

# CoP

Community of Practice Technical Brief



## Integrated Approaches towards Clean Air and Clean Energy

Policy Brief



Clean Air Asia is an international non-governmental organization leading the regional mission for better air quality, and healthier, more livable cities throughout Asia. Clean Air Asia's approach is one of science-based, actionable guidance combined with an ethos of partnerships and collaboration to ensure our work has meaningful and sustainable impact.

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# 1

## INTRODUCTION

Energy is important in the social, economic, cultural, and political spheres since it provides for the power requirements of households, businesses, and industries. Thus, an ample supply of energy is necessary to meet the growing demands of the energy sector (Erdiwansyah, 2019). Almost all of the economies of the countries in SEA have grown by more than a factor of two. Over the past two decades, the energy demand in Southeast Asia (SEA) has grown by about 3% year on average, and this trend is expected to continue through 2030. In addition, coal-fired power plants (CFPs) continue to be the primary sources of electricity generation. Almost 40% of the total electricity produced in the SEA in 2020 came from CFPs. The total amount of power generated by CFPs continues to rise even while their percentage of total electricity generation has continuously decreased (IEA, 2022).

Air pollution is considered one of the greatest health risks globally, with Asia accounting for around one-third of all air pollution-related mortality worldwide (CCAC, 2019). The air pollution emissions from CFPs worsen climate change, endanger the ecology of the ecosystem, and have detrimental effects on human health (Clean Air Asia, 2020). Aside from the negative impacts of air pollution emissions from CFPs, coal is also the most accountable for the heat-trapping emissions driving global warming. There is little chance that the world will remain below a 1.5 degree global average temperature rise unless coal is phased out and global carbon emissions are cut in half by 2030. Asia is already witnessing unheard-of heatwaves, droughts, and floods as a result of the world's warming, which has reached a little over 1 degree Celsius (UN, 2022).

To lessen the negative environmental effects of CFPs, national governments in SEA have developed and implemented policies and regulations. These policies range from those that have a direct impact on CFP emissions to those that have an indirect impact. Most SEA countries have set net zero emissions and carbon neutrality goals to combat climate change. Furthermore, important regulations are in place to phase out subsidies for fossil fuels, raise efficiency, increase the percentage of renewable energy, restrain the rise of overall demand, and promote energy efficiency in end-use industries. These initiatives are aimed at boosting clean energy technology, which could result in co-benefits to air quality and the climate (IEA, 2022).

# 2

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## NATIONALLY DETERMINED CONTRIBUTIONS TO CLIMATE ACTION

The Paris Agreement, which was approved by the United Nations Framework Convention on Climate Change (UNFCCC) Parties in 2015, lays out long-term objectives for enhancing the global effort to address the challenges posed by climate change. By keeping global warming far below 2 °C and, if possible, below 1.5 °C, it creates a framework for avoiding the harmful effects of climate change. Signatory Parties must describe and disclose their nationally determined contributions (NDCs), also known as climate action targets and commitments, in order to achieve this goal.



These NDCs, which represent the nations' pledges to climate change mitigation and adaptation, are expected to be implemented between 2020 and 2030 (*Amarjargal et al., 2020*).

Furthermore, the NDCs must be updated every five years, and each revision is expected to be more ambitious than the previous one in terms of climate targets and actions to ensure a steady progression over time (*Amarjargal et al., 2020*). In their most recent NDCs, countries in Asia provided details about their reduction targets in the energy sector. The Philippines intends to increase the country's capacity for resilience and adaptation, notably through increased access to climate funding, technology transfer, and development, as well as capacity building. Vietnam plans to decrease the operation of CFPs and promote the use of renewable energy while the country develops its forthcoming Power Development Plan (PDP8). Indonesia seeks to increase the amount of installed renewable energy, energy efficiency, and clean coal technologies, as well as the operation of natural gas-fired Thermal Power Plants (TPPs). Thailand aims to reduce greenhouse gas emissions in its two key sectors – energy and transport – by the end of 2030 (*UNFCCC, n.d.*).

