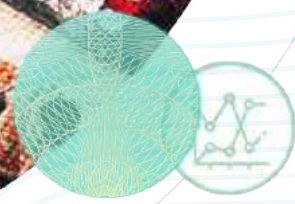




Economic Research Institute
for ASEAN and East Asia

SUMMARY OF ERIA RESEARCH PROJECTS 2023



**SUMMARY OF
ERIA RESEARCH
PROJECTS
2023**



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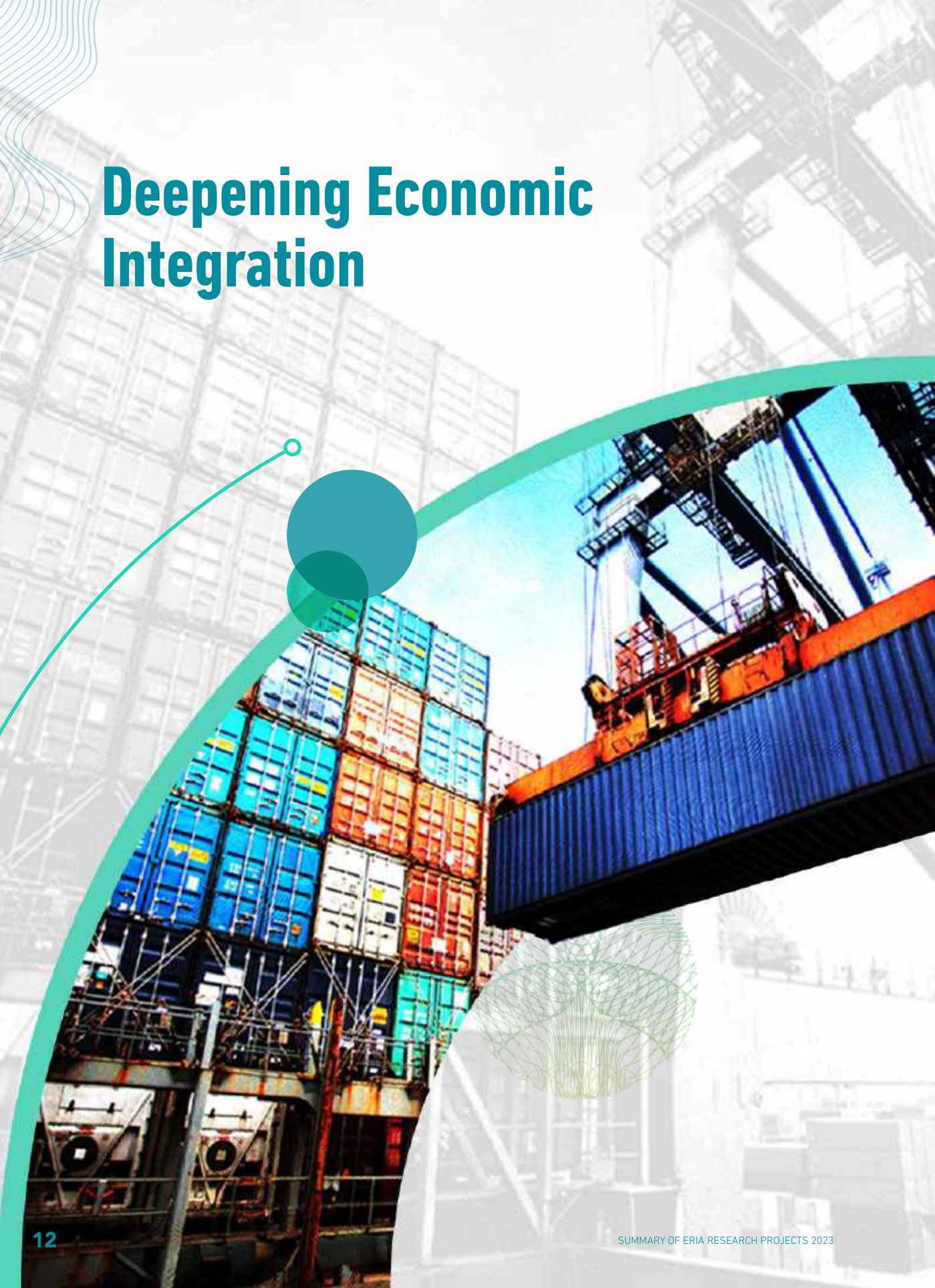
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Deepening Economic Integration





I. Digital Economy

01

Digital ID System in Facilitating Digital Transformation in ASEAN and East Asia

Lurong Chen and Fukunari Kimura



Summary

The widespread adoption of Electronic-ID (E-ID) has transformed the national identification (ID) system by applying digital technologies and turning it into a digital network. With the development of the internet and the consequent higher requirements on security and privacy, online anonymity has been gradually supplemented by online-plus-offline identity registration and/or verification. By effectively linking up the cyberspace and the physical world, E-ID serves as a passport in the digital society, facilitating civic participation in public services and enabling the government to better customise its service by better identifying users.

The proposed project will be a follow up to the ERIA project (RA-1-1-2108) on Digital Government and Online Public Services. The study will be highly relevant to one of the themes of India's 2023 G20's presidency: making G20 truly inclusive.

Policy Implications

- ASEAN guidance to harmonise the development of the E-ID system to promote digital transformation
- Application of E-ID in economic, social, and human development domains
- Measures to maximise the benefits of using of E-ID

Geographic Scope

ASEAN plus six countries



02

Developing a Framework for Internet Health Metrics – Scoring and Analysis Feasibility Study and Refinement

Lurong Chen



Summary

One of the most important conditions for enabling robust cooperation in cyberspace is the availability of cross-comparable statistics that empower decision-makers to set policies based on evidence, establish priorities, and view trends.

The Economic Research Institute for ASEAN and East Asia (ERIA) has funded CyberGreen's Phase 1 and Phase 2 projects to develop the framework for internet health. CyberGreen has been working to develop and maintain a prototype database and data platform.

Building on the achievements of the first phase of the study, this research project aims to continue focusing on continued data science and coding/development, and the addition of written analysis and a workshop for capacity building. The focus of phase 3 is to have a fully operational system that provides global scores across six components to complete the data and scoring platform that are deemed critical to internet infrastructure, following the algorithms developed by the previous phases.

Policy Implications

The Internet Infrastructure Health Metrics Framework will allow states to measure their overall risk, understand how it changes over time, and compare their risk levels with other states. Given ERIA's efforts to mainstream inclusivity and sustainability in digitally connected societies and economies, we recommend that ERIA encourage and support ASEAN countries in evaluating consistent periodic measurements of their internet infrastructure's health. This will help manage cyber risk factors, and develop rational, data-driven policies geared for healthier and more sustainable digital economic development. CyberGreen will partner with ERIA by providing the data-driven analysis necessary to achieve these objectives.

Geographic Scope

ASEAN

Partner Organisation

Cybergreen Institute



03

Accelerating Digital Transformation in ASEAN and East Asia

Lurong Chen



Summary

The study will follow two main tracks: a tech track that focuses on technology adoption, and a policy track that focuses on digital strategy and policy adopted by Asian countries.

The tech track focuses on new information and communication technology and new business models, such as (i) artificial intelligence and machine learning, (ii) big data and cloud computing, (iii) Internet of Things, (iv) financial technology or fintech, (v) blockchains, (vi) social media, and (vii) servicification. Studies on each subject will include consideration of data flow, technology transfer, privacy protection, consumer protection, cybersecurity and intellectual property rights, and other related issues, particularly human skills development.

The policy track monitors and assesses the policy effort to promote digital transformation in the region. The track will build a framework of policy analysis based on the policy checklists developed by the Organisation for Economic Co-operation and Development and the United Nations Conference on Trade and Development and the monitoring system used by the European Union, and then apply the framework to examine the digital strategies and policy plans of Asian countries.

Policy Implications

The study will provide the following:

1. Policy instruments to overcome the barriers to and unlock the potential of using new technology, either nationally, regionally, or both.
2. Actions to solve problems that may occur in digital transformation, and risk management to avoid failure that may come from directionality, demand articulation, policy coordination, or reflexivity.

Geographic Scope

ASEAN member states



04

Embracing Digital in Global Value Chains: Accommodating the Unbundlings in the Asian Economy

Lurong Chen



Summary

The project aims to further extend the analytical framework proposed by Kimura (2018). It employs the concept of unbundling and discusses the current status and future perspectives of the Asian economy. The discussion centres on three distinct levels of unbundling backed up by technological breakthroughs to overcome trade cost. Each level of unbundling requires different sets of logistics and other economic infrastructure, policy environment, and human resources.

The scope for applying or upgrading unbundling and hosting various business models may be bound by readiness of utilising the related mechanics, which, in Asia, differs widely. In the proposed project, policy lessons will naturally be drawn from investigating the preparation of the whole country or regions for different levels of unbundling, which help them take advantage of new technologies and solve bottlenecks to advance unbundling.

Policy Implications

To unleash benefits from the third unbundling, soft and hard infrastructure as well as human capital will be the key.

- i. For soft infrastructure, further liberalisation and facilitation for trade in goods and services as well as the movement of people will become even more important. Free flow of data with trust across national borders will be crucial, with a series of back-up policies for consumer protection, privacy protection, and cyber security.
- ii. For hard infrastructure, internet connection is essential although quick and efficient logistics for goods transactions will continuously be important.
- iii. Nurturing human capital as well as utilising foreign resources will become crucial for developed, newly developed, or developing countries to expand commitment to the third unbundling.

Geographic Scope

ASEAN plus six countries



05

ASEAN Digital Economy 2040

Lili Yan Ing



Summary

Technological advancement has vastly improved quality of life. Various technological revolutions have changed the way people produce goods, organise businesses, communicate, and conduct their daily lives. Digital transformation (DX) is one of the most crucial innovations that have changed modern human life, following on from the invention of the steam engine, electronic machinery, computer, and artificial intelligence (AI). In recent decades, ASEAN has developed several strategies on DX issues to advance the ASEAN Economic Community, such as the ASEAN Digital Masterplan 2025, the ASEAN Digital Integration Framework Action Plan (2019–2025), and the ASEAN Agreement on E-Commerce Work Plan (2021–2025). These are parts of the ASEAN Digital Economy Strategy, which aims to establish an open, secure, interoperable, competitive, and inclusive digital economy within ASEAN.

Despite the ongoing progress on ASEAN digitalisation, ASEAN Member States face several challenges related to DX. First, the technology divide. Technology deployment capability could be the key issue of DX, which, seen from the uneven deployment of digital technologies due to limited capabilities, is reflected in internet usage and speed, and technology production. Second, privacy. Information and data on private individuals are exposed to service providers. The pervasive exchange of data has fuelled concerns about the use and misuse of data. Third, cyber security. The expansion of rapid digitalisation and the use of data by businesses and consumers for communication, digital trade, and as a source of access to information and innovation come with increased threats, e.g. against data, systems, and people. Last, competition. Technological advancement enables firms to produce and operate on massive economies of scale, which builds up market concentration. Market concentration reduces competition and can be a barrier for micro, small, and medium-sized enterprises and start-ups to be on a level playing field, as big tech players tend to use integration to dominate markets and capture more revenue at the cost of consumers.

Considering the advantages and challenges of DX, the ASEAN Chairmanship in 2023 should support ASEAN in addressing challenges to advance the ASEAN Digital Community by 2040.



Policy Implications

- Review of progress and readiness on digitalisation of ASEAN Member States
- Policy implications and recommendations to Indonesia's ASEAN Chairmanship on ASEAN Digital Framework, closing ASEAN digital divide gaps, and development of digital technologies in ASEAN
- Policy recommendations to strengthen ASEAN digital integration to advance the ASEAN Digital Community

Geographic Scope

ASEAN, with focus on Indonesia's
ASEAN Chairmanship

Partner Organisation

Asian Development Bank Institute



06

GVC Mapping for Southeast Asia and India in the New Digital Economy: Policy Perspectives

Anita Prakash and Alicia Garcia Herrero



Summary

From a public health perspective, East Asia, Southeast Asia, and India have, in general, contained the COVID-19 pandemic. A reduction in consumer spending as a result of the pandemic has, however, led to reduced demand for exports. The inflationary pressures on almost all economies, accompanied by rising interest rates and global liquidity crunch, have made Southeast Asia vulnerable to reduced trade demands and investments prospects. For all ASEAN Member States— which have performed well in terms of managing the public health side of the crisis—the pandemic has been a major negative shock to the economy. Subdued growth in production sharing since 2009 has likely been reinforced by the pandemic.

To explain the highly uneven trade and investment patterns, the study proposes to examine the trade integration at the sub-regional level. It will also evaluate the global value chain (GVC) performance in a post-pandemic scenario where investments trends may be changing amongst the sub-regions and shorter value chains could be the new trend in supply chains.

The study will capture the challenges for Southeast Asia and India in the potential change in conditions facing GVCs due to the rise of new sectors and modes of delivery. The digital economy looms large as do environmental products such as renewable power generation equipment (e.g. solar cells), as well as electric vehicles. Consumer tastes have been shifting in this direction for some time, and it is plausible that recovery programmes in the high-income markets will favour this shift through incentives and other measures.

The study will cover the GVC integration and investment trends in Southeast Asia and India in terms of trade integration and GVC participation in the current times in the sectors that are important in the digital economy and the demand for the restructured supply chains for the goods and services in environmental sector, energy transition, and critical commodities. The study will also cover the investment trends in these regions with a special focus on capacities and policy regulations that facilitate (or regulate) production sharing and investments in the digital and/or green economy. The study will cover intra-regional patterns of supply chain linkages and inter-regional supply chain data with external markets such as the EU and the US. The new area of trade tensions over control of technology, their effect on the GVCs and investments, and the role of trade agreements will be examined.



Policy Implications

The study will bring out data-based and policy research-supported evidence on the state of GVCs in ASEAN and India and indicate their likely preparedness of participation in the GVCs of the digital economy. The study will assess the policy capacities and policy space in the regions for competing for investments in the new technology sectors, as well as creating more space for manufacturing in smaller economies such as Cambodia, Lao People's Democratic Republic, and Myanmar. The study will establish the challenges facing ASEAN and India in a global slowdown of trade and investments, and in establishment of supply chain linkages in the digital economy.

