Fundamentals for developing a long-term renewable energy roadmap for ASEAN

Policy brief
August 2023

Policy pointers

ASEAN imminently needs a long-term renewable energy vision and roadmap for the region's net zero emission target. This roadmap is the guiding principle that sets the foundation for the region's renewable energy development aspirations and goals.

The roadmap development should align with the 1.5˚C goal and have a conceptual framework incorporating all fundamentals. In addition to an aspirational vision that is compatible with a 1.5˚C pathway, a strategic process and approach which identifies key enablers will be integral to the development process.

Recognising non-state actors' roles will add value to the process. Maintaining accountability and transparency is critical, as is involving non-state actors who contribute valuable insights to the roadmap's development.

The Association of Southeast Asian Nations (ASEAN) has a unique opportunity to develop a sustainable energy system based on renewable energy resources.

The region has abundant potential for solar, wind, hydro, biomass, and geothermal energy. These resources can be used to support socioeconomic development while mitigating climate change. Renewable energy development will play a crucial role in aligning the region's emissions pathway with the goal of limiting global warming to 1.5°C. Thus, a long-term renewable energy roadmap needs to be developed and implemented in the region.

The roadmap needs to accommodate at least the following fundamentals:

- a clear vision for the future of renewable energy in the region
- a comprehensive plan for achieving these goals
- a commitment from all ASEAN member states and key actors.

This brief gives an overview of the importance of having a long-term renewable energy roadmap for ASEAN. It explores how to govern the development process best, closing with recommendations for developing a participative and integrated roadmap among key actors beyond governments.

Introduction

Energy plays a pivotal role in realising the ASEAN Economic Community's (AEC) objective to be a well-connected, integrated, competitive, and resilient region (Vo and Vo 2021). A robust and sustainable energy sector is essential to support economic growth, enhance connectivity, and ensure the region's competitiveness in the global arena.

At the heart of ASEAN's energy strategy lies the ASEAN Plan of Action for Energy Cooperation (APAEC). The APAEC is ASEAN's energy blueprint that sets the region's energy goals and sits within the AEC implementation framework (ASEAN Centre for Energy 2020). It acts as a guiding plan that provides direction and coherence to the energy policies and initiatives pursued by ASEAN member states. In paving the way for a sustainable energy future, a long-term renewable energy (RE) roadmap for the region has been discussed (ASEAN Centre for Energy 2022a).

This policy brief outlines what is critical for the ASEAN region to consider in its roadmap development. These key elements include:

- an ASEAN long-term renewable energy vision
- core and supporting issues on roadmap development
- a roadmap development process.

Each component significantly guides the region towards a more sustainable and prosperous energy landscape.

1. ASEAN long-term renewable energy vision

Major flagship studies project a substantial rise in ASEAN energy demand by 2050, with the industrial sector as the primary consumer (ASEAN Centre for Energy 2022b; International Energy Agency (IEA) 2022; International Renewable Energy Agency (IRENA) 2022). The expected energy growth will be two to three times the 2020 energy demand, however the RE share of the total primary energy supply is only expected to be between 21 and 30 per cent (see Table 1). Hence, the region needs to raise its long-term RE goals in order to align the ASEAN emissions pathway with the 1.5°C goal.

A long-term RE vision will lay the foundation for its RE roadmap's development. This vision should, at least:

- set a more ambitious RE target
- consider technology advancements
- a strength-based approach
- a regional-first framework.

Set a more ambitious renewable energy target. Set attainable but ambitious targets for the percentage of renewable energy in the region's overall energy mix by specific years (e.g., 2030, 2040, and 2050) that consider aspirational net zero emission targets across ASEAN member states. For example, the International Energy Agency's 1.5°C-aligned scenario stated that the region could achieve 70 per cent RE share, while the IRENA scenario concluded that the region's RE share could potentially increase up to 65 per cent, both in the final energy mix by 2050 (International Energy Agency (IEA) 2022; International Renewable Energy Agency (IRENA) 2022). These targets will drive the necessary energy sector transformations while also encouraging regional cooperation.