Although NDCs are the backbone of the Paris Agreement and a crucial sign of political commitment, the level of collective ambitions they currently express remains insufficient to meet the objectives of the agreement. The Paris Agreement's goal of limiting global warming to below 2.0 degrees Celsius (°C) or even 1.5 °C is still technically attainable, but only if countries significantly raise their ambitions and take action to meet these goals (*Amarjargal et al., 2020*).

# 3

## ENERGY TRANSITION TARGETS IN ASIA

A decrease in air pollution may indicate a decrease in the use of fossil fuels and an increase in the use of renewable energy sources. Moreover, mitigating CO<sub>2</sub> emissions is a key driver for switching to renewable energy. The Asia-Pacific region is among the most significant globally because of its considerable industrial production and population; hence faster energy transition is necessary for the region (*Taghizadeh-Hesary et al., 2020*). Asia has a huge potential to implement its energy transition plans due to the decreasing cost of clean energy and increasing efficiency of green energy (*Qiao, 2019*). China and India are the two Asian countries that could produce the majority of the world's renewable energy during the energy transition (*Mamat et al., 2019*). The geographic location of Asian economies in areas with advantageous climatic conditions (e.g., tropical, humid) allows for easier access to a wide range of renewable energy sources (*Shukla et al., 2017*).

Several countries in Asia aim to retire a portion of their CFPs in the next decade. They also plan to source more electricity from renewable and clean energy resources. The energy transition targets of some of the Asian countries are summarized in Table 1.



Table 1. Summary of Energy Transition Targets in Asia

Country	Energy Transition Targets
Bangladesh	Achieve 40% of power generated from clean energy by 2041
Brunei Darussalam	Achieve 30% of electricity generation from renewables by 2035
Cambodia	In an accelerated scenario, total installed capacity by 2030 at 55% hydro, 6.5% biomass and 3.5% solar photovoltaic (PV)
India	Obtain 500 gigawatts (GW) of renewable energy capacity by 2030
Indonesia	Increase share of “new and renewable energy” in primary energy supply to reach 23% by 2025 and 31% by 2050; 52% share of renewables in electricity capacity additions from 2021 to 2030
Lao PDR	Achieve 30% share of renewables in total primary energy consumption by 2025
Malaysia	Achieve 31% share of renewables installed capacity by 2025
Myanmar	Achieve 20% share of renewables installed capacity by 2025
Pakistan	By 2030: 60% of energy is supplied from clean energy resources
Philippines	Achieve 35% of power generated from renewable resources and have 15 gigawatts (GW) renewables installed capacity by 2030
Singapore	Obtain 2 gigawatts (GW) solar photovoltaic (PV) installed capacity by 2030
Thailand	Increase share of renewables to 30% in total final energy consumption by 2037; Increase share of renewables-based power to 36% in capacity and to 20% in generation by 2037; Increase share of renewables in transport fuel consumption to 25% by 2036
Vietnam	Targets on renewables share in total primary energy supply (TPES) of 15–20% in 2030 and 25–30% in 2050; 31-38 gigawatts (GW) solar photovoltaic (PV) and wind installed capacity by 2030; 4 gigawatts (GW) offshore wind installed capacity by 2030, 36 gigawatts (GW) GW by 2045

Source: Clean Air Asia, 2023; IEA, 2022

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## POLICIES ON ENVIRONMENT AND ENERGY SECTORS

SEA countries are still mostly reliant on conventional energy for domestic needs; nevertheless, governments are responding to the mounting pressure from rising energy demand by investing in the development of environmentally friendly and sustainable energy sources. Countries in SEA have enacted several measures to promote the production of renewable energy, including agreements and unrestricted laws (Erdiwansyah, 2019).