Geographic Scope

Asia, ASEAN, South Asia, India, EU, US

Partner Organisations

Economic Research Institute for ASEAN and East Asia;
Natixis, Asia-Pacific Division.

Related Publication

Shepherd, B. and A. Prakash (2021), *Global Value Chains and Investments: Changing Dynamics in Asia*. ERIA Research Project Report 2021-01. Jakarta: ERIA.

Downloadable from:

<https://www.eria.org/research/global-value-chains-and-investment-changing-dynamics-in-asia/>



07

Enhancing Infrastructure Provision to Address Digital Divide

Fauziah Zen, Teuku Riefky, Artidiatun Adji, Bayu Aji Aritejo, Riatu Mariatul Qibthiyah, and Think Twenty (T20) Panel



Summary

The rapid integration of digital technology has significantly increased productivity for those with access to it (Remes, Mischke and Krishnan, 2018; Diermeier and Goecke, 2017). However, digital integration is not distributed equally (McKinsey Global Institute, 2018) as can be observed between developed and developing countries, urban and rural areas, and within different income groups. The COVID-19 pandemic has exacerbated socioeconomic inequality, as groups with better digital access have maintained or even increased productivity compared with those without access during restrictions on in-person interaction. Numerous studies have suggested that lower-income groups benefit more from digital access, as their marginal productivity increase is higher than that of higher-income groups (Cieslik and Kaniewsk, 2004; Jensen, 2007; Muto and Yamano, 2009; Koutrompis, 2009; Riyanto, et al., 2017). The lack of inclusivity in digital access has widened inequality during the crisis. Inclusive digitalisation will generate an economic cushion for the poor and vulnerable groups, especially during crises.

Achieving more equal digital access and usage requires major improvements in hard and soft infrastructure. However, achieving adequate levels of infrastructure faces several institutional, technical, and financial challenges. This policy note identifies policy recommendations to ensure better digitalisation inclusivity by establishing a well-defined and commonly agreed framework for an inclusive digital economy specifically for developing countries; improving institutional capacity; establishing public infrastructure of knowledge; using alternative finance instruments; and implementing more progressive fiscal instruments. The Group of 20 (G20) leaders could lead in assisting and endorsing the creation of an inclusive digital framework for developing countries. The G20 could encourage developed countries to provide more financial and technical assistance to developing countries.

Policy Implications

- G20 members should commit to share financial, technical, and institutional capacity resources to improve the establishment of public libraries, free internet access, and affordable internet packages for rural areas, amongst other initiatives, so that essential digital services are available to the public.
- G20 members should develop more forward-looking digital literacy programmes that consider the characteristics of developed and developing countries, which could be adopted as a common framework. The programmes should include adequate community-based training and infrastructure knowledge, and providing access to education, especially for marginalised populations.
- In doing so, G20 members can encourage the empowerment of the smallest units of community or nucleus community level to better utilise growing digitalisation.



- G20 member countries should encourage the provision and mobilisation of technical assistance facilities that focus on specific aspects of conceptualising, planning, and implementing the digitalisation agenda.
- G20 member countries should further improve horizontal and vertical cooperation between public institutions, considering the interregional and inter-level nature of digital ventures.
- Establishing more progressive fiscal instruments to address the vicious cycles of digital divide.

Geographic Scope

G20 and developing economies

Partner Organisations

Institute for Economic and Social Research, Faculty of Economics and Business, University of Indonesia;
Faculty of Economics and Business, Universitas Gadjah Mada



08

Study on Digital Transformation in the Manufacturing Sector in Asia

Yasushi Ueki, Keita Oikawa, and Fusanori Iwasaki



Summary

The ASEAN member states, particularly the advanced industrialized countries, are striving to enhance their productivity for sustainable industrial development. To achieve this, they are actively promoting the digitalization of industrial activities, also known as the Fourth Industrial Revolution (4IR). Automation and digital technologies are considered vital tools in this endeavour. Alongside investment in information and communications technology (ICT) equipment and systems, companies and industries must acquire engineering and data analysis knowledge, implement organizational reforms, and foster data-sharing capabilities.

Supply chain digitization is seen as a concrete measure to strengthen the international production network. By digitally mapping and monitoring supply chains, risks and bottlenecks can be instantly identified. Investments in customs clearance facilitation and e-commerce platforms contribute to secure cross-border transactions.

Digitalization is transforming the nature of innovation, shifting the focus from incremental to disruptive innovation across various industries. Digital technologies are creating new business opportunities.

To understand the digitalization trend, it is important to consider its utilization at the firm and factory levels. While initial progress may be seen among financially resourced companies, broader capacity building initiatives necessitate collaboration among industry, government, and academia.

The project aims to conduct case studies on capacity building efforts for industrial digitalization in ASEAN countries. Thailand and the Philippines have implemented policies and strategies such as Thailand 4.0, the Eastern Economic Corridor (EEC), and the Inclusive Innovation Industrial Strategy. Research findings highlight the need for detailed examination of capacity building at the firm level, and the optimization of data sharing within the value chain.

The COVID-19 pandemic has influenced corporate attitudes toward digitalization investment and communication methods, requiring analysis based on new information and data. The study aims to investigate efforts by ASEAN companies in capacity building for automation and digitalization, with a focus on industrial human resource development. By understanding the current challenges faced by ASEAN companies, especially in the context of the pandemic, the project seeks to provide valuable insights for policy promotion in developing countries, particularly in ASEAN.



The project consists of three main parts. Firstly, conducting a comprehensive review of previous studies on digitalization and manufacturing sectors in economics and business administration. The goal is to gain a deep understanding of the existing research and create a mapping of the relationships among these studies.

Secondly, qualitative case studies are conducted through interviews in selected ASEAN member states. The focus is on understanding the current situation of the manufacturing sectors, including companies' capacity building efforts and the support and cooperation systems provided by the government and academia.

Thirdly, a questionnaire survey is developed to quantitatively examine the factors which impact the effectiveness of investment in automation and digitalization equipment and systems, as well as the factors influencing data utilization. The survey takes into account the specific conditions and situations in the selected ASEAN member states. The project also considers the effects of the COVID-19 pandemic, including changes in digital utilization and communication methods which may have been triggered by the pandemic.

Policy Implications

The results of the project will contribute to considering fully utilizing the digitalization trend in ASEAN and East Asia. In that sense, the deep survey of previous research, as well as selected case studies, will directly contribute to the concrete activities of ERIA's newly established centre for digital innovation and sustainable economy to support EAS digitalization.

Geographic Scope

ASEAN



09

Study on the E-waste Economy in ASEAN

Keita Oikawa and Fusanori Iwasaki



Summary

This study aims to address the urgent issues surrounding electrical and electronic equipment (EEE) waste, and present policy recommendations for collaboration between ASEAN and Japan in the ASEAN-Japan Circular Economy Initiative (AJCEI). A significant increase in EEE waste generation is predicted in Asia, with ASEAN facing challenges in treating uncontrolled used EEE (UEEE) and locally generated EEE waste. The informal sector, which plays a significant role in waste management in ASEAN, lacks proper technologies and knowledge for environmentally sound treatment, leading to environmental pollution and health risks. Japan's experience in EEE waste management can serve as a valuable reference for ASEAN countries. The global momentum toward a circular economy (CE) reinforces the need for efficient resource use and sustainable systems. Both ASEAN and Japan are pursuing CE policies, and the AJCEI is expected to enhance economic relations. To address these issues, three key recommendations are proposed. Firstly, Japan shares its experiences in establishing and enforcing legal systems with ASEAN countries, focusing on specific challenges and solutions. Secondly, business collaboration between ASEAN countries and Japan should be fostered through technical cooperation, joint ventures, and international resource circulation. Lastly, developing international standards for reuse and remanufacturing is crucial to facilitate trade and ensure quality and safety assurance.

Policy Implications

Three key recommendations are proposed. Firstly, Japan's experiences in establishing and enforcing legal systems, particularly focusing on the progress made by each ASEAN country, should be shared with ASEAN countries. For example, countries like Viet Nam and Singapore have enacted laws for UEEE management, including extended producer responsibility (EPR) and recycling fee systems. However, the enforcement of these laws appears to be inadequate. By exchanging experiences, Japan can share its expertise in establishing and enforcing laws such as the Home Appliance Recycling Law. This could be done through the creation of a guidebook in English, highlighting the specific challenges faced by each country and their corresponding solutions. Bilateral or multilateral workshops in Japan can also facilitate the exchange of experiences and promote cooperation in human resource development among government officials.



Secondly, business collaboration between ASEAN countries and Japan should be fostered. This collaboration can take various forms, such as technical cooperation; joint ventures; and international resource circulation involving the trade of UEEE, reused goods, remanufactured goods, and scraps. Promoting business matching opportunities and establishing joint ventures in ASEAN countries can encourage business collaborations. Creating conducive circumstances for the global trade of UEEE, reused goods, remanufactured goods, and scraps will further facilitate international resource circulation. Notable examples of successful business cases, such as Reuse Mobile Japan, JX Metal, Fujifilm Business Innovation, Wongpanit, and EcoBatt-Energy Cambodia, demonstrate how collaboration can address specific challenges outlined in this study.

Lastly, international standards to promote reuse and remanufacturing should be developed. Challenges such as distinguishing UEEE for reuse and e-waste, and the lack of standards for defining remanufactured goods, are identified. International standards are crucial in facilitating trade and ensuring quality and safety assurance for remanufactured goods. Harmonizing the definitions of UEEE for reuse, remanufactured EEE, and scraps for recycling in ASEAN and Japan is recommended. This can be achieved through bilateral or multilateral agreements, regional standards development, or engagement with international standard bodies such as ISO and IEC.

Geographic Scope

ASEAN

Partner Organisations

Mitsubishi UFJ Research and Consulting





II. Economic Integration

10

Asian Free Trade Agreements in Levelling the Playing Field of Digital Trade

Lurong Chen



Summary

The study aims to provide solid analysis on market integration and digital trade. It will provide evidence-based suggestions on the formulation of related economic policies in the digital era. By putting Asia's multiple processes into a common research framework, the project tries to generate a more comprehensive viewpoint on how to foster regional development by levelling the global field of digital trade. Extensively, the results will also shed light on global rule settings on international trade and investment in the digital age.

Policy Implications

The expected policy recommendations are the following:

- (i) A policy framework that could help ASEAN and East Asia combine regional integration and digitalisation into a mutually reinforcing development blueprint.
- (ii) Needed policy package(s) to fill the gaps between Asia's 'want-to-do' and 'can-do' in designing regional and global governance on digital trade, with particular concerns on the trade-off between the short-term social and economic cost associated with market adjustment and long-term gains from participating in global value chains; and
- (iii) Policy design or work plan that will be feasible and easier to be implemented in facilitating digital trade and supporting regional development, with policy priorities balancing regional and national interests.

Geographic Scope

ASEAN plus six countries



11

Study on ASEAN–China Free Trade Area

Lurong Chen



Summary

The study aims to identify (i) impediments and potential areas for improvements to the ASEAN–China Free Trade Area, and (ii) potential mutual beneficial areas for further cooperation between ASEAN and China.

Policy Implications

Policy recommendations for ASEAN on concrete measures and areas of interest between ASEAN and China to advance trade and investment relations; particularly in areas such as (i) connectivity; (ii) supply chains resilience; (iii) digital economy; (iv) investment and service liberalisation; (v) sustainable development; (vi) inclusiveness of micro, small, and medium-sized enterprises; and (vii) labour mobility and human capital development.

Geographic Scope

ASEAN plus China



12

Implementation of ASEAN Memorandum of Understanding on Non-Tariff Measures of Essential Goods Under the Hanoi Plan of Action on Strengthening ASEAN Economic Cooperation and Supply Chain Connectivity in Response to the COVID-19 Pandemic: 'Impact Assessment'

Doan Thi Thanh Ha, Dionisius Narjoko, Ayako Obashi, and David Christian



Summary

In November 2022, the ASEAN Economic Ministers signed the Memorandum of Understanding (MOU) on the Implementation of the Non-Tariff Measures (NTMs) on Essential Goods Under the Hanoi Plan of Action on Strengthening ASEAN Economic Cooperation and Supply Chain Connectivity in Response to the COVID-19 Pandemic. The MOU aims to ensure smooth flow of essential goods and prevent supplies disruption during the pandemic. It is valid for 2 years and originally consisted of a list of 152 essential goods, mostly medical goods such as test kits and equipment. Later, 107 tariff lines, consisting of agricultural and food products, were added, bringing the total of essential goods to 259 8-digit items.

To ensure the free flow of essential goods in the region and provide continued support to the private sector amidst the ongoing pandemic, the 35th ASEAN Free Trade Area Council tasked the ASEAN Secretariat (ASEC) to prepare a list containing potential goods for the expansion of the List of Essential Goods for ASEAN Member States' (AMSs) deliberation, and the Senior Economic Official Meeting to do the necessary follow-up and submit its recommendations at the ASEAN Economic Ministers Retreat in 2022.

To support policymaking, ASEC tasked the Economic Research Institute for ASEAN and East Asia to conduct a quantitative and qualitative analysis on the impact of the MOU on ASEAN's trade in essential goods. The objectives of the ERIA study are to identify NTMs imposed on 259 essential goods by AMSs, including those issued before and after the implementation of the MOU; present and assess changes in the pattern of trade and supply chain in essential goods before and after the implementation of the MOU; conduct quantitative assessment of the impact of NTMs on trade in essential goods whilst considering relevant controlling factors; and conduct surveys with the private sector to evaluate the usefulness and effectiveness of the MOU.

Policy Implications

The report will provide quantitative and qualitative evaluation of the effectiveness (or the lack thereof) of the MOU and provide recommendations on whether and how to extend it.

Geographic Scope

ASEAN countries

Partner Organisation

ASEAN Trade Facilitation Joint Consultative Committee, ASEAN Secretariat



13

Non-tariff Measures, Regional Economic Integration and Sustainable Development – Phase 1

Lili Yan Ing, Doan Thi Thanh Ha, and Ralf Peters



Summary

Started in 2015, the development of ASEAN+6 Non-tariff Measures (NTM) database involves intensive work from national consultants, with technical support and coordination from the Economic Research Institute for ASEAN and East Asia (ERIA) and the United Nations Conference on Trade and Development (UNCTAD), as well as strong support from governments.

