

# Chapter 1

## Introduction

**This chapter should be cited as**

Sakaguchi K. and V. Anbumozhi (2015), 'Introduction', in *Sustainability Assessment of Utilising Conventional and New Type Geothermal Resources in East Asia*. ERIA Research Project Report 2014-41, Jakarta: ERIA, pp.1-2. Available at: [http://www.eria.org/RPR\\_FY2014\\_No.41\\_Chapter\\_1.pdf](http://www.eria.org/RPR_FY2014_No.41_Chapter_1.pdf)

# Chapter 1

## Introduction

Many Asian countries have been attempting to develop the geothermal resources of their territories although types of geothermal resources vary from country to country. Countries with rich high-temperature resources have been utilising their geothermal resources by conventional steam power generation. Even in the countries without volcanoes, heat extraction from the deeper underground using enhanced/engineered geothermal system (EGS) techniques and/or from shallow underground for direct use has been studied. However, geothermal utilisation in these countries has not been progressing mainly due to the lack of information on the latest technology of development and sustainable use of geothermal resources.

Geothermal technologies, such as reservoir engineering, monitoring techniques, and scale-controlling techniques, which are all essential for sustainable utilisation of geothermal resources for both power generation and direct use, are worldwide common aspects.

This joint research project ‘Sustainability Assessment of Utilising Conventional and New Type Geothermal Resources in East Asia’ aims at extracting common and field depending aspects, finding common and/or individual solutions and sharing information to improve technology for sustainable geothermal utilisation in Asian countries. Geothermal experts from seven countries—China, Indonesia, Japan, the Republic of Korea (henceforth Korea), the Philippines, Thailand, and Viet Nam—joined this project. The final output of this study are a collection of case studies, and a guideline of sustainable development and utilisation of geothermal resources. Since the characteristics of geothermal systems are controlled by local geology and other environment factors, the case study collection will give a scope of the variation of geothermal systems to developing countries and governments. The manual or guideline will help governments in making recommendations or regulations for sustainable utilisation, which includes protection of the environment.

In the first year of the project (September 2013–June 2014), a review was made to extract common and individual problems related to maintaining sustainability in

developed areas and installed systems for direct use of geothermal energy. Also, information on various techniques for resource/reservoir assessment, monitoring, scale-controlling, among others, was collected through a questionnaire to each member country. Chapters 2 to 4 provide the results of such review and information collection. Recommendations to policymakers for more intensive utilisation of geothermal energy are given in each section of this report.

In the second year of the project (September 2014–June 2015), based on the result of ‘technology and management of geothermal energy use’ in Chapter 2, several technical topics were selected to be common problems among member countries and thus investigated. Collection of case studies on these topics were conducted and guidelines for sustainable use of geothermal energy were made based on the compilation of these case studies. These results are shown in Chapters 5 to 7.