The Philippine government established a renewable energy framework in 2008 and has collaborated internationally on the technical assessment of renewable energy resources (Kies et al., 2017). The National Renewable Energy Board (NREB) has established working groups and subcommittees to recommend policies, such as the implementation of Renewable Portfolio Standards (RPS), the National Renewable Energy Program (NREP), the feed-in tariff (FiT), and other fiscal incentives including the utilization of Trust fund. In 2011, the government introduced the Green Energy Roadmap to increase the country's energy supply security (Olvido, 2021). The National Energy Efficiency and Conservation Action Plan (2016-2020) and the Philippine Energy Efficiency Roadmap (2014-2030) are just two of the government's initiatives to promote energy efficiency and savings. It is intended to lower energy usage by 10% by the end of the 2011–2030 period (ADB, 2018). Vietnam aims to increase the share of renewable energy by 5% in 2020 and by 11% in 2050 (Chang et al., 2016; Quirapas





et al., 2015). The Vietnamese government has also started several initiatives to develop biofuels. The study of renewable energy in the nation is of interest to many research institutions, academic groups, and individuals (Duc Luong, 2015). The Indonesian government has established a national energy policy to reach optimal renewable energy consumption by 2025, lowering dependence on oil, gas, and coal by 20%, 30%, and 33%, respectively. Biomass, hydropower, wind, solar, and nuclear energy will each account for about 5% of total energy production, whereas liquid fuels will make up about 2%. In 2025, the domestic energy demand is projected to rise by 15% from 2005 levels, in line with the energy policy's goal of maximizing the use of sustainable energy sources at the national level (Erdiwansyah, 2019). The policies on the use of renewable energy and financing mechanisms are summarized in Table 2.

