



COORDINATING MINISTRY FOR ECONOMIC AFFAIRS
THE REPUBLIC OF INDONESIA



NATIONAL ECONOMIC COUNCIL
REPUBLIC OF INDONESIA



Organized by



INTERNATIONAL CONFERENCE

INCLUSIVE ENERGY TRANSITIONS IN SOUTHEAST ASIA AND BEYOND

Cross-Regional Learning from South Asia

10–12 February 2026 • Jakarta, Indonesia



This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.

In collaboration with



**NOSSAL
 INSTITUTE**

Certified by



INTERNATIONAL CONFERENCE

INCLUSIVE ENERGY TRANSITIONS IN SOUTHEAST ASIA AND BEYOND

Cross-Regional Learning from South Asia

10–12 February 2026 • Jakarta, Indonesia

Transition Technologies: Sociotechnical Challenges

Daniel del Barrio Alvarez,
International Project Lab., Department of Civil Engineering, The University of Tokyo

This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.

Transition technologies unexpected socio-technical challenges and solutions



thejapantimes

ENVIRONMENT / ENERGY / OUR PLANET

'Megasolar' is a dirty word in Japan. Where do solar projects go from here?

Reasons for opposition are diverse. [...] Residents are also worried that the panels ruin countryside scenery. For example, aerial images of solar modules occupying a pond in the city of Nara, leaving barely enough space for a *kofun* (ancient burial mound) in the middle, have recently made the rounds on social media platform X, with many users lamenting them as an eyesore.



Source: Japan Times (2024)

<https://www.japantimes.co.jp/environment/2024/05/26/energy/megasolar-opposition-solutions/>

The Asahi Shimbun | Asia & Japan Watch

Search

HOME What's New National Report Politics Business Asia & World Sci & Tech

The Asahi Shimbun > Business > article

Former rural golf courses now sites for sea of solar power panels

By KENGO KAMO / Staff Writer
November 14, 2021 at 07:00 JST

Share Tweet Print



The solar farm shown in this aerial photo is the former site of a golf course in Kamigori, Hyogo Prefecture. (Toyokazu Kosugi)

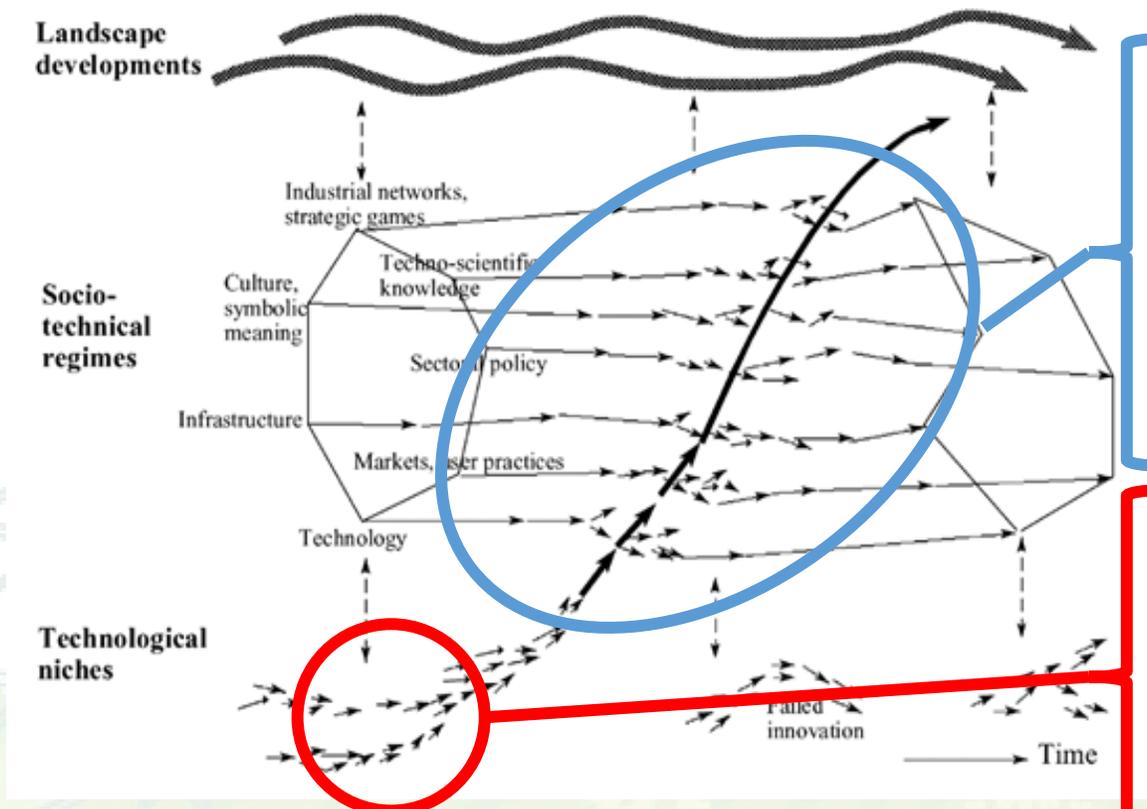
Source: Asahi Shimbun (2021)