Consider the region's technological advancements. Highlight the role of innovation and technological advancements in driving the renewable energy transition, such as adopting smart grids (Bong et al. 2022), energy storage solutions (Lu et al. 2021), and energy system digitalisation. This includes incorporating and integrating existing and future ASEAN member states RE developments and manufacturing capabilities.

Tailor the approach to leverage the region's existing strengths. Emphasise that the approach to RE implementation in ASEAN should be tailored to the unique circumstances of each member state, taking into account their existing advantages and strengths. For example, Indonesia, Malaysia, the Philippines, and Thailand could focus on biofuel (IRENA 2017), while countries traversed by the Mekong River may leverage their existing hydropower capabilities.

Table 1. Current ASEAN member states efforts are not at the highest, so an ambitious long-term renewable energy roadmap is needed

Variables	ACE - The 7th ASEAN Energy Outlook	IRENA - The 2nd RE Outlook for ASEAN	IEA - Southeast Asia Energy Outlook 2022
Energy Demand in 2050	Growth **around 3-fold from 2020 level** to 1,282 Mtoe	Growth **around 2.5-fold from 2018 level** to more than 50 EJ (Around 1,194 Mtoe)	Growth **almost 2-fold from 2020 level** to more than 52 EJ (Around 1,242 Mtoe)
Renewable energy projection in 2050	**Reaching 21.3%** of total primary energy supply	**Reaching 26%** of total primary energy supply	**Almost 30%** of total primary energy supply
Sectors with majority energy consumption	Industrial sector	Industrial sector	Industrial Sector
Emission projection in 2050	4,503 Mt CO_2-eq	2,868 Mt CO_2-eq	2,700 Mt CO_2-eq
Net zero-related scenario	N/A	1.5°C Scenario (1.5-S)	Net Zero Emissions by 2050 Scenario (NZE Scenario)

Note: This matrix compares government efforts scenario only (Source: Climateworks Centre analysis); ACE: ASEAN Centre for Energy; IRENA: International Renewable Energy Agency; IEA: International Energy Agency

Regional-first framework for collaboration. Put forward a way to share best practices, experiences, and knowledge that is in the region's best interest, to allow faster progress towards the RE vision (Ayas et al. 2023). International support, like technical assistance or funding opportunities, could also be directed to specific areas that help advance ASEAN renewable energy transition.

2. Core and supporting issues on roadmap development

In addition to a clear vision, an ASEAN long-term RE roadmap development should identify and prioritise core (technical) and supporting (non-technical) issues that will address key challenges and unlock opportunities in the energy sector. The core and supporting issues are outlined below.

Core issues

Solar and wind power are underexplored in current ASEAN energy development plans. To address this issue, make electrification one of the key pillars in the region's decarbonisation roadmap. Assess the current energy mix and explore the advantages of RE integration. Address challenges related to intermittency and grid integration to maximise the potential of solar, wind, hydropower, and geothermal resources. (International Energy Agency (IEA) 2022).

Alignment between existing initiatives and long-term planning. Existing initiatives, like early retirement of coal plants (Ayas et al. 2023) and floating solar PV development, are yet to be incorporated into the region's energy transition planning. Proper alignment and planning will mitigate the risks associated with managing power supply and demand.

Biofuels' potential is overlooked, requiring careful planning for sustainable development. Biofuel could play a central role as a regional transitional fuel. However, its planning and development should consider and address its sustainability issues, like land use change, water scarcity, and biodiversity loss. Other biofuel-related considerations include: focus on advancing biofuel technology, promote sustainable feedstock development (Merdekawati, Suryadi, and Palenewan 2023), and provide incentives to scale up biofuel production to decarbonise the transportation sector.

Discussion about regional RE supply chain and its manufacturing capability is lacking. To address this issue, strengthen ASEAN manufacturing and supply chain capabilities to spur the region's clean energy transition. This includes mapping and analysing the existing RE supply chain, encouraging regional

manufacturing for cost-effectiveness and energy security, and promoting local capabilities and regional collaboration (Bigos 2023).

Supporting issues

Ensure a just energy transition. Fair, equitable, no-one-left-behind principles need to be at the centre of the region's energy transition plan. This includes processes for communities and workers impacted by the shift from fossil fuels to renewable energy sources (Abram et al. 2022).

