Note) | Aug 2020 (Note) | Not yet submitted | N/A |

*Source:* *EMSD records*

*Note:* *EMSD called returns from B/Ds in late June 2020. The returns were originally due for submission by mid-August 2020, which was extended to end-August 2020 as a result of the outbreak of the third wave of COVID-19 in July 2020.*

2.4 In September 2020, EMSD informed Audit that:

(a) the deadlines for submission of returns by B/Ds were set at August/September of the financial year subsequent to the respective reporting financial years. As the returns involved some 70 B/Ds responsible for managing over 2,000 government venues (Note 18), according to EMSD's experience from the past years, only around half of the returns from B/Ds could be available by the respective deadlines. Typically, all the first submission of returns by B/Ds could only be available in October or even later. This could be attributable to the fact that electricity bills for the last month of the reporting financial year (i.e. March) were only available by early May as the billing cycle of both electricity supply companies was around 30 days. Besides, B/Ds would have their own competitive priorities under their policy and operational portfolio;

(b) the preparation of the annual report on achievement of energy saving target was not a simple statistical exercise of raw data collection and summation. B/Ds had to collect all raw electricity consumption data as well as other information (e.g. the latest building usage, occupancy and patronage) to carry out necessary normalisation (see para. 2.16) before they could compile their returns for submission to EMSD. Such process involved much coordination work within B/Ds. Upon receipt of B/Ds' returns, an EEO officer would be assigned to sample check and dig out data which might require verification, provide feedback to the B/Ds concerned and take the subsequent follow-up actions. Rounds of clarifications and communications between EEO and the B/Ds concerned and revisions of relevant data might follow. After that, EEO would compile data and prepare the annual report for submission to ENB. All of the abovementioned procedures would take considerable time (about 2 to 3 months for each procedure) to complete; and

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**Note 18:** *According to EMSD, B/Ds compile returns on electricity consumptions of the government buildings under their management on a "government venue" basis. Each government venue may include one government building or certain government buildings at nearby location grouped together. Such groupings are decided by B/Ds on a case-by-case basis and in general follow the B/Ds' practice in monitoring the electricity consumptions over time.*

(c) nevertheless, on the whole, there might be room for expediting the process of compilation and submission of annual reports on achievement of energy saving target.

2.5 In Audit's view, EMSD needs to explore measures to complete the compilation and submission of the annual reports on achievement of energy saving target to ENB as early as possible with a view to providing the government-wide statistical information for planning, monitoring and reference purposes (see para. 1.6(a)(ii)).

2.6 Audit also noted that B/Ds submitted returns on the total electricity consumption of the government buildings under their management to EMSD in the form of spreadsheets and EMSD had not made use of an information technology system with programming functions for importing and collating the data from B/Ds for generation of management reports. In September 2020, EMSD informed Audit that:

(a) it was always in search of relevant information technology tools that might help improve the data compilation work; and

(b) in response to Audit's observations, it was reviewing the use of feasible and pragmatic information technology solutions that could help improve the data compilation work and the review would be completed by December 2020.

In Audit's view, EMSD needs to make better use of information technology in compiling government-wide energy consumption data with a view to enhancing the efficiency of the compilation work.

## *Need to continue to take follow-up actions on energy saving performance of B/Ds*

2.7 In September 2018, in view of the fact that half of the electricity saving cycle for the 2015-20 electricity saving target had passed and the actions in 2018 might be the last opportunity for B/Ds to make in-year bids for energy saving projects (of which the saving might be materialised and be counted in the cycle), EEO took a

new and one-off measure to assist B/Ds to improve their electricity saving performance by:

(a) conducting an analysis on B/Ds' electricity saving performance (up to 2016-17) and identifying 13 B/Ds whose performance was below the government-wide achievement of 3.4% electricity saving (up to 2016-17); and

(b) requesting EMSTF (the maintenance agent of the concerned B/Ds for electrical and mechanical installations) to provide technical assistance to help the 13 B/Ds improve their electricity saving performance, including ascertaining the reasons for performing below the government-wide achievement of electricity saving and urgently assisting the 13 B/Ds to submit proposals for energy saving projects.

2.8 While noting that the follow-up actions taken by EEO in September 2018 were a new and one-off measure to assist B/Ds to improve their electricity saving performance, in Audit's view, there is merit for EMSD to continue to take follow-up actions on the energy saving performance of B/Ds with a view to providing more technical assistance to help B/Ds improve their performance.

## *Need to encourage B/Ds to include their achievements in energy saving in environmental reports*

2.9 According to the 2015 Circular Memorandum, B/Ds are encouraged to include in the environmental reports their achievements in electricity saving in government buildings under their management. According to ENB Circular Memorandum No. 2/2017 "Controlling Officer's Environmental Report" issued in July 2017, Controlling Officers are requested to publish their environmental reports on their B/Ds' homepages on the Internet (Note 19). Audit conducted an Internet

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**Note 19:** *The Circular Memorandum also sets out that: (a) an environmental report demonstrates the Controlling Officer's awareness of the environmental aspects of his/her work, how these issues are being addressed and how it is intended to improve upon the environmental performance in future; and (b) B/Ds have to publish annual environmental reports approved personally by Controlling Officers during the calendar year following the calendar year being reported on (e.g. publication of 2018 report in 2019).*

search of B/Ds' publication of environmental reports for 2018 and found that, as of July 2020, 38 (57%) of 67 B/Ds with government buildings under their management (Note 20) had not included their achievements in electricity saving in their environmental reports. In Audit's view, ENB needs to take measures to encourage B/Ds to include their achievements in energy saving in their environmental reports.

## Audit recommendations

2.10 **Audit has *recommended* that the Director of Electrical and Mechanical Services should:**

(a) **explore measures to complete the compilation and submission of the annual reports on achievement of energy saving target to ENB as early as possible with a view to providing the government-wide statistical information for planning, monitoring and reference purposes;**

(b) **make better use of information technology in compiling government-wide energy consumption data with a view to enhancing the efficiency of the compilation work; and**

(c) **continue to take follow-up actions on the energy saving performance of B/Ds with a view to providing more technical assistance to help B/Ds improve their performance**.

2.11 **Audit has *recommended* that the Secretary for the Environment should take measures to encourage B/Ds to include their achievements in energy saving in their environmental reports.**

**Note 20:** *For 2018-19, 67 B/Ds had reported to EMSD the electricity consumptions of the government buildings under their management.*

## Response from the Government

2.12 The Director of Electrical and Mechanical Services agrees with the audit recommendations in paragraph 2.10. He has said that:

(a) as the compilation of the annual reports on achievement of energy saving target is much more than raw data collection and summation, and involves the process of data preparation and normalisation carried out by B/Ds, as well as sample checking conducted and the related follow-up clarifications sought by EMSD, the whole process would take considerable time to complete. EMSD will work closely with B/Ds to find ways to expedite the process as far as practicable;

(b) EMSD is always in search of relevant information technology tools that may help improve the data compilation work. A review of the use of feasible and pragmatic information technology solutions to improve the data compilation work is underway for planned completion by December 2020; and

(c) the one-off measure taken in September 2018 (i.e. reminding the relevant B/Ds that their electricity saving performance was below the government-wide achievement and urging them to submit proposals for energy saving projects) was to assist B/Ds to improve their electricity saving performance (see para. 2.7). EMSD is always willing to go the extra mile and will continue with the measure to remind the relevant B/Ds at an appropriate time when their energy saving performance falls short of the government-wide achievement with a view to providing more technical assistance to help them improve their performance.

2.13 The Secretary for the Environment agrees with the audit recommendation in paragraph 2.11. He has said that ENB will update the relevant guidelines to encourage B/Ds to include their achievements in energy saving in their environmental reports.

## Normalisation process

2.14 According to EMSD, for the purpose of evaluating the achievement of electricity saving target, normalisation (Note 21) is:

(a) applied to the raw electricity consumptions for discounting the effect of activity changes in the calculation of electricity savings under comparable operating conditions in the base year; and

(b) essential for improving the comparison between data collected under changed operational profiles so as to better reflect the actual electricity savings among years on a like-for-like basis.

2.15 Table 4 shows the analysis of total electricity consumption of government buildings for the period from 2015-16 to 2018-19.

**Note 21:** *According to EMSD guidelines on normalisation, activities of B/Ds evolve over time and are closely related to different operational profiles in meeting the public service demands. Changes in operational profile from year to year can have a significant impact on the electricity consumptions of B/Ds.*

**Table 4**

**Analysis of total electricity consumption of government buildings (2015-16 to 2018-19)**

| Year | Actual | | Normalisation (Note 1) | | |
|---|---|---|---|---|---|
| | Raw electricity consumption<br>(a)<br>(million kWh) | Change in raw electricity consumption as compared with base year (Note 2)<br>(b)<br>(%) | Normalised electricity consumption of comparable venues<br>(c)<br>(million kWh) | Base year electricity consumption of comparable venues<br>(d)<br>(million kWh) | Achievement of the 2015-20 electricity saving target<br>(e) = (c)-(d) / (d)<br>(%) |
| 2015-16 | 1,476 | +4.0% | 1,340 | 1,353 | −0.9% |
| 2016-17 | 1,467 | +3.4% | 1,284 | 1,330 | −3.4% |
| 2017-18 | 1,449 | +2.1% | 1,254 | 1,318 | −4.9% |
| 2018-19 | 1,455 | +2.5% | 1,238 | 1,312 | −5.7% |

*Source:* *EMSD records*

*Note 1:* *According to EMSD: (a) some government venues (see Note 18 to para. 2.4(a)) were closed or newly opened after 2013-14 (i.e. the base year); and (b) the closed and newly-opened government venues did not have electricity consumptions in the report year (e.g. 2018-19) and comparable baselines in 2013-14 respectively. Therefore, the evaluation of achievement in electricity saving was conducted on government venues having comparable baselines in 2013-14 only by excluding the electricity consumptions of the closed and newly-opened government venues.*

*Note 2:* *Total actual electricity consumption for the base year (2013-14) was 1,420 million kWh.*

*Remarks:* *According to EMSD, there may be a slight discrepancy between the shown percentage and calculation result by corresponding figures owing to rounding.*

2.16 EMSD provides guidelines on normalisation, conducts briefing sessions and renders assistance if B/Ds have queries in applying normalisation. The normalisation process is as follows:

(a) ***Application of normalisation by B/Ds.*** B/Ds are responsible for compiling energy saving data through maintaining records of electricity consumptions of government venues (see Note 18 to para. 2.4(a)) under their management, keeping track of their activity changes, and applying normalisation to the raw electricity consumptions to calculate the electricity

savings under comparable operating conditions in the base year for the purpose of submitting returns on the electricity consumptions (including raw and normalised electricity consumptions) to EMSD on an annual basis (see para. 2.3). According to EMSD guidelines on normalisation, if the normalised electricity saving is larger than 30%, B/Ds should carefully review the normalisation methodology to ensure that the normalisation is fully justified as under comparable operating conditions, and could seek advice from EMSD if needed; and

(b) ***Checking of normalisation calculations by EMSD.*** According to the 2015 Circular Memorandum, as parameters of discounting activity changes related to electricity consumptions for different government venues would vary, B/Ds are required to submit detailed normalisation calculations by government venues upon request by EMSD for review/verification of activity changes and electricity savings under comparable operating conditions. According to EMSD:

(i) it selects samples of government venues from B/Ds' returns for checking of normalisation calculations on a random basis;

(ii) as B/Ds are responsible for proper record-keeping and ensuring the correctness of data in their returns, EMSD's sample checking is conducted on a proforma basis only (i.e. only checking the reasonableness of the figures presented in the spreadsheet returns submitted by B/Ds and the underlying information supporting the figures will not be obtained and checked); and

(iii) during the checking, enquiries may be made to B/Ds for clarifications on parameters used for normalisation. Advice may also be provided to B/Ds for their consideration.

