



## Chapter 14

# Closing Summary: Deploying Indonesia's Energy Resources for a National Carbon-Neutral Energy Ecosystem

Harun Ardiansyah & Putty Ekadewi

---

This book is the melting pot of the minds of Indonesian students who are currently pursuing higher education abroad. The authors are spread into different backgrounds, all with the same intent and focus: as students, what can we do and how can we help Indonesia achieve its energy targets?

When we think of energy and electricity in Indonesia, the first things to come to mind are coal mines, oil and gas economies, and electricity outages. The public has fewer ideas about Indonesia's progress in renewable energy or even the country's strategies to integrate renewables into the mix. Failure of the public to comprehend the country's energy vision, in some way, has affected the way the public view strategic energy projects and policies. For example, our high reliance on fossil resources is driven by various cost subsidies from the

---

H. Ardiansyah & P. Ekadewi  
University of Illinois at Urbana-Champaign, e-mail: haruna2@illinois.edu

© 2022 Overseas Indonesian Student's Association Alliance & BRIN Publishing  
Ardiansyah, H., & Ekadewi, P. (2022). Closing summary: Deploying Indonesia's energy resources for a national carbon-neutral energy ecosystem. In H. Ardiansyah, & P. Ekadewi (Eds.), *Indonesia post-pandemic outlook: Strategy towards net-zero emissions by 2060 from the renewables and carbon-neutral energy perspectives* (283–287). BRIN Publishing. DOI: 10.55981/brin.562.c14  
ISBN: 978-623-7425-83-0 E-ISBN: 978-623-7425-87-8

government that makes renewable options seem costly, thus unable to compete economically. This book tries to close this knowledge gap by summarizing the ecosystem of Indonesia's energy sector and outlining the general ideas behind several alternative energies: solar, wind, hydro, geothermal, and biomass. This book tries to go beyond the 'classics' by introducing new technology like hydrogen as energy storage and nuclear energy, bringing the debate closer to the Indonesian public.

Energy is at the core of human existence alongside primary necessities like water and nutrition. It is one element that could make or break a country's global status in the modern post-industrialization world. Indonesia is one of the world's highly populated countries. As a result, the energy needs of the country is expected to grow significantly along with the rise in population and globalization. The COVID-19 pandemic has seen workplaces and classes moved to a 'from home' setting. A direct impact of this phenomenon is the highlight of inequality in the country. Students living in rural areas find it difficult to have stable access to electricity and internet connections necessary to support their at-home studies. The effect of the pandemic on energy industries is phenomenal. Almost equally across all sectors, activities are lower or even suspended, putting existing projections and scenarios off track. It is important to evaluate, assess, and re-strategize Indonesia's plans for a net-zero future by 2060 to stay on target despite the pandemic's disturbances and new opportunities.

We have discussed several points concerning renewable, carbon-free energy, and energy transition strategies for Indonesia based on selected alternative energy sources in the book.

## **A. Status and Challenges of Indonesia to Achieve Net-Zero Emission by 2060**

From policy developments to the global shift in perspectives, it is clear that Indonesia is moving towards a net-zero future albeit slowly, one of its strategies being energy transition from fossil-based resources to renewable energy. We are still far from targets loosely written on

paper on various policy instrumentations in the field. There is an urgent need to speed up energy transition if Indonesia is still aiming to reach its targets by 2025 and 2050 as written in the RUEN or by 2060 as stated with regards to the recent COP26 meeting in Glasgow, UK.

## **B. Redefining Nationally Defined “New and Renewable Energy” to International Standards of Carbon-Neutral and Renewable Energy**

The term renewable energy has always been loosely defined, relying on the characteristics of the energy source, which leaves room for the identification of new non-fossil-based energy into the group. However, sustainability does not only rely on the ability of the source material to renew itself as sustainability revolves around the complex interaction between living and non-living systems on Earth (ecology). We have seen in this chapter the need to further clarify our future energy source by adding another characteristic: carbon-free. Moreover, the ecological cost of energy transition must also be considered when choosing alternative energy. These costs are often associated with land clearing, construction, and system startup, but will be offset later by the installations as it runs.

## **C. Potentials and Challenges of All Possible Carbon-Free and Renewable Energies**

Classic renewables like solar, wind, hydro, biomass, and geothermal energies are already installed worldwide, including Indonesia, in varying proportions. Thanks to the characteristics of the energy source itself, geographical factor plays a big role in determining the type of alternative energy adopted by each country. In Indonesia, wind power installation is less popular because the country has an overall low wind speed. Instead, the country chose to adopt biomass to be used as biofuel, which drastically increases biomass energy utilization in the national energy mix compared to solar, although the latter is equipped with energy potential several magnitudes over the former. In the future, solar energy is expected to grow exponentially.

Moving on from 'the classics', nuclear and hydrogen emerge as new technologies for the Indonesian energy market. Nuclear energy in the world has developed over time, each time with better safety protocols and lower risks of disaster. However, not all countries in the world can use this energy source, debates revolving around nuclear are still rolling since the energy source is regarded as a hot ball today. Indonesia's commercial nuclear power plant number is still at zero, meaning nuclear energy has not contributed to the national energy mix. The government needs to launch the debate on nuclear power potentials versus concerns in order to position itself on the topic, keeping in mind of both future energy and environmental security. On the other hand, hydrogen emerged recently as the solution for energy storage, which can be coupled with various types of renewables to maintain energy stability.

#### **D. Multi-Sectoral Approach to Deploy Renewable and Carbon-Neutral Energy in Indonesia**

Indonesia is a country with a large and socioeconomically diverse population. Energy is the drive behind the daily economic activity of the citizens. To successfully deploy renewables in Indonesia, the challenges rely on consumer demand and its sensitivity on energy pricing. Therefore, to launch a transition campaign successfully, the government needs to either drive up consumer demand for renewables over fossil-based energy or take on energy transition's economic load to minimize the consumers' economic burden. The first option requires mass education of the people, which is problematic given our current timeline. The second option is better suited for the first phase. Government incentives could increase renewables uptake in the first phase of transition. Along the way, better education and an economically rising population could push for better government actions and industrial sector accountability to commit to their climate protection pledges.

## E. Impact of Carbon-Free and Renewable Energy Deployment on Society

The energy transition is reflected in other aspects, besides fossil-based consumption and alternative energy generation. We can see the impacts of energy transition in: reduced CO<sub>2</sub> emissions, less environmental pollution, decreased rate of global surface temperature increasement, increased health and well-being of the society, better equality between genders, increased proportion of skilled workers in the energy sector, and increased economic growth in the renewable sector among others. The first and most direct impact of energy transition can be felt by eliminating of coal power plants in favor of non-polluting wind or solar generators. Coal power plants are widely known to bring detrimental health effects to surrounding populations, which is dismal because now coal still plays a big role in the energy sector. After a while, the global increase in surface temperature can be halted because of lower CO<sub>2</sub> emissions, known to contribute to the greenhouse effect, the power behind a rapid rise in Earth's surface temperature. Finally, by developing the renewable energy sector, jobs will open. This will lead to an overall increase in skilled workers and a better opportunity to close the gender gap, affecting the economy positively. The effect of the energy transition is significant, which is why Indonesia needs to catch up in developing this sector, not only to target the national energy mix, but also to improve the livelihood of its citizens.

Finally, we hope that by aiming to close the knowledge gap on renewables and alternative energies as well as suggesting several points to re-strategize Indonesia's energy targets, we can help the country stay on track to its vision for a net-zero future by 2060.