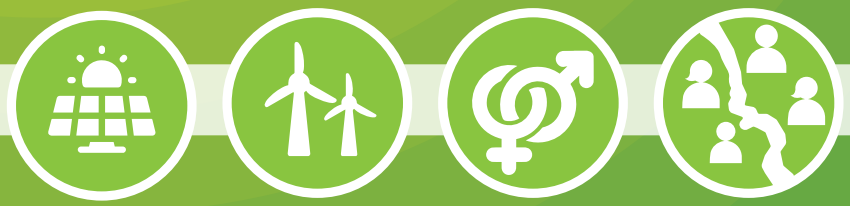
SOUTHEAST ASIA'S ENERGY AND CLIMATE PROFILES

Laurence L. Delina



This paper is part of a research series on the energy landscape in Southeast Asia.

HEINRICH BÖLL STIFTUNG
SOUTHEAST ASIA

INTRODUCTION

Southeast Asia comprises 11 countries, 10 of which form the Association of Southeast Asian Nations (ASEAN). ASEAN is a bloc focused on promoting economic growth and regional stability. With a combined population of about 667 million people, ASEAN represents about 10% of the global population (IMF, 2021). ASEAN has set the goal of obtaining almost a quarter of its energy needs from renewable energy by 2025, aligning the region with international commitments of the United Nations Sustainable Development Goals (SDGs) (United Nations, 2015a) and the Paris Agreement (United Nations, 2015b). This regional commitment translates the understanding of energy transition beyond its member-states' environmental sustainability to focus on improving quality of life, including access to sustainable fuels.

However, fossil fuels (coal, gas and oil) still account for 66% of the regional energy mix in 2020, mainly from oil use and gas- and coal-fired power generation. In terms of renewables, hydropower still dominates the regional energy landscape at 63% of renewable energy sources, while solar and wind energy contributed only 9% to the ASEAN energy mix in 2029 (ASEAN Center for Energy, 2021). Oil, coal, and hydro are energy systems with negative consequences on climate, ecosystems, biodiversity, and the livelihoods of communities.

The COVID-19 pandemic, which continues to threaten lives and livelihoods, has revealed the critical role of energy in linking social and economic development with environmental sustainability. As countries locked down, for instance, it became crucial to push the digital economy and other public services toward sustainability. The global community has indeed started to search for sustainable energy pathways through the pandemic and its impact while pushing for more significant shifts toward a more sustainable future by "building back better". Southeast Asian countries are also presented with the same opportunity to advance regional efforts towards sustainable energy transition. Beyond the shifts in energy systems, however, it is also essential to align energy transition with the principles of justice.

Some post-COVID national recovery plans have already highlighted environmental sustainability through their new commitments to reduce carbon emissions, as shown, for example, in the Malaysian National Recovery Plan (Yusof, 2021). Clearer policy directions for green recovery programs from other Southeast Asian countries, however, remain absent. A sustainability-directed plan is critical, especially given the findings from a United Nations report on the Asia-Pacific's energy future, which glaringly noted that concrete measures to achieve sustainable objectives are unclear and that many stimulus packages announced to date have favored the use of fossil fuels (United Nations, 2021). A regional post-pandemic plan anchored to a just energy transition narrative offers one way forward for Southeast Asia.

The next section briefly describes some key background notes, highlighting the region's energy profile, energy poverty, and climate change vulnerability.