## *Scope for improvement in the normalisation process*

2.17 Audit noted that there was scope for improving the normalisation process, as follows:

(a) ***Scope for improving the checking of normalisation calculations by EMSD.*** Audit examined the 2018-19 normalisation calculations of 15 government venues checked by EMSD (the total number of calculations checked by EMSD was not available — see (c) below) and with comments on the calculations provided to the concerned B/Ds. All the concerned B/Ds had responded to EMSD's comments. For 4 of the 15 government venues, Audit noted that there might be scope for EMSD to seek further clarifications on the effect of activity changes on normalisation calculations from the concerned B/Ds responsible for managing them. However, as of March 2020 (i.e. the submission date of 2018-19 annual report on achievement of electricity saving target to ENB — see Table 3 in para. 2.3), clarifications had not been sought by EMSD;

(b) ***Scope for providing further guidelines for checking normalisation calculations.*** Regarding the checking of normalisation calculations submitted by B/Ds, there were no detailed guidelines on the checking procedures (e.g. sample selection criteria, sample size, and documentation of checking results and follow-up actions). There was scope for providing further guidelines to assist EMSD staff in this regard. In October 2020, EMSD informed Audit that a draft version of the guiding principles for checking normalisation calculations submitted by B/Ds had been prepared in September 2020; and

(c) ***Need to compile management information for checking results.*** EMSD had not compiled regular management information (e.g. number of calculations checked for each year, summary or highlights) for the checking results of normalisation calculations. In October 2020, EMSD informed Audit that the checking results and findings were discussed internally during the checking process and it had devised in September 2020 a set of management information to be compiled regularly for checking the returns on energy saving data from B/Ds.

## Audit recommendations

2.18 **Given that the proper application of normalisation to the raw electricity consumptions of government buildings is important for the evaluation of the achievement of the energy saving target, Audit has *recommended* that the Director of Electrical and Mechanical Services should take measures to improve the normalisation process with a view to facilitating the proper evaluation of the achievement of energy saving target, including:**

(a) **enhancing EMSD's follow-up actions on checking of B/Ds' normalisation calculations of energy saving (e.g. following up with B/Ds with outstanding responses and reminding B/Ds to fully explain the normalisation adjustments);**

(b) **early finalising and promulgating the guiding principles for checking normalisation calculations submitted by B/Ds (e.g. sample selection criteria, sample size, and documentation of checking results and follow-up actions) and reminding EMSD staff to conduct checking accordingly; and**

(c) **compiling regularly the management information for checking the returns on energy saving data from B/Ds.**

## Response from the Government

2.19 The Director of Electrical and Mechanical Services agrees with the audit recommendations. He has said that:

(a) EMSD provides training (see para. 4.24) on normalisation to B/Ds through annual briefings. The relevant guidelines and training materials are available on the Government's Central Cyber Government Office (CCGO) website for B/Ds' reference;

(b) B/Ds are responsible for compiling and reporting energy saving data as accurate as possible through maintaining the relevant records and carrying out normalisation of the raw data as necessary. In the process, EMSD assumes an advisory role, conducts sample checking of B/Ds' normalisation calculations and provides advice to B/Ds for their consideration during its

checking. Since the operational environment is unique for each government venue, the concerned B/D is at the best position and with the required information of the specific government venue to carry out normalisation that it considers appropriate. Generally, EMSD has no ground to disagree with the normalisation calculations made by B/Ds after B/Ds have considered its view; and

(c) EMSD will continue to take follow-up actions on checking of B/Ds' normalisation calculations of energy saving, enhance the follow-up actions with B/Ds with outstanding responses, and remind B/Ds to document the justifications on normalisation adjustments.

## Green energy target

2.20 As announced in the 2019 Policy Address, the Government has set a green energy target of 6% improvement in energy performance (covering electricity and other forms of energy for government buildings and infrastructures) for the 5-year period from 2020-21 to 2024-25 under comparable operating conditions in 2018-19 as the baseline (see para. 1.5(b)). In June 2020, ENB issued Circular Memorandum No. 1/2020 "Green Energy Target for Government Buildings and Infrastructure Facilities" (hereinafter referred to as the 2020 Circular Memorandum) to B/Ds setting out the actions that B/Ds should take to help achieve the green energy target.

### *Need to keep under review the implementation of green energy target*

2.21 The green energy target, being a new initiative, covers certain new areas including electricity consumptions in government infrastructures and other forms of energy (e.g. town gas and liquefied petroleum gas) consumptions in government buildings and infrastructures. Audit noted that EMSD had issued guidelines on applying normalisation to electricity consumption but not for the consumption in other forms of energy. In September 2020, EMSD informed Audit that the guidelines on applying normalisation to electricity consumption would be revised by incorporating normalisation in other forms of energy, and the revised guidelines would be issued by early 2021 so that B/Ds could make reference in their preparation of returns on energy saving data for the first year of implementing the green energy target. In Audit's view, ENB and EMSD need to:

(a) take into account the experience gained in implementing the 2015-20 electricity saving target and the audit findings in this Audit Report in implementing the green energy target; and

(b) keep under review the implementation of measures by B/Ds to achieve the green energy target (in particular the new areas covered by the target) and provide necessary assistance (e.g. issuing guidelines on applying normalisation to energy other than electricity as scheduled) to help B/Ds achieve the target.

## *Need to complete RE projects at existing government buildings as early as possible*

2.22 ***Funding for small-scale RE projects.*** According to the 2020 Circular Memorandum, the green energy target recognises the contribution of RE (Note 22), and B/Ds are encouraged to plan and roll out more small-scale RE projects at existing government buildings and infrastructures. Since 2017-18 and up to 2019-20, a total of $2 billion (Note 23) has been earmarked for installation of small-scale RE systems at existing government buildings and infrastructures, with an estimated project cost not exceeding $30 million per project.

2.23 ENB is the policy bureau responsible for the RE initiative. The implementation of small-scale RE projects is assisted by ArchSD and EMSD, as follows:

(a) ***RE projects at government buildings.*** These RE projects are implemented by ArchSD and funded under Subhead 3101GX (see Note 16 to para. 1.7).

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**Note 22:** *According to the Energy Saving Plan promulgated in May 2015 (see para. 1.4), RE systems (e.g. photovoltaic installations on government buildings and public facilities) could produce electricity.*

**Note 23:** *As announced in the 2017 Policy Address, to support the development of RE projects, $200 million was earmarked from 2017-18 for B/Ds to implement small-scale RE projects at existing government buildings and infrastructures. The earmarked funding provision was later increased to $1 billion in 2018-19 and further increased to $2 billion in 2019-20.*

ArchSD will invite B/Ds to submit proposals for these RE projects on an annual basis; and

(b) ***RE projects at government infrastructures.*** These RE projects are implemented by the works departments responsible for managing the infrastructures and funded under block votes for Category D projects (Note 24) of the Capital Works Reserve Fund controlled by the relevant works departments. EMSD is the coordinator for calling (on an annual basis) B/Ds' submission of RE project proposals and carrying out screening of the submitted proposals.

2.24 ***Implementation of RE projects at government buildings.*** Regarding the small-scale RE project proposals for government buildings submitted by B/Ds from 2017-18 to 2019-20 and implemented by ArchSD, as of June 2020:

(a) 67 projects had been approved for implementation with a total approved funding of $198 million. Of these 67 approved projects, 28 projects had been completed and 39 projects were at planning or construction stages (Note 25); and

(b) 14 project proposals by B/Ds were under feasibility study by ArchSD.

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**Note 24:** *Category D projects funded under various block votes cover thousands of minor works items, works related studies and site investigations, and standalone minor works items each costing not more than $30 million. Examples of these block votes relevant for RE projects at government infrastructures are: (a) Head 704 (Drainage), Subhead 4100DX for drainage works, studies and investigations controlled by the Drainage Services Department; and (b) Head 709 (Waterworks), Subhead 9100WX for waterworks, studies and investigations controlled by the Water Supplies Department.*

**Note 25:** *There were another 17 approved small-scale RE projects at government infrastructures implemented by the pertinent works departments with a total approved funding of $314 million. As of June 2020, of these 17 approved projects, 1 project had been completed and 16 projects were at planning or construction stages.*

2.25 Audit noted that:

(a) as of June 2020, for the 39 RE projects at government buildings (at planning or construction stages) implemented by ArchSD (see para. 2.24(a)), the progress of 9 projects were about 3 to 5 months later than their original completion dates (Note 26). In September 2020, ArchSD informed Audit that it was processing the extension of time applications for the 9 projects failing to meet the original completion dates. The reasons for the extension of time applications included extra time for design to overcome structural constraints, material delivery affected by the COVID-19 outbreak, and works rescheduling to suit building users' operations; and

(b) regarding the 14 project proposals under feasibility study as of June 2020 (see para. 2.24(b)), they were submitted by B/Ds to ArchSD before August 2018 (i.e. about 2 years ago). In September 2020, ArchSD informed Audit that, since September 2018, it had started to plan and carry out the feasibility studies for 178 RE project proposals by batches. The last batch involving the 14 project proposals would be completed by the end of 2020 as scheduled.

As the green energy target recognises the contribution of RE (see para. 2.22), Audit considers that ArchSD needs to complete the RE projects at existing government buildings as early as possible.

# Audit recommendations

2.26 **Audit has *recommended* that the Secretary for the Environment and the Director of Electrical and Mechanical Services should:**

**Note 26:** *According to ArchSD: (a) of the 39 RE projects at government buildings, 30 projects not due for completion as of June 2020 were on schedule; and (b) the time taken for completing RE projects at government buildings varies depending on the types of RE systems (e.g. solar lighting or photovoltaic systems) applied. The average original completion time for approved RE projects at government buildings as of June 2020 was about 1 year.*

(a) **take into account the experience gained in implementing the 2015-20 electricity saving target and the audit findings in this Audit Report in implementing the green energy target; and**

(b) **keep under review the implementation of measures by B/Ds to achieve the green energy target (in particular the new areas covered by the target) and provide necessary assistance (e.g. issuing guidelines on applying normalisation to energy other than electricity as scheduled) to help B/Ds achieve the target.**

2.27 **Audit has *recommended* that the Director of Architectural Services should complete the RE projects at existing government buildings as early as possible.**

## Response from the Government

2.28 The Secretary for the Environment agrees with the audit recommendations in paragraph 2.26. He has said that ENB will work with EMSD to take forward appropriate measures.

2.29 The Director of Electrical and Mechanical Services agrees with the audit recommendations in paragraph 2.26. He has said that EMSD will:

(a) take into account the experience gained in implementing the 2015-20 electricity saving target and the audit findings in this Audit Report in implementing the green energy target; and

(b) work closely with B/Ds to provide necessary assistance on normalisation to help B/Ds achieve the green energy target.

2.30 The Director of Architectural Services agrees with the audit recommendation in paragraph 2.27. She has said that ArchSD will closely monitor the progress of RE projects at various stage of implementation to ensure completion as early as possible.

# PART 3: MANAGEMENT OF ENERGY AUDITS AND RETRO-COMMISSIONING FOR GOVERNMENT BUILDINGS

3.1 This PART examines EMSD's work in coordinating and overseeing the conduct of energy audits (paras. 3.2 to 3.11) and RCx (paras. 3.12 to 3.30) for government buildings.