The ASEAN NTM database and the NTM report were handed over to the ASEAN Member States (AMSs) at the ASEAN Economic Ministers Meeting in 2019. The database has been endorsed by ASEAN as a primary resource for AMSs to populate and develop the NTM section of their national trade repositories. As such, the database has provided a vital basis for the review, revision, and regulatory cooperation on NTMs within each country and across countries.

Similarly, the NTM databases and reports in Australia, China, India, Japan, New Zealand, and the Republic of Korea, accomplished in 2018, also serve as an equally important resource for multiple stakeholders: for academia to conduct evidence-based research on the cost and benefits of NTMs, for policymakers to better manage NTMs, and for businesses that often have difficulty finding trade-related information.

Following the success of the data update projects, ERIA, in collaboration with UNCTAD, has provided a series of capacity building and training activities on data collection and analysis. At the request of ASEAN, research on NTMs has also been conducted to support various economic integration initiatives such as the Regional Comprehensive Economic Partnership (RCEP), ASEAN's memoranda of understanding on NTMs on essential goods, and the implementation of the NTM tool kit. These activities have been well-received by ASEAN countries and have shown ERIA's strong commitment to work closely with ASEAN to support regional integration and development.

We have observed significant developments in the regional and international landscape since 2018 when ERIA last updated the databases. Rising global uncertainties following the US–China trade war, the COVID-19 pandemic, and the Ukraine–Russia war, amongst others, have highlighted the importance of strengthening economic integration and avoiding unnecessary regulatory burdens, including restrictive NTMs. The resulting change in the dynamics of the global value chain calls for stronger regulatory cooperation to ensure smooth flow of goods and services across borders. In the implementation plan for post–COVID-19 recovery, the ASEAN countries have reaffirmed their collective efforts for fast and resilient recovery. The signing of RCEP by 15 leaders further emphasises such commitment in the region. Additionally, emerging issues such as digital transformation, new technology, and sustainable development require significant policy reforms and effective trade facilitation.



To facilitate the policy-making process taking into account these new developments, it is vital that updated information be available. Against this backdrop, the project aims to update the existing NTMs in ASEAN+6 database, stocktake trade-related regulatory reforms in the region, review the implementation of regional and international commitments on NTMs in the countries, and analyse and assess the effectiveness of these reforms on trade and development.

Policy Implications

Address NTMs to enhance export competitiveness, regional integration, and sustainable development. Identify and assess countries' policy responses in the context of rising global uncertainties (US–China trade war, COVID-19, the war in Ukraine, rising geopolitical tensions, and increased trade restrictive measures, amongst others).

Geographic Scope

ASEAN, Australia, China, India, Japan, Republic of Korea, New Zealand

Partner Organisation

United Nations Conference on Trade and Development



14

Study on the Development Plan for a Sustainable Growth of Lao People's Democratic Republic

Masahito Ambashi, Ikumo Isono, Souknilanh Keola, Fusanori Iwasaki, Keita Oikawa, Yoichiro Hatakeyama, and Yasuhiro Yamada



Summary

The Lao People's Democratic Republic (Lao PDR) has achieved remarkable economic growth in recent years, thanks to its integration into international global production networks based on the 'second unbundling' and the increasing international division of labour. This economic achievement is exemplified by improved living standards throughout the country as indicated by an increase in per capita income. However, Lao PDR faces problems such as overdependence on the energy and mineral sectors and growing development gaps within the country. The first version of the 'Lao PDR at the Crossroads: Industrial Development Strategies 2016–2030' aims to provide a comprehensive design of short- to long-term industrial development strategies for Lao PDR. It emphasises the strategy of leveraging the country's transition from a landlocked nation to a land-linked country in the Mekong Region. As chair of the ASEAN Summit and the East Asia Summit in 2023—a role it undertakes only once every decade—Lao PDR has a great opportunity to announce its novel development strategy to potential investors worldwide. 'Lao PDR at the Crossroads' symbolises the critical juncture at which the country finds itself, with its central location as a transport hub in the Mekong Region.

Since 1990, direct manufacturing investments, mainly from developed countries, have been the driver of economic development in ASEAN countries. This was due to the global optimisation of production bases of multinational corporations (MNCs) based in developed countries and the abundant labour force in ASEAN countries, which accelerated the establishment of MNCs' manufacturing bases in the region. The development of information and communications technology has played a significant role in enabling the optimisation of global production centres, dramatically lowering the communication costs between regions and, as a result, goods produced through a multi-step manufacturing process no longer need to be manufactured in the same location or in close proximity to each other.

To enhance the resilience of the international production network, regional connectivity is critical. There are two major types of connectivity: physical connectivity, which is based on infrastructure development and reduced customs clearance costs, and digital connectivity, which is based on reduced costs for the transfer of information across borders. Physical connectivity is responsible for lowering the cost of transporting goods between regions. Digital connectivity, on the other hand, complements physical connectivity by facilitating the interregional distribution of ideas. With digital connectivity, advanced ideas that utilise cutting-edge information-processing technologies such as artificial intelligence, Internet of Things, and robotics can reach remote areas instantly, supporting everything from production to transportation. By deepening both physical and digital connectivity, the competitiveness of East Asia's international production network can be maintained and strengthened.



The Comprehensive Asia Development Plan 3.0, an ERIA publication, illustrates the importance of digital connectivity, as it also emphasises digitalisation as the base of development of ASEAN and East Asia region under the pillars of integration, innovation, inclusiveness, and sustainability.

Based on the advancement of digitalisation, the second version of the 'Lao PDR at the Crossroads' includes the new version of the mid- and long- term development strategy of Lao PDR.

Policy Implications

By reviewing the progress from the first version of 'Lao PDR at the Crossroads' and ERIA's several projects on Lao PDR, this project summarises the progress achieved and provides key implications for further development of Lao PDR, the Mekong Region, and ASEAN as a whole. These recommendations should be taken into consideration during the ASEAN summits under the Lao PDR chairmanship in 2024.

Geographic Scope

Lao PDR, Mekong Region

Partner Organisation

Lao National University, Institute of Developing Economies-Japan External Trade Organization, National Institute of Economic Research (Lao PDR)

Related Publication

Nishimura, H., F. Kimura, M. Ambashi, S. Keola (2015), *Lao PDR at the Crossroads: Industrial Development Strategies 2016-2030*. ERIA Research Project Report 2015-02. Jakarta: ERIA.

Downloadable from:

<https://www.eria.org/publications/lao-pdr-at-the-crossroads-industrial-development-strategies-2016-2030/>



15

International Political Economy of Supply Chain Decarbonisation

Fusanori Iwasaki and Keita Oikawa



Summary

In recent times, there has been a growing concern regarding the maintainance of the global supply chains. The COVID-19 pandemic triggered a great deal of international debates surrounding the stability of international production networks and global supply chains. These debates revolved around critical issues such as supply chain resilience, economic security, and supply chain decarbonisation.

The pandemic has exposed the risks of over-dependence on a single country for manufacturing, and highlighted the need to diversify manufacturing locations (West, 2022). Amidst the conflicts between major powers like the US and China, the concept of supply chain resilience has been linked to discussions on economic security, leading to a movement advocating for a return to domestic production, with the state assuming the responsibility of manufacturing essential commodities (Beal, 2022). For instance, Taiwan Semiconductor Manufacturing Company's establishment of a semiconductor manufacturing base in Kumamoto, Japan, exemplifies this trend (Nikkei Asia 2022). This shift towards domestic markets has accelerated the international trend of enclosing critical commodities amongst like-minded countries to ensure a stable supply (Beal, 2022).

The problem of enclosing critical commodities, either directly or indirectly, is not unrelated to the military aggression of the Russian Federation against Ukraine. The crisis in Ukraine has forced Western countries to change their supply chains, mainly in the energy sector, resulting in huge impacts on emerging economies in Asia and other regions. We are witnessing a political and economic decoupling of the world.

In this context, the lofty goal of decarbonising supply chains, exemplified by GAFA (Google, Apple, Facebook, and Amazon) companies, has forced companies to decide whether to align themselves with the West in a decoupled global supply chain by forming partnerships with Western companies. This unprecedented situation, wherein a private company's efforts to combat climate change are also affecting relations of states through global supply chains, underscores the necessity for a political economy analysis to understand this highly ambiguous term—supply chain resilience—and its alignment with state agendas and how the East Asian region responds to these issues.

Whilst academia is trying to understand the issue of global supply chains (Kier et al., 2022; LeBaron and Lister, 2022; Wang and Zhao, 2022), there is still a lack of analysis concerning the nexus amongst resilience and decarbonisation of the global supply chain, despite the growing attention these issues receive in international negotiations such as those conducted by the Group of Seven, Group of Twenty, East Asia Summit, and others.



To bridge the gaps between academic research and practical applications, the project aims to provide a political economy analysis of the development of international relations within the context of three keywords in global supply chains: resilience, security, and decarbonisation.

Policy Implications

Given that ASEAN and the East Asia region serve as the 'Factory of Asia', issues related to supply chain resilience, economic security and decarbonisation hold significant importance. The project provides policymakers in the region a better understanding of the recent supply chain-related issues.

Geographic Scope

ASEAN



16

New Economic Order

Lili Yan Ing, Dani Rodrik, Daniel Trefler, et al



Summary

Generations that lived prior to the 1930s probably never ever thought that the world economy and technology would be growing at today's pace. Opening the world markets and trade was initiated at the end of the Second World War. The global economy has undergone profound changes since then. During the 1970s, the so-called New International Economic Order aimed to support the least developing and developing countries in economic and political development to benefit the poor (Gebremariam, 2017). The world economy keeps globalising and integrating, and international trade and its policies are becoming more important in shaping the dynamic of the global economy (Schwab and Smadja, 1994). Middle-power and emerging countries have been continuously rising in importance to the world (World Bank, 1993, 2007).

Yet, the past economic and financial crises in the modern era, particularly the Global Financial Crisis in 2008–2009 and the Sovereign Debt Crisis in 2010 in the US, Europe, and the Russian Federation have resulted in job losses and financial losses for many poor and unskilled workers. To some extent, these prove that developed countries—the rich, to be precise—are immune and untouched by the crises. The situation has resulted in rising anti-globalisation sentiments, not only in the US, Europe, and the Russian Federation, but also in other parts of the world.

After more than 79 years of globalisation, the New Economic Order is likely to reemerge as the economic order tends to change since the ball is no longer in the hands of the US and its allies and hegemony has subsided and shifted to China's growing power.

Policy Implications

Policy recommendations to the Group of Seven (G7) and Group of Twenty (G20) presidencies and the UN Sustainable Development Goals (SDGs) on global economic recovery, digital innovation, and energy transition.

Geographic Scope

Global

Partner Organisation

International Economic Association



17

Local Content Requirements: Facilitation or Restriction

Lili Yan Ing, Gene M. Grossman, Susan Stone, Dorothee Flaig, Jane Korinek, Paulo De Sa, Marc Melitz, Keith Head, Thierry Mayer, Zhi Wang, Heiwai Tang, M. Chatib Basri, Michelle Limenta, Junianto James Losari, Oscar Fernando, Yessi Vadila, David Christian, Siwage Dharma Nagara, and Ray Zhang



Summary

Local content requirements (LCRs) are one of economic instruments used to protect infant domestic industry or create employment. But do they really work and achieve their goals? Some argue that East Asian-governed markets such as China, Japan, Republic of Korea, and Taiwan have successfully boosted their economies through export-oriented policies supported by LCR regulations. Do the data tell the real story?

Discussions on this issue will be documented in the 10 chapters of the book.

Policy Implications

- Provides review of LCR policy and regulations
- Economic analyses on the impacts of LCRs on Indonesia's exports and investment

Geographic Scope

Global with focus on Indonesia



18

Revision of the Institute of Developing Economies/Economic Research Institute for ASEAN and East Asia-Geographical Simulation Model (IDE/ERIA-GSM) Baseline Scenario for the New Normal and Re-examination of the Impact Analysis on ASEAN Economies

Ikumo Isono, Takuma Matsuda, Kenmei Tsubota, Kazuhiro Nara, Satoru Kumagai, Toshitaka Gokan, Keola Souknilanh, and Kazunobu Hayakawa

Summary

The COVID-19 pandemic has had a major impact on the global economy, causing major disruptions to supply chains, labour markets, and consumer demand in many countries. Whilst policy efforts continue to adapt to the new reality of a pandemic, the full extent of its economic impact is still unknown. However, many experts predicted that 2022 would be the turning point in the economic trajectory of the pandemic, when vaccination efforts would intensify and the economy would gradually resume.

Unfortunately, the situation is further complicated by rising geopolitical tensions: the Russian Federation's invasion of Ukraine in February 2022 has led to economic sanctions imposed on the Russian Federation by Western countries. This has further complicated the economic stand-off between the US and China as the global balance of power continues to shift.

Against this background, the Institute of Developing Economies/Economic Research Institute for ASEAN and East Asia-Geographical Simulation Model (IDE/ERIA-GSM) is in the process of revising its baseline scenario. The model is a computable general equilibrium model based on spatial economics and is used to analyse the economic impacts of trade and transport facilitation measures. It is hoped that updating the model's assumptions to reflect changes in the global economy will provide a better understanding of how pandemics, geopolitical tensions, and other factors are shaping the global economy. The IDE/ERIA-GSM model has proven to be a valuable tool for policymakers and researchers to gain insight into the potential impact of different policy scenarios on the economy. However, as the global economy continues to evolve and new challenges arise, it is essential to continually update the assumptions and parameters of the model to ensure its accuracy and validity.

In FY2022, in parallel with the IDE's project, the impact of global economic decoupling on the ASEAN and East Asian economies has been analysed and policy recommendations made through various channels. When the world is divided into three groups—the West, led by the US; the East, led by China; and the neutral countries—the global economy will be hit, and both the West and the East will be damaged. ASEAN, on the other hand, will be affected more positively by the trade diversion effect if it remains neutral. This is a result that supports the path taken by third countries, also known as the Global South, to prevent decoupling and not to participate in decoupling, as ASEAN Member States have done in their presidencies at the East Asia Summit, Group of Twenty (G20) and Asia-Pacific Economic Cooperation (APEC) in November 2022.



