

Lecture Notes in Energy 92

Shaharin Anwar Sulaiman *Editor*

Energy and Environment in the Tropics

 Springer

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edited by: Shaharin Anwar Sulaiman

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Preface

Since the 1980s, the terms global warming and climate change were brought up to alert the whole world on an upcoming crisis. It was not well accepted at the beginning, although the awareness was slowly increasing. By now in 2022, the observed rise in temperature and greenhouse gas concentrations has been at the fastest rates in Earth's history. The consequences for these are becoming more distinct. The sea level is clearly raising, submerging certain areas of low elevations. More rains and storms can be seen than before, as well as drought. At the same time, desertification of land is expanding leading to less fertile areas for agriculture, which are needed to support the fast-growing population. By the end of the Great Coronavirus Pandemic of 2019–2021 (COVID-19), a few difficult situations emerged such as the Russia-Ukraine conflict and the early sign of food crisis. The latter could lead to famine. The world economy is also badly hit. Clearly today, the environment, which was perceived differently in the 1980s, coupled with the certain unpredicted situations is making the world's future to become uncertain.

A decade ago, the environmental problems were always expressed as a secondary matter after the mention of energy shortage issues. However, presently, the environment is regarded as a far more important issue due to the many negative effects experienced by many countries. In managing today's problems of environment and energy necessitates various efforts by various stakeholders. In the tropics, this would be unique due to diverse conditions of the areas such as climate, geographical, culture and political conditions. Mitigating the environmental problems in the tropics among others involves enhancing the potential of various types of fuels and conversion of energies. Simultaneously, how the energy is utilized must also be considered holistically. Nevertheless, awareness on the need to improve energy efficiency and to protect the environment is still lacking in many parts of tropical countries. There are plentiful of efforts required within the tropical countries in order to catch up with the vision aspired in the Paris Agreement in 2015. This book delves into studies on issues related to the environment and energy in the tropics. The chapters are contributed by authors from several tropical nations who are experts in the environment and energy topics in their respective countries. The book covers topics in relation to the present state of the environment in selected countries, mainly in Malaysia and the Philippines.

The major content of the book is on the potential energy conversion technologies that can be leveraged for different countries in order to alleviate environmental problems particularly in the tropics. Topics on indoor air quality and energy efficiency, which affect the environment of today, are also presented in this book.

The editor wishes to express his gratefulness to all the contributing authors for their strong effort in preparing the texts for this book. It is hoped that the book would serve as a useful reference to readers.

Seri Iskandar, Malaysia

Shaharin Anwar Sulaiman

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Urban Heat Island Phenomenon in Tropical Countries: Analysis of the Wake Flow Behind Slender High-Rise Building

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Abstract

Urban Heat Island (hereafter, UHI) is a phenomenon described by an increased temperature in an urban area compared to the temperature of its surrounding (Mohajerani et al. in *J Environ Manag* 197:522–538, 2017).

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