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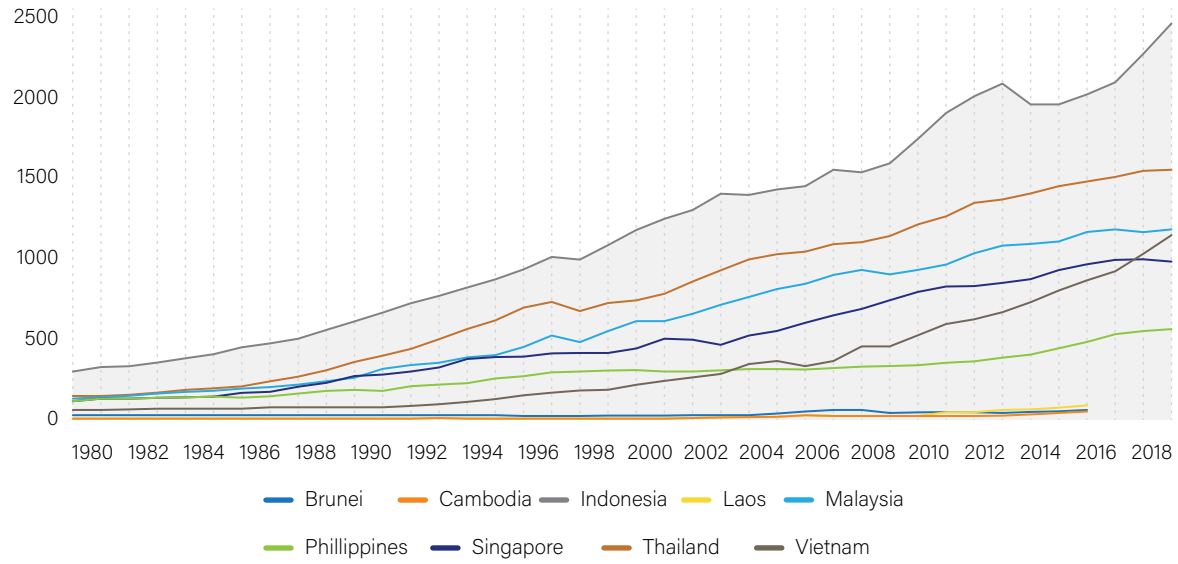
Energy profile

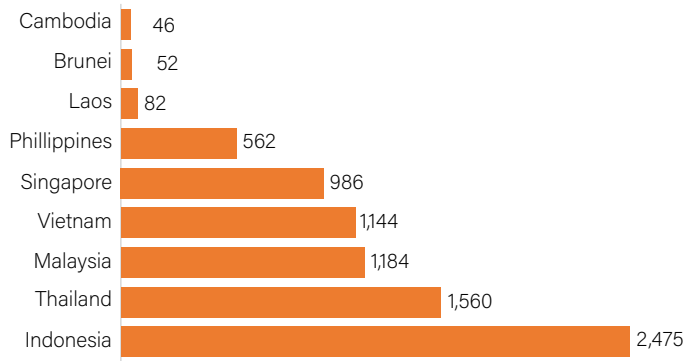
Southeast Asia's strong economic growth trends have its power demand growing at about 6% per year, the fastest globally (see Figures 1 and 2). Indonesia is the region's largest energy consumer, followed by Thailand and Malaysia. Vietnam's energy use is also fast increasing, overtaking Singapore in 2019. Cambodia, Myanmar, and Laos remain the countries in the region with the lowest energy consumption.

Figure 1: Southeast Asia's energy consumption in terawatt-hours (TWh), 1980–2019



Source: Drawn by the author from BP (2021)

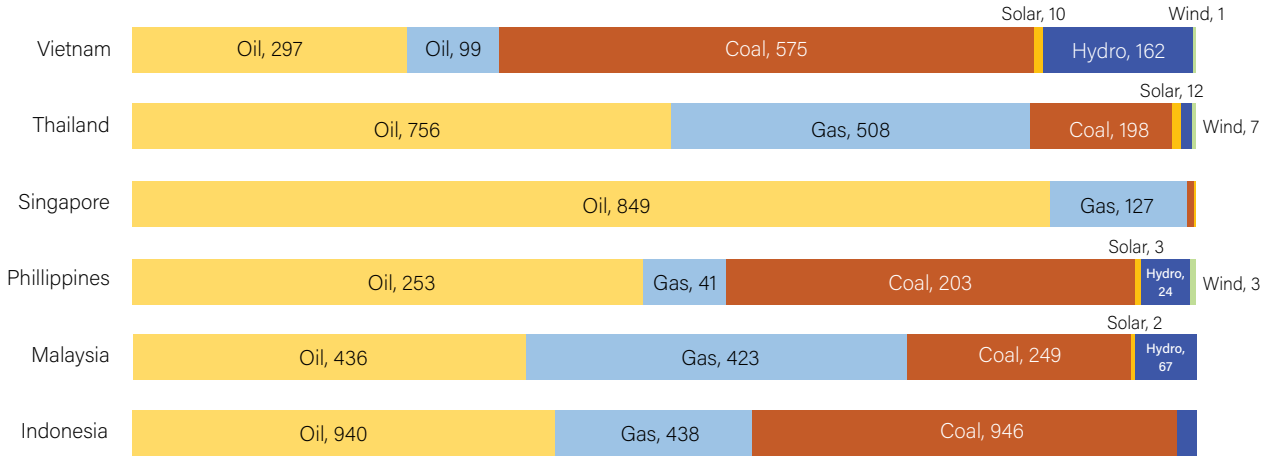
Figure 2: Southeast Asia's primary energy use in TWh, 2019



Source: Drawn by the author from BP (2021)

In 2019, 80% of the region's electricity came from fossil fuels (see Figure 3). Natural gas, another fossil fuel, is also increasing in rates. Over the decades, there has been very little change in the amount of renewable energy-based generation. Renewables account for only 10% of the mix, of which large hydropower is the major contributor. Solar, wind, and biomass-based renewable energy resources represent only a tiny portion of the generation.