**Table 2. Summary of Energy Policies in Select Countries in Asia**

Philippines	
<p><b>Policies - Use of Renewable Energy</b></p> <ol style="list-style-type: none"> <li>1. Biofuels Act of 2006 (RA 9367) <ul style="list-style-type: none"> <li>• The Biofuels Act of 2006 prescribes a minimum percentage of electricity generation from renewable energy for each electricity supplier, with a minimum of 5% bioethanol, 10% biodiesel, and 1% biodiesel.</li> </ul> </li> <li>2. Renewable Energy Act of 2008 (RA 9513) <ul style="list-style-type: none"> <li>• The Renewable Energy Act of 2008, otherwise known as RA 9513, is the foundation of RE policies in the Philippines. With its enactment, incentives are presented so as to encourage the development of RE projects.</li> </ul> </li> <li>3. National Renewable Energy Plans and Programmes (NREP) 2011-2030 <ul style="list-style-type: none"> <li>• The plan includes the implementation of an RE Information Exchange that contains specialized RE resource and market information that are readily available to target clients.</li> </ul> </li> </ol>	<p><b>Financing Mechanisms</b></p> <ol style="list-style-type: none"> <li>1. Renewable Portfolio Standard (RPS) <ul style="list-style-type: none"> <li>• The Renewable Portfolio Standard (RPS) is a policy which requires electric power industry participants to source or produce a fraction of their electricity from RE resources.</li> </ul> </li> <li>2. Feed-in Tariff System (FiTs) <ul style="list-style-type: none"> <li>• FiTs provide electricity at a fixed price to develop renewable energy resources.</li> </ul> </li> <li>3. Green Energy Option Program <ul style="list-style-type: none"> <li>• The Green Energy Program is a mechanism that allows households and end-users to choose RE resources as their energy source.</li> </ul> </li> <li>4. Mini-hydroelectric Power Incentive Act (RA 7156) of 1991 <ul style="list-style-type: none"> <li>• The Mini-hydroelectric Power Incentive Act provides incentives to mini-hydroelectric power developers.</li> </ul> </li> </ol>
Vietnam	
<p><b>Policies - Use of Renewable Energy</b></p> <ol style="list-style-type: none"> <li>1. The Electricity Law of Vietnam of 2004 <ul style="list-style-type: none"> <li>• The Electricity Law of Vietnam of 2004 generally contains regulations with regards to planning and investing in power sector, electricity savings, power market development, and the rights and obligations of organizations.</li> </ul> </li> <li>2. Scheme on Development of Biofuels <ul style="list-style-type: none"> <li>• The scheme aims to increase production and use of biofuels as an alternative to fossil fuels.</li> </ul> </li> <li>3. National Power Development Master Plan for 2011-2020 <ul style="list-style-type: none"> <li>• The National Power Development Master Plan aims to increase RE power share and provide electricity to rural households.</li> </ul> </li> <li>4. Revised National Power Development Master Plan for 2011-2020, with an outlook to 2030 <ul style="list-style-type: none"> <li>• RE-based power plants are targeted to increase electricity share to 7% in 2020 and 10% in 2030, with total installed capacity of 4,200 by 2020.</li> </ul> </li> </ol>	<p><b>Financing Mechanisms</b></p> <ol style="list-style-type: none"> <li>1. Decree No. 218/2013/ND-CP <ul style="list-style-type: none"> <li>• The Government of Vietnam has promulgated Decree No. 218/2013/ND-CP to implement the Law of Corporate Income Tax, providing incentives for RE utilization.</li> </ul> </li> <li>2. Prime Minister's Decision No. 130/2007/QĐ-TTg of 2007 <ul style="list-style-type: none"> <li>• Incentives for RE-based power projects include income tax, import duties, land rent and use, and subsidy.</li> </ul> </li> </ol>
Indonesia	
<p><b>Policies - Use of Renewable Energy</b></p> <ol style="list-style-type: none"> <li>1. National Energy Policy of 2006 <ul style="list-style-type: none"> <li>• Indonesia aims to increase the share of New and Renewable Energy (NRE) by 2025, with at least 5% for biofuel, 5% geothermal, 5% others, and 2% liquified coal.</li> </ul> </li> <li>2. Law No. 21 of 2014 on Geothermal (New Geothermal Law) <ul style="list-style-type: none"> <li>• Law No. 21 of 2014 aims to develop geothermal activities to become Indonesia's alternative energy source.</li> </ul> </li> <li>3. Roadmap for Accelerated Development of New and Renewable Energy (NRE) 2015-2025 <ul style="list-style-type: none"> <li>• The roadmap aims to support energy resilience and transition to NRE sources.</li> </ul> </li> <li>4. Revised National Energy Policy (2014) <ul style="list-style-type: none"> <li>• The Revised National Energy Policy sets a minimum NRE target of 23% in 2025 and 31% in 2050.</li> </ul> </li> </ol>	<p><b>Financing Mechanisms</b></p> <ol style="list-style-type: none"> <li>1. Ministry of Finance (MoF) Regulation No. 21/PMK.011/2010 <ul style="list-style-type: none"> <li>• Regulation No.21/PMK.011/2010 provides tax incentives to encourage RE-based projects.</li> </ul> </li> <li>2. Clean Technology Fund <ul style="list-style-type: none"> <li>• The Clean Technology fund is a multilateral fund created by international finance organizations to promote energy efficiency, electrification, and geothermal capacity.</li> </ul> </li> <li>3. Feed-in Tariffs (FiTs) <ul style="list-style-type: none"> <li>• FiTs provide consistent revenue for RE power projects, allowing private investors to participate up to 50 MW.</li> </ul> </li> <li>4. Viability Gap Fund (VGF) (PMK 170/2018) <ul style="list-style-type: none"> <li>• VGF allows eligible infrastructure projects to be financed without investment capital and financial viability.</li> </ul> </li> </ol>

Source: Abeleda et al., 2014; ASEAN Centre for Energy, 2016; Chavez, 2020; IABF Law Group, 2021; Grantham Research Institute on Climate Change and the Environment, n.d.; Jong, 2021; Reuters, 2021; Utomo et al., 2021

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## CONCLUDING REMARKS

The historical and future development plans in the power sector in Asia show an increasing trend of electricity production through renewable energy. Air quality management and clean energy targets will benefit greatly from integrated approaches from various sectors. However, the absolute amount of fossil-based power generation remains significant.

