Executive Summary

Cambodia, Lao PDR, Myanmar, Thailand, and Viet Nam, which are located in the Lower Mekong Basin Region (LMBR) with great potential and opportunity for co-operation, have achieved remarkable achievements in economic development in recent years. With their rapid economic growth and having implemented the rural electrification programme, their electricity demand also rapidly increased. Exploitation of renewable energy (RE) sources is seen as one of the best ways to facilitate economic growth in a less carbon-intensive way, ensure energy security with focus on indigenous resources and benefits to public health, and improve the economy of rural areas through electrification. Hence, the Energy Research Institute Network (ERIN) Research Project on 'Integrative Strategy and Policies for the Promotion of Appropriate Renewable Energy Technologies in Lower Mekong Basin Region' was implemented by a Working Group of the five represented countries in the region, with expertise and financial assistance from the Economic Research Institute for ASEAN and East Asia (ERIA).

This study aims to (i) set up the strategy and policies for the RE development of LMBR countries; (ii) assess and select the prioritised RE technologies; and (iii) identify the social, economic, and environmental benefits derived from RE development.

Among the five LMBR countries, Thailand is the most advanced in promoting private sector investment in RE resources. Experiences in policy application, success stories, weak points, and lessons learnt from Thailand were analysed and shared among the five countries. Cambodia, Lao PDR, Myanmar, and Viet Nam are still in their initial steps in RE deployment, therefore, these countries focused on the analysis, evaluation, and selection of suitable policy instruments for developing RE technologies in their respective countries. Effective RE policy instruments in advanced countries, such as some European countries, the United States, Japan, and other Association of Southeast Asian Nations (ASEAN) member countries were also evaluated and considered if these can be applied in the LMBR.

The prioritised RE technologies were selected based on the major criteria of their potential for greenhouse gas (GHG) reduction and their abatement costs, and each government's priorities and benefits to the economy, society, and environment. Calculations of the cost–benefit for each RE technology were undertaken and outputs of calculations were used as a base for the selection of prioritised RE technologies and appropriate future installed capacity of each RE technology in the region.

Due to the similarity in economic condition and the existing exploitation status of RE sources, yet with limited input data for modelling, cost–benefit calculations for each RE technology and the impacts of RE technologies on low-carbon and sustainable development were carried out for Viet Nam as a case study during the first year.

In this study, the Long-range Energy Alternatives Planning (LEAP) model was used to develop a baseline scenario or business as usual (BAU) scenario to outline future energy demand for the period 2013–2040 based on gross domestic product (GDP) and population projections,

changes in technology, and existing policies. Emission factors for each technology and fuel type were selected based on the values identified by the IPCC (available in LEAP).

The Alternative Policy Scenarios (APSs) were further developed based on the accessible potential of all types of RE sources, assuming that additional action plans or policies would be developed or likely to be under consideration. The differences between the BAU and APSs represent the additional RE consumption and potential fossil energy savings as well as potential GHG reduction.

In the case of Viet Nam, five RE technologies–solar photovoltaic (PV), biogas, wind, small hydro, and biomass– were considered and evaluated in APSs for power generation, which achieved the share of RE at 12.7% of total power generation output by 2030 and 14.1% by 2040. Moreover, the RE technologies used for power generation lead to reduced GHG emissions ranging from 9.5 million to 175.2 million tonnes CO_2.eq. Similarly, the incremental costs vary from US$-1.73 trillion to US$1.61 trillion.

In this study, a Co-Benefits Approach based on Multi-Criteria Analysis (MCA) method was used to evaluate the prioritised technology options based on criteria that reflect the country's RE development priorities, GHG emission reduction potential, as well as environmental, social, and economic benefits. Selection results for prioritised RE technologies showed that wind power is the first prioritised range with the highest score, followed by solar PV. Both technologies could get high scores on environmental benefits and country's development priorities. Biomass and small hydropower are the third and fourth prioritised range because these technologies got high scores on GHG emission reduction potential. Biogas power got the lowest score due to its low potential on GHG emission reduction and low economic benefits.

The study used analytical framework to identify the barriers for RE deployment. The analysis showed that the main barriers for achieving the target of RE development of 14% by 2040 include (i) limited access to capital; (ii) limited attractiveness to financiers because of indirect subsidies to power production from natural gas and coal; (iii) limited and unattractive feed-in tariffs for RE power generation; (iv) limited understanding of RE technologies at the local level; (v) cumbersome requirements for establishing plans for RE development; (vi) weakly developed supply chains, and (vii) lack of energy service provision, operation, and maintenance of RE equipment.

To achieve the above RE development target, strategies and action plans were proposed to address existing barriers. The RE policy instruments applied effectively in other countries were reviewed and analysed in order to propose the appropriate effective policies for supporting these action plans.

Finally, the strengthened subregional cooperation was proposed by undertaking cross-border RE projects to reduce the costs of developing RE technologies and make the energy future of the subregion more stable and secure.