Figure 3: Southeast Asia's energy consumption by source, in ExaJoules, 2019



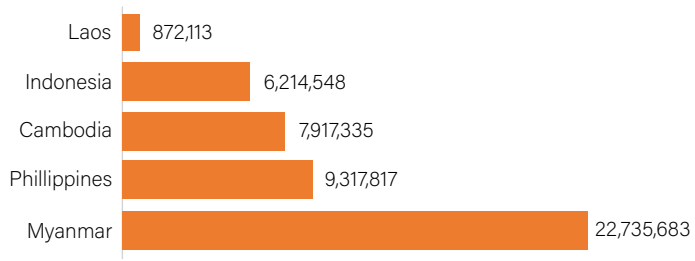
Source: Drawn by the author from BP (2021)

The region's large hydropower capacity is contentious infrastructure. The dams in the Mekong River, for example, have been criticized for their impacts on downstream communities in Cambodia and Vietnam (Molle et al., 2012; Campbell and Barlow, 2020). Ecological, social, and cultural issues are expected to persist as more storage-based hydropower capacity is planned in the Mekong River. The same can be said with the planned hydropower facilities in Myanmar's Salween River and the Philippines' major rivers (Götz and Middleton, 2020; Delina, 2020).

Energy poverty

Despite Southeast Asia's economic development, poverty rates are still high in some countries and some regions within countries. There are communities in the region struggling to access essential human services, most especially modern energy. In 2016, 47 million people in Southeast Asia did not have access to electricity (see Figure 4). Close to 23 million people in Myanmar, 10 million in the Philippines, eight million in Cambodia, and more than six million in Indonesia lack electricity access.

Figure 4: Number of people without access to electricity in Southeast Asia, 2016



Source: Drawn by the author from Sustainable Energy for All (SE4ALL) (2021)

Closing energy poverty, especially modern electricity, is a critical sustainable development target. If addressed, electrification offers several co-benefits to other sustainable development targets, including poverty alleviation, health, education, and gender empowerment (Jeuland et al., 2021). All five ASEAN countries with populations without access to electricity have set targets to close these access gaps (see Table 1).

Table 1: Electrification targets in Southeast Asia

Cambodia	Electrification for all villages by 2020, and 70% electrification for households by 2030
Indonesia	Achieve an electrification ratio of 99.7% by 2025
Laos	Achieve an electrification rate of 98% by 2025
Myanmar	Achieve an electrification rate of 80% by 2030
Philippines	Achieve 100% electrification by 2022

Climate vulnerabilities

Southeast Asia is highly vulnerable to the impacts of accelerating climate change. Countries perched on the edge of the Pacific and Indian Oceans are particularly susceptible to storm surges, and frequent and stronger typhoons and cyclones. The Philippine typhoon belt regions have been particularly affected by strong typhoons (Holden and Marshall, 2018), intensified by a warming atmosphere that holds more moisture, and thus caused heavier rainfall. Stronger and more frequent typhoons have already been claiming lives and affecting vital livelihoods. These impact people's survival and derail opportunities to have a quality of life.

Sea level rise also threatens several capital cities in the region. Manila, Bangkok, and Jakarta are already exposed to flooding. More precipitation volumes and poor infrastructure and planning will only increase the vulnerabilities of these cities. A large part of Jakarta, a city with 30 million people, for instance, is predicted to submerge by 2050 (Firman et al., 2011), prompting the Indonesian government to move its capital out to Kalimantan in Borneo Island at the cost of over USD 32 billion (Lyons, 2019). This money represents a lost opportunity for spending more on sustainable development.

Prolonged dry spells also impact the region's agriculture sector, reducing crop yields (Shrestha et al., 2018) and directly affecting people's livelihoods, health, and security. At the same time, droughts result in forest fires, leading to transboundary air pollution (Yamashita and Honda, 2018). For instance, Malaysian and Indonesian forest fires have affected nearby countries such as Singapore and even as far away as the Philippines.