## Energy audits for government buildings

3.2 Energy audit is a systematic review of the energy consuming equipment/systems in a building to identify energy management opportunities (EMOs), which provides useful information for the building owner to decide on and implement the energy saving measures for environmental consideration and economic benefits. EMOs are classified into three categories, as follows:

(a) ***Category I.*** This category of EMO involves housekeeping measures which are improvements with practically no cost investment and no disruption to building operation (e.g. turning off air conditioning/lighting when not in use and adjusting air conditioning temperature set-points);

(b) ***Category II.*** This category of EMO involves changes in operation measures with relatively low cost investment (e.g. improvement in lighting switching arrangement and addition of timer control); and

(c) ***Category III.*** This category of EMO involves relatively higher capital cost investment to attain efficient use of energy (e.g. replacement of chillers).

3.3 According to the Code of Practice for Building Energy Audit (hereinafter referred to as the Energy Audit Code) issued by EMSD, the general procedures for conducting an energy audit are as follows:

(a) ***Collection of building information.*** An energy auditor will collect information on building operation and technical characteristics of various energy consuming equipment/systems relevant to the central building services installations. Examples of essential information to be collected

include inventories of the energy consuming equipment, equipment day-to-day operation records, energy consumption data of the building, and records of EMOs already implemented or to be implemented and corresponding energy audit report if available;

(b) ***Review of energy consuming equipment and systems.*** The energy auditor will study the information collected and conduct site inspections for an appreciation of the applicable energy consuming equipment and systems of the central building services installations. Based on the findings in the study and inspections, the energy auditor will compile records of the characteristics of the energy consuming equipment and systems;

(c) ***Identification of EMOs.*** The energy auditor will conduct an evaluation and appraisal on the energy consuming equipment/systems, focusing on their energy performance against their corresponding operating conditions. A comparison with original design with due consideration of relevant operating conditions will be conducted to identify if there are any deviations from efficient operation and to identify accordingly potential EMOs for improving energy efficiency. The findings may also identify potential EMOs contributing to the reduction of energy consumption of the central building services installations;

(d) ***Cost-benefit analysis of EMOs.*** For each potential EMO identified, the energy auditor will make an estimate on the energy saving that can be achieved if the EMO is implemented. For Categories II and III potential EMOs in which capital costs are involved (see para. 3.2(b) and (c)), the energy auditor will conduct a cost-benefit analysis, giving an estimate of the cost for the EMO against its estimated energy saving; and

(e) ***Recommendations and energy audit report.*** The energy auditor will make recommendations of EMOs to be implemented, with due regard to the energy savings, cost benefits, and the known operation and maintenance programme of the building concerned, in an energy audit report and submit the report to the building owner for consideration and endorsement.

## *Energy audit programmes for government buildings*

3.4 The energy audit programmes for government buildings arranged by EMSD are as follows:

(a) ***Energy audit programme for achieving the 2015-20 electricity saving target.*** To help achieve the 2015-20 electricity saving target (see para. 2.2), energy audits were conducted for major government buildings (Note 27) to identify EMOs. There were 344 major government buildings selected for conducting energy audits. EMSD was entrusted by the pertinent B/Ds for conducting energy audits for the 344 major government buildings. The energy audit work was outsourced to four energy audit consultants in 2015-16 and 2016-17 with a total expenditure of $7.8 million (funding provided by ENB) and all energy audits were completed by March 2017; and

(b) ***Energy audit programme for achieving the green energy target.*** With reference to the annual electricity consumption in 2017-18, 251 government buildings were shortlisted for conducting energy audits between 2020-21 and 2022-23 to identify EMOs for achieving the green energy target (see para. 2.20). According to the 2020 Circular Memorandum, the selection criteria are as follows:

(i) ***Criterion 1.*** Buildings with an annual electricity consumption above 500,000 kWh each in 2017-18 and potential for further electricity saving (i.e. buildings with 2017-18 electricity saving performance below average and no funding being sought from EMSD for implementing energy saving projects); or

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**Note 27:** *Government buildings with an annual electricity consumption above 500,000 kWh each in 2013-14 were considered as major government buildings, which accounted for about 90% of total electricity consumption of all government buildings. About 120 major government buildings that had gone through energy audits in accordance with EMSD's Energy Audit Code in the past three years (i.e. from 2012-13 to 2014-15) did not need to re-conduct energy audits in 2015-16 and 2016-17.*

(ii) ***Criterion 2.*** Buildings with an annual electricity consumption between 400,000 and 500,000 kWh each in 2017-18 (Note 28).

EMSD will provide funding for the energy audit programme, engage and supervise energy audit consultants, and oversee the entire audit processes for the shortlisted 251 government buildings. According to EMSD, as of August 2020, it was undergoing the tendering process for engaging energy audit consultants for the related work in line with the project programme.

3.5 Upon completion of energy audits, energy audit consultants would submit energy audit reports to EMSD (which would forward the reports to the pertinent B/Ds) and organise briefing sessions for stakeholders (such as B/Ds and EMSTF as the maintenance agent) explaining their recommendations for EMOs. B/Ds are responsible for identifying and prioritising the recommendations for EMOs in the energy audit reports for implementation (Note 29) as far as practicable within their operational constraints so that their actions will contribute to the fulfilment of the government-wide energy saving target.

## *Need to ensure that government buildings meeting the selection criteria are selected for conducting energy audits*

3.6 Regarding the 251 government buildings shortlisted by EMSD for conducting energy audits for achieving the green energy target (see para. 3.4(b)), Audit found that 5 government buildings fulfilling Criterion 1 (i.e. with an annual electricity consumption above 500,000 kWh each and potential for further electricity

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**Note 28:** *According to EMSD, 15 government buildings with an annual electricity consumption between 400,000 and 500,000 kWh each in 2017-18 were not shortlisted for conducting energy audits between 2020-21 and 2022-23 after considering the potential for further electricity saving in these buildings.*

**Note 29:** *In identifying and prioritising the recommendations for EMOs for implementation, B/Ds would take into account various factors, including specific operational characteristics of individual buildings, disruption to building operation, closure plan, financial resources, equipment replacement plan, and the feasibility, detailed design and cost-effectiveness of energy saving projects.*

saving — see para. 3.4(b)(i)) (Note 30) were not shortlisted for conducting energy audits. After verification by EMSD upon Audit's referral, EMSD advised that:

(a) 1 government building had been closed for demolition after 2017-18; and

(b) for the remaining 4 government buildings, EMSD would further review with the B/Ds concerned the need for conducting energy audits during planning of the energy audit programme over the 3-year implementation period.

3.7 In Audit's view, EMSD needs to:

(a) take measures to ensure that government buildings meeting the selection criteria are selected for conducting energy audits; and

(b) early complete the reviews on the need for conducting energy audits for the government buildings identified by Audit in paragraph 3.6(b) and conduct energy audits for them if needed.

## *Scope for obtaining information for selected government buildings on implementation of EMOs identified in energy audits*

3.8 According to EMSD, of the 344 government buildings with energy audits conducted between 2015-16 and 2016-17 under the last energy audit programme (see para. 3.4(a)), 136 (40%) buildings were included in the current energy audit programme (see para. 3.4(b)) again. The 136 government buildings were selected again for conducting energy audits mainly due to having high electricity consumption (above 500,000 kWh each) and potential for further electricity saving (i.e. buildings with 2017-18 electricity saving performance below average (Note 31) and no funding being sought from EMSD for implementing energy saving projects).

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**Note 30:** *The 5 government buildings were identified based on EMSD's records for electricity consumption and electricity saving performance in 2017-18 for government buildings.*

**Note 31:** *Up to 2017-18, these buildings had electricity saving performance below the government-wide achievement of 4.9% electricity saving.*

3.9 The need to conduct energy audits again (Note 32) for the 136 government buildings within a short period was mainly due to the fact that their electricity saving performance was below average in 2017-18 (see para. 3.8). In fact, Audit noted that the electricity saving performance of 106 (78%) of the 136 government buildings was also below average in 2018-19. In this connection, according to the Energy Audit Code, an energy audit can achieve energy efficiency and conservation through the implementation of EMOs identified in the audit. At present, B/Ds are responsible for identifying and prioritising the recommendations for EMOs in the energy audit reports for implementation as far as practicable (see para. 3.5). However, Audit noted that there was no requirement for B/Ds to provide information to EMSD on the implementation of EMOs and the related energy savings achieved. In Audit's view, there is scope for EMSD to consider taking measures to collect such information for selected government buildings (e.g. those with no or insignificant energy savings achieved after conducting energy audits) as far as practicable with a view to identifying areas for improvement in conducting energy audits and implementing the EMOs identified.

## Audit recommendations

3.10 **Audit has *recommended* that the Director of Electrical and Mechanical Services should:**

(a) **take measures to ensure that government buildings meeting the selection criteria are selected for conducting energy audits;**

(b) **early complete the reviews on the need for conducting energy audits for the government buildings identified by Audit in paragraph 3.6(b) and conduct energy audits for them if needed; and**

(c) **consider taking measures to collect information on the implementation of EMOs and the related energy savings achieved for selected government buildings (e.g. those with no or insignificant energy savings achieved after conducting energy audits) as far as practicable with a**

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**Note 32:** *According to EMSD: (a) the technological advancement in energy efficiency and conservation as time progresses could open up further opportunities for energy saving; and (b) the "Hong Kong's Climate Action Plan 2030+" promulgated by the Government also mentions the need for more frequent energy audit for air conditioning system for major energy use buildings.*

**view to identifying areas for improvement in conducting energy audits and implementing the EMOs identified.**

## Response from the Government

3.11 The Director of Electrical and Mechanical Services agrees with the audit recommendations. He has said that:

(a) selection criteria and mechanism are in place to thoroughly review if there are other potential government buildings meeting the selection criteria for conducting energy audits over the 3-year implementation period of the energy audit programme for achieving the green energy target. During the annual planning of energy audits, EMSD will review and negotiate further with B/Ds to ensure that energy audits will be conducted for government buildings meeting the selection criteria;

(b) EMSD has completed the reviews on the need for conducting energy audits for all the government buildings mentioned in paragraph 3.6(b) in accordance with the established selection criteria and mechanism, and energy audits will be arranged for them; and

(c) during the 3-year implementation period of the energy audit programme for achieving the green energy target, EMSD will arrange with energy auditors to collect information on the implementation of EMOs and the related energy savings achieved for selected government buildings as far as practicable with a view to identifying areas for improvement in implementing the EMOs identified.

## Retro-commissioning for government buildings

3.12 RCx is a systematic and cost-effective process to periodically check an existing building's energy and other performances (e.g. equipment conditions, how equipment and systems function together, and the effectiveness of operation and maintenance strategies) to identify energy saving opportunities (ESOs). RCx focuses on identifying less-than-optimal energy performance in an existing building, determining what changes need to be made and implementing changes in order to keep the building operating efficiently (Note 33). The RCx process can be performed alone or with a retrofit project (e.g. replacement of less energy-efficient appliances with more efficient ones). For more comprehensive improvement to the energy performance of building systems, ESOs identified in RCx may include operational improvements (e.g. system tunings and modification of existing building services systems) and minor improvement works. Implementation of ESOs identified in RCx can optimise energy efficiency performance of the building.