Policy Implications

If policy decoupling occurs despite the efforts of economic agents, the simulation results clearly show that if ASEAN joins either camp, the economic situation is worse than in the baseline case without decoupling, and if it does not join, the trade diversion effect provides positive economic benefits. Adherence to a rules-based international trade order will ultimately benefit ASEAN members and peoples. It is important that ASEAN continues to demonstrate its centrality and show the world its efforts to avoid decoupling and not to participate in decoupling.

On the other hand, China and the US will have the greatest negative impact when ASEAN joins the other camp. As for China, if decoupling with the West is inevitable, then including ASEAN in the camp can mitigate the negative impact slightly. Therefore, these incentives to recruit ASEAN into the camp can be seen only from an economic perspective.

Geographic Scope

Global, with focus on East Asia

Partner Organisation

Institute of Developing Economies-Japan External Trade Organization

Related ERIA Publication

Isono, I. and S. Kumagai (2023), 'ASEAN's Role in the Threat of Global Economic Decoupling: Implications from Geographical Simulation Analysis', ERIA Policy Brief No 2022-10. Jakarta: ERIA Downloadable from <https://www.eria.org/publications/aseans-role-in-the-threat-of-global-economic-decoupling-implications-from-geographical-simulation-analysis/>



19

Economic Impact Analysis of Timor-Leste's Accession to ASEAN and Enhanced Connectivity

Ikumo Isono, Kenmei Tsubota, Satoru Kumagai, Toshitaka Gokan, Keola Souknilanh, Keita Oikawa, Yoichiro Hatakeyama, and Kazunobu Hayakawa



Summary

Timor-Leste joining the Association of Southeast Asian Nations (ASEAN) is an important step forward for the country and the region as a whole. In November 2022, the ASEAN Summit in Phnom Penh, Cambodia, approved in principle Timor-Leste's membership in ASEAN. Timor-Leste has been a participant in the ASEAN Regional Forum since 2005 and signed the Treaty of Amity and Cooperation in Southeast Asia in 2007.

The ASEAN Economic Community is an important aspect of ASEAN's integration efforts. It aims to create a single market and production base that allows the free flow of goods, services, investment, capital, and skilled labour within ASEAN. The elimination of tariffs, promotion of liberalisation of trade in services, and facilitation of trade and transport are some of the key measures applied between Timor-Leste and ASEAN to promote economic integration.

A SWOT (strengths, weaknesses, opportunities, and threats) analysis of Timor-Leste's accession to ASEAN, conducted by Japan International Cooperation Agency, identified strengths and weaknesses that are likely to affect economic integration between Timor-Leste and ASEAN. Timor-Leste's excellent labour force, stable economy, and high-quality organic coffee are important strengths that contribute positively to integration with ASEAN. However, its slow economic development, geographical disadvantage in ASEAN, small economy, and lagging technology pose major challenges to economic integration with ASEAN. These constraints raise concerns about competition from larger economies and the dominance of domestic markets by ASEAN companies.

The geographical simulation model (IDE/ERIA-GSM) by IDE-JETRO and ERIA is used to analyse the economic impacts of Timor-Leste's accession to ASEAN. The model is an applied general equilibrium model based on a spatial economics model; the IDE/ERIA-GSM framework follows Spatial Economics by Fujita, Krugman, and Venables. The model aims to explore the relationship between economic integration and economic development.

Timor-Leste's accession to ASEAN is expected to have economic implications for the country, ASEAN, and the region as a whole. Whilst economic integration has potential benefits, such as increased market opportunities, challenges also need to be resolved, such as the country's slow economic development and competition from larger economies. The IDE/ERIA-GSM model provides insights into the potential outcomes of Timor-Leste's accession to ASEAN and identifies challenges to be resolved and priority policies that should be implemented.



Policy Implications

The simulation analysis is still in its early stages, but the expected results and policy recommendations are as follows:

High positive economic benefits for Timor-Leste are expected. Therefore, the Government of Timor-Leste should actively build on its efforts towards ASEAN membership. ASEAN, dialogue partners, and donors should also facilitate capacity building towards Timor-Leste's accession to ASEAN.

Timor-Leste has only 1/536th of the population and 1/724th of the GDP of the 10 ASEAN Member States. Therefore, in a scenario where Timor-Leste joins ASEAN, the country-specific economic impact on ASEAN countries would be almost zero. This analysis needs to focus on the impact within Indonesia, particularly in East Nusa Tenggara and each regency (kabupaten) within Maluku Province.

It will be important to position Timor-Leste's accession to ASEAN within the further development of ASEAN's economic integration process through a strategic combination of improved connectivity, as the Comprehensive Asia Development Plan indicates.

Geographic Scope

Timor Leste and 10 ASEAN Member States

Partner Organisation

Institute of Developing Economies-Japan External Trade Organization



20

Study on the Regional Comprehensive Economic Partnership (RCEP) from International Relations Perspectives (Phase 2)

Fusanori Iwasaki and Keita Oikawa



Summary

A free trade agreement (FTA) basically has an overall positive effect on the economic growth of the countries participating in it. Taking into account the internal dynamic of a country participating in an FTA, typically more competitive industries are likely to benefit from it, whilst less competitive ones are likely to suffer, creating a rift between groups with conflicting interests. For instance, the United States withdrew from the Trans-Pacific Partnership (TPP) in 2017 during the administration of Donald Trump because he said he wanted to protect people in the manufacturing sector against foreign manufacturers.

The Regional Comprehensive Economic Partnership (RCEP) is a mega FTA that is expected to have positive economic effects on countries that already have an FTA with ASEAN, including India. India withdrew from the RCEP negotiations because it was concerned about exacerbating its trade deficit with China.

To shed light on the factors driving regional free trade negotiations, the study will explore the mechanisms behind countries' decisions to join or opt out of FTAs. Phase 2 of this project will examine the development of RCEP as a case study, analyse public perceptions of the leaders of TPP and RCEP, and evaluate the meaning of ASEAN centrality through quantitative analysis of centrality.

Geographic Scope

ASEAN, East Asia



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ERIA Research on the Regional Comprehensive Economic Partnership (Phase 2): Understanding the Opportunities and Challenges

Dionisius Narjoko, Shandre M. Thangavelu, Christopher Findlay, Gary Hawke, Innwon Park, Miaojie Yum, Vutha Hing, Dandy Rafitrandi, Sisavanh Didaravong, Cassey Lee, Aung Tun, Myrna S. Austria, Archanun Kohpaiboon, Juthathip Jongwanich, Nguyen Dinh Chuc, Iman Pambagyo, Donna Gultom, Chandra Tri Putra, Shiro Armstrong, Peter Drysdale, Chea Samnang, and Hein Roelfsema

Summary

The Regional Comprehensive Economic Partnership (RCEP) is the largest free trade agreement in 2020. The signatories to this agreement are the 10 members of ASEAN (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam) and five countries (Australia, China, India, Japan, Republic of Korea, and New Zealand) with existing free trade agreements with ASEAN. It is the largest regional trading block in the world, comprising a combined population of 2.2 billion, or 30% of the world population, total regional gross domestic product (GDP) of about \$38,813 billion, or 30% of global GDP in 2019, and nearly 28% of global trade.

RCEP has set an important agenda for global trade and investment by opening large domestic markets, releasing huge resources for trade and investment, and creating dynamic regional and global value chain activities. Given the COVID-19 pandemic's current context of uncertainty and inward-looking policies, RCEP is a critical and important framework for global trade and regionalism. It provides the impetus for global trade and investment and supports open regionalism and global trade and investment.

In response to the significance of RCEP in shaping the future regional economic integration, ERIA has engaged another round of research on RCEP. The 2022 research discusses the agreement's elements or chapters, all of which are published by ERIA in two volumes. The project continues in 2023 with the publication of the third volume. It will be launched in 2024 to coincide with Indonesia's ASEAN chairmanship.

For its participants, the impact of RCEP is expected to be significant. However, they still face challenges in fully benefitting from the agreement. ERIA's research will explore the gaps between domestic regulations and RCEP commitments and the potential gains from implementing the agreement.

The study will include country papers that discuss specific gap analysis for regulatory reform in RCEP member states. The gap analysis is expected to guide structural transformation in a member country to maximise the benefit from the agreement. The research should be able to identify areas of reform and propose general strategy for the implementation of the reform.



The project covers the institutions within RCEP. It plans to address two topics: the more general institutional building within RCEP and the institutional building for the economic and technical cooperation agenda under the agreement.

The study on the first topic aims to discuss how an institutional framework and mechanisms can be built to allow RCEP to always be relevant and to address the current key global or regional issues in international trade and investment. The study on the second topic aims to contribute to the discussion on implementation of the general activities defined by the technical economic cooperation chapter in the agreement.

The project will conduct case studies of potential reforms for all RCEP member states and produce a few papers on the institutional aspect of the agreement, including the following: 'The Economic Cooperation Opportunity in RCEP' by Peter Drysdale and Shiro Armstrong, and 'Institutional Framework and Mechanism in RCEP', by Iman Pambago and Donna Gultom.

Policy Implications

This project is expected to improve the understanding of commitments under RCEP and of expected benefits and challenges. The research will help member states continue to refine the commitments and constantly improve country-level policy programmes to help the private sector maximise the gains from the agreement.

Geographic Scope

ASEAN and EAS countries

Partner Organisation

University of Adelaide, Australian National University, New Zealand Institute of Economic Research, Korea University, Liaoning University, Centre for Strategic and International Studies, Lao PDR Ministry of Planning and Industry, ISEAS Yusof Ishak Institute, De La Salle University, Thammasat University, Vietnam Academy of Social Sciences, Center for Indonesian Policy Studies, Cambodia Skills Development Center, and Utrecht University

Related Publications

Kimura, F., S. Thangavelu, D. Narjoko (2022), Regional Comprehensive Economic Partnership: Implications, Challenges, and Future Growth of East Asia and ASEAN. Jakarta: ERIA. Downloadable from <https://www.eria.org/publications/regional-comprehensive-economic-partnership-implications-challenges-and-future-growth-of-east-asia-and-asean/>

Kimura, F., S. Urata, S. Thangavelu, D. Narjoko (2022), Dynamism of East Asia and RCEP: The Framework for Regional Integration. Jakarta: ERIA. Downloadable from <https://www.eria.org/publications/dynamism-of-east-asia-and-rcep-the-framework-for-regional-integration/>



22

Study on the Characteristics of the Regional Comprehensive Economic Partnership and the Role of International Organisations (Phase II)

Keita Oikawa, Sotaro Sada, Fusanori Iwasaki, and Yuichi Ikeda



Summary

The East Asia and the Asia-Pacific regions are economically integrating through the Comprehensive and Progressive Agreement for Trans-Pacific Partnership and the Regional Comprehensive Economic Partnership, as well as the Association of Southeast Asian Nations (ASEAN) community-building process. Whilst these regional trade agreements have deepened multilateral relations, the region lacks a sufficient mechanism to quantify multilateral diplomacy.

This study analyses the region from three perspectives: diplomatic ranking, clusters, and synchronisation. Diplomatic ranking identifies countries that have contributed to diplomacy for intra-regional cooperation. Diplomatic clusters assess the cohesiveness of countries in diplomatic stances whilst diplomatic synchronisation measures periods of cooperative events. These perspectives are quantified by ranking of diplomatic centrality, blockmodeling of the signed network, and analytic signal, respectively. The study uses bilateral event data to create a political distance network that includes the original East Asia Summit member countries (ASEAN+6) and the United States from 1985 to 2020 and to define diplomatic centrality. Diplomatic ranking indicated three major trend periods: 1985–1992, 1993–2011, and 2012–2020. Until 1992, Japan, the ASEAN Member States (AMSs), and Australia were at the top, whilst from 1993 to 2011, Japan and China almost dominated the rankings. Since 2012, AMSs have joined Japan and China in the top ranks. Diplomatic clusters demonstrate that Australia and New Zealand have the closest diplomatic stances, whilst the stances of Japan and the Republic of Korea were closely aligned throughout the 36-year period. China, AMSs, and the United States followed next in terms of closeness of diplomatic stances. Diplomatic synchronisation quantifies the progress of regionalism in East Asia, and the results show that AMSs were at the centre of multilateral diplomacy in 2018–2019.

Policy Implications

The results of the study's analysis are consistent with various previous studies and political facts, and demonstrate the progress of East Asian economic integration in recent years. The research proposes a data-based method of analysing multilateral diplomacy by applying network science and physics, which allows for case studies to be augmented with quantitative evidence, making complex international relations more accessible to a wider audience.

Geographic Scope

ASEAN, Australia, China, India, Japan, Korea, New Zealand, and the United States

Partner Organisation

Kyoto University





III. Globalisation

23

The Rise of Global Economic Uncertainty and Firm Behaviour

Doan Thi Thanh Ha, Chin Hee Hahn, Shujiro Urata, and Dionisius Narjoko



Summary

In recent years, the global economy has witnessed widespread and rising uncertainties that have far-reaching consequences for firms and economies worldwide. The most significant source of uncertainty is likely to be the US–China trade tension, which began with the tit-for-tat tariffs between the two countries. This has triggered proposals by several countries suspected to be inclined towards economic nationalism and protectionism. Whether the shock is permanent or temporary is uncertain, but it has the potential, if it stays, to fragment the global market even further.

The COVID-19 pandemic is another global uncertainty shock that firms in all countries have had to grapple with. Aside from infection concerns, the efforts of governments to control the spread of the disease have disrupted the global supply chain and rendered the global, as well as the domestic, economy a more fragmented one. In response, some of the changes in firms' and consumers' behaviour will be short-lived whilst some other changes are likely to be long-lived or irreversible.

Uncertainties associated with climate change and global, regional, and national initiatives to reduce carbon dioxide emission also pose challenges for firms and governments. Although there have been a lot of disagreements amongst countries on various related issues based on efficiency and equity grounds, some policy proposals, albeit aimed at achieving legitimate environmental objectives, may well have the effect of restricting international trade.

