

# Chapter 7

## Conclusions and Policy Recommendations

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## Chapter 7

### Conclusions and Policy Recommendations

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#### 1. Conclusions

Energy efficiency and conservation (EEC) will be significant in curbing the growth of energy demand and contribute to energy savings and security, whilst maintaining economic growth in the country and applying appropriate EEC policies. Cambodia is one of the fast-growing energy demand countries in ASEAN due to its robust economic growth since 1990s. Thus, an appropriate energy efficiency master plan will be needed in the country to encourage EEC investment and behavioural change of energy consumers under the EEC regulations, so-called the EEC Act. This master plan, based on a practical and effective approach, comprises six chapters summarised as follows:

Chapter 1 specifies the sub-decree or regulations on energy efficiency to lay out the legal and organisational framework for activities in the field of energy efficiency and aims to create conditions to reduce energy consumption. In this case, the sub-decree or regulation guide the Ministry of Mines and Energy (MME) and relevant agencies to develop a comprehensive policy and regulatory framework to achieve energy efficiency in all sectors. The EEC sub-decree or regulations aim to promote energy efficiency as part of country's sustainable development by developing and applying a system of activities and measures for (i) the improvement of energy efficiency at the end-use level, (ii) the introduction of schemes of obligations for energy savings, (iii) the development of the market of energy efficiency services and encouragement of provision of energy efficiency services, and (iv) the introduction of financial mechanisms and schemes supporting the fulfilment of the national objective of energy efficiency. Needless to say, the EEC sub-decree describing the legal framework is important for establishing energy service companies (ESCOs), developing energy managers, standards and labelling, education and campaigns, and preparation of EEIs, which are referred henceforth as the five EEC policies and programmes.

Chapter 2 explains the role of an ESCO, its scope of services, and its importance in the implementation of EEC in Cambodia. The two ESCO business models are presented in the chapter as well: shared saving energy performance contract (EPC) and guaranteed saving EPC. Specific contents with useful information are also provided for the following topics: (i) registration and licensing, (ii) financial Incentives, (iii) ESCO business model, and (iv) a case study for an EPC project in Malaysia. The road map to planning and implementing the establishment of ESCOs in Cambodia are also mentioned. ESCOs have a huge potential role in reducing the country's energy consumption and, therefore, greenhouse gas (GHG) emissions. They play a key role in addressing energy shortages and price increases.

Chapter 3 describes and addresses the needs, duties, and methodology in developing energy managers to support the implementation of EEC in Cambodia. The specific content of this chapter includes (i) the requirements, duties, and expectation of an energy manager; (ii) the formation of the CEM (certified

energy managers) advisory committee to drive the registration and licensing requirements of CEM – which are minimum qualifications, certification syllabus, certification process and registration, licensing and renewal; (iii) mandatory training and international support to kick-start the capacity development of energy managers and train local EEC experts as future local trainers; (iv) formation of an association of energy managers to create a strong working relationship between government regulators (the General Department of Energy [GDE]) and the designated premise owners, to develop members' welfare, and to continuously raise the standard of CEMs' competencies and skills to achieve EEC goals; (v) 5-year implementation road map for developing energy managers. CEMs are essential and responsible to effectively and efficiently manage energy in designated premises to ensure that energy use is fully optimised. Proper selection of suitable personnel who have influence and are accepted by both management and colleagues and have further qualifications with EEC skills and knowledge through training, certification, and continuous development are the key attributes towards successful implementation of EEC management programmes.

Chapter 4 explains the electrical equipment use in promoting energy efficiency by achieving a minimum energy performance standards (MEPS) that, in turn, will reduce the overall power consumption of the said premises, especially households. With MEPS in place, an energy labelling system shall be used, and registration of the equipment shall be done based on the labelling categories. Specific contents are also provided for the following topics: (i) identification of relevant institutions, (ii) selection of targeted appliances, (iii) testing bodies, and (iv) registration of MEPS and energy labelling. The road map to roll out the various stages of the MEPS requirements and energy labelling is also mentioned.

Chapter 5 discusses various communication and promotional methods for education and campaigns through public and professional forums, media campaigns like printed media with practical EEC information, websites and TV broadcast, home energy reporting, school system, and publicity campaigns through national awards. Specific contents with useful and practical information are also provided for the following topics: (i) school syllabus, (ii) media campaigns, (iii) pamphlets for EEC promotion, and (iv) home energy report. A road map to roll out various education and campaign activities in phases is also discussed. In general, the successful planning and implementation of education and promotion campaign activities will require both technical input and committed government support.