3.13 RCx consists of four stages, as follows:

(a) ***Planning stage.*** This stage involves the collection of building design and operational information of energy consuming equipment/systems and facility requirements, conduct of initial site visits to observe operation conditions, and review of information and data collected. An RCx plan, which covers findings of preliminary system analysis and the site measurement plan, should be prepared for proceeding to the investigation stage;

(b) ***Investigation stage.*** This stage involves in-depth system analysis to identify whether there are any existing operational problems leading to inefficient energy use or unsatisfactory indoor environment, and determine ESOs which could improve the performance of the building. An investigation report (which includes a cost-benefit analysis of the recommended ESOs, implementation details, and measurement and verification (M&V) methods

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**Note 33:** *According to EMSD, in general: (a) RCx focuses on optimising existing equipment while an energy audit focuses on identifying potential capital improvements; and (b) for an energy audit, potential improvements are identified for B/Ds' consideration of their implementation. On the other hand, for RCx, improvements identified are actually implemented with results being measured and verified in the RCx process.*

of energy savings for ESOs to be implemented) should be prepared. A list of ESOs selected for implementation should be confirmed and agreed with the building owner ahead of the implementation stage;

(c) ***Implementation stage.*** This stage involves the implementation of selected ESOs and the conduct of M&V of energy saving for each implemented ESO. A final RCx report should be prepared summarising the outcomes of the implementation stage. An on-going commissioning plan should be developed before proceeding to the next stage; and

(d) ***On-going commissioning stage.*** This stage involves the implementation of the on-going commissioning plan to ensure that the benefits from the RCx process are maintained. Data should be continuously gathered and compared to ensure that building systems remain optimised continuously. Provision of training to the operation and maintenance staff to implement the on-going commissioning plan is an essential step in this stage.

## *Pilot study on RCx in government buildings*

3.14 In 2016, EMSD commenced an RCx pilot study to see how RCx may be applied to buildings in Hong Kong. After taking into consideration the buildings' usage, age and electricity consumption, site availability and support from operators/users, EMSD selected 6 government buildings (aged from 10 to 30 years) to conduct RCx pilot study. The RCx study was outsourced to six service providers with funding provided by ENB. As of July 2020, the total expenditure incurred on the RCx pilot study was $6.2 million.

3.15 In 2017, the RCx investigation stage for the 6 government buildings was completed with 96 ESOs identified. The energy savings arising from the implementation of these ESOs were estimated at 2.3 million kWh per year (which was about 5% of the total building electricity consumption in 2014-15) and the estimated payback period (Note 34) of these ESOs ranged from 2 to 6 years, averaging 3 years. In 2018, the RCx implementation stage for the 6 government buildings was completed.

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**Note 34:** *The estimated payback period is determined by dividing the cost of ESOs by the estimated annual energy saving generated. It represents the estimated time (in years) required to recover the cost of ESOs through energy saving.*

## *RCx programme for government buildings*

3.16 Having considered that the results of the RCx pilot study were positive, EMSD promoted the concept of RCx within the Government by liaising with B/Ds to conduct RCx in more government buildings. In 2018, EMSD identified 280 government buildings with an annual electricity consumption above 1 million kWh each in 2014-15 and invited the pertinent B/Ds to conduct RCx for the government buildings under their management through a 7-year RCx programme from 2019-20 to 2025-26. According to the pertinent B/Ds' responses, of the 280 government buildings, 229 government buildings would be included in the programme. Subsequently, EMSD had successfully convinced a B/D to include one more government building under its management in the programme. In the event, RCx would be conducted for 230 (82%) government buildings. The pertinent B/Ds responsible for managing the remaining 50 (18%) government buildings had not yet decided whether their buildings would be included in the programme (Note 35).

3.17 In 2018, EMSD applied funding under the Capital Non-works Resource Allocation Exercise for implementing the 7-year RCx programme at a total cost of $215 million. Funding of $13 million for 2019-20 and $39 million for 2020-21 were approved to implement the RCx programme. EMSD would engage service providers to conduct RCx to identify ESOs for government buildings under the RCx programme by batches. As of July 2020, the RCx study (for investigation stage) for 44 government buildings had commenced and 12 service providers had been engaged to conduct such work. In 2019-20, the expenditure incurred on the RCx programme was $12.6 million.

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**Note 35:** *According to EMSD, RCx is a process that should be repeated every 3 to 5 years to maintain optimal building performance. The 6 government buildings under the RCx pilot study were also included in the invitation list of 280 government buildings. According to the pertinent B/Ds' responses, 4 government buildings would be included in the RCx programme. The pertinent B/D responsible for managing the remaining 2 government buildings had not yet decided whether the buildings would be included in the programme. EMSD would invite the pertinent B/D again in the later part of the 7-year RCx programme.*

### *Need to update the guidelines concerning the assessment of energy savings arising from the implementation of ESOs*

3.18 According to the technical guidelines on RCx issued by EMSD:

(a) anticipated energy saving and preliminary M&V plan for each proposed ESO should be prepared either on individual ESO basis or multiple ESOs basis at the investigation stage. For multiple ESOs, whole-facility metering using utility bill data for estimating energy savings is an ideal option. However, it should only be used when the anticipated energy savings for the whole-facility arising from implementing multiple ESOs are higher than 10%; and

(b) after ESOs are implemented, post-implementation data should be collected for conducting M&V of energy savings for implemented ESOs to check whether the anticipated energy savings are attained or not at the implementation stage.

3.19 A total of 96 ESOs were identified for the 6 government buildings under the RCx pilot study (see para. 3.15). As of July 2020, the implementation of 82 ESOs had been completed (Note 36). Audit noted that:

(a) regarding the 82 ESOs, the anticipated energy savings at the investigation stage arising from implementing these ESOs for each of the 6 government buildings were less than 10% (ranging from 2.3% to 6.9% per building, averaging 4.1%). As a result, assessment of energy savings should be conducted on individual ESO basis and the whole-facility metering option for multiple ESOs basis was not applicable (see para. 3.18(a)); and

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**Note 36:** *Regarding the remaining 14 ESOs identified in the RCx pilot study, according to EMSD, as of July 2020: (a) 5 ESOs would be completed in late 2020 or 2021; (b) 5 ESOs would not be required for the time being as the B/D concerned considered that the existing setting and conditions of building services installations met the venue operational needs. EMSTF (as the maintenance agent) would regularly monitor the need of implementing these ESOs; and (c) 4 ESOs would not be implemented as the estimated payback period of the ESOs was longer than 12 years.*

(b) individual assessments of energy savings for 64 (78%) of the 82 implemented ESOs had been conducted. No individual assessments had been conducted for the remaining 18 (22%) implemented ESOs.

3.20 In August and September 2020, EMSD informed Audit that:

(a) assessment of energy saving arising from the implementation of each ESO might not be cost-effective as a large amount of individual checking meter installation was required with intensive labour cost. Moreover, the system would be required to be shut down temporarily for metering installation, causing great nuisance to building operation as well as building users;

(b) overall assessment of energy savings arising from the implementation of multiple ESOs for each of the 6 government buildings by the whole-facility metering option had been conducted. By comparing the actual electricity consumption data of the 6 government buildings in 2015-16 and 2018-19 (i.e. before and after RCx implementation), it was observed that the electricity consumption of the 6 government buildings had reduced by 3 million kWh or 5.9% in total, ranging from 0.2 million kWh to 0.9 million kWh (or 2.8% to 16.3%) per building, averaging 0.5 million kWh (or 7.7%). As the total actual electricity saving of 3 million kWh was larger than the total anticipated electricity saving of the 82 ESOs of 1.8 million kWh, the anticipated electricity savings of the 82 ESOs had been achieved;

(c) RCx was a new measure in Hong Kong with the first guidelines published in 2017 and a revised edition published in 2018. EMSD had kept under review the guidelines to incorporate the experience gained from the RCx pilot study. Assessment of energy savings by the whole-facility metering option could be applied when multiple ESOs were to be implemented or the anticipated energy saving of an ESO was higher than 10%. EMSD would update the technical guidelines on RCx in the fourth quarter of 2020 concerning the application of the whole-facility metering option for assessment of energy savings arising from the implementation of ESOs; and

(d) individual assessment of energy savings arising from the implementation of ESOs would be considered in future RCx projects as far as practicable.

3.21 In Audit's view, EMSD needs to update the technical guidelines on RCx concerning the assessment of energy savings arising from the implementation of ESOs and remind EMSD staff to conduct the assessment in accordance with the updated guidelines.

## *Need to ensure that on-going commissioning plans are developed at RCx implementation stage*

3.22 According to the technical guidelines on RCx issued by EMSD:

(a) an on-going commissioning plan should be developed at the RCx implementation stage (see para. 3.13(c)); and

(b) the on-going commissioning stage aims to ensure that building systems remain optimised continuously. The on-going commissioning plan should be implemented in this stage to ensure that the benefits from the RCx process are maintained (see para. 3.13(d)).

3.23 Audit noted that there was no on-going commissioning plan developed at the RCx implementation stage for 2 of the 6 government buildings under the RCx pilot study. In August and September 2020, EMSD informed Audit that:

(a) the 6 service providers engaged to conduct RCx for the 6 government buildings under the RCx pilot study were not required to provide on-going commissioning plans at the implementation stage. Four service providers only provided preliminary on-going commissioning plans at the implementation stage as value-added services; and

(b) after the completion of the RCx implementation stage for the 6 government buildings in 2018, EMSTF, as the maintenance agent, had undertaken the RCx on-going commissioning stage (including developing, updating and implementing on-going commissioning plans for maintaining the benefits from the RCx process) for the 6 government buildings continuously in accordance with the latest version of technical guidelines on RCx.

In Audit's view, EMSD needs to take measures to ensure that on-going commissioning plans are developed at RCx implementation stage for future RCx projects.

## *Need to keep under review the RCx implementation timetable for government buildings*

3.24 EMSD would implement a 7-year RCx programme from 2019-20 to 2025-26 and 230 government buildings would be included in the programme (see para. 3.16). According to EMSD:

(a) RCx is a key measure to help achieve energy savings in government buildings. Conducting RCx progressively in suitable major government buildings to improve their energy efficiency is a policy initiative as announced in the 2018 Policy Address;

(b) the RCx programme is estimated to bring about 5% electricity saving; and

(c) it would group the government buildings under the RCx programme into batches for RCx implementation. The priority of implementation would be based on various factors including annual electricity consumption and age of building, and plan for major renovation or change in use.

3.25 For 230 government buildings included in the RCx programme, according to EMSD, as of September 2020:

(a) the RCx study (for investigation stage) for 44 government buildings had commenced; and

(b) a tentative RCx implementation timetable for the remaining 186 government buildings (of which 57 buildings were scheduled for commencement in 2020-21) had been prepared after considering various factors (including annual electricity consumption and age of building, availability of operation team and support from users). EMSD would review the timetable with the relevant stakeholders annually and make adjustment as appropriate.

3.26 In Audit's view, EMSD needs to keep under review the RCx implementation timetable for government buildings included in the RCx programme, having regard to their implementation priority, and confirm the implementation

schedule with the concerned B/Ds as early as possible with a view to facilitating planning and preparation work of both EMSD and the concerned B/Ds.

### *Need to encourage the pertinent B/Ds to include the government buildings under their management in the RCx programme*

3.27 There were 50 government buildings for which the pertinent B/Ds had not yet decided whether they would be included in the RCx programme (see para. 3.16). According to EMSD, for 7 government buildings, the pertinent B/Ds had not provided reasons. For the remaining 43 government buildings, the reasons provided by the pertinent B/Ds included, for example:

(a) concerns on the scale of RCx and the related impact on repercussions from the building occupants;

(b) replacement/energy saving projects in respect of building services equipment under planning or being implemented; and

(c) buildings with decanting/redevelopment/renovation/demolition plan.