In this project, we aim to examine empirically, by utilising firm-level micro data, the effects of the global economic uncertainties on firms' activities such as trade, investment, innovation, input sourcing, labour demand, and pricing behaviour. Whilst the sources of uncertainty mentioned above are important, we welcome as well studies that explore the effects of other important sources of uncertainties. We recognise that data availability may be a constraint for analysing recent issues, but we encourage studies that could shed light on the most recent developments. We expect that this project will also contribute to evidence-based policy-making in response to the rise of the global economic uncertainty.

Policy Implications

Policies to support growth and development of firms through uncertainties.

Geographic Scope

ASEAN, Australia, China, India, Japan, Republic of Korea, New Zealand



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Revision of the List of Prospective Infrastructure Projects in the ASEAN Region

Yoichiro Hatakeyama, Ikumo Isono, and Keita Oikawa

Summary

The Economic Research Institute for ASEAN and East Asia (ERIA) released the Comprehensive Asia Development Plan 3.0 (CADP 3.0) in 2022, formulating a new development strategy for the digital age and identifying future infrastructure projects to achieve the strategy in ASEAN Member States. The project includes not only 'economic and physical' infrastructures (roads, railways, ports, industrial parks, etc.) highlighted in CADP 2.0 but also 'social and urban' infrastructures with a new development strategy—which properly recruits digital technology and professional skilled workers. This alteration is being considered important when coming up with the list of CADP 3.0. As a result, with CADP 3.0, ERIA was able to compile a list of 779 promising projects in the ASEAN region.

It is crucial to remember that the list was based on information collected in 2019–2020. During the COVID-19 pandemic, whilst small revisions to the list could be implemented, it was difficult to conduct physical surveys to gather information. This means that it has been 3 years since the last major revision of the list.

The purpose of this research is to collect the latest information on promising projects and update their status to provide a basis for future research.

In addition to the list, ERIA developed the Digital Map on its website for 761 concrete infrastructure projects in 2017. However, whilst the construction/development of some projects mapped in 2017 has been completed, other projects have faced changes in plans or cancellation due to policy alteration. Given these situations, it is time to update not only the prospective projects list but also the Digital Map.

Policy Implications

Present necessary policies, programmes, and measures on infrastructure development as part of strategies to promote integration, innovation, inclusiveness, sustainable economy, and digital economy.

Geographic Scope

ASEAN



Related ERIA Publications

Kimura, F., P.S. Intal Jr., S. Umezaki, and M. Okabe (2010), *The Comprehensive Asia Development Plan*. Jakarta: ERIA.

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Zen, F., K. Yamamoto, T. Fujisawa, F. Kimura, I. Isono, and R. Banomyong (2019), 'Seamless Transport, Logistics Markets, and Physical Connectivity', *ASEAN Vision 2040 Volume IV : Integrated and Connected Seamless ASEAN Economic Community*, pp.172–202. Jakarta: ERIA.

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4th Phase of Global Value Chains, Urban Amenities and City Agglomerations: Structural Transformation and GVC Unbundling in East Asia

Dionisius Narjoko, Shandre M. Thangavelu, Christopher Findlay, Yoko Konishi, Ju Hyun Pyun, Wenxiao Wang, Subash Sasidharan, Titik Anas, Saowaruj Rattanakhomfu, Cassey Lee, Penghuy Ngov, Phouphet Kyophilavong, Carlos Mangunsong, Adrian Kusuma Pratama, Natanael Waraney G. Massie, Nguyen Dinh Chuc, Ali Soltani, Fandy Rahardi

Summary

This project is the 4th phase of the research on the role of urban amenities in global value chains (GVC) and agglomeration. It builds and continues the previous research, expanding to explore other aspect or element of urban amenities in their role to strengthen or facilitates deeper and wider GVC and agglomeration.

As the basis analytical framework of this research, Glaeser et. al (2015) highlight the importance of cities to create urban networks that creates innovation and entrepreneurship to spur the economic growth. Urban networks, through urban amenities, increase the global economies of scale through innovation in services and global linkages, which in turn attract skilled workers to move and live in large and mega cities due to the higher returns from global urban networks.

The role of urban amenities becomes more important in East and Southeast Asia as economies in these regions are well connected through their networks of production along the GVC. In fact, some countries in these regions, especially the Southeast Asia ones, have started to move to the 3rd unbundling where has involved greater services and human capital in the part of the GVC.

The research in this phase (the Phase 4) is rather special as it is partly motivated by the Covid-19 pandemic and some uncertainties lingering the regions in how they manage IPN and GVC in the future, for the post-pandemic period. Countries in these regions are undergoing significant structural transformation in the GVC activities from the pandemic shock. The pandemic is expected to increase the intensification of digital technologies and level of urban agglomerations driven by communication and telecommunications technologies.

For this reason, the Phase 4 focuses on the impact of urban amenities and agglomeration in attracting and creating innovative activities in services in terms of digital transformation, attracting skilled workers, driving creativity and entrepreneurship, and increasing the global and regional service linkages in the global production value chain. It is expected that the digital transformation and urban networks and linkages will accelerate in the pandemic and post-pandemic recovery. Papers in this phase will be directed to address issues under these topics and in the context of post-pandemic, with a broad objective to learn how digital transformation and urban networks as well as linkages can evolve and/or be maximize to strengthen GVC-IPN in the future.



In addition to it, this phase also continues the research agenda of creating ERIA Urban Amenities Index. To this end, the research has created the index for major cities in the following countries: Indonesia, Vietnam, Japan, South Korea, India, and China. The Phase 4 is undertaking more countries, namely Malaysia and Singapore. The Phase 4 project also started the work for the Australia Urban Amenities Index.

Policy Implications

The study is expected to provide insights on how to move forward with digital transformation in respect to aligning urban amenities as a factor of the growth in IPN-GVC especially in the context of post pandemic

Geographic Scope

East and Southeast Asia

Partner Organisation

University of Adelaide, Australian National University, Research Institute of Economy, Korea University, Zhongnan, University of Economics and Law, Indian Institute of Technology Madras, Svava Research Indonesia, Thailand Development Research Institute, ISEAS Yusof Ishak Institute, Nagoya University Cambodia Satellite Campus, National University of Laos, DTS Indonesia, Vietnam Academy of Social Sciences, University of South Australia



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Urban Amenities and City Agglomerations: Structural Transformation and Global Value Chains (GVCs) in East Asia (Fifth Phase)

Dionisius Narjoko, Shandre M. Thangavelu, Christopher Findlay, Yoko Konishi, Ju Hyun Pyun, Wenxiao Wang, Subash Sasidharan, Ketan Reddy, Titik Anas, Saowaruj Rattanakhomfu, Cassey Lee, Nguyen Dinh Chuc, Vutha Hing, Penghuy Ngov, Ali Soltani, Chris Leishman, Phouphet Kyophilavong, Carlos Mangunsong, Adrian Kusuma Pratama, Natanael Waraney G. Massie, Fandy Rahardi, and Fukunari Kimura.



Summary

The research aims to improve our understanding of the role of cities and their amenities in facilitating deeper and wider engagement of a country's economy in global value chains (GVCs). This includes the following:

- Examining the drivers of creativity in urban areas, leading to innovation and more extensive entrepreneurial activities.
- Examining the impact of urban amenities (as measured by the Urban Amenity Index developed in 3rd and 4th phase studies) on domestic and regional competitiveness and productivity using aggregated and disaggregated analyses. To date, this research has created amenities index for major cities in the following East Asian Summit (EAS) countries: India, Indonesia, Japan, Malaysia, Singapore, Republic of Korea, and Viet Nam. Ongoing work is underway to develop the index for Australia.
- Examining the efficiency and competitiveness of cities in driving innovation and extensive entrepreneurial activities in East Asia.
- Extending the amenities index measurements for Australia and Cambodia.
- Examining the locational characteristics of firms across cities, which are likely to be driven by different quality of urban amenities.
- Understanding the linkages between GVCs and cities and urban amenities in terms of service linkages and city linkages using micro-level data.
- Highlighting the importance of digital economy and the development of services sector in the region.

Policy Implications

The study is expected to provide policy recommendations on the development of urban amenities in EAS countries. These will cover a range of topics, including the types of urban amenities, the factors that influence the development of urban amenities such as connectivity and infrastructure, and the cities or regions that have the greatest potential for further development.

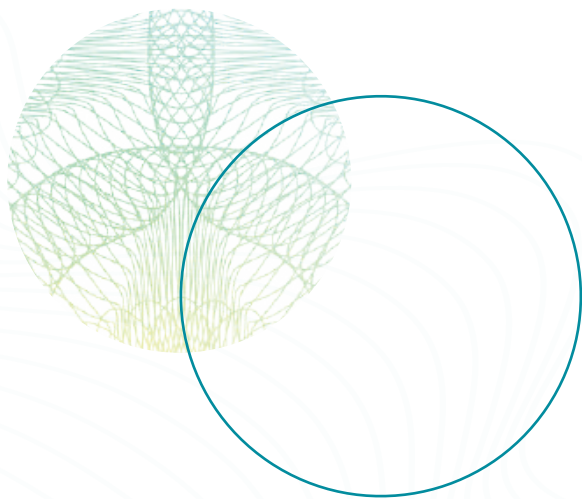


Geographic Scope

Australia, Cambodia, China, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Philippines, South Korea, Thailand, and Viet Nam.

Partner Organisation

University of Adelaide, Australian National University, Research Institute of Economy, Trade, and Industry, Korea University Business School, Zhongnan University of Economics and Law, Indian Institute of Technology Madras, Svava Research Indonesia, Thailand Development Research Institute, ISEAS Yusof Ishak Institute, Institute of Regional Sustainable Development, Nagoya University, University of South Australia, National University of Laos, DTS Indonesia



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Services, Global Value Chains (GVCs), and Structural Transformation

Dionisius Narjoko, Shandre M. Thangavelu, Christopher Findlay, Yoko Konishi, Jung Hur, Wang Wenxiao, Sanja Samirana Pattnayak, Cassey Lee, Archanun Kohpaiboon, Nguyen Dinh Chuc, Vutha Hing, Phouphet Kyophilavong, Dandy Rafitrandi, Fukunari Kimura, and Christopher Findlay.



Summary

The research focuses on the services sector within the context of global value chain (GVC) and the structural changes that come along the evolution of the sector. In general, it aims to improve understanding of the process, mechanics, and consequences of various topics under the theme. It continues to the next phase in FY2022, collecting more evidence on the theme. The project covers regions of the East Asia Summit countries.

The project covers the following

- a. Sources and determinants of servicification of manufacturing and services activities.
- b. Impact of structural transformation of servicification in manufacturing, services, and agricultural GVCs, which is critical for post-COVID-19 pandemic recovery in East Asia and ASEAN.
- c. Impact of digital transformation and post-pandemic recovery on the traditional and modern services activities.
- d. Structural transformation from the second stage unbundling to the third stage unbundling for the East Asian and ASEAN countries.
- e. The framework for digital trade in services and development of the framework in terms of digitalisation of other services and digitalisation of industrialisation.
- f. Impact of servicification and structural transformation on human capital development in East Asian countries.

Policy Implications

The study is expected to provide policy recommendations on the elements or aspects of services sectors, including the determinants of growth or productivity of services, the extent of servicification and the stage of transformation towards the third unbundling, the current state and trend of services contribution to overall economy or to other sectors (e.g. manufacturing, agriculture), services sector in agglomeration, urban amenities and city development, and others.



Geographic Scope

Australia, Cambodia, China, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Philippines, South Korea, Thailand, and Viet Nam.

Partner Organisation

University of Adelaide, Australian National University, Research Institute of Economy, Trade, and Industry, Sogang University, Zhongnan University of Economics and Law, Indian Institute of Management, ISEAS Yusof Ishak Institute, Thammasat University, Institute of Regional Sustainable Development, National University of Laos, Centre for Strategic and International Studies.

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Review of Services Sector in Indonesia

Dionisius Narjoko, Professor Christopher Findlay (Australian National University), Jane Drake-Brockman (University of Adelaide), Fajar Hirawan (CSIS Jakarta), Dandy Rafitrandi (CSIS Jakarta), Krisna Gupta (Center for Indonesian Policy Studies (CIPS)), Ibrahim Kholilul Rohman (Indonesia Financial Group), Daniel Suryadarma (Asian Development Bank Institute), Samuel Nursamsu (World Bank Jakarta), Akhmad Zainal Mubarak (Akatiga, Bandung), and Few other if necessary, to be identified. Titik Anas, Christopher Findlay, Kiki Verico



Summary

The project is proposed in response to the official request made by the Fiscal Policy Agency (*Badan Kebijakan Fiskal*), Ministry of Finance, Republic of Indonesia,¹ to the Economic Research Institute for ASEAN and East Asia.

The objective of the project is to identify the challenges faced by the sector to enable the ministry to participate more actively through various fiscal policies/measures. This reform is necessary for the sector to increase its competitiveness and growth. The Ministry has accorded high priority to this issue, along with reforms in other sectors/issues such as industrial development. It is considered critical in determining the path towards the 'Vision of Indonesia 2045' that aims for its transformation into a developed country.

Policy Implications

The study is expected to identify key areas for reforms in Indonesia's services sector.

Geographic Scope

Indonesia

Partner Organisation

Australian National University; University of Adelaide, Center for Strategic and International Studies, Jakarta; Center for Indonesian Policy Studies; Indonesia Financial Group; and Asian Development Bank Institute

¹ The request was conveyed informally to Dr. Narjoko and the official request from the Head of the Fiscal Agency of the Ministry will be delivered soon within one-month time from end of January 2023.



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Study on New Strategies for Recovery from the Pandemic and Sustainable Development in Asia

Keita Oikawa and Fusanori Iwasaki



Summary

ASEAN countries have succeeded in increasing their income levels through the establishment of international production networks that use skilled and cost-effective labour force and aggressive measures to attract foreign direct investment. About 30% of Japanese companies expanding overseas are locating their operations in ASEAN. The region has become an important manufacturing base for Japanese companies. Recently, digitalisation has seen leapfrogging and the rise of unicorns in ASEAN as it has developed into a global growth centre. However, the COVID-19 pandemic has strongly impacted the region, posing a major challenge to recovering from its negative effects and to maintaining sustainable growth.

