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## INTRODUCTION

After seventy years of Independence, Indonesia still struggles to solve four main challenges. Firstly, Indonesia has the highest number of people without electricity access in the Asian region, after India (IEA 2013). Secondly, out of the ten Southeast Asian countries, Indonesia has the lowest electrification rate, after Cambodia, Myanmar, and the Philippines (IEA 2013). Thirdly, in terms of electricity consumption per capita, out of 135 countries, Indonesia ranked 28th from the bottom in 2011, after the Philippines and before India.<sup>1</sup> Fourthly, in terms of carbon dioxide emissions from electricity and heat production, Indonesia was one of the top emitters, placed at 16th out of 133 countries in 2011. The emissions will increase if Indonesia becomes more dependent on coal power plants in the future. As the demand for electricity in Indonesia is expected to rise, this has consequences not only in terms of the provision of primary energy supply for power generation, but also in terms of electricity transmission and distribution, intended improvements regarding the quality of electricity supply, the maintenance and sustainability of power supply, the reduction of electricity poverty, and finally, the creation of a green (more environmentally sustainable) power system.

**Table 1.1**  
**Electricity Access, 2012**

Region	Population without Electricity in Millions	Electrification Rate (%)	Urban Electrification Rate (%)	Rural Electrification Rate (%)
China	3	100	100	100
India	204	75	94	67
Southeast Asia	140	77	92	65
Brunei Darussalam	0	100	100	99
Cambodia	10	34	97	18
Indonesia	60	76	92	59
Laos	1	78	93	70
Malaysia	0	100	100	99
Myanmar	36	32	60	18
Philippines	29	70	89	52
Singapore	0	100	100	100
Thailand	1	99	100	99
Vietnam	4	96	100	94
Rest of Developing Asia	175	61	82	52
Bangladesh	62	60	90	48
DPR Korea	18	26	36	11
Mongolia	0	90	98	73
Nepal	7	76	97	72
Pakistan	56	69	88	57
Sri Lanka	2	89	97	88
Other Asia	29	32	59	23
Developing Asia	620	83	95	74

Source: IEA (2014).

Nowadays, the challenges of the power sector can be quite complex and decision-makers would need to take multidimensional objectives into consideration. These include the economic, environmental, social, and human (safety) factors. Further, there is also the trade-offs for some criteria. For example, from an economic perspective, the power system would need to be developed using the least cost principle and following the structure of current generating cost in Indonesia, coal power plants have the lowest cost. However, from the environmental perspective, this policy is not strongly advisable as the coal-based power plants emit more carbon dioxide compared to gas- or oil-based plants. In addition, the power system planning would need to address issues such as reducing energy poverty, regional disparity, and income inequality in order to meet social objectives. Considering the challenges on the geographical and topography situation, and varieties in the population density, there is a need to combine both on-grid and off-grid connection to electrify the most remote parts of Indonesia. The power system would need to have a high degree of resilience in protecting human beings from any disaster, both expected and unexpected. In short, the power system development planning would need to improve people's welfare for both the current as well as future generations.

I argue that as electricity is a vital part of modern-day energy utility services, one can use the analytical framework for energy security to discuss electricity security. The analytical framework of this book follows Savacool (2011), which break down energy security into five dimensions, namely, regulation and governance, availability, technology development and efficiency, environmental sustainability, and affordability. It is important to note that all these dimensions are interconnected and keeping them in balance will determine energy sustainability.

The World Energy Council (WEC) provides the Energy Sustainability Index (WEC 2013) which covers two major elements — energy performance and contextual performance. In terms of energy performance, this consists of energy security, energy equity, and environmental sustainability; while on the contextual performance, this includes political strength, societal strength, and economic strength. Energy performance reflects the trilemma and the score indicates how well the country fares in pursuing the balance score among the three dimensions. WEC (2013) indicated that in 2013, Indonesia had relatively high score in terms of energy security compared to other

ASEAN countries, but it scored lower in terms of energy equity and environmental sustainability. This means that Indonesia needs to take on a more balanced approach in pursuing energy security, energy equity, and environmental sustainability. The trend on political strength and economic strength decreased between 2012 and 2013, while societal strength remained constant (WEC 2013).

Comparing Savacool's dimension and the Energy Sustainability Index, I conclude that they are similar. For example, availability is reflected in energy security dimension; affordability is linked to energy equity; technology development and efficiency and renewable energy is referred to environmental sustainability; and finally, regulation and governance is connected to contextual performance.

This book is organized into five main chapters, in accordance with the five dimensions of energy security. Chapter 2 begins by investigating the regulation and governance dimension. The institutional and organizational developments from the pre-Independence period to the current organizational and institutional setting was evaluated. This chapter broadly captures the history of the electricity sector in Indonesia. Thus far there have only been a few works that have tried to employ a long-term perspective in analysing the Indonesian electricity sector. Thus this chapter is useful for readers as it aims to link the state of the electricity sector with the economic background. It is necessary to broaden the time horizon for analysis in order to have a better understanding of the institutional and organizational changes that have occurred in the Indonesian electricity sector and to draw on the lessons that one can learn from the past.

Chapter 3 addresses the availability dimension. It analyses the supply and demand conditions of the electricity sector from the early Soeharto era to the present. The supply side covers the generating, transmission, and distribution sectors, while the demand side covers sectoral consumption. It also investigates the convergence index in three specific areas: the capacity across the big islands, the electrification ratio, and electricity consumption per capita.

Chapter 4 is the extension of Chapter 3. It aims to investigate the 1997/98 economic crisis and its implications on the national power company (PLN). The crisis has huge impact on PLN in terms of financial difficulties and it affected not only PLN, but also the electricity sector

in general. The crisis led to an increase in electricity subsidy in the following years. It underlined the importance of good governance and good corporate governance in managing the power sector. Following the under-supply of electricity and the economic crisis, Chapter 5 focuses on whether there is a causality link between economic growth and electricity consumption in Indonesia. This chapter provides an understanding of the consequences of associating economic growth with electricity consumption. Chapter 5 also lays the foundation in understanding the policy setting between availability and environmental sustainability in Chapter 6.

Technological development and efficiency, and renewable energy dimensions are discussed in Chapter 6. This chapter highlights the main problem that Indonesia needs to address of why development of renewable energy lags behind that of fossil-based fuels. It emphasizes the important role Indonesia will play in pursuing a “green path” (more environmentally sustainable) power system. Finally, Chapter 7 addresses a critical problem of Indonesia’s energy poverty by focusing on electricity accessibility. This chapter focuses on three major issues: affordability of electricity; identifying electricity-poor households in terms of housing conditions, social protection, information and communication access; and the rural electrification programme. It suggests that in order to improve the rural electrification ratio, Indonesia will need to take on a more robust, comprehensive, and sustainable approach.

While some parts of this book consist of technical analyses involving econometrics, the general arguments and implications are relevant to the general public and policymakers. It is hoped that this book will provide a better understanding of the problems of the electricity sector in Indonesia and offer some viable directions to pursue sustainable development in providing electricity.

## Note

1. <<http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators#>> (accessed 14 February 2014).

## References

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