3.28 In August 2020, EMSD informed Audit that some of the 50 government buildings might be included for implementing RCx at a later stage. In Audit's view, EMSD needs to take measures to encourage the pertinent B/Ds to include the government buildings under their management in the RCx programme (e.g. studying B/Ds' reasons for not including their buildings in the programme and addressing their concerns) with a view to optimising energy efficiency performance of the buildings.

## Audit recommendations

3.29 **Audit has *recommended* that the Director of Electrical and Mechanical Services should:**

(a) **update the technical guidelines on RCx concerning the assessment of energy savings arising from the implementation of ESOs and remind EMSD staff to conduct the assessment in accordance with the updated guidelines;**

(b) **take measures to ensure that on-going commissioning plans are developed at RCx implementation stage for future RCx projects;**

(c) **keep under review the RCx implementation timetable for government buildings included in the RCx programme, having regard to their implementation priority, and confirm the implementation schedule with the concerned B/Ds as early as possible with a view to facilitating planning and preparation work of both EMSD and the concerned B/Ds; and**

(d) **take measures to encourage the pertinent B/Ds to include the government buildings under their management in the RCx programme (e.g. studying B/Ds' reasons for not including their buildings in the programme and addressing their concerns) with a view to optimising energy efficiency performance of the buildings.**

## Response from the Government

3.30 The Director of Electrical and Mechanical Services agrees with the audit recommendations. He has said that:

(a) RCx is a new measure in Hong Kong with the first guidelines published in 2017. EMSD has kept under review the guidelines to incorporate the experience gained from the RCx pilot study. The guidelines were revised in 2018 and will be further updated in the fourth quarter of 2020 concerning the application of the whole-facility metering option for assessment of energy savings arising from the implementation of ESOs;

(b) EMSD has incorporated the requirement of developing on-going commissioning plans into the technical guidelines for RCx to ensure that such plans are developed at RCx implementation stage for future RCx projects;

(c) EMSD has prepared the tentative RCx implementation timetable for the 186 major government buildings to facilitate the implementation of the RCx programme. EMSD will keep under review the timetable each year or when necessary having regard to the implementation priority of government

buildings, and confirm the implementation schedule with the concerned B/Ds; and

(d) EMSD will continue to appeal to the concerned B/Ds to include the government buildings under their management in the RCx programme by addressing their concerns and showcasing the successful cases to them.

# PART 4: MANAGEMENT OF ENERGY SAVING PROJECTS AND OTHER MANAGEMENT ISSUES

4.1 This PART examines the work of EMSD (paras. 4.3 to 4.15) and ArchSD (paras. 4.16 to 4.23) on energy saving projects in government buildings relating to the 2015-20 electricity saving target (see para. 2.2), and other management issues (paras. 4.24 to 4.39).

## *Background*

4.2 The funding arrangement for energy saving projects in government buildings relating to the 2015-20 electricity saving target is as follows:

(a) for energy saving projects in government buildings, B/Ds could submit funding applications for such projects to ArchSD under Subhead 3101GX (hereinafter referred to as the Minor Building Works Block Vote — see para. 1.7); and

(b) to assist the relevant B/Ds in the implementation of energy saving projects in government buildings, the Government has earmarked about $900 million for the gradual implementation of such projects from 2017-18 to 2021-22, comprising funding of about $700 million under Subhead 696 controlled by EMSD (hereinafter referred to as EMSD Block Vote) and funding of about $200 million under the Minor Building Works Block Vote controlled by ArchSD (see para. 1.8).

As of March 2020, there were 471 approved energy saving projects (with a total approved project estimate (APE) of $928 million) in government buildings relating to the 2015-20 electricity saving target (see Table 5).

**Table 5**

**Number and total APE of approved energy saving projects in government buildings relating to the 2015-20 electricity saving target (March 2020)**

| Funding source | Projects | |
|---|---|---|
| | No. | Total APE ($ million) |
| (a) EMSD Block Vote | 267 | 740 |
| (b) Minor Building Works Block Vote controlled by ArchSD | 204 | 188 |
| Total | 471 | 928 |

*Source: EMSD and ArchSD records*

## Work of the Electrical and Mechanical Services Department on energy saving projects

4.3 EMSD has developed a management framework for administering energy saving projects in government buildings and funded under its block vote. The general procedures for administering such energy saving projects by EEO of EMSD are summarised in Figure 1.

**Figure 1**

**General procedures for administering energy saving projects in government buildings by EEO of EMSD**

| | |
|---|---|
| ***(a) Calling returns from B/Ds and preliminary checking*** | • Calling returns from B/Ds on potential energy saving projects in government buildings<br>• Compiling a list of potential energy saving projects and examining the list to ensure that the selection criteria (Note 1) for energy saving projects funded under EMSD Block Vote are met |
| ***(b) Annual budgeting*** | • Submitting the list of potential energy saving projects to the Energy Saving Projects Committee (ESPC — Note 2) for consideration and endorsement<br>• Obtaining ENB's policy support before submitting a funding bid to the Financial Services and the Treasury Bureau (FSTB) under the relevant internal resource allocation exercise |
| ***(c) Reviewing funding applications from B/Ds*** | • With internal resource allocation, inviting the B/Ds concerned (i.e. with returns submitted to EEO in the calling exercise — see (a) above) to submit funding application forms for energy saving projects (including information on estimated payback period and anticipated electricity saving)<br>• Monitoring closely the funding situation and inviting B/Ds to submit in-year bids for energy saving project proposals in the financial year concerned when saving is identified in projects (e.g. lower-than-expected tender prices and withdrawn projects)<br>• Reviewing all duly completed funding application forms and compiling a list of energy saving projects that meet the selection criteria<br>• Prioritising energy saving projects in the list (Note 3) |
| ***(d) Project approval*** | • Submitting the list of prioritised energy saving projects to ESPC for scrutiny and making recommendations to the Controlling Officer (i.e. the Director of Electrical and Mechanical Services or his delegates) for approval<br>• Informing B/Ds of the results of funding applications |
| ***(e) Project implementation*** | By the concerned B/Ds or their works agents as appropriate:<br>• implementing approved energy saving projects by the works agents (e.g. EMSTF or outside contractors) engaged by the concerned B/Ds<br>• monitoring the implementation progress of projects by the concerned B/Ds or their works agents (e.g. EMSTF — Note 4) as appropriate<br>By EEO:<br>• monitoring the project expenditure of energy saving projects |

*Source: EMSD records*

**Figure 1 (Cont'd)**

*Note 1: The selection criteria are: (a) projects involve installation or replacement of electrical and mechanical equipment/facilities with energy saving potential; (b) the estimated project cost is over $0.2 million but not exceeding $10 million; (c) the maximum payback period of energy-efficient measures for the projects shall not exceed 12 years; and (d) all projects should be ready for implementation within 6 months after funding approval.*

*Note 2: ESPC was set up in May 2017 to administer the funding applications of energy saving projects in government buildings and funded under EMSD Block Vote. It is chaired by an Assistant Director of EMSD, and comprises a Chief Engineer of EMSD and a representative from ENB as members.*

*Note 3: Energy saving projects are prioritised according to estimated payback period of energy-efficient measures for the projects. If estimated payback periods are the same, anticipated electricity saving will be taken into account for project prioritisation.*

*Note 4: In May 2017, EEO entered into a service level agreement with EMSTF to engage EMSTF for the provision of services to facilitate EEO's administration of energy saving projects funded under EMSD Block Vote. According to the agreement, if the concerned B/Ds assigned EMSTF as the works agent to implement the approved energy saving projects, EMSTF is required to submit to EEO: (a) progress reports including information on project progress and cashflow; and (b) reports on performance measurement (i.e. M&V of actual payback period and electricity saving) upon project completion.*

## *Scope for improvement in monitoring the progress of energy saving projects*

4.4 According to EEO:

(a) the works agents (e.g. EMSTF) engaged by the B/Ds concerned are responsible for supervising the project works including the conduct of on-site checking; and

(b) EEO will regularly approach the B/Ds concerned or their works agents as appropriate to request them to monitor the progress of energy saving projects and conduct on-site checking on project implementation.

4.5 As of March 2020, there were 267 energy saving projects (Note 37) relating to the 2015-20 electricity saving target with a total APE of $740 million funded under EMSD Block Vote (see (a) in Table 5 in para. 4.2). Of the 267 projects, 174 (65%) projects had been completed and 93 (35%) projects were with works in progress.

4.6 According to EMSD, the implementation of an energy saving project from site investigation, design and preparation of tender to commissioning should take one to two years, and all energy saving projects had commenced upon obtaining funding approval. For the 93 energy saving projects with works in progress as of March 2020 (see para. 4.5), 18 (19%) projects (all were with one-year implementation programme and implemented by EMSTF as the works agent) were behind schedule, ranging from 0.9 to 1.9 years. Of these 18 projects, 14 projects had commenced for more than 1 year and up to 2 years, and 4 projects had commenced for more than 2 years and up to 2.9 years.

4.7 In September and October 2020, EMSD informed Audit that:

(a) during the social unrest in 2019-20 and COVID-19 outbreak, a large amount of site investigation activities, tendering work, material delivery and site installation works were postponed and delayed due to various reasons such as special work arrangements, temporary closure of government venues, and material delay in manufacturing and shipment processes; and

(b) despite the difficulties mentioned above, as of August 2020, the number of projects with works in progress had decreased from 93 in March 2020 (see para. 4.5) to 47. Of the 47 projects, 20 (43%) projects were approved in 2019-20 with two-year implementation programme, and hence, they were on schedule.

4.8 In Audit's view, EMSD needs to closely liaise with the B/Ds concerned or their works agents as appropriate to request them to monitor the progress of energy saving projects with a view to ensuring their timely completion.

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**Note 37:** *Of the 267 energy saving projects, 261 (98%) projects were implemented by EMSTF as the works agent and 6 (2%) projects were implemented by other works agents engaged by the pertinent B/Ds.*

## *Scope for improving performance measurements for energy saving projects*

4.9 According to EEO, upon completion of an energy saving project (normally with one to two-year implementation programme — see para. 4.6) funded under EMSD Block Vote, the B/D concerned and/or its works agent are required to conduct performance measurement (i.e. M&V of actual payback period and electricity saving) for the project within the one-year defects liability period. As of March 2020, of the 174 completed energy saving projects (see para. 4.5), performance measurements for 136 projects had been completed while those for the remaining 38 projects (Note 38) were in progress. For 3 (8%) of the 38 projects, while the projects had been completed for more than 1 year as of March 2020, the performance measurements were still in progress. In September and October 2020, EMSD informed Audit that:

(a) under the existing practice, the B/Ds concerned or their works agents as appropriate would follow up with and require the contractors responsible for implementing the energy saving projects to complete performance measurements within the one-year defects liability period upon completion of works as far as practicable; and

(b) despite the difficulties mentioned in paragraph 4.7(a), as of August 2020, the performance measurements had been completed for all the 174 completed energy saving projects.

4.10 In Audit's view, EMSD needs to remind the B/Ds concerned or their works agents as appropriate to closely monitor the progress of performance measurements for completed energy saving projects with a view to ensuring their timely completion.