ASEAN has promoted economic integration to deepen its production networks by strengthening its competitiveness. With the establishment of the ASEAN Economic Community and the realisation of the Regional Comprehensive Economic Partnership (RCEP), the economic integration of the region has progressed. A seamless trade and investment environment has been created in combination with cross-border infrastructure development and facilitation of trade procedures. Nevertheless, ASEAN still needs to build new policies for sustainable development such as responding to the digital economy through improvement of related infrastructure, finance, capacity building, etc.; establishing a competition policy to extend the merits of digitalisation to small and medium-sized enterprises (SMEs) and agriculture; more seriously addressing environmental and congestion problems, disparity between rural and urban areas, improvement of profitability of local industries such as agriculture and tourism, response to diversifying medical needs, etc.; addressing problems of gender, ocean health, and protection of workers; and fostering new industries driving economic growth.

Based on the above, it is beneficial to study those issues and share the knowledge gained across Asia.

Geographic Scope

Bangladesh, India, Indonesia, Malaysia, the Philippines, and Thailand

Partner Organisation

Japan Economic Foundation



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Study on New Strategies for Recovery from the Pandemic and Sustainable Development in Asia (Phase 2)

Keita Oikawa, Fusanori Iwasaki, and so forth (TBD)



Summary

ASEAN has promoted economic integration in order to deepen its production networks through strengthening its competitiveness. With the establishment of the ASEAN Economic Community and the realization of the Regional Comprehensive Economic Partnership (RCEP), economic integration of the region has progressed. A seamless trade and investment environment has been created in combination with cross-border infrastructure development and the facilitation of trade procedures. Meanwhile, ASEAN still needs to build new policies for sustainable development: responding to the digital economy (improvement of related infrastructure, finance, capacity building, etc); establishment of competition policy to extend the merits of digitalization to SMEs and agriculture; becoming more serious over environmental/congestion problems, disparity between rural and urban areas, improvement of profitability of local industries such as agriculture/tourism, response to diversifying medical needs, etc; problems of gender and ocean health and protection of workers; and fostering new industries driving economic growth.

In order to address those issues, we will conduct a stock taking study, policy impact evaluation, and build strategies for selected issues. The studies will be conducted by assembling a study group consisting of about 10 researchers. The chairperson is Professor Yasuyuki Sawada (University of Tokyo). The members of the group will be selected by Professor Sawada.

Policy Implications

New economic policy strategies which should be developed across Asia in a form which immediately responds to the needs of the regional centre of ASEAN.

Geographic Scope

ASEAN

Partner Organisation

The Japan Economic Foundation



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Regional Integration in Indo-Pacific: Connectivity, Cooperation, and New Supply Chain Linkages.

Anita Prakash



Summary

In 2018, the Economic Research Institute for ASEAN and East Asia (ERIA) developed ASEAN Vision 2040, where it was agreed that Asia-Pacific could not sufficiently represent current economic linkages in East Asia. To many writers, Indo-Pacific was not acceptable as they believed it to represent security connotations, primarily led by the United States (US). ASEAN Vision 2040 settled for the Indo-Asia-Pacific construct instead. However, in 2018, Japan's Prime Minister Shinzo Abe's speech at the UN General Assembly shifted the focus to economic linkages and cooperation in the region. Free and Open Indo-Pacific was emphasised as the platform of all economic cooperation and connectivity in the region, Asia–Africa, and Asia–Europe. The Quadrilateral Security Dialogue or Quad was revived, bringing in the US as a major economic partner whilst underplaying its security focus, and actively engaging Australia and India, with ASEAN at the centre of greater economic linkages amongst the partners.

ASEAN, too, has constructed its ASEAN Outlook on Indo-Pacific, which was endorsed by the East Asia Summit in 2019. The ASEAN Outlook on Indo-Pacific recognises ASEAN's centrality in the new architecture of Indo-Pacific. The reality, however, is that the Indo-Pacific region is an economic construct along the Indian Ocean, in which several alternate plans and groups of countries are working on their mutual relations and combined strengths. The new plans aim to create new or alternative supply chains or strengthen existing ones to address changing political and economic realities in Asia, and to accommodate the partners' interests from outside Asia.

The Indo-Pacific region requires greater connectivity—both in infrastructure and institution—and investments to realise several connectivity plans and supply chain linkages proposed by member countries. The region is preparing for greater participation in the digital economy and must rapidly undertake digital transformation to remain engaged in the value chain of a more digitalised global economy.

The study covers the economic interlinkages in the Indo-Pacific region, especially the active promotion by governments of the infrastructure connectivity plans, trade, and investment facilitation frameworks in the region, Australia–Japan–India, Australia–Japan–US, the Mekong Region, the Trilateral Highway, Asia Africa Growth Corridor, Masterplan on ASEAN Connectivity, and ASEAN COVID-19 Recovery Framework, etc. The study suggests that the Indo-Pacific economic architecture is linked to restoring multilateralism that recognises diversity yet leaves no one behind. The study maps the diverse connectivity plans and evolving supply chains in the region and with regions in Africa and the European Union, which contribute to the economic architecture in Indo-Pacific.



The study is an attempt to consolidate information on the Indo-Pacific economic architecture along six important verticals: infrastructure, global value chain integration, development cooperation, the digital economy, human resources and the movement of people, and geographical inclusiveness for the Pacific.

The study traces the history of Asia-Pacific and the current emphasis on Indo-Pacific to showcase the rebalancing of old elements of trade integration and the introduction of new elements of cooperation in which strategic and economic interests are brought closer to principles of governance, transparency, and equity, and inclusiveness emerge as the core of the emergent architecture in the Indo-Pacific.

The facilitating and leadership role of governments in realising trade and investments, developing capacities, and promoting new supply chain linkages is especially examined. This mapping and taxonomy of the policy-led economic architecture in Indo-Pacific will be helpful in understanding the cooperation amongst governments for new developing economic linkages through infrastructure development, investments, governance of the new value chains, and participation in the digital economy in the region.

Existing literature and data on connectivity, digital economy, and supply-chain integration in the region are used to map the infrastructure plans and projects and trade integration in the region. Trade and investment data sourced from ASEAN, Organisation for Economic Co-operation and Development, Asian Infrastructure Investment Bank, United Nations Economic and Social Commission for Asia and the Pacific, etc. are analysed to project the changing dynamics in investments, infrastructure, and supply chains.

Policy Implications

Governments are taking a more proactive role in the economic and strategic aspects of the regional architecture. New alignments are taking place in the form of physical, institutional, and strategic cooperation for supply chain linkages and connectivity plans. Trade and investment patterns are undergoing change, especially with the arrival of the digital economy. The COVID-19 pandemic has especially tested the resiliency of supply chains in the region, and ASEAN and its dialogue partners need to make new inroads into regional value chains and production networks to benefit from changing patterns of investment and manufacturing, especially when participating in the global digital economy. The study covers the emerging economic architecture and supply chain linkages amongst countries and regions in Indo-Pacific. It especially brings out policy certainty from governments, especially for joint partnerships and bilateral and trilateral cooperation for connectivity and supply chains, investments and infrastructure development, cooperation for human resource and skills, and governance of and participation in the new digital economy. Policymakers view Indo-Pacific as a plurilateral component of the international economy in which regions and countries find it mutually advantageous to work cooperatively. The study avoids anecdotal narratives and explains how Atlantic and Pacific powers are brought systemically closer to the Indian Ocean to emphasise cooperation and international production sharing that involve services as much as goods. The study delineates the international cooperation aspects and new pathways for development in Indo-Pacific.

Geographic Scope

Asia, European Union, Indo-Pacific, Oceania,
The Pacific, United States



Related Publications

Tay, S., S. Armstrong, P. Drysdale, and P. Intal Jr. (eds.) (2019), *ASEAN Vision 2040 Volume II: Collective Leadership, ASEAN Centrality, and Strengthening the ASEAN Institutional Ecosystem*. Jakarta: ERIA.

Downloadable from:

<https://www.eria.org/research/asean-vision-2040-volume-ii-collective-leadership-asean-centrality-and-strengthening-the-asean-institutional-ecosystem/>

Kimura, F., S. Umezaki, and A. Prakash (eds.) (2020), *The India–Myanmar–Thailand Trilateral Highway and Its Possible Eastward Extension to Lao PDR, Cambodia and Vietnam: Challenges and Opportunities*. ERIA

Research Project Report 2020-02. Jakarta: ERIA. Downloadable from:

<https://www.eria.org/research/the-india-myanmar-thailand-trilateral-highway-and-its-possible-eastward-extension-to-lao-pdr-cambodia-and-vietnam-challenges-and-opportunities/>

Prakash, A. (2018), *Asia Africa Growth Corridor: Development Cooperation and Connectivity in the Indo-Pacific*.

ERIA Policy Brief 2018-03. Jakarta: ERIA. Downloadable from:

<https://www.eria.org/research/asia-africa-growth-corridor-development-cooperation-and-connectivity-in-the-indo-pacific/>

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Promoting Resilient Infrastructure and Public–Private Partnerships

Fauziah Zen, Teuku Riefky, Hengki Purwoto, Yohanna Gultom, Pratomo Ismujatmika, and Think Twenty (T20) Panel



Summary

The increasing threat of natural disasters and effects of climate change demand resilient infrastructure. Whilst damage from vulnerable infrastructure could have enormous economic and human costs, providing resilient infrastructure could prevent that. First, resilient infrastructure offers social benefits, ranging from protecting human life against natural hazards and climate change, to achieving a better and more equitable quality of life. Second, resiliency can be used to attract more investment by signalling how standards are put in place. Despite its advantages, resilient infrastructure is often considered as costly as the estimation of a project's return does not include the benefits of resiliency, and there is a lack of proper incentives for applying resiliency principles. However, when combined with adequate funds for infrastructure investment, resiliency standards can be the solution rather than the problem, provided that the main stakeholders are aware of and have proper support for implementation using public–private partnerships (PPPs). Private participation also suffers from a lack of investment, whilst being expected to fill the funding gaps of public funds. Strengthening institutions, harmonising plans and understanding across public agencies, and providing the right incentives are the most crucial factors in PPP implementation, especially in developing economies. This policy brief focuses on these issues and calls for active support from Group of 20 (G20) members and the international community.

Policy Implications

- a. Knowledge exchange with G20 members with more experience in harmonising and inclusive intergovernmental coordination.
- b. Provision by G20 members of technical and financial assistance to support PPP development preparation for developing countries.
- c. Framework and standardisation of PPP contracts developed by G20 members to ensure the completeness and quality of PPP contracts and governance.
- d. The G20 to prioritise and continue developing better-designed infrastructure resilience metrics that considers differences in countries' characteristics.
- e. Encourage continuous multi-stakeholder coordination and participation involving governments, the private sector, communities, and civil society to improve the resilience aspects of infrastructure that adapts to the change of dynamics in the population. Strengthen the sharing and mobilisation of resources to improve the financial, technical, and institutional capacity towards middle- and low-income countries.
- f. The G20 to develop a comprehensive, holistic framework for institutional capacity improvement beyond the current training and standardisation available to ensure that institutional capacity support can be fully translated into the establishment of resilient infrastructure.



- g. The G20 encourages institutional investors to adopt these resilience measures as standard assessments for financial mobilisation.
 - h. The G20 to coordinate with international development institutions to ensure that infrastructure resilience aspects are integrated with existing standardisation and requirements for infrastructure development.
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Geographic Scope

G20 and developing economies

Partner Organisation

Institute for Economic and Social Research, Faculty of Economics and Business, University of Indonesia, Faculty of Economics and Business, Universitas Gadjah Mada, Indonesia Infrastructure Guarantee Fund

Related ERIA Publications

Zen, F. and M. Regan (2022), *Projecting Infrastructure Needs and the Financing Mechanism: A Review of Estimations by ADB, McKinsey, and the OECD*, ERIA DP: 2021-61.

Downloadable from: https://www.eria.org/uploads/media/discussion-papers/FY21/Projecting-Infrastructure-Needs-and-the-Financing-Mechanism_A-Review-of-Estimations-by-ADB%2C-McKinsey%2C-and-the-OECD.pdf



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Innovative Water Finance (World Water Forum 2024)

Fauziah Zen, Riatu Qhibtiyyah, Guy Alaerts, Cecilia Tortajada, and Teuku M. Riefky



Summary

Access to quality water is one of the crucial elements on the development agenda because of its spillover effects on several Sustainable Development Goals (SDGs) such as food security; healthy lives; sustainable water and sanitation; sustainable consumption and production; sustainable cities; and sustainable forests, marine, and terrestrial ecosystem. The COVID-19 pandemic, combined with the increasing effects of climate change and war, has drawback effects on SDGs, especially on the progress of global health, food security, and poverty. According to the World Health Organization, approximately 2 billion people still lacked access to safely managed drinking water in 2020, indicating that the world is far from being on track to meet the SDGs by 2030. Access to safely managed drinking water remains unequal across geographical locations and income classes, with women and children disproportionately affected.

Improved access to quality water has significantly decreased infant mortality and enhanced public health. The return on investment in terms of health, productivity, and other factors is estimated at more than three times the cost in urban areas and more than six times the cost in rural areas (WHO, World Bank, and Unicef, 2022). Rapid urbanisation also puts pressure on cities to provide sufficient quality water to their citizens, especially in slum areas with poor water and sanitation infrastructure.

Investment in water and sanitation is typically carried out by the public sector, utilising concessional scheme in many cases. Private finance, on the other hand, is limited to only well-managed zones or developed economies. Even though water is essential to human life, providing clean water to all is challenging in developing countries due to structural issues and risk-return profiles. The mobilisation of private finance in water provision has been slow, highlighting the need for greater public investment and development aid. Although blended finance has been developed, its implementation is still limited.

The study will explore the key areas of innovative finance, including blended finance, institutional aspects, incentive system, and the supply and demand sides. It will look at the existing policy and arrangements to facilitate various feasible financial schemes and discuss the strengths and barriers of the implementation. The discussions will consider the contexts of developing economies and the global role to support the policy.



Policy Implications

The policy research paper aims to provide insights on the current issues of water management, efficiency of clean water provision and quality at national and subnational levels, and financing innovation of the water system. Furthermore, based on the analysis and insights gained by the research process, the study will develop and formulate policy recommendations on three aspects: institutional framework, incentive system, and global cooperation.