A skilled workforce is the key to renewable energy growth. In addition to strengthening the RE supply chain and manufacturing capabilities, preparing and developing a skilled workforce through education, training, and research programs will enable countries to meet the rising demand for RE jobs, in both the power sector and throughout its supply chains (Merdekawati et al. 2022).

Implement the gender equality, disability, and social inclusion (GEDSI) framework into all metrics. The GEDSI framework should be embedded into the process, to ensure access, participation, control and benefits for all, particularly marginalised communities. This would include: integrating gender and social considerations, empowering marginalised communities, and mainstreaming GEDSI in renewable energy policies and projects (Bilqis et al. 2022).

Optimise fiscal capacity to attract private RE financing. Considering the limited public financing for RE development, is will be important to address the barriers and enable private financing. Recommendations include: exploring innovative financing mechanisms, incentivising RE and disincentivising fossil fuels, finalising the ASEAN green taxonomy, facilitating regional public–private partnerships, and attracting international investments to fund renewable energy projects (Vakulchuk, Overland, and Suryadi 2023).

3. Roadmap development process

The development of ASEAN's long-term RE roadmap has begun and is being governed by the region's two key entities: ASEAN Centre for Energy (ACE) and ASEAN Secretariat (ASEC). More specifically, the Renewable Energy Sub-Sector Network (RE-SSN), a platform representing the region, led this roadmap development process, aligning between the AEC and the APAEC.

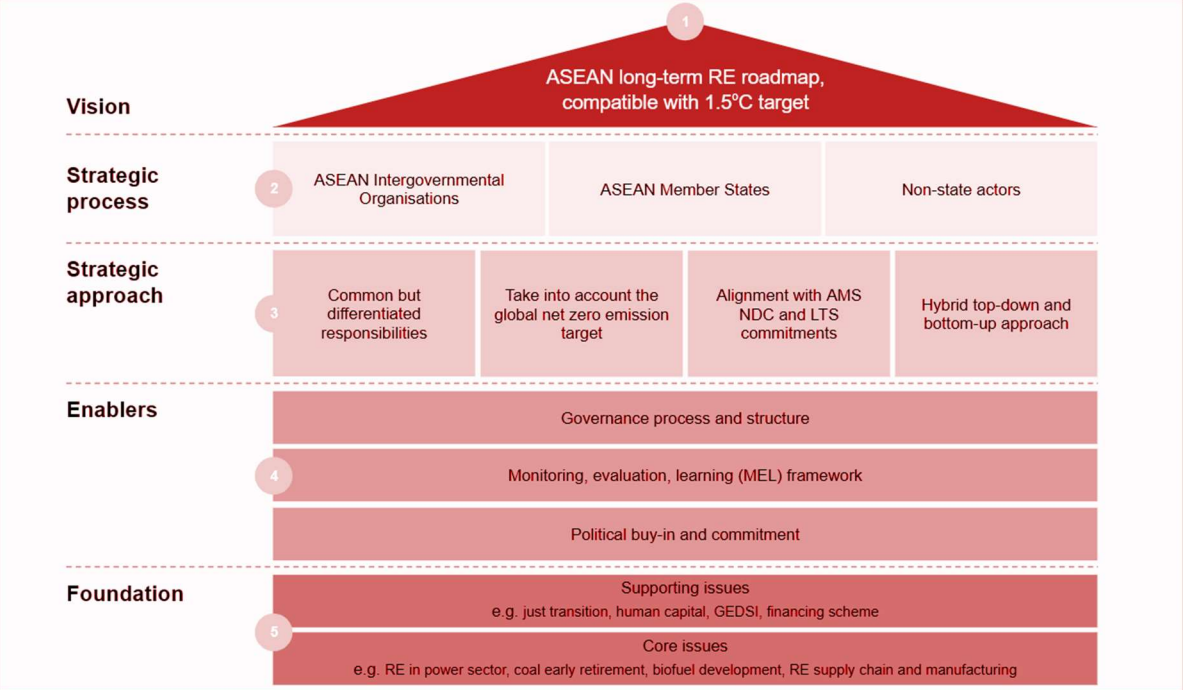
Both ACE and ASEC have encouraged public participation through focused group discussions. The first discussion session occurred on 12 May 2022, and the second session occurred on 3 May 2023 during the 30th RE-SSN annual meeting.