A strong national commitment to sustainable growth, such as through continued and increased focus on clean energy combined with informed environmental policy decisions, may reduce emissions. The existing policy landscape in the region demonstrates that all countries have formulated and promulgated policies for the power sector that have direct and indirect impacts on air pollution. Countries in Asia may be able to continue on their path to developed-nation status while still being able to manage their local air quality and contribute to climate change mitigation by reducing emissions through sustainable socio-economic development strategies, including urban planning and clean fuel use (CCAC, 2019).

## Recommendations



- 1 Reducing the amount of fossil fuels, particularly coal and fuel oil, used for electricity generation will eventually result in better air quality and co-benefits for the climate.
- 2 Not all renewable energy sources, such as biomass-TPPs, are equally clean for the environment in terms of air quality. Hence, each RE type should be given the opportunity to utilize specialized strategies for emission control. To obtain a clearer picture of the status of the execution of policies that have a direct impact on air quality, more research should be conducted.
- 3 Policymakers should consider increasing investment in renewable energy as a pillar of sustainable development and take note of the advantages offered by decentralized renewable energy systems (Erdiwansyah, 2019).



- 4 There are several pathways to achieve the energy transition targets in Asia through the framework of *Just Energy Transition*:
  - Create and provide structure characterized by (1) the creation, implementation, and enforcement of science-based policies, guidance frameworks, and roadmaps informed by the needs of various sectors, (2) providing capacity-building opportunities for key stakeholders, (3) empowering communities, workers, and the public, and (4) establishing mechanisms and physical structures to support policies and to decentralize the energy system.
  - Application of energy financing solutions such as the reduction of financing and business development options for CFPs, strengthening of public and private investments for clean energy facilities, and the incentivization of the use of clean and renewable energy technologies
  - Develop sustainable energy, characterized by the exploration of local energy resources, the empowerment of communities in handling local energy sources, and the strengthening of infrastructure to maximize the local energy resources.
  - Establishment of a circular economy — an economy with feedback loops, both of which aim to reduce or avoid having non-salvageable waste from various processes and activities that drive the economy.

## Reference

Amarjargal, B., Ebro, H., Nylander, J., & Duggal, V. K. (2020). Achieving nationally determined contributions through market mechanisms in Asia and the Pacific. <https://doi.org/10.22617/wps200088-2>

Aquino, A.P., & Abeleda, C.L. (2014). Renewable Energy Act for Energy Self-Sufficiency and Harmful Emission Reduction. <https://ap.jftc.org.tw/article/721>

ASEAN Centre for Energy. (2016). ASEAN Renewable Energy Policies. <https://agep.aseanenergy.org/wp-content/uploads/2018/04/ASEAN-Renewable-Energy-Policies.pdf>

Asian Development Bank. (n.d.). Retrieved March 14, 2023, from <https://www.adb.org/sites/default/files/publication/463306/philippines-energy-assessment-strategy-road-map.pdf>

Chang, Y., Fang, Z., & Li, Y. (2016). Renewable energy policies in promoting financing and investment among the East Asia Summit countries: Quantitative assessment and policy implications. *Energy Policy*, 95, 427–436. <https://doi.org/10.1016/j.enpol.2016.02.017>

Chavez, L. (2020). Philippines declares no new coal plants – but lets approved projects through. <https://news.mongabay.com/2020/11/philippines-declares-no-new-coal-plants-but-lets-approved-projects-clean-air-asia/>. (rep.). Coal-Fired Power Plant Emission Standards in South and Southeast Asian Countries Policy Analysis. Retrieved February 9, 2023, from <https://cleanairasia.org/sites/default/files/2021-05/-%201.3%20South%20and%20Southeast%20Asian%20Countries%20Coal-Fired%20Power%20Plant%20Emission%20Standards%20Policy%20Analysis%202020.pdf>.

