

Chapter **1**

Introduction

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Chapter 1

Introduction

1. Background

The nuclear energy industry is facing great difficulties, especially in countries such as the United States (US), France, and Japan. Some construction projects have been seriously delayed (e.g. Vogtle 3 and 4 in the US and Flamanville 3 in France) and others have ended in failure (e.g. V.C. Summer 2 and 3 in the US and Wylfa Newydd in the United Kingdom (UK)). On the other hand, many countries need huge amounts of low-carbon energy to implement their environmental policies. To enhance the competitiveness of nuclear energy in the clean and low-carbon energy market, advanced reactors with innovative features have been developed in some countries.

Amongst those advanced reactors, small modular reactors (SMRs) are expected to meet various demands that have not been satisfied by conventional large-scale reactors because of their design features: small generation capacity, modular construction technology, safe and low risk of radiation exposure, etc. (World Nuclear Association, 2021) Because of these advantages, SMR development projects are being conducted in some leading countries, such as the US, the UK, Canada, and so on. At the same time, some new countries that have not utilised nuclear energy have come to consider the deployment of SMRs.

Of course, there are many barriers to deploying nuclear power plants (NPPs). However, all countries are seeking various options to meet their energy and environmental policy demands. SMRs could become an important option. Most of the Economic Research Institute for ASEAN and East Asia (ERIA) member countries are also at an important phase in deciding their future energy options because they are experiencing rapid economic development and are expected to have continuously increasing energy demand.

2. Purpose

This research focuses on the innovative efforts in leading countries and on considerations in the 'newcomer' countries to provide the East Asia Summit member countries with useful insights and information to consider for their future nuclear energy policies.

3. Study Method

1) Literature survey

First, the report summarises the technical features of SMRs and clarifies from where these features stem. Then, it presents surveys of the current status and plans for the development and deployment of SMRs (or other advanced reactors) in leading countries such as the US, the UK, and Canada. The surveys focus on the technical features of the reactors and the perspectives of economic feasibility and regulatory schemes. At the same time, the surveys also provide insights on the status of planning, feasibility studies, and international cooperation and agreements related to the deployment of SMRs in other countries such as Indonesia, the Philippines, Poland, the Czech Republic, Estonia, Finland, Jordan, and Kenya.

2) Summary of SMR adoption in the international context

Besides the information on the status in each country, it is important to understand what is being discussed by experts in the international context. As many countries are interested in SMRs today, they are often mentioned in international conferences and reports. Therefore, the Institute of Energy Economics, Japan (IEEJ) follows and summarises these discussions. This can help to gain additional information that cannot be found by a literature survey. During the period of this research project, the COVID-19 pandemic has become serious around the world. Therefore, the IEEJ has virtually participated in international conferences, with webinars held on 2, 9, 16, 23, and 30 June via Zoom meetings.

An expert on the global nuclear energy market writes her view on SMRs for this research project, which is cited after the summary of the webinars and reports.