Engaging in 'track 1.5' diplomacy with key non-state actors – such as think tanks, civil societies, and private sectors – who support aligning the energy pathway with 1.5°C will add valuable insights to the roadmap's development. This inclusive approach fosters a stakeholder-driven roadmap that garners support from diverse perspectives. This will help ensure its successful implementation and create a sustainable energy landscape for the ASEAN region.

The roadmap should be able to track progress, recognise member states' various developmental stages and capacities, and ensure necessary alignment with the global net zero target throughout the development process. The region can seamlessly merge regional aspirations with on-the-ground realities by combining a top-down vision with bottom-up, localised planning, paving the way for a sustainable energy future.

As it develops, accountability and transparency of the roadmap process will be paramount. This includes: getting political buy-in from ASEAN member states; establishing a monitoring, evaluation, and learning framework; and having a clear governance process and structure. Figure 1 outlines a conceptual framework for developing ASEAN's long-term RE roadmap.

Figure 1. Conceptual framework for developing the ASEAN long-term RE roadmap



Source: Climateworks Centre analysis

Key takeaways

The ASEAN long-term RE vision lays the foundation for a sustainable and prosperous energy future in the region. With ambitious targets, technological advancements, and international collaboration, it will drive a transformative energy transition.

The roadmap's development process should comprehensively address core issues and seize opportunities in the energy sector. Prioritising accountability, transparency, and the involvement of non-state actors will foster inclusivity and diverse perspectives.

With a shared commitment to renewable energy, the roadmap has the potential to create a resilient, equitable, and environmentally friendly energy landscape, uniting the ASEAN community in this crucial endeavour.

Policy actions

For ASEAN intergovernmental organisations: Facilitate regional collaboration through workshops, capacity-building, and financing mechanisms, while collaborating with international financial institutions and monitoring progress towards renewable energy targets.

For ASEAN member states: Promote a bidirectional approach to align national policies with ASEAN's RE vision and vice versa, as well as prioritise renewable energy innovation, establish just transition mechanisms, and strengthen regional cooperation for equitable transitions and knowledge sharing.

For non-state actors: Participate in 'track 1.5' engagements or diplomacy to contribute insights, promote renewable energy investments, advocate for gender equality and social inclusion, and support renewable energy workforce development through training and programs.

References

Abram, Simone, Ed Atkins, Alix Dietzel, Kirsten Jenkins, Lorna Kiamba, Joshua Kirshner, Julia Kreienkamp, Karen Parkhill, Tom Pegram, and Lara M. Santos Ayllón. 2022. 'Just Transition: A Whole-Systems Approach to Decarbonisation'. *Climate Policy* 22 (8): 1033–49. https://doi.org/10.1080/14693062.2022.2108365.

ASEAN Centre for Energy. 2020. 'ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase II'. ASEAN Centre for Energy. https://aseanenergy.org/asean-plan-of-action-for-energy-cooperation-apaec-phase-ii-2021-2025/.

———. 2022a. 'The 2nd Focus Group Discussion on ASEAN Renewable Energy Long-Term Roadmap'. *Reportage* (blog). May 2022.

———. 2022b. 'The 7th ASEAN Energy Outlook'. Volume 7. ASEAN Energy Outlook. Jakarta: ASEAN Centre for Energy. https://aseanenergy.org/the-7th-asean-energy-outlook/.

Ayas, Ceren, Michael Dolan, Trang Nguyen, and Jannata Giwangkara. 2023. 'Energy Transitions in Vietnam and Indonesia: Building Blocks for Successful Just Energy Transition Partnerships'. Melbourne: Climateworks Centre. https://www.climateworkscentre.org/resource/energy-transitions-in-vietnam-and-indonesia-building-blocks-for-successful-just-energy-transition-partnerships/.

Bigos, Ecaterina. 2023. 'How Manufacturing and Clean Energy Can Power Asean's Economic Future'. *South China Morning Post*, 18 May 2023, sec. Opinion. https://www.scmp.com/comment/opinion/article/3220718/how-manufacturing-and-clean-energy-can-power-aseans-economic-future.