## *Scope for improving accuracy of project estimates*

4.11 When submitting a funding application for energy saving project under EMSD Block Vote, B/Ds and/or their works agents for building services installations (e.g. EMSTF) are required to provide a project estimate on the funding application

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**Note 38:** *Of the 38 projects, 35 (92%) projects were implemented by EMSTF as the works agent and 3 (8%) projects were implemented by other works agents engaged by the pertinent B/Ds.*

form. Upon receipt of the funding application, EEO will review the duly completed application form before including the project in the list of energy saving projects to be considered by ESPC (see (c) in Figure 1 in para. 4.3). Audit examination found that, of the 267 energy saving projects funded under EMSD Block Vote as of March 2020 (see para. 4.5), 121 (45%) projects had changes in APE, as follows:

(a) for 47 projects, their total APE had increased from the original sum of $96.3 million by $27.4 million (28%) to $123.7 million (a 4% to 300% increase (Note 39) of the original APE of each project, averaging 48%); and

(b) for 74 projects, their total APE had decreased from the original sum of $351.3 million by $130.5 million (37%) to $220.8 million (a 2% to 96% decrease of the original APE of each project, averaging 41%).

4.12 Between August and October 2020, EMSD informed Audit that:

(a) the actual market conditions and the pricing strategy adopted by the tenderers were difficult to predict; and

(b) the original APE of energy saving projects specified in the EMSD Block Vote application form was the preliminary project estimate used for budgetary planning purposes. The APE of energy saving projects had been updated from time to time during project implementation (e.g. upon return of tender prices) and the related changes in APE had been endorsed by ESPC. With ESPC's close monitoring mechanism and flexible workflow, surplus funding arising from tender savings was identified early and channelled swiftly to fund 29 projects (11% of the 267 projects — see para. 4.5) in the waiting list or through in-year bids.

**Note 39:** *According to EMSD, for the project with an increase in APE of 300%, the works scope was revised to include the replacement of 28 additional floodlights (on top of the original scope involving 33 floodlights) with more energy-efficient ones as requested by the B/D concerned. The replacement of these additional floodlights involved lots of minor builder's works at the building façade at more than 50 metres above the ground level, resulting in a much higher increase in APE.*

4.13 Having consolidated experience of implementing energy saving projects, B/Ds and/or their works agents should be able to better estimate the project cost. In Audit's view, EMSD needs to remind the B/Ds concerned or their works agents as appropriate to make more accurate project estimates for energy saving projects as far as practicable.

## Audit recommendations

4.14 **Audit has *recommended* that, in administering energy saving projects in government buildings and funded under EMSD Block Vote, the Director of Electrical and Mechanical Services should:**

(a) **closely liaise with the B/Ds concerned or their works agents as appropriate to request them to monitor the progress of energy saving projects with a view to ensuring their timely completion; and**

(b) **remind the B/Ds concerned or their works agents as appropriate to:**

(i) **closely monitor the progress of performance measurements for completed energy saving projects with a view to ensuring their timely completion; and**

(ii) **make more accurate project estimates for energy saving projects as far as practicable.**

## Response from the Government

4.15 The Director of Electrical and Mechanical Services agrees with the audit recommendations. He has said that:

(a) as the vote controller, EMSD (through its EEO) has been regularly requesting the B/Ds concerned or their works agents as appropriate to provide returns on expenditure progress of all energy saving projects funded under EMSD Block Vote. The expenditure progress of all these projects is also reported to ESPC for endorsement during regular ESPC meetings. EEO will continue to closely liaise with the B/Ds concerned or

their works agents as appropriate to request them to monitor the progress of energy saving projects with a view to ensuring their timely completion;

(b) B/Ds' works agents are responsible for conducting performance measurements upon completion of energy saving projects. In general, the performance measurements will be completed by the contractors responsible for implementing the projects during the defects liability periods of the works contracts, which are normally one year. EEO will remind the B/Ds concerned or their works agents as appropriate to closely monitor the progress of performance measurements for completed energy saving projects with a view to ensuring their timely completion; and

(c) EEO will always remind B/Ds or their works agents as appropriate to make more accurate project estimates as far as practicable in funding application forms under EMSD Block Vote in order to minimise the variance between the original project estimate and the returned tender price. In addition, ESPC will continue to closely monitor, review and endorse energy saving projects in the waiting list or through in-year bids during regular meetings with a view to redeploying any surplus funding.

## Work of the Architectural Services Department on energy saving projects

4.16 According to ArchSD, after the announcement of the 2015-20 electricity saving target, it has started systematically registering and consolidating B/Ds' funding applications for energy saving projects in government buildings under the Minor Building Works Block Vote from 2016-17 onwards. The general procedures for administering bids from various B/Ds for minor building works projects costing over $2 million but not exceeding $30 million (including energy saving projects in government buildings) by ArchSD are summarised in Figure 2.

**Figure 2**

**General procedures for administering bids for minor building works projects costing over $2 million but not exceeding $30 million (including energy saving projects in government buildings) by ArchSD**

| | |
|---|---|
| ***(a) Calling returns from B/Ds and preliminary screening*** | • Calling returns (Note 1) from B/Ds for bids for minor building works projects (including energy saving projects in government buildings)<br>• Conducting preliminary screening of the proposed projects according to the selection criteria (Note 2) for projects funded under the Minor Building Works Block Vote |
| ***(b) Annual budgeting*** | • Proposing annual estimates to FSTB under the relevant internal resource allocation exercise (Note 3) based on the returns received from B/Ds<br>• With internal resource allocation, submitting the proposed projects (including energy saving projects) to the Minor Building Works Committee (MBWC — Note 4) or the Accommodation Strategy Group (ASG — Note 5) for selection and prioritisation |
| ***(c) Inviting funding applications from B/Ds*** | • Inviting the B/Ds concerned to submit funding application forms for the projects (including energy saving projects) selected by MBWC/ASG (see (b) above)<br>• Reviewing all duly completed funding application forms in consultation with the B/Ds concerned or their works agents as appropriate before putting forward to MBWC/ASG for further processing |
| ***(d) Project approval*** | • Putting forward the funding application forms to MBWC/ASG for scrutiny and making recommendations to the relevant authorities (the Director of Architectural Services or the Deputy Secretary for Financial Services and the Treasury (Treasury)3) for approval<br>• Informing B/Ds of MBWC/ASG's decisions on funding applications |
| ***(e) Project implementation*** | By ArchSD:<br>• creating a project record for each project (including energy saving project) and regularly updating the project records for monitoring the project financial situation<br>By relevant works agents (e.g. EMSTF and ArchSD — Note 6):<br>• monitoring the project progress and, for energy saving projects, conducting performance checking (i.e. M&V of actual payback period and electricity saving) upon project completion |

*Source: ArchSD records*

**Figure 2 (Cont'd)**

*Note 1:* *ArchSD calls returns annually for minor building works projects of expenditure over $2 million but not exceeding $30 million each to be funded under the Minor Building Works Block Vote (a block allocation subhead for minor building works under the Capital Works Reserve Fund) in the ensuing financial year. For minor alterations, additions and improvement works of expenditure less than or equal to $2 million each to be funded under the Minor Building Works Block Vote, B/Ds may submit funding applications throughout the financial year subject to the availability of funding. The Assistant Director (Property Services) has delegated authority to approve funding of minor building works (other than fitting-out works in newly allocated government accommodation) projects not exceeding $2 million each.*

*Note 2:* *The selection criteria are: (a) projects involve minor building works proposals (including energy saving projects); (b) the estimated project cost is not exceeding $30 million with at least 10% to 20% of the estimated cashflow to be incurred in the year of approval; and (c) all projects should commence within 6 months after funding approval.*

*Note 3:* *The annual funding provision for the block allocation subheads under the Capital Works Reserve Fund (including the Minor Building Works Block Vote) is subject to the approval of the Finance Committee of the Legislative Council.*

*Note 4:* *MBWC considers proposed minor building works (other than fitting-out works in newly allocated government accommodation) projects of expenditure over $2 million but not exceeding $20 million each to be funded under the Minor Building Works Block Vote. It is chaired by the Director of Architectural Services and comprises representatives from ArchSD, EMSD and the Government Property Agency as members.*

*Note 5:* *ASG, on the recommendations of MBWC, examines proposed minor building works projects of expenditure over $20 million but not exceeding $30 million each to be funded under the Minor Building Works Block Vote. It is chaired by the Deputy Secretary for Financial Services and the Treasury (Treasury)3 and comprises representatives from FSTB, ArchSD and the Government Property Agency as members.*

*Note 6:* *According to ArchSD: (a) for approved energy saving projects with works involving building services systems (e.g. upgrading of central control and monitoring system) without any building works, such works are normally implemented by the system maintenance agent (e.g. EMSTF or outside contractors engaged by B/Ds). ArchSD, being the vote controller, will arrange to issue allocation warrants to EMSTF or other B/Ds and then monitor the expenditure from funding approval until project completion. EMSTF or others, being the works agents, will monitor the project progress and conduct performance checking upon project completion; and (b) for approved energy saving projects involving building works (e.g. upgrading the lighting fittings with more energy-efficient ones would involve taking-down, setting aside and re-fixing of suspended ceilings by building works contractors), ArchSD, with the support of the project delivery services on building services works provided by EMSTF, will assume the role of works agent to implement the projects and accordingly, will issue works orders to contractors, supervise the works, monitor the project progress and conduct performance checking upon project completion.*

4.17 As of March 2020, there were 204 energy saving projects relating to the 2015-20 electricity saving target with a total APE of $188 million funded under the Minor Building Works Block Vote controlled by ArchSD (see (b) in Table 5 in para. 4.2). Of the 204 projects, 50 (25%) projects were implemented by ArchSD and 154 (75%) projects were implemented by EMSTF or other B/Ds through allocation warrants (see Note 6 to Figure 2 in para. 4.16). Table 6 shows the status of these projects as of March 2020.

**Table 6**

**Status of energy saving projects approved from 2016-17 to 2019-20 and funded under the Minor Building Works Block Vote (March 2020)**

| Status | No. of projects | | | | |
|---|---|---|---|---|---|
| | 2016-17 (Note) | 2017-18 | 2018-19 | 2019-20 | Total |
| ***Implemented by ArchSD*** | | | | | |
| Works in progress | 1 | 1 | – | – | 2 (1%) |
| Completed | 7 | 3 | 30 | 8 | 48 (24%) |
| ***Implemented by EMSTF or other B/Ds*** | | | | | |
| Works in progress | – | 7 | 1 | – | 8 (4%) |
| Completed | 25 | 66 | 53 | 2 | 146 (71%) |
| Total | 33 | 77 | 84 | 10 | 204 (100%) |

*Source:* *ArchSD records*

*Note:* *According to ArchSD, the projects approved in 2016-17 were funded under the $200 million earmarked for the gradual implementation of energy saving projects from 2017-18 to 2021-22 (see para. 4.2(b)) because the relevant project expenditure was incurred mainly after the earmarked funding had been allocated to the Minor Building Works Block Vote since 2017-18.*

## *Scope for improvement in monitoring the progress and cashflow of energy saving projects*

4.18 According to ArchSD:

(a) to avoid affecting the resources available for all other minor building works projects funded under the Minor Building Works Block Vote, the Government has earmarked a funding provision of about $200 million (see para. 4.2(b)) for energy saving projects in government buildings under the Minor Building Works Block Vote;

(b) to avoid funds being tied up by projects which are not yet ready for implementation, ArchSD will only consider B/Ds' proposed energy saving projects under the Minor Building Works Block Vote with at least 10% to 20% of the estimated cashflow to be incurred in the year of approval (see Note 2 to Figure 2 in para. 4.16); and

(c) it will monitor the annual expenditures of energy saving projects from funding approval until project completion.