Chapter 6 explains the concept of establishing energy efficiency indicators (EEIs), which requires the collection of quality energy and activity data from designated premises in the commercial and industry sectors. Regulatory requirements and designated premises for the commercial and industry sectors are explained. Although the definition of designated premises has been suggested to be based on 3,000,000 kWh/year (or 10 mil MJ/year), further deliberation and review should be made to establish an acceptable threshold value. This value will affect the number of commercial buildings and industrial premises that will be required to submit energy management reports with relevant energy consumption and activity data. The chapter also defines the EEIs for the commercial, residential, and industry sectors, with methodologies including validation and analyses that are based on the concept of energy efficiency indicators pyramid of the International Energy Agency (IEA). The establishment of EEIs is focused on developing sub-sector energy intensity. The importance of developing the EEIs and subsequently benchmark values for each industrial sub-sector, commercial building sub-sector, and each household per

area or district basis has been highlighted. The EEs and benchmark values for the respective sub-sectors will prove to be particularly important and useful for policymakers and the GDE. Publication of energy consumption data nationwide and a road map to roll out phased activities are discussed in this chapter.

Appendix A discusses the case study on the review of energy saving potential in the existing chiller system of a 250-room hotel. This case study demonstrates a method of reviewing and analysing the electricity consumption of the existing chiller system after conducting a walk-through audit and obtaining relevant energy consumption data. The case study was able to identify and analyse the saving potential in chiller replacement with a new and high efficiency chiller and auxiliary equipment. The case study shows reasonable return on investment. More importantly, it provides a useful example of how a walk-through audit can generate useful information and findings on the potential benefits of EEC applications.

## **2. Recommendations**

The GDE will be a key player in promoting EEC in Cambodia. Thus, improvement of the EEC department under the GDE will be a top priority, such as allocating more human and financial resources under the EEC sub-decree. The EEC department of the GDE should work on and prioritise the five EEC policies and programmes mentioned above.

The GDE should start the education and campaign programme by firstly collaborating with Cambodian energy managers. The purpose of the programme is to make Cambodians aware of the EEC; in other words, instilling the EEC in the people's mind through media campaigns. The programme will request Cambodians to apply simple EEC measures – such as frequent switching off of appliances, minimising standby power, reducing the leaking of cool air, installing simple shading devices in buildings, etc. The programme will target reducing waste in electricity consumption in the industry, commercial, and residential sectors. As a second step, the GDE will introduce EEC education in schools and in communities through the school syllabus and EEC leaflets, respectively.

The GDE is also reminded to develop many local energy managers quickly through domestic and/or EEC lecture courses to the candidates. The GDE shall certify and issue the EEC licence to the candidates who qualified in domestic and foreign examinations on EEC. Developing energy managers will surely contribute to the increase in opportunities for energy audits to measure energy consumption in industries and buildings. These audits will help realise the energy saving potential in Cambodia.

The GDE should invite ESCOs, including foreign ESCOs such as from Malaysia and Thailand, to Cambodia's energy market quickly because they will be the key players in conducting EEC consultations to factories and commercial buildings through expedited programmes, such as energy audits. The GDE, in collaboration with the Ministry of Industry and Handicraft, will license the candidates of ESCOs in Cambodia, who send their application forms to the GDE. The country's energy sector is attractive for ESCOs because energy prices are relatively higher than in neighbouring countries due to the absence of energy subsidies. However, the GDE will initially support ESCOs to give them business opportunities through the conduct of energy audits in government buildings.

Standard and labelling (S&L) system is an important EEC policy for the GDE. However, realising this system will take time because the GDE will surely facilitate a testing lab in Cambodia. The department will also establish MEPS for each electricity-intensive appliance such as air conditioner, refrigerator, microwave oven, etc. But linking the S&L system with education and campaign will significantly contribute to saving energy across the sectors, especially in the residential sector. The GDE must start preparing the S&L system to focus on its institutional recognition aspects.

The EEIs are especially useful in measuring the effectiveness of energy use and energy saving amounts achieved through the implementation of EEC policies and programmes. But the EEIs are determined, based on analyses of energy end-use consumption surveys or data collected from the industry and commercial sectors, after approval of an EEC sub-decree or the EEC Act. For example, the GDE will first designate factories and commercial buildings for the survey and collect detailed energy consumption data from the designated entities. This is to determine the EEIs of factories, defined as energy consumption divided by production and EEIs of buildings as energy consumption divided by floor area. The GDE must start preparing the survey or data collection by selecting factories and buildings to be designated, designing the questionnaire, etc.