Climate and Clean Air Coalition (CCAC), & Partnership, A. P. C. A. (1970, January 1). Air pollution in Asia and the Pacific: Science-based solutions (summary + full report). Climate & Clean Air Coalition. Retrieved March 8, 2023, from <https://www.ccacoalition.org/en/resources/air-pollution-asia-and-pacific-science-based-solutions-summary-full-report>

Duc Luong, N. (2015). A critical review on energy efficiency and conservation policies and programs in Vietnam. *Renewable and Sustainable Energy Reviews*, 52, 623–634. <https://doi.org/10.1016/j.rser.2015.07.161>  
Erdiwansyah, Mamat, R., Sani, M. S. M., & Sudhakar, K. (2019). Renewable energy in Southeast Asia: Policies and recommendations. *Science of The Total Environment*, 670, 1095–1102. <https://doi.org/10.1016/j.scitotenv.2019.03.273>

Grantham Research Institute on Climate Change and the Environment. (n.d.a.). Biofuels Acts RA 9367 and Amending Act RA 10745. <https://climate-laws.org/geographies/philippines/laws/biofuels-acts-ra-9367-and-amending-act-ra-10745>

Grantham Research Institute on Climate Change and the Environment. (n.d.a.). Mini-hydroelectric Power Incentive Act (RA 7156). <https://www.climate-laws.org/geographies/philippines/laws/mini-hydroelectric-power-incentive-act-ra-7156>

IABF Law Group. (2021). Viability Gap Funding: Increasing Attractiveness of PPP Infrastructure Projects in Indonesia. <https://iab-net.com/newsroom/viability-gap-funding-increasing-attractiveness-of-ppp-infrastructure-projects-in-indonesia-38>

IEA (2022), Southeast Asia Energy Outlook 2022, IEA, Paris <https://www.iea.org/reports/southeast-asia-energy-outlook-2022>, License: CC BY 4.0

Kies, A., Schyska, B., Thanh Viet, D., von Bremen, L., Heinemann, D., & Schramm, S. (2017). Large-scale integration of renewable power sources into the Vietnamese Power System. *Energy Procedia*, 125, 207–213. <https://doi.org/10.1016/j.egypro.2017.08.188>

Olvido, M.B. and L.T. Morales (2021), 'Philippines Country Report', in Han, P. and S. Kimura (eds.), *Energy Outlook and Energy Saving Potential in East Asia 2020*, Jakarta: ERIA, pp.225-247.

Qiao, L. (2019). Why the Time is Now for an Energy Transition in South East Asia. GWEC. Available online at: <https://gwec.net/why-the-time-is-now-for-an-energy-transition-in-south-east-asia/> (accessed June 10, 2020)

Quirapas, M. A., Lin, H., Abundo, M. L., Brahim, S., & Santos, D. (2015). Ocean Renewable Energy in Southeast Asia: A Review. *Renewable and Sustainable Energy Reviews*, 41, 799–817. <https://doi.org/10.1016/j.rser.2014.08.016>  
Reuters. (2021). Vietnam's coal-fired power may double by 2030 under draft energy plan. <https://www.reuters.com/business/energy/vietnams-coal-fired-power-may-double-by-2030-under-draft-energy-plan-2021-10-15/>

Shukla, A. K., Sudhakar, K., & Baredar, P. (2017). Renewable Energy Resources in South Asian countries: Challenges, policy and recommendations. *Resource-Efficient Technologies*, 3(3), 342–346. <https://doi.org/10.1016/j.reffit.2016.12.003>

Taghizadeh-Hesary, F., & Rasoulinezhad, E. (2020). Analyzing energy transition patterns in asia: Evidence from countries with different income levels. *Frontiers in Energy Research*, 8. <https://doi.org/10.3389/fenrg.2020.00162>  
Unfccc.int. (n.d.). Retrieved March 8, 2023, from <https://unfccc.int/NDCREG>

Unfccc.int. (n.d.). Retrieved March 8, 2023, from <https://unfccc.int/news/un-agencies-support-the-just-energy-transition-in-asia>

Utomo, F.G.R., & Yusgiantoro, F.C. (2021). How Phasing Out Coal-Fired Power Plants Will Benefit Indonesia's Economy. <https://www.purnomoyusgiantorocenter.org/how-phasing-out-coal-fired-power-plants-will-benefit-indonesias-economy/>





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