4.19 Audit examination found that:

(a) of the 204 energy saving projects funded under the Minor Building Works Block Vote as of March 2020, 58 (28%) projects had not incurred any expenditure in the year of approval (Note 40). Of the 58 projects, 17 (29%) projects (with a total APE of $19 million) had not incurred any expenditure in subsequent year after the year of approval as of March 2020 (Note 41); and

(b) based on the checking of 13 completed projects, the total actual expenditure of 4 projects (with a total APE of $14.9 million) was less than the total APE by $8.1 million or 54% of the total APE (ranging from 41% to 77%

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**Note 40:** *Of the 58 projects, 2, 35, 18 and 3 projects were approved in 2016-17, 2017-18, 2018-19 and 2019-20 respectively.*

**Note 41:** *Of the 17 projects, 2, 13 and 2 projects were approved in 2016-17, 2017-18 and 2018-19 respectively.*

of the APE of each project, averaging 58%). However, as of March 2020, these projects were still at account finalisation stage and the funding of $8.1 million was still tied up.

4.20 In Audit's view, ArchSD needs to remind the B/Ds concerned or their works agents as appropriate to make more accurate cashflow forecasts for energy saving projects, and inform ArchSD of the project status and cashflow regularly.

### *Need to require the B/Ds concerned or their works agents as appropriate to provide information on estimated payback periods and anticipated electricity savings of proposed energy saving projects when submitting funding applications*

4.21 Audit noted that while EMSD had required B/Ds to provide information regarding estimated payback period and anticipated electricity saving on the funding application form for energy saving projects funded under its block vote for the purpose of prioritising the projects (see (c) in Figure 1 in para. 4.3), ArchSD had not required the B/Ds concerned or their works agents as appropriate to provide such information when submitting funding applications for proposed energy saving projects funded under the Minor Building Works Block Vote. In September 2020, ArchSD informed Audit that its project officers were well aware of the technical requirements of the 12-year maximum payback period for energy saving projects and duly complied with such requirements during technical feasibility study stage and funding application vetting stage by making enquires with B/Ds or their works agents as appropriate. In Audit's view, to facilitate ArchSD's vetting work, there is merit for ArchSD to require the B/Ds concerned or their works agents as appropriate to provide information on the estimated payback periods and anticipated electricity savings of proposed energy saving projects when submitting funding applications under the Minor Building Works Block Vote.

## Audit recommendations

4.22 **Audit has *recommended* that, in administering energy saving projects in government buildings and funded under the Minor Building Works Block Vote, the Director of Architectural Services should:**

(a) **remind the B/Ds concerned or their works agents as appropriate to make more accurate cashflow forecasts for energy saving projects, and inform ArchSD of the project status and cashflow regularly; and**

(b) **require the B/Ds concerned or their works agents as appropriate to provide information on the estimated payback periods and anticipated electricity savings of proposed energy saving projects when submitting funding applications under the Minor Building Works Block Vote.**

## Response from the Government

4.23 The Director of Architectural Services agrees with the audit recommendations. She has said that ArchSD will:

(a) in monitoring the financial situation of approved energy saving projects under the Minor Building Works Block Vote, remind the B/Ds concerned or their works agents as appropriate to make more accurate cashflow forecasts and inform ArchSD of the project status and cashflow regularly; and

(b) in administering funding applications for energy saving projects under the Minor Building Works Block Vote, require the B/Ds concerned or their works agents as appropriate to provide information on the estimated payback periods and anticipated electricity savings of proposed energy saving projects when submitting funding applications.

# Other management issues

## *Scope for improvement in providing training to B/Ds*

4.24 EMSD organises "Briefing Sessions on Government Energy Consumption Reporting and Monitoring" (hereinafter referred to as annual briefing sessions — Note 42) for B/Ds to facilitate their preparation of energy reporting, the conduct of energy audit and the implementation of electricity saving measures (including housekeeping measures) and projects. During the annual briefing sessions, in addition to EMSD speakers, guest speakers will be invited to give presentations on energy-related topics (e.g. ways to monitor energy consumption effectively and new technology for improving energy efficiency). According to ENB, the annual briefing sessions would be an opportunity to appraise B/Ds of the roadmap on the work for more energy-efficient buildings. Table 7 shows the number of attendees in annual briefing sessions from 2015 to 2020.

**Table 7**

**Number of attendees in annual briefing sessions (2015 to 2020)**

| Year | No. of briefing sessions | No. of attendees |
|---|---|---|
| 2015 | 3 (Note 1) | 680 |
| 2016 | 2 | 366 |
| 2017 | 2 | 374 |
| 2018 | 2 | 341 |
| 2019 | 2 | 226 |
| 2020 | 2 (Note 2) | 279 |

*Source:* *EMSD records*

*Note 1:* *According to EMSD, 3 briefing sessions were held in 2015 due to overwhelming response.*

*Note 2:* *The 2 briefing sessions relating to the new green energy target (see para. 2.20) were webinars held in late July and early August 2020.*

**Note 42:** *According to EMSD, the objectives of the annual briefing sessions are to enable participants to: (a) better understand good practices of effective energy consumption monitoring; (b) acquire knowledge/skills necessary for reporting energy consumption in the coming years; and (c) familiarise themselves with updated measures to save energy and improve energy efficiency.*

4.25 Audit noted that:

(a) regarding B/Ds' participation in annual briefing sessions:

(i) the number of attendees in annual briefing sessions was in a decreasing trend in general from 2015 to 2020 (see Table 7 in para. 4.24); and

(ii) Audit examination of the lists of attendees of the 2020 briefing sessions (webinars) relating to the new green energy target found that 24 of some 80 B/Ds did not have any representative attending the briefing sessions; and

(b) regarding presentation materials for the annual briefing sessions, EMSD uploaded them onto the CCGO website for B/Ds' reference. Audit examination found that as of July 2020, of the total 27 sets of presentation materials for the annual briefing sessions held from 2015 to 2019, EMSD had not yet uploaded 15 sets of presentation materials (Note 43) onto the CCGO website.

4.26 In September and October 2020, EMSD informed Audit that:

(a) during the electricity saving cycle for the 2015-20 electricity saving target, the number of attendees was the highest in 2015 (i.e. the first briefing sessions held after the implementation of the target) while the relevant numbers were relatively lower in the subsequent years. All B/Ds were encouraged to send representatives to attend the briefing sessions, whereas whether to send representatives to attend the briefing sessions was the decision of B/Ds;

(b) for the 2020 briefing sessions, due to the outbreak of the third wave of COVID-19, the participation was affected by the special work arrangements

**Note 43:** *Of the 15 sets of presentation materials, 5 sets were prepared by EMSD (e.g. presentation on "Planning for Retro-commissioning in Government Buildings" by EMSD in the 2018 briefing sessions) and 10 sets were prepared by guest speakers (e.g. presentation on "Meter Online Services Platform for Energy Saving" by a guest speaker in a 2017 briefing session).*

of B/Ds in July and August 2020, as well as the change of the means of holding the briefing sessions from traditional face-to-face seminars to webinars. For the decreasing trend in the number of attendees in annual briefing sessions from 2015 to 2019, the compilation of annual returns on energy saving data by B/Ds was more or less a repeated process within the five-year electricity saving cycle. Some B/Ds, particularly those with no or a relatively small number of government venues under their management, might not attend the briefing sessions every year after attending the first one held in 2015 as they might consider that they were familiar with the normalisation methods and encountered no difficulty in preparing their returns;

(c) every year, the presentation materials about the returns on energy saving data and the normalisation methods were uploaded onto the CCGO website for B/Ds' information and reference after the briefing sessions. B/Ds without representative attending the briefing sessions could still access the associated information through the CCGO website, or directly make technical inquiry to EMSD if they had problems in compilation of their returns; and

(d) the 5 sets of presentation materials prepared by EMSD (see Note 43 to para. 4.25(b)) were uploaded onto the CCGO website in mid-September 2020. EMSD was unable to share the presentation materials prepared by guest speakers as no consent had been sought from the concerned speakers. For the 2020 briefing sessions, all the presentation materials had been uploaded onto the CCGO website in August 2020 as the related presentations were all delivered by government officers.

4.27 As the green energy target is a new initiative implemented in 2020-21 covering certain new areas (see para. 2.20), Audit considers that ENB, in collaboration with EMSD, needs to take measures to encourage B/Ds (in particular those B/Ds with no representative attending the 2020 briefing sessions) to nominate representatives to participate in the annual briefing sessions or access the presentation materials through the CCGO website with a view to enhancing their understanding of the green energy target and facilitating its achievement. Audit also considers that EMSD needs to upload all presentation materials (including seeking consent from non-government speakers for releasing the materials) for the annual briefing sessions onto the CCGO website as far as practicable with a view to providing useful and up-to-date materials for B/Ds' reference.

## *Scope for enhancing the participation in green building certification*

4.28 ***Green building certification in Hong Kong.*** The Building Environmental Assessment Method (BEAM) Plus, introduced by the Hong Kong Green Building Council (HKGBC — Note 44) in April 2010, is a comprehensive assessment tool to certify green buildings in Hong Kong. Its assessment covers various performance aspects (e.g. energy use, water use, and materials and waste) and energy use is the most important performance aspect for buildings with the highest weighting. The assessment tools under BEAM Plus (Note 45) include:

(a) ***BEAM Plus New Buildings.*** This assessment tool covers the demolition, planning, design, construction and commissioning of a new building project. It has four grades, namely Platinum, Gold, Silver and Bronze (in descending order); and

(b) ***BEAM Plus Existing Buildings.*** This assessment tool measures the actual performance of a building and evaluates its facility management practices. The assessment may be initiated at any time during a building's operational life. There are two schemes under BEAM Plus Existing Buildings, namely Comprehensive Scheme and Selective Scheme. Project applicants may apply for Comprehensive Scheme that covers assessment on all performance aspects, or Selective Scheme that covers assessment on one or more of the performance aspects, according to the practical circumstances of their buildings. Each of the two schemes has four grades, namely:

(i) Platinum, Gold, Silver and Bronze (in descending order) under Comprehensive Scheme; and

(ii) Excellent, Very Good, Good and Satisfactory (in descending order) under Selective Scheme. Each performance aspect (e.g. energy use)

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**Note 44:** *HKGBC, established in 2009, is a non-profit and member-led organisation which strives to promote the standards and developments of sustainable buildings in Hong Kong.*

**Note 45:** *There are four BEAM Plus assessment tools. Apart from those mentioned in paragraph 4.28(a) and (b), the remaining two assessment tools are: (a) BEAM Plus Interiors, which covers the design and construction of fit-out, renovation and refurbishment works in non-domestic occupied spaces; and (b) BEAM Plus Neighbourhood, which adopts a more holistic approach to assessing sustainability performance at the early or inception stage of a development project.*

is assessed on an individual basis with a certificate issued for each assessed performance aspect.

The assessment status under BEAM Plus includes Registered (Note 46), Provisional and Final (Note 47). Final certification is valid for a period of five years.

4.29 ***Green building certification for government buildings.*** The Government is committed to promoting green buildings in Hong Kong and leads by example in participating in green building certification. According to the Joint Circular on "Green Government Buildings" issued by the Development Bureau and ENB in April 2015, all new government buildings of construction floor area above 5,000 square metres ($m^2$) with central air conditioning or above 10,000 $m^2$ should aim to obtain the second highest grade or above under BEAM Plus (i.e. a grade of BEAM Plus Gold or higher) as far as practicable (Note 48). This target was also included in the Energy Saving Plan promulgated in May 2015 (see para. 1.4). Table 8 shows the green building final certification status of government buildings as of July 2020.

