Chapter 1

Introduction

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Chapter 1
Introduction

The rapid economic growth in the East Asia Summit (EAS) region countries has driven the formation of new industrial and commercial facilities, as well as the energy-supply infrastructure, and this trend is expected to continue. Therefore, concrete efforts to control energy consumption is required to maintain sustainable economic development in these countries, which otherwise will have to increase significantly their energy supply to meet the demand.

Experiences in developed countries have shown that an important perspective for improving energy efficiency on the consumption-side is not only to promote the diffusion of highly efficient energy equipment but also to formulate an institutional framework for efficient energy use, such as an energy conservation law, at the initial stage of capital accumulation and the development of industrial or commercial facilities.

In line with the oil crisis in the 1970s, the rise of climate change issues since the 1990s, etc., developed countries have devised various political and technical approaches for energy management. In particular, the advancement of information and communications technology (ICT) since the early 2000s has greatly helped the development of the energy management system (EMS), which is also widely called xEMS, the collective term of various types of EMS, such as factory energy management system (FEMS), building energy management system (BEMS), and home energy management system (HEMS). Furthermore, efforts have been accelerated to relate the load management functions of EMS with demand response.

With the expected economic growth and changes in industrial structure and in energy consumption pattern in the EAS countries, it is important to study the prospects of the advancement of the EMS that meet the specific needs of each country in the region. Conducting a study on this subject as an ERIA research project to identify the common policy challenges for the advancement of the EMS in the EAS region is expected to contribute to the sustainable economic growth of the region.

1. Objective

This study aims to analyse the potential for the deployment of EMS technologies in the EAS region and to propose, upon identifying the policy challenges that are common in the EAS region, policy recommendations for the promotion of EMS.

2. Achievement of the First-Year Study

During the first year (FY 2014), this study chose five countries in the ASEAN region, namely Indonesia, Thailand, Malaysia, Singapore, and Viet Nam. A working group (WG) was organized consisting of two members each from these countries, one from government agency and another from power utility who are responsible for implementing energy-efficiency policy.

At the first meeting in Jakarta in March 2015, the WG members shared their experiences on energy efficiency policies and programmes. Each of the five countries had already formulated legislation for energy efficiency and started programmes, such as mandating large consumers of energy to nominate qualified energy managers to administer energy management, energy-efficiency labelling for appliance, financial incentives for energy-efficiency measures, and so on. The deployment of xEMS, however, is still at an early stage in these countries, and although there are some cases of actual installation, most of them are still pilot projects.

The WG also conducted a case study for confirming the potential of deploying BEMS. The case studies were conducted in two sites, one in Indonesia and another in Thailand. First, the desk-based research on energy-saving actions or behaviours was conducted. Second, the effectiveness of energy-saving measures was examined through the field survey on the actual status of energy consumption, and the energy-saving effect was verified in detail.

Findings show that office buildings in high-temperature and high-humidity areas have more room for energy savings from air-conditioning systems. Two main points to improve in air conditioners of office buildings are to adjust the intake volume of fresh air from outdoors and the frequency of motor power using inverters.

The results of the study were presented at the second WG meeting in Tokyo in July 2015 and discussed more specifically in the first-year report.

3. Scope of Work of the Second-Year Study

Following the achievement of the first-year study, the study team dealt with the following tasks during the second year (FY 2015) to complete the study.

(1) Energy efficiency through deployment of EMS technologies

Following the discussion at the WG meetings that the dissemination of EMS was still at an early stage in ASEAN countries and that the benefit of EMS deployment had not yet been accepted widely, this study reviewed the roles of EMS as a tool to promote energy efficiency from practical point of view as discussed in Chapter 2. Energy-management practices using EMS were also introduced in this chapter.

(2) Case studies of deploying EMS technologies for the industrial sector

In addition to office buildings, the second-year study covered case studies for industrial sector (FEMS). Two sites, one in Malaysia and in Singapore, were selected for the study. With the support of energy auditing experts, factory or plant walk-through was carried out at the selected sites.

Based on the results of the case study, a set of energy efficiency measures was proposed and the cost-benefit balance of these measures was estimated. Following these results, the possibility of energy-saving through optimising the operation of energy-consuming appliances (e.g. air compressor, boiler, and turbine) that underlies the potential of EMS deployment was identified. The results were presented at the WG meeting and discussed more specifically in Chapter 3.

With the completion of items (1) and (2), the case studies cover all the five countries participating in the WG in the 2-year study period.

(3) Additional case study of deploying EMS technologies for office buildings

During the first-year study, case studies for deploying BEMS were conducted at two sites, one in Indonesia and in Thailand. To confirm the effectiveness of the analysis, another case study was carried out at one more site in Viet Nam where the climate conditions that strongly affect the air-conditioning demand and the status of economic development are different from those of the previous two sites. With the support of energy auditing experts, building walk-through was carried out at the selected site.

Based on the results of the case study, a set of energy-efficiency measures was proposed and the cost-benefit balance of these measures was estimated. Following the results of the case study on three sites, including the first-year study, the possibility of energy saving through optimising the operation of energy-consuming appliances (e.g. air conditioning, lighting), which underlies the potential of EMS deployment, was identified. These results were presented at the WG meeting and discussed more specifically in Chapter4.

(4) Identification of policy measures for EMS deployment

For accelerating EMS deployment in the ASEAN region, especially at the early stage, appropriate policy intervention to support it may need to be implemented, such as mandatory reporting and nomination of qualified energy managers for large consumers, promotion of energy service company (ESCO) business, energy price reforms, and so on.

Based on the current status of energy-efficiency policy in the five countries that was also discussed in the first-year study report, this study discussed the general characteristics of energy- efficiency institutional framework in the ASEAN region. With the results of the case studies for office buildings and factories, the impact of EMS dissemination on the national economy in the ASEAN region was then analysed.

In conclusion, the study presented a set of proposed policy options that the EAS countries should deal with to promote EMS dissemination. These options are explained in Chapter 5.