Bilqis, Amira, Muhammad Rizki Kresnawan, Andy Tirta, and Theresia Betty Sumarno. 2022. 'ASEAN RE-Gender Roadmap'. Jakarta: ASEAN Centre for Energy. https://aseanenergy.org/asean-re-gender-roadmap/.

Bong, Cassendra P C, Haslenda Hashim, Wai Shin Ho, Zarina Binti Ab Muis, Nor Alafiza Binti Yunus, Alnie Demoral, Andy Tirta, M Rizki Kresnawan, Rika Safrina, and Silvira Ayu Rosalia. 2022. 'Integration of Variable Renewable Energy, Electric Vehicle, and Smart Microgrid in ASEAN: A Focus Group Discussion Approach'. *IOP Conference Series: Earth and Environmental Science* 997 (1): 012013. https://doi.org/10.1088/1755-1315/997/1/012013.

International Energy Agency (IEA). 2022. 'Southeast Asia Energy Outlook 2022'. Paris: International Energy Agency. https://www.iea.org/reports/southeast-asia-energy-outlook-2022.

International Renewable Energy Agency (IRENA). 2022. 'Renewable Energy Outlook for ASEAN: Towards a Regional Energy Transition (2nd Edition)'. Abu Dhabi: International Renewable Energy Agency (IRENA). https://www.irena.org/publications/2022/Sep/Renewable-Energy-Outlook-for-ASEAN-2nd-edition.

IRENA. 2017. 'Biofuel Potential in Southeast Asia: Raising Food Yields, Reducing Food Waste and Utilising Residues'. Abu Dhabi: International Renewable Energy Agency. https://www.irena.org/publications/2017/Jun/Biofuel-potential-in-Southeast-Asia-Raising-food-yields-reducing-food-waste-and-utilising-residues.

Lu, Bin, Andrew Blakers, Matthew Stocks, and Thang Nam Do. 2021. 'Low-Cost, Low-Emission 100% Renewable Electricity in Southeast Asia Supported by Pumped Hydro Storage'. *Energy* 236 (December): 121387. https://doi.org/10.1016/j.energy.2021.121387.

Merdekawati, Monika, Beni Suryadi, Amira Bilqis, Shahnaz Nur Firdausi, and Jeihan Kartika Hapsari. 2022. 'Job Creation Towards Achieving the Regional Renewable Energy Target'. Policy Brief. Jakarta: ASEAN Centre for Energy. https://aseanenergy.org/job-creation-towards-achieving-the-regional-renewable-energy-target/.

Merdekawati, Monika, Beni Suryadi, and Jason Jimmy Amadeus Palenewan. 2023. 'ASEAN Bets on Biofuel, but Feedstock Crunch Could Void the Gamble'. *Eco Business*, 15 May 2023, sec. Opinion. https://www.eco-business.com/opinion/asean-bets-on-biofuel-but-feedstock-crunch-could-void-the-gamble/.

Vakulchuk, Roman, Indra Overland, and Beni Suryadi. 2023. 'ASEAN's Energy Transition: How to Attract More Investment in Renewable Energy'. *Energy, Ecology and Environment* 8 (1): 1–16. https://doi.org/10.1007/s40974-022-00261-6.

Vo, Duc Hong, and Anh The Vo. 2021. 'Renewable Energy and Population Growth for Sustainable Development in the Southeast Asian Countries'. *Energy, Sustainability and Society* 11 (1): 30. https://doi.org/10.1186/s13705-021-00304-6.

About

This policy brief is produced by Energy Transition Policy Development Forum for ASEAN Indonesia Chair 2023 as part of the ASEAN Energy Side Event Series under the Energy Cooperation Coordinator of ASEAN 2023 Chair Secretariat, supported by Climateworks Centre (CWC), Centre for Policy Development (CPD), International Institute for Sustainable Development (IISD), Indonesia Research Institute for Decarbonization (IRID), Institute for Essential Services Reform (IESR), and Purnomo Yusgiantoro Center (PYC). This brief summarises and reflects our discussion on the topic during our second ASEAN Energy Side Event on 18 July 2023.

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