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**Note 46:** *Project applicants can register their projects through the online registration forms on the HKGBC's website. A project will attain Registered status after being notified by HKGBC of the completion of BEAM Plus project registration.*

**Note 47:** *After project registration, a project applicant will submit materials (e.g. project information fact sheet, and supporting documents and drawings) for project assessment. A project may be subject to two assessments, namely provisional and final assessments, depending on the type of assessment tool selected. A new building project will be subject to provisional assessment when it is at design/early construction stage. Provisional assessment offers an opportunity to an applicant to review and improve its building design before commencing the actual construction works. When all the prerequisites are achieved in the provisional assessment, HKGBC will provide the provisional certification result to the applicant. Provisional certification is valid for a period of six years or up to the issue of final certification result, whichever is earlier. The entire assessment is not finalised until a final certification result is obtained so as to ensure that green and sustainable design features are actually implemented, and construction practice meets the required performance standards. In other words, a building with final green building certification rating is truly green from the planning to commissioning stage.*

**Note 48:** *The Joint Circular issued in April 2015 replaced the Joint Circular issued in April 2009 which required that all new government buildings with construction floor area of more than 10,000 $m^2$ should aim to obtain the second highest grade or above under an internationally or locally recognised building environmental assessment system. The Joint Circular issued in April 2015 has extended the coverage to all new government buildings of construction floor area above 5,000 $m^2$ with central air conditioning.*

**Table 8**

**Green building final certification status of government buildings**
**(July 2020)**

| Grade | No. of government buildings certified under assessment tool for | | |
|---|---|---|---|
| | New buildings | Existing buildings | Total |
| Platinum | 21 | 1 | 22 |
| Gold | 18 | – | 18 |
| Excellent | – | 3 (Note 1) | 3 |
| Satisfactory | – | 1 (Note 2) | 1 |
| Total | 39 (Note 3) | 5 (Note 4) | 44 |

*Source:* *HKGBC website and ArchSD records*

*Note 1:* *The performance aspects under Selective Scheme of BEAM Plus Existing Buildings certified for the three existing government buildings were energy use, site aspects and management respectively.*

*Note 2:* *The performance aspect under Selective Scheme of BEAM Plus Existing Buildings certified for this existing government building was energy use.*

*Note 3:* *Of the 39 new government buildings, the certification applications for 22 buildings were coordinated by ArchSD (3 buildings were under projects completed before 2015 and 19 buildings were under projects completed between 2015 and 2018 (see para. 4.30(b))) and 17 buildings were coordinated by other B/Ds.*

*Note 4:* *Of the 5 existing government buildings, the certification applications for 3 buildings were coordinated by ArchSD and 2 buildings were coordinated by other B/Ds.*

## *Need to closely monitor the progress to obtain final green building certification for new government buildings*

4.30 From January 2015 to July 2020, ArchSD had completed 34 government building projects for which the green building certification requirement (see para. 4.29) was applicable. Audit noted that, as of July 2020, of the 34 completed government building projects:

(a) 15 (44%) projects had not yet obtained final green building certification. Of the 15 projects, 1, 4 and 10 projects were completed in 2015, 2018 and

2019 respectively. Except for 1 project (Note 49) which was still at Registered status, all the remaining 14 projects (Note 50) were at provisional assessment status (3 projects with Platinum grade and 11 projects with Gold grade); and

(b) 19 (56%) projects (completed between 2015 and 2018) had obtained final green building certification (6 projects with Platinum grade and 13 projects with Gold grade).

4.31 In August and September 2020, ArchSD informed Audit that, in order to obtain the final green building certification, a lot of supporting information (e.g. on-site measurement of indoor air quality and room acoustic performance after building occupation with stable operation, and verification of the actual performance of some building services systems (e.g. air conditioning) under seasonally deferred testing) and documents had to be prepared and gathered to demonstrate that the completed building could achieve the required environmental performance level. Hence, it would take a longer time to collect all the data and documents required for the submission to meet the assessment requirements under BEAM Plus New Buildings and obtain the final certification. In Audit's view, ArchSD needs to closely monitor the progress in making assessment submissions for new government buildings with a view to obtaining the final green building certification as early as possible.

## *Need to take measures to encourage B/Ds to apply for green building certification for existing government buildings*

4.32 Regarding existing government buildings, in June 2017, ENB informed the Legislative Council that it would encourage B/Ds to apply for BEAM Plus

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**Note 49:** *The government building project commenced in December 2015 and was completed in June 2019. In September 2020, ArchSD informed Audit that: (a) the project obtained a Registered status under BEAM Plus in February 2014; (b) provisional assessment was made in December 2019, and a revised submission was made in September 2020. The revised submission was currently under assessment; and (c) preparation of final assessment submission was in progress and targeted for submission by the end of 2020.*

**Note 50:** *In September 2020, ArchSD informed Audit that, among the 14 projects, 2 projects had already obtained the final certification in August 2020, 1 project was currently under final assessment, and 11 projects were with submissions under preparation.*

certification for such buildings to showcase the Government's commitment to green buildings. Audit noted that, as of July 2020:

(a) only 5 existing government buildings had obtained final certification under BEAM Plus Existing Buildings; and

(b) ENB, with the assistance from EMSD, was compiling a list of existing government buildings that might be considered for obtaining BEAM Plus Existing Buildings certification under Selective Scheme in the performance aspect of energy use and/or Comprehensive Scheme. In September 2020, ENB informed Audit that the list had not yet been finalised.

4.33 In Audit's view, ENB needs to take measures to encourage B/Ds to apply for green building certification for the existing government buildings under their management with a view to demonstrating the Government's continued commitment to promoting green buildings.

## Audit recommendations

4.34 **Audit has *recommended* that the Secretary for the Environment should:**

(a) **in collaboration with the Director of Electrical and Mechanical Services, take measures to encourage B/Ds (in particular those B/Ds with no representative attending the 2020 briefing sessions) to nominate representatives to participate in the annual briefing sessions or access the presentation materials through the CCGO website with a view to enhancing their understanding of the green energy target and facilitating its achievement; and**

(b) **take measures to encourage B/Ds to apply for green building certification for the existing government buildings under their management with a view to demonstrating the Government's continued commitment to promoting green buildings.**

4.35 **Audit has *recommended* that the Director of Electrical and Mechanical Services should upload all presentation materials (including seeking consent from**

**non-government speakers for releasing the materials) for the annual briefing sessions onto the CCGO website as far as practicable with a view to providing useful and up-to-date materials for B/Ds' reference.**

4.36 **Audit has *recommended* that the Director of Architectural Services should closely monitor the progress in making assessment submissions for new government buildings with a view to obtaining the final green building certification as early as possible.**

## Response from the Government

4.37 The Secretary for the Environment agrees with the audit recommendations in paragraph 4.34. He has said that ENB will:

(a) collaborate with EMSD in taking measures to encourage B/Ds to attend the annual briefing sessions; and

(b) take measures to encourage B/Ds to apply for green building certification for their existing buildings.

4.38 The Director of Electrical and Mechanical Services agrees with the audit recommendations in paragraphs 4.34(a) and 4.35. He has said that EMSD will:

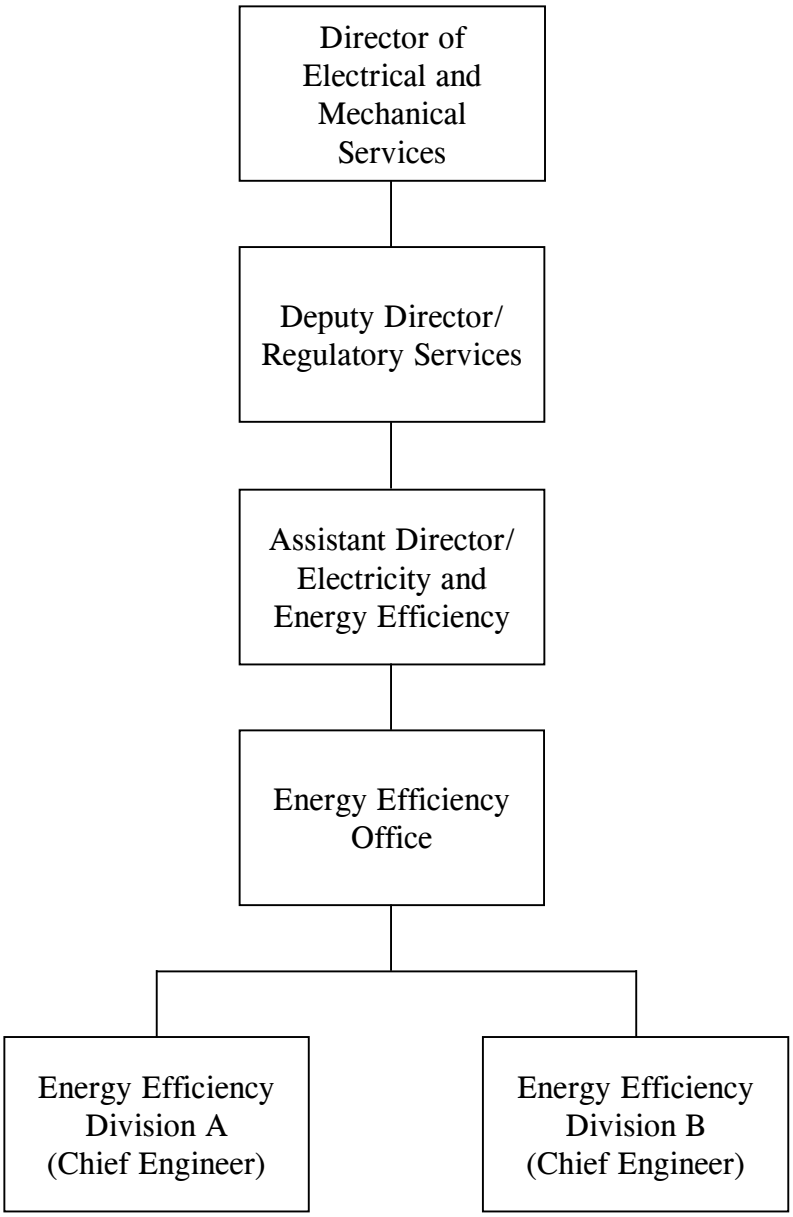
(a) collaborate with ENB in taking measures to encourage B/Ds to attend the annual briefing sessions; and

(b) after holding the annual briefing sessions, upload all presentation materials prepared by government speakers and by non-government speakers (after obtaining their consent) onto the CCGO website as far as practicable with a view to providing useful and up-to-date materials for B/Ds' reference.

4.39 The Director of Architectural Services agrees with the audit recommendation in paragraph 4.36. She has said that ArchSD will closely monitor the progress of assessment submissions for new government buildings with a view to obtaining the final green building certification as early as possible.

**Appendix A**
(para. 1.6(a) refers)

## Electrical and Mechanical Services Department: Organisation chart (extract) (31 July 2020)




*Source: EMSD records*

# Acronyms and abbreviations

| | |
|---|---|
| APE | Approved project estimate |
| ArchSD | Architectural Services Department |
| ASG | Accommodation Strategy Group |
| Audit | Audit Commission |
| BEAM | Building Environmental Assessment Method |
| B/Ds | Government bureaux/departments |
| CCGO | Central Cyber Government Office |
| EEO | Energy Efficiency Office |
| EMOs | Energy management opportunities |
| EMSD | Electrical and Mechanical Services Department |
| EMSTF | Electrical and Mechanical Services Trading Fund |
| ENB | Environment Bureau |
| ESOs | Energy saving opportunities |
| ESPC | Energy Saving Projects Committee |
| FSTB | Financial Services and the Treasury Bureau |
| HKGBC | Hong Kong Green Building Council |
| kWh | Kilowatt-hours |
| $m^2$ | Square metres |
| MBWC | Minor Building Works Committee |
| M&V | Measurement and verification |
| RCx | Retro-commissioning |
| RE | Renewable energy |