Geographic Scope

Indonesia, developing economies

Partner Organisation

Ministry of Public Works and Housing, Republic of Indonesia



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Book Publication: Knowledge Capturing of the National Strategic Project

Fauziah Zen, Kiki Verico, Riatu M Qibthiyah, Wempi Saputra, Darwin Djajawinata, Andre Permana, M. Yudhistira Halley, Anbumozhi Venkatachalam, Eri Hariyanto, Teuku Riefky, Riko Amir, Khoirunurrofik, Rullan Rinaldi, Della Tumenggung, Candra Ananda, Kadek Dian Sutrisna, Wilmar Salim, Andin Hadiyanto, and Titik Anas



Summary

Since the 1998 economic crisis, Indonesia's infrastructure availability has fluctuated, almost reaching 50% of its gross domestic product (GDP). In 2019, Indonesia's infrastructure stock accounted for only 43% of its GDP, falling below the average standard observed in developed countries. For this reason, Indonesia needs to catch up in increasing the availability of its infrastructure to boost the economy and achieve its goal of becoming a developed country.

In 2014, the Indonesian government rolled out its main agenda, known as Nawacita, with three main characteristics: the present state, building from the outskirts, and a mental revolution. Subsequently, Nawacita was translated into the 2015–2019 National Medium-Term Development Plan (RPJMN), which outlined the policy directions for developing basic infrastructure and connectivity by targeting the development of leading sectors. The RPJMN was implemented through strategic projects to meet basic needs and improve people's welfare. The undertakings were then outlined in Presidential Regulation (Perpres) Number 3 of 2016 concerning the Acceleration of the Implementation of National Strategic Projects (PSNs).

PSNs are projects by the government, regional governments, and/or business entities for increasing growth and equitable development in the context of improving community welfare and promoting regional development. These are realised in various forms, such as the development of toll road and non-toll road infrastructure, inter-city and inner-city rail facilities and infrastructure, airport and port revitalisation and construction, housing projects, oil refineries, gas pipelines, water systems and dams, agricultural and maritime systems, transport systems, and tourism projects. Through PSNs, Indonesia's infrastructure's quality and sufficiency is expected to be increased quickly and massively to support national productivity.

Whilst hundreds of the government's PSNs have been successful, a few were abolished after experiencing severe obstacles in their implementation. The successes and failures of PSNs have provided valuable lessons for the government and the people of Indonesia. Consequently, it is important to study the journey of PSNs, examine financing scenarios, and the roles of various parties are an essential knowledge to be studied so that Indonesia's sustainable infrastructure development can run even better.



A comprehensive book documenting the implementation of PSNs in Indonesia since 2016 is necessary to serve as a source of information, detailing the rationale behind PSNs, the entities involved, the timelines and locations of implementation, and the overall implementation process. With a sound and complete story of PSN implementation, the country can learn from experience and do much better in the future. The insights gained can also be lessons for other developing economies, especially those that are struggling with infrastructure deficiencies.

Policy Implications

- a. Systematic documentation and database on infrastructure projects
- b. Policy for future infrastructure development
- c. Alternative and sustainable infrastructure finance

Geographic Scope

Indonesia

Partner Organisation

Ministry of Finance, Republic of Indonesia



Narrowing Development Gaps





IV. Agriculture

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Building and Enhancing the Sustainable Agriculture and Food System in ASEAN Countries – Preliminary Scoping Study

Masanori Kozono, Achmad Sholikhin, and Venkatachalam Anbumozhi



Summary

Due to steady population growth, global food demand is expected to continuously increase. Climate change, the COVID-19 pandemic, and geopolitical tension have threatened agricultural food sources. Similarly, in the ASEAN region, these problems have led multiple stakeholders to more seriously address unsustainable agriculture and food systems. On 26 October 2022, the ASEAN Regional Guidelines for Sustainable Agriculture was endorsed by the ASEAN Ministers of Agriculture and Forestry, to build and enhance sustainable agriculture and food system.

A preliminary scoping study engaging 10 AMSs aims to identify key priority areas for building and enhancing a sustainable food system in the context of ASEAN and according to each country's national priorities. An interview and/or questionnaire survey is conducted with ASEAN government officials and stakeholders, including farmers, cooperatives, processors, distributors, and consumers, to assess their awareness and perception of sustainable food systems, identify priority areas, and assess the readiness to realise a sustainable food system. Expected to be identified are gaps in priority areas in the sustainable food system amongst ASEAN countries and between the target area and reality of the ASEAN guidelines.

Policy Implications

- Identification of key priority sustainable issues and strategies of agriculture and food system in each ASEAN country
- Basic assessment of the readiness of AMSs in implementing sustainable agriculture and food system

Geographic Scope

ASEAN Member States (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Viet Nam)

Partner Organisation

Institut Pertanian Bogor University, Indonesia; Universiti Islam Sultan Sharif Ali; Royal University of Agriculture; National University of Laos; Yezin Agricultural University; Centre for Agriculture and Bioscience International; Visayas State University; Kasetsart University; Singapore Institute of Management–Global Education; The Institute of Agriculture Market and Institution Research, Viet Nam



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Building and Enhancing the Sustainable Agriculture and Food System in ASEAN Countries – Development of Action Plan for Implementation of the ASEAN Guidelines on Sustainable Agriculture

Masanori Kozono, Errol Perera, and ASEAN Secretariat

Summary

The recent international discussion emphasised the need to transform the agriculture and food system into more sustainable and resilient to address the repercussions of the COVID-19 pandemic, geopolitical tensions, and long-term challenges such as steady population growth and climate change. To ensure food availability and affordability, the sustainability and resilience not only of agriculture but also of a whole food system must be enhanced, from food production to consumption. The ASEAN Guidelines for Sustainable Agriculture was endorsed at the 44th Meeting of the ASEAN Ministers of Agriculture and Forestry (AMAF), held on 26 October 2022, in recognition of the importance of ensuring a more resilient and circular agriculture and food system. The guidelines set out 5 principles for balancing the social, economic, and environmental dimensions of sustainability and 28 key strategies to enhance sustainable agriculture. The ASEAN Member States are at the initial stage of implementing the guidelines. The joint press statement of AMAF stated the need to develop The Roadmap (Action Plan) for the Implementation of the ASEAN Guidelines for Sustainable Agriculture. This is in line with the directives given by the 44th AMAF Meeting and with the Priority Economic Deliverables of Indonesia's ASEAN Chairmanship for 2023 focusing on strengthening food security in the region.

Policy Implications

- Identification of practical and manageable action points to achieve the five key principles of the sustainable agriculture guidelines
- The Action Plan for the Implementation of the ASEAN Guidelines on Sustainable Agriculture

Geographic Scope

ASEAN Member States (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Viet Nam)

Partner Organisation

ASEAN Secretariat



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Sustainable Agriculture with Climate Smart Approach

Venkatachalam Anbumozhi, Suresh Babu, V R Reddy, Meinhard Breiling



Summary

In accordance with India's G20 Presidency theme "One Earth, One Family, One Future", the Agriculture Working Group (AWG) aims to chart a global road map to enhance global food security and nutrition; strengthen international efforts toward sustainable agri-food systems; and make agricultural livelihoods inclusive, equitable and economically viable to producers. Four priority areas have been identified for holding discussions and building G20 consensus in the AWG meetings: food security and nutrition, sustainable agriculture with a climate smart approach, inclusive agriculture value chains and food systems, and digitalization for agricultural transformation.

Sustainable agriculture and climate-resilient agriculture was discussed at the 2009 G20 summit in response to the food and fuel crisis, and has grown from a concept into an approach in successive summits. A climate-smart agriculture (CSA) approach has thus become an integrated approach to help farmers adapt to and mitigate the impacts of climate change, while also increasing food production. ERIA, as an International organization, has been invited to provide intellectual input with a focus on climate resilient technologies and farming system models for sustainable agricultural production and financing for green and climate-resilient agriculture. In this context, key areas of policy focus for AWG include: increasing investment in agricultural research; encouraging public-private partnerships for developing innovative technologies; providing financial, technical, and logistic support to farmers; and creating an enabling environment for the adoption of climate smart farming practices. The key questions put forward by the study are, how can G20 countries foster collaboration for exchanging information and experience and establishing a partnership to make food production systems more resilient to climate change? And how does G20 enhance global investments, funding, and financing climate-smart agriculture? The major objective of the research and associated activities is to guide the G20 policy process in the context of India's G20 presidency, by taking an inventory of the economically viable technologies for climate-resilient agriculture and tracking the progress made in implementing the adaptation interventions.

Policy Implications

India has identified the following two deliverables at G20 level:

Enhanced research collaborations for developing climate-resilient technologies and practices.

Commitment to mobilize around critical areas of collective action for enhanced investments in sustainable climate-smart agriculture.



This looks into G20-level recommendations on scaling up the technology adoption models and implementing climate-resilient agriculture interventions, as well as sub-regional agricultural policy and strategy to design appropriate extension programs at the decentralized levels of training programs. Policy recommendations will be made to develop the implementation of the monitoring and tracking of implementing the technology dissemination programs on building climate-resilient agriculture.

Geographic Scope

G20 and ASEAN

Partner Organisation

International Food Policy Research Institute (IPFRI)
Tamilnadu Agricultural University (TNAU)

Related ERIA Publications

Anbumozhi, V., M. Breiling, V. Reddy (eds.) (2019), Towards a resilient ASEAN Volume 1 Disasters, Climate Change, and Food Security: Supporting ASEAN Resilience. Jakarta: ERIA.

Downloadable from: <https://www.eria.org/research/towards-a-resilient-asean-volume-1-disasters-climate-change-and-food-security-supporting-asean-resilience/>





V. Healthcare and Aging

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Medical Excellence (MExx) Acceleration Programme

Yoshie Hirose, Shoko Misaka, Fumitaka Machida, and Hiroki Nakatani



Summary

Since 2020, the Economic Research Institute for ASEAN and East Asia (ERIA) has been actively promoting MExx projects aimed at solving problems in the medical field through multisectoral collaboration.

Although local stakeholders will manage several initiatives for the project, the biggest challenge is maintaining their motivation. In 2022, some experts joining workshops indicated that simple dialogues are not enough to realise MExx's ideal concept. To address this situation, this research aims to create knowledge tools, such as clear guidelines and a roadmap, that enhance local stakeholders' autonomy, in addition to business project ideas and action plans that enable them to envision concrete positive outcomes. This research will primarily focus on delivering these two outcomes with local partners.

In India, on 14 March 2023, local experts actively discussed potential business projects aimed at resolving issues in the acute medicine field in the country. They discussed the present challenges and presented multiple ideas, which will be integrated into a holistic strategy and action plan along with a feasibility study and impact assessment. The ideation of the business project will also identify key players who can handle or assist the project. In addition, the MExx project in India will work on enhancing the supply chain for healthcare and medical services as well as elderly care. To facilitate pragmatic discussions with multisectoral stakeholders, the preliminary study will identify specific topics for discussion. This will be another deliverable that this research can bring.

Policy Implications

Proposals on new policies and amendments to existing policies to improve the healthcare systems in Viet Nam and India

Geographic Scope

India and ASEAN Member States

Partner Organisation

NITI Aayog, India; Hanoi Medical University Hospital, Viet Nam; Medical Excellence, Japan



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Gap Analysis/Map the Availability of In Vitro Diagnostics in National Healthcare Systems in Relation to the WHO Model List of Essential In Vitro Diagnostics

Takuma Kato, Antonio Villanueva, and Naofumi Hashimoto, Integrated Quality Laboratory Services, World Health Organization.



Summary

A collaboration between the Economic Research Institute for ASEAN and East Asia (ERIA) and the World Health Organization (WHO), the research will undertake a gap analysis and/or map the availability of in vitro diagnostics in national healthcare systems in relation to the WHO Model List of Essential In Vitro Diagnostics (EDL) to inform the next steps to improve access to such diagnostics in the ASEAN region. Eight countries will be targeted for mapping, selected jointly by ERIA and WHO, in close collaboration with WHO Southeast Asia Regional Office and Western Pacific Regional Office. The specific gap analyses could include elements such as (i) how the EDL is utilised in countries, including if national lists of essential in vitro diagnostics are being developed; (ii) the gap, if any, between recommendations in the EDL and national health coverage; (iii) causes of eventual gaps; and (iv) information on the assessment of the value of in vitro diagnostics and the integration of in vitro diagnostics in clinical practice.

Policy Implications

Report on the gap analysis of availability of in vitro diagnostics in targeted ASEAN Member States in relation to recommendations in the EDL, and proposed follow-up actions.

Geographic Scope

Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, The Philippines, Thailand, Timor-Leste, and Viet Nam

Partner Organisation

World Health Organization



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Scope of Work: Country Background Report on Indonesia's Healthy Ageing Policy 'Strengthening the Health System for Older Persons'

Takuma Kato, Asuka Nagatani and Lilis Heri Mis Cicih



Summary

Ageing population has become a global phenomenon as the number and proportion of older people continue to grow not only in developed countries but also in emerging economies. In 1990–2020, the world's share of older people (aged 65+) has increased from 6% in 1990 to 9.3% in 2020. This number is projected to continue to increase to 16% by 2050. This means that one in six people in the world will be 65 years old or older in the next 3 decades (UN Desa, 2022). Populations age in countries with improved nutritional intake, sanitary conditions, economic conditions, and health facilities, resulting in declining mortality rates and increasing life expectancy. As an emerging economy with progressive human capital development, Indonesia's population has started to age, primarily because of the demographic transition following low mortality and birth rates (Bappenas, 2019).

The project will conduct a thematic study, Strengthening the Health System for the Older Persons in Indonesia, as an input for the Background Study for the Ageing Population as part of the Background Study for the National Medium-term Development Plan (RPJMN) 2025–2029, and provide recommendations for the Government of Indonesia. This document will analyse the current policy gap for healthy ageing and provide future directions for a healthy ageing policy. The analysis will serve as the study's innovation as compared with previous documents and reports on similar topics and issues. The study aims to provide measurable targets and indicators for RPJMN 2025–2029. The study's objectives are as follows:

- 1) Analyse current health problems of older people and the magnitude of future problems (including the impact of ageing on health financing, demand and supply of health services, and others).
- 2) Map the readiness of health services for older people (number and types of health facilities and health services, human resources, financing schemes, role of communities, and others).
- 3) Provide recommendations and designs of health systems for older people, including service mechanisms, types of services, human resources, financing schemes, community roles, private roles, and others.
- 4) Identify policy instruments to strengthen future healthcare services for older people (the need for new or revised regulations, governance, amongst others).