<https://www.asahi.com/ajw/articles/14464677>

Transition technologies with the potential to lead to socio-technical changes

Dynamic patterns on socio-technical transitions

Technology readiness levels (IEA)



Mature	11	Proof of stability reached
Market uptake	10	Integration needed at scale
	9	Commercial operation in relevant environment
Demonstration	8	First of a kind commercial
	7	Pre-commercial demonstration
Large prototype	6	Full prototype at scale
	5	Large prototype
Small prototype	4	Early prototype
Concept	3	Concepts needs validation
	2	Application formulated
	1	Initial idea

Multilevel Perspectives Framework (Geels, 2011, *Environmental Innovation and Societal Transitions* <https://doi.org/10.1016/j.eist.2011.02.002>)

IEA's ETP Clean Energy Technology Guide with over 600 technologies monitored <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>

Offshore wind local-national-regional-global supply chain?

Transition potential	<ul style="list-style-type: none"> • Reliable large-scale clean energy • Industrial and ports revitalization • Power to X potential
Sociotechnical challenges	<ul style="list-style-type: none"> • Compatibility with marine ecosystems and economic activities • International supply chains • Local content vs market attractiveness
Social inclusion	<ul style="list-style-type: none"> • Job creation during construction: town revitalization by coordination of projects' development (avoiding boom and bursts) • Job creation for maintenance: return of young skilled population



Low carbon urban mobility for just energy/transportation transition?

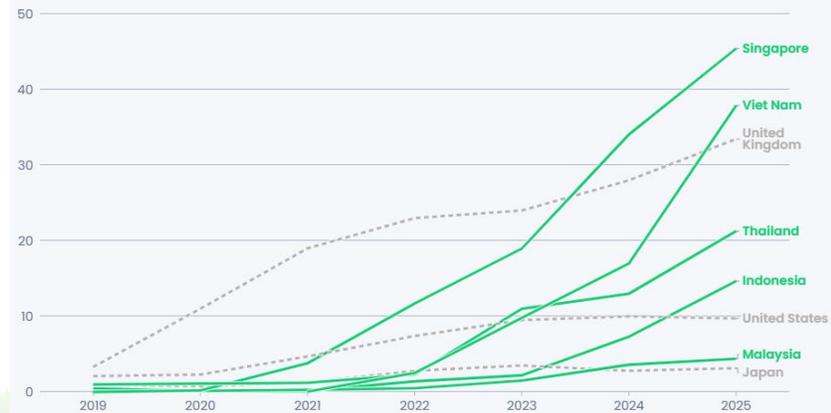
Transition potential	<ul style="list-style-type: none"> • A low carbon mobility leapfrog? • Enthusiastic adoption • Industrial development opportunities
Sociotechnical challenges	<ul style="list-style-type: none"> • Affordability • Accessibility (spatial and time) • Transportation vs Energy just transition do not always align • Technological disruption and social adoption
Social inclusion	<ul style="list-style-type: none"> • Integration of informal mobility systems • “Right to the city” • Participatory foresight



ASEAN countries are leapfrogging legacy auto markets to reach high shares of EV sales

EV share of new passenger car sales (%)

Grey lines show EV sales shares in select advanced economies for comparison



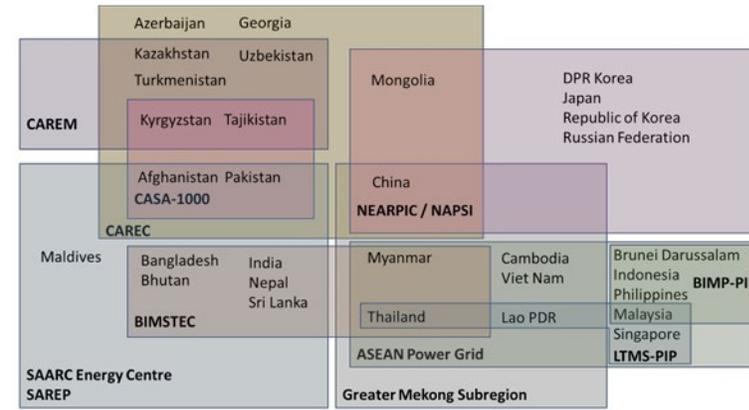
Source: IEA (to 2024), available national data for Jan-Oct 2025
EVs includes plug-in hybrid electric vehicles and battery electric vehicles.

EMBER



Power connectivity and cross-border just energy transition?

