Executive Summary

This study aims to analyse the potential for the deployment of energy management system (EMS) in the East Asia Summit region, especially focusing on Association of Southeast Asian Nations (ASEAN) countries, and to propose, upon identifying the policy challenges that are common in the region, policy recommendations for the promotion of EMS. The duration of the study is two years, and this report deals with the results of the study in the second and final year, to complement the first-year study report (ERIA Research Project FY2014 No. 39, published in September 2015).

The first-year study chose five ASEAN countries, namely, Indonesia, Malaysia, Singapore, Thailand, and Viet Nam, as the target countries. Referring to the international statistical data and the discussion at the Working Group meeting that consisted of two members each from these countries, the study identified the characteristics in energy consumption that are common in the ASEAN region, aand noted also the differences among countries. To confirm the applicability of EMS for office buildings – building energy management system (BEMS) – the study conducted case studies to confirm the applicability of EMS on two sites, one in Indonesia and another in Thailand. Based on the walk-through of these buildings, the study identified some key points for improving the energy efficiency of office buildings by adjusting the operation of their air-conditioning system, which can be a potential for deploying BEMS. The results are summarized in the aforementioned first-year report.

Subsequent to the first-year study is this second-year study, which focused on the applicability of EMS for factories – factory energy management system (FEMS) – to supplement the first-year study that mainly targeted office buildings, and proposed a set of policy recommendations for promoting the deployment of EMS in the ASEAN region as a whole.

The second-year study report first discussed the importance of deploying EMS in a practical point of view. It is important to note that waste of energy is caused not only by the use of inefficient appliances but also by the inefficient use of appliances. Therefore, even without replacing energy-consuming appliances with more efficient ones, by monitoring and analysing the operational data of these appliances and by optimising their operational setup, certain potential of energy efficiency may be derived. Installation of EMS, which provides visual information, serves as the solution. However, because of this indirect role of EMS to serve for energy efficiency, the benefit of installing EMS may appear to be unclear. Therefore, this study pointed out that a policy intervention is necessary to support the diffusion of EMS.

The study also conducted case studies that focused more on the industrial sector, FEMS. In fact, the industrial sector consists of various types of subsectors. The utility services the subsectors consume, such as electricity, steam, hot and cold water, and compressed air, also vary. Effective energy-saving measures, therefore, also differ depending on industries. This study listed typical energy-saving measures, indicated which measure is especially effective

for which industries, and described specifically how these measures will be implemented.

(1) Optimisation of compressed air system;

(2) Optimisation of combustion and steam supply;

(3) Optimisation of heat-source equipment;

(4) Optimisation of boiler, turbine, and generator; and

(5) Optimisation of distillation tower.

Two sites were selected for the industrial sector case study: (i) the air compressor system at Proton City in Malaysia and (ii) the cogeneration plant operated by Green Power Asia Pte Ltd (GPA) in Singapore. Although conducting the survey at only two sites may be too rough to grasp the whole view of the industrial sector, optimisation of compressed air system and optimisation of boiler, turbine, and generator are commonly used by various types of industry. In terms of the types of industry, automobile, food, and beverage are among the industries that widely exist in Southeast Asia.

For the GPA case, which is eager to reduce the cost of supplying electricity and steam to its client, this study initially proposed the operation optimisation system to minimise the excessive power generation over the demand of the site. Although the system is not well fit for the case because of too little flexibility in operation, this study considers this idea feasible widely in the Southeast Asian region when the target facility is large and complicated enough.

For the Proton case, the site operator is already aware of the importance of reducing the consumption of compressed air, which accounts for about 17 percent of energy use, and has already started an initiative for this since 2014. Although its initiatives have achieved good results in energy efficiency, this study observed that there are still several energy-saving measures for compressed air systems, especially by reducing the air pressure more meticulously at each point of demand side, and estimated that there is a potential of reducing the energy consumption of the air compressor system by 8.71 percent.

The second-year study also conducted one more case study on office building at EVN Head Office in Viet Nam to supplement the case studies in the first year. The office building was completed in 2014 and its installed facilities are still new, but the study observed that much can still be done to improve the energy efficiency by optimising the operational management, such as adjusting the discharge pressure of pumps, operating intermittently the parking lot fans, and controlling the lights by windows. Based on the survey results, this study estimated a potential of energy saving by 7.4 percent.

Despite the case study results that witnessed the possibility of energy efficiency by optimising the operation of appliances, this study observed that there are some challenges for the deployment of EMS, i.e. main factors that may hamper the investment in EMS.

(1) Identification of the benefit of EMS implementation. Since EMS itself is not an energy-saving appliance but is a tool to support the energy efficiency of an entire factory or building, a sophisticated methodology to evaluate its effect is needed.

(2) Financial support and incentive for EMS installation. Financial support and incentive to EMS installation is still inactive in many countries because EMS deployment is supposed to be a relatively advanced step of energy efficiency.

(3) Private sector's involvement in energy-efficiency businesses. Policy intervention should be advanced from direct subsidies to investment to the promotion of private sector's involvement in energy-efficiency-related businesses.

(4) Economically irrational energy prices. In countries with domestic production of energy sources, energy prices are generally set lower than the international prices, and this deprives of energy demand's price elasticity.

To deal with the aforementioned challenges, this study proposed four policy recommendations to facilitate the deployment of EMS and energy-efficiency technologies.

(1) To strengthen mandatory reporting and target setting on energy management. Mandating the reporting on energy consumption and target setting for energy consumption is expected to enhance the awareness of the consumers (e.g. large factories and buildings) to monitor specifically the status of energy consumption.

(2) To provide assistance for the capacity development of energy managers. Developing the capacity of energy managers to devise meticulous methodologies of evaluating the effect of energy efficiency helps in verifying the benefit of using EMS.

(3) To provide incentives for promoting energy service company (ESCO) business. Promotion of ESCO business stimulates the suppliers of EMS to develop their business from simply selling the EMS system alone to providing the customer with various kinds of solution services related to energy efficiency.

(4) To take decisive actions for energy policy reforms since designing energy tariff rates that appropriately reflect the actual costs of supply motivates the consumers to invest in energy-efficiency technologies. However, because energy price may be a politically sensitive issue in some countries, it may take time to adjust the domestic energy prices to a completely cost-reflective structure.