Adapting to these extreme weather events requires resilient communities and energy systems (Delina et al., 2020). Energy access, especially during these times, is essential for survival. Modular renewable energy systems such as solar-powered emergency kits have been necessary for communication, illumination, warmth, and cooking during typhoon events. Community-scale renewable energy systems are also quick to rehabilitate compared with grid-based electricity systems.

REFERENCES

ASEAN Center for Energy. (2021, September). ASEAN Power Updates. https://aseanenergy.org/asean-power-updates-2021/

BP. (2021). *BP Statistical Review of World Energy*. https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

Campbell, I., & Barlow, C. (2020). Hydropower development and the loss of fisheries in the Mekong River Basin. *Frontiers in Environmental Science, 8*, 200.

Delina, L. L. (2020). Indigenous environmental defenders and the legacy of Macli-ing Dulag: Anti-dam dissent, assassinations, and protests in the making of Philippine energyscape. *Energy Research & Social Science, 65*, https://doi.org/10.1016/j.erss.2020.101463

Delina, L. L., Ocon, J., & Esparcia Jr, E. (2020). What makes energy systems in climate-vulnerable islands resilient? Insights from the Philippines and Thailand. *Energy Research & Social Science, 69*, https://doi.org/10.1016/j.erss.2020.101703

Economic and Social Commission for Asia and the Pacific. (2021). *Sustainable Cooling in the Asia-Pacific Region: Tackling climate change and enhancing quality of life*. United Nations: Bangkok.

Firman, T., Surbakti, I. M., Idroes, I. C., & Simarmata, H. A. (2011). Potential climate-change-related vulnerabilities in Jakarta: Challenges and current status. *Habitat International, 35*(2), 372–378. https://doi.org/10.1016/j.habitatint.2010.11.011

Götz, J. M., & Middleton, C. (2020). Ontological politics of hydrosocial territories in the Salween River basin, Myanmar/Burma. *Political Geography, 78*, https://doi.org/10.1016/j.polgeo.2019.102115

Holden, W. N., & Marshall, S. J. (2018). Climate change and typhoons in the Philippines: Extreme weather events in the Anthropocene. In P. Samui, D. Kim, and C. Ghosh (Eds.), *Integrating Disaster Science and Management: Global Case Studies in Mitigation and Recovery* (pp. 407–421). Elsevier.

International Monetary Fund. (2021). World Economic Outlook Database. https://www.imf.org/en/Publications/WEO/weo-database/2021/April/select-country-group

Jeuland, M., Fetter, T. R., Li, Y., Pattanayak, S. K., Usmani, F., Bluffstone, R. A., Chavez, C., Girardeau, H., Hassen, S., Jagger, P., Jaimel, M. M., Karumba, M., Kohlin, G., Lenz, L., Litzow, E. L., Masatsugu, L., Naranjo, M. A., Peters, J.,...Toman, M. (2021). Is energy the golden thread? A systematic review of the impacts of modern and traditional energy use in low- and middle-income countries. *Renewable and Sustainable Energy Reviews, 135*, https://doi.org/10.1016/j.rser.2020.110406

Lyons, K. (2019, August 27). Why is Indonesia moving its capital city? Everything you need to know. *The Guardian*.

Molle, F., Foran, T., & Kakonen, M. (Eds.). (2012). *Contested waterscapes in the Mekong region: Hydropower, livelihoods, and governance*. Earthscan.

Shrestha, R. P., Raut, N., Swe, L. M. M., & Tieng, T. (2018). Climate change adaptation strategies in agriculture: Cases from southeast Asia. *Sustainable Agriculture Research, 7*(3), 39–51.

Sustainable Energy for All. (2021). Sustainable Energy for All Database. The World Bank, International Energy Agency, and the Energy Sector Management Assistance Program. https://databank.worldbank.org/source/sustainable-energy-for-all

United Nations (2015a). *Transforming our world: the 2030 Agenda for Sustainable Development*. https://sdgs.un.org/2030agenda

United Nations (2015b). *Paris Agreement*. https://www.un.org/en/climatechange/paris-agreement

Yamashita, K., & Honda, Y. (2018). Climate change and air pollution in East Asia: Taking transboundary air pollution into account. In R. Akhtar & C. Palagiano (Eds.), *Climate Change and Air Pollution* (pp. 309–326). Springer.

Yusof, A. (2021). Malaysia's 'dynamic' recovery plan tackles COVID-19 crisis holistically: Tengku Zafrul. *New Strait Times*.

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