Transition potential	<ul style="list-style-type: none"> • Optimization of energy resources • Inter-dependence and resilience • Fostering integration
Sociotechnical challenges	<ul style="list-style-type: none"> • Coordination between cross border integrations • Benefit sharing, even if just perceived • Large scale technological systems • Unknown co-benefits
Social inclusion	<ul style="list-style-type: none"> • Scenarios co-design • Strategic interconnections to unlock development • Collaborative management of shared infrastructures



ASEAN Secretariat News Statements Events Chairmanship

Home | Joint Press Release of the Ninth ASEAN Economic Ministers on Energy Cooperation Meeting, Manila, Philippines 12-16 November 1990

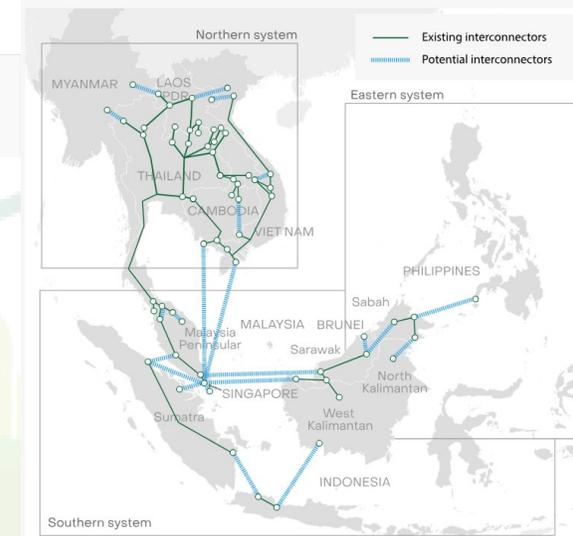
Home | Statements | Joint Press Release of the Ninth ASEAN Economic Ministers on Energy Cooperation Meeting, Manila, Philippines 12-16 November 1990

November 12, 1990

18. The Ministers agreed that the Trans-ASEAN Power Grid project be expanded and its implementation expedited to allow a greater exchange of power among all the ASEAN member countries.

Enhancing regional power connectivity could promote energy security and spur renewables growth

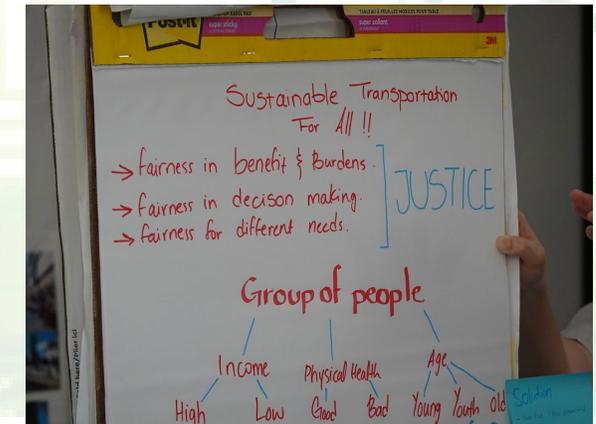
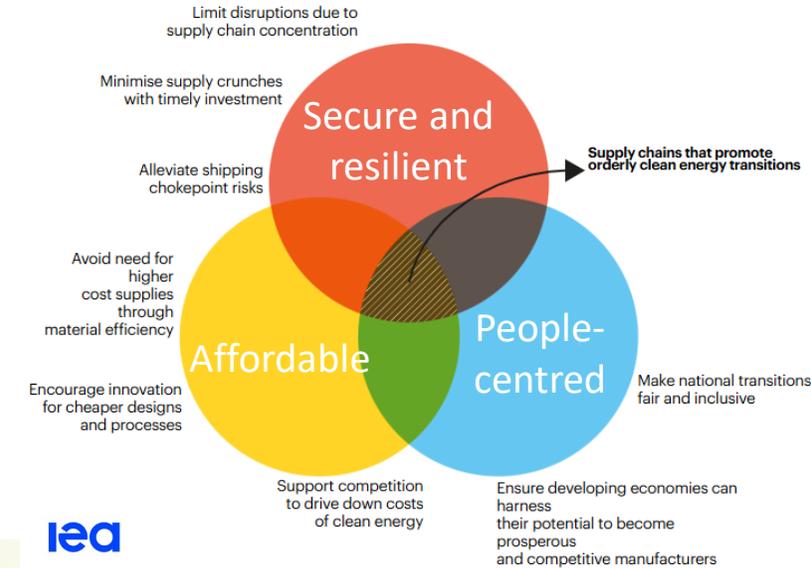
Existing and potential cross-border electricity interconnectors



Source: ASEAN Centre for Energy (2023, 2021); Huda, Seah and Qiu (2023)
 Note: the map particularly highlights cross-border interconnections and does not reflect the overall grid infrastructure in ASEAN countries; points on the map are suggestive, not exact

Key take aways: A sociotechnical energy transition to “better” energy systems

- Energy transition = Energy security + α
 - Just transition and energy justice principles
 - People-centred energy transition
 - New frameworks to be proposed to serves as guide but...
- How to operationalize them into actual policy practice?
 - What to measure?
 - How to collect and share data?
 - Socio-technical interdisciplinary collaboration?
 - Stakeholder inclusion and representation?
 - Participatory future-looking scenarios?



THANK YOU!



INTERNATIONAL CONFERENCE
INCLUSIVE ENERGY TRANSITIONS IN SOUTHEAST ASIA AND BEYOND
Cross-Regional Learning from South Asia
10–12 February 2026 • Jakarta, Indonesia