Policy Implications

The study aims to produce data analysis and propose policy design and recommendations on healthcare services (including long-term care) for older people in Indonesia. The results will serve as input to a background study for the Medium-term National Development Plan 2025–2029. In general, the expected outputs of this study are as follows:

- 1) The current situation of health of older people and the extent of their future health problems.
- 2) Mapping of healthcare service readiness to meet the needs of older people.
- 3) Policy gap analysis, including regulations, institutional healthcare services, and financing.
- 4) Identify strategic issues and how to respond to the health needs of older persons in the future
- 5) A healthcare system design for older people and needed policy instruments.
- 6) Lessons learnt from other countries.

Geographic Scope

Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, The Philippines, Thailand, Timor-Leste, and Viet Nam

Partner Organisation

Ministry of National Development Planning (BAPPENAS), University of Indonesia



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Longitudinal Study of Ageing and Health in the Philippines and Viet Nam

Takuma Kato, Asuka Nagatani, Grace T. Cruz, Vu Cong Nguyen, and Yasuhiko Saito.



Summary

Populations are ageing partly because people are living longer. As people live longer, they have started focusing on quality of life. Longevity is considered one of the greatest successes of humanity. But how can it be a success if it means a longer time in ill health or inactivity? Healthy or active years are a quality-of-life indicator. The concept of 'health expectancy' emerged as a summary measure of population health that combines mortality and morbidity. By monitoring changes in health expectancy over time, changes can be evaluated in the population's health structure. More importantly, identifying determinants of health expectancy can help policymakers develop evidence-based policies.

Studies in the Philippines and Viet Nam in 2018 have been published. The survey is the second to compare data from 2018 to 2023. This study will unveil the impact of COVID-19.

The objectives of this study are as follows:

- 1) Describe the current health status of older adults in the Philippines and Viet Nam.
- 2) Investigate associated correlates of the current health status of older adults in the Philippines and Viet Nam.
- 3) Examine changes in health status of older adults using the baseline survey data and previously conducted cross-sectional survey data in the Philippines and Viet Nam.
- 4) Examine changes in individual health status of older adults using the longitudinal survey data in the Philippines and Viet Nam.
- 5) Investigate potential determinants of changes in health status of older adults in the Philippines and Viet Nam.
- 6) Estimate health expectancies by gender, place of residence (urban and rural), and education to examine inequality between subpopulations of older adults in the Philippines and Viet Nam.

Policy Implications

Disability-free life expectancy can be observed by using data from previous surveys, such as the 2007 Philippine Study on Aging and the 2011 Survey on Disability and Profile of Disabilities in Vietnam, and 2018 baseline surveys and trends in health amongst older adults in both countries. Health expectancy is termed as 'disability-free life expectancy' when it is computed using questions on disability. Disability-free life expectancy will be estimated for at least two time points to suggest whether morbidity is being compressed or expanded amongst older adults in the countries. Expansion requires government programmes and policies that will ensure improvement of the health status of older adults in the future. Similarly, a health system should be in place to address the healthcare needs of older people.



With a follow-up survey in 2023, factors that affect transition amongst possible health states, such as disability free, disability, and death, can be explored. By identifying determinants of health transition, potential measures can be suggested to improve health status of older adults.

Cognitive impairments, dementia, and depression are emerging mental health issues amongst older adults. The quality of life not only of those with such conditions but also of their family members will be extremely low. More needs to be learnt about their health status and quality of life. Frailty, sarcopenia, falls, and sleep patterns are research topics recently developed. With the new longitudinal surveys, what older adults need and the findings should give a better understanding of potential measures to be taken by the governments of both countries.

Geographic Scope

The Philippines and Viet Nam

Partner Organisation

Demographic Research and Development Foundation;
Institute of Population, Health and Development;
Nihon University

Related ERIA Publications

Cruz, G.T., C.J.P. Cruz and Y. Saito (eds.) (2019), Ageing and Health in the Philippines. Jakarta: Economic Research Institute for ASEAN and East Asia (ERIA).

Downloadable from: <https://www.eria.org/publications/ageing-and-health-in-viet-nam/>

N.C. Vu, M.T. Tran, L.T. Dang, C.L. Chei, and Y. Saito (eds.) (2020), Ageing and Health in Viet Nam. Jakarta: ERIA and Ha Noi: PHAD.

Downloadable from: <https://www.eria.org/publications/ageing-and-health-in-viet-nam/>





VI. SMEs

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Development of Small and Medium-sized Enterprises (SMEs) in Eastern Indonesia

Lili Yan Ing, Rambu Raing McCullagh, Suryani Eka Wijaka, Kemala Febrihadini, Christoforus Adri Pieter Koleangan, Jeane Budhi, Amanda Archangela, Tri Wahyuningsih, Cornelis Deda, Chatarina Sri Prapti Jektiningsih, Trifosa Dimara, Sri Milawati Asshagab, Niche Evandani, Asia Miscolayati Hasanah, Meiyanti Widyaningrum, Anika Widiana, Ian Sapulette, Gracia Hadiwidjaja, and Elitua Simarmata

Summary

The COVID-19 pandemic has hit the Indonesian economy across sectors, particularly micro, small, and medium-sized enterprises (MSMEs). MSMEs contribute 63% of Indonesia's gross domestic product and absorb 93% of employment. The COVID-19 pandemic is the worst crisis in Indonesia's modern era and its impact on MSMEs can become a threat to the national economy. For the Indonesian government, the next 3 years are crucial to putting the economy back on the right track of development, with particular focus on the development of Eastern Indonesia: West Nusa Tenggara, East Nusa Tenggara, North Sulawesi, Maluku, and Papua. The selection of these regions is based on the government's development priorities in the tourism sector in Eastern Indonesia, where the creative industry is also a priority as it is an inseparable part of tourist attractions.

The study aims to identify and map the obstacles and potentials of Eastern Indonesia and provide insights to the central government and local governments to promote investment and accelerate the development of Eastern Indonesia

Policy Implications

Provides inputs to the policymaking process of the Government of Indonesia in fostering the development of MSMEs, especially in Eastern Indonesia.

Geographic Scope

Indonesia (Eastern Indonesia)

Partner Organisation

Indonesia Service Dialogue Council, Ministry of Trade, Coordinating Ministry for Maritime and Investment Affairs



43

The Participation of Micro, Small and Medium Enterprises in ASEAN's Digital Economy

Dionisius Narjoko, Cassey Lee, Sothea Oum, Francis Mark A. Quimba, Archanun Kohpaiboon, Juthathip Jongwanich, Nguyen Dinh Chuc, Phouphet Kyophilavong, Tham Siew Yean, Samuel Nursamsu, Michael Schaper, Mitsuyo Ando, Toh Mun Heng, I Wayan Dipta (former Deputy Minister of the Ministry of Cooperative and MSME Indonesia).



Summary

Micro, small and medium enterprises (MSMEs) accounts for more than 90% of total enterprises in ASEAN countries. About 70% of total employment in the region is provided by MSMEs. In cognizance of this, the development and promotion of MSMEs as well as their role in regional economic integration are emphasized in the AEC Blueprint 2025. Some of the key MSME-related issues identified in the Blueprint include innovation, internationalization (exporting and GVC participation), intellectual property protection and utilization, e-commerce and financial inclusion. Many of the strategic measures related to these areas involve the application of digital technologies. Hence, participation in the digital economy is a crucial element in the development of MSMEs.

The goal of the research project will be to assess the current state of MSMEs' participation in the digital economy. The project will also provide policy assessments and recommendations for MSME development through their participation in the digital economy.

The project can be considered as one of the deliverables of ERIA for the Indonesia's ASEAN Chairmanship 2023. This continues the 'tradition' whereby during Indonesia's ASEAN Chairmanship in 2011, ERIA proposed the ASEAN SME Policy Index which has now become one of major reference for ASEAN in the monitoring of the implementation of ASEAN Economic Community for SME.

This project was jointly proposed by ERIA and ISEAS-Yusof Ishak Institute (Singapore) on the basis of an invitation from ISEAS to conduct the second collaborated project on SME theme. The first was done in the past around 2014-15. The project will produce country papers from the EAS member states.

Policy Implications

The project is expected to produce policy recommendations in the following areas:

- A broad policy framework aimed at enhancing MSME development through participation in the digital economy consistent with the goals of the AEC Blueprint
- Detailed medium-term and long-term policies required to enhance MSMEs' participation in the digital economy in such a way as to enhance their performance.



Geographic Scope

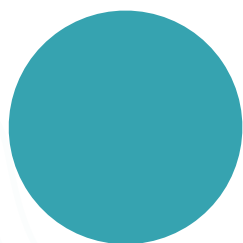
ASEAN

Partner Organisation

ISEAS-Yusof Ishak Institute (main partner organization), Center for Strategy and Innovation Policy, Philippine Institute for Development Studies, Thammasat University, Vietnam Academy of Social Sciences, National University of Laos, Curtin University, Keio University, National University of Singapore

Geographic Scope

Papers produced by this project will appear as a book that will be published by ISEAS Yusof-Ishak Institute and ERIA (joint publication).



44

Study on Digital Divide Micro, Small, and Medium-sized Enterprises in ASEAN

Keita Oikawa, Fusanori Iwasaki, and Yasushi Ueki



Summary

Closing the digital divide in micro, small, and medium-sized enterprises (MSMEs) is widely acknowledged as important for inclusive and sustainable growth. Studies, however, cover only limited areas or categories of firms in ASEAN Member States (AMSs). There is a dearth of studies that examine the post-COVID-19 pandemic status of MSMEs in AMSs. To close these gaps, it is necessary to comprehend the status of MSMEs' digital divide in AMSs before and after the pandemic, identify the obstacles to closing the digital divide, and determine ways to overcome them.

The phase I interview survey suggested infrastructure, financial, ICT skills, and business knowledge gaps. Lower-income countries face an infrastructure gap due to a lack of internet infrastructure and support services. MSMEs struggle to invest in ICT human capital or hire ICT experts due to financial gap. An ICT skills gap exists between high- and low-income countries and between urban and rural areas. There is a business knowledge gap, as MSMEs lack the necessary business knowledge to articulate their issues and needs. The survey implied that the epidemic has expedited the adoption of digital technology by small and medium-sized enterprises (SMEs) in terms of sales and marketing. However, it has also led to increased cybersecurity concerns.

To support the digitalisation and digital transformation of MSMEs in ASEAN, China–Japan–Korea solution providers can collaborate with ASEAN local governments. The ongoing work involves the second phase of the project, which aims to quantitatively analyse the actual status of the digital divide and recommend relevant policy implications.

Geographic Scope

ASEAN



45

Policy Review and the Impacts of Financing Micro, Small, and Medium-sized Enterprises in Selected East Asian Economies, with Focus on Indonesia

Fauziah Zen, Muhammad Hanri, Syafridi, Dwi Apriany, Sulistiadi Dono Iskandar, Yusuf Reza Kurniawan, Yogi Rahamyanti, Ichihiro Uesugi, Teerawat Charoenrat, Yot Amornkitvikai, Rubayah Yakob, and Adoracion Navarro



Summary

Micro, small, and medium-sized enterprises (MSMEs) have an essential role in economic and social development in many developing countries, including ASEAN countries. They contribute to employment generation (Matthew et al., 2020) and poverty reduction (Nursini, 2020). Between 2010 and 2019, MSMEs accounted for 97.2% of companies in ASEAN, and contributed 69.4% to employment, 41.1% to total GDP, and 20.4% to total export value. Indonesia's MSMEs made a relatively high contribution to GDP, reaching 61.1% in 2018, surpassing the contributions of MSMEs in Brunei Darussalam, Malaysia, Thailand, and Singapore, which ranged between 35% and 45% of GDP.

The study focuses on Indonesia's microcredit subsidies to MSMEs and employs a survey methodology involving over 5,800 respondents. Valuable lessons and policy insights from Japan, Malaysia, the Philippines, and Thailand will be incorporated in the research. Data from the survey and the national social and economic census (*Susenas*) will be used through quantitative methods to provide causal evidence on the benefits of improving access to finance for MSMEs in terms of both short- (i.e. business outcomes) and long-term measures (health and education outcomes). The study will also look at the potential utilisation of financial technology to facilitate disbursement of microcredit for MSMEs, as well as the credit rating system. The experiences and analytical reviews from Japan, Malaysia, the Philippines, and Thailand will contribute to these aspects of research.

Policy Implications

Revisit the objectives of fiscal support to MSMEs based on the characteristics and criteria of each business class to design the appropriate mechanisms, objectives, and expected impacts of each type of subsidy scheme.

Formulate strategies and policies to improve the outreach of facilitating access to finance for MSMEs, particularly to those that have never accessed financing from banks and non-banks.

Formulate policies to improve the facilitation of access to finance for MSMEs and the use of credit rating and financial technology (including its risk mitigation) so that government programmes related to MSME financing are more targeted and sustainable.



Geographic Scope

Indonesia, Japan, Malaysia, the Philippines, and Thailand.

Partner Organisations

Ministry of Finance, Republic of Indonesia; Research Institute of Economy, Trade and Industry, Japan.



VII. Education

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Study on Enquiry-based STEM education in Asia

Keita Oikawa



Summary

The world is experiencing significant structural changes, including the coexistence of humans and artificial intelligence (AI) in the Fourth Industrial Revolution, and the shift to a data-driven society. This has led policymakers and educators to emphasize enquiry-based science, technology, engineering and mathematics (STEM) education. The Asian Development Bank (ADB) is actively supporting reforms in upper secondary STEM education across countries in Asia, such as providing a recent \$70 million loan to Cambodia for the Science and Technology Project in Upper Secondary Education.

Although enquiry-based STEM education is recognized as crucial for sustainable growth in Asia, there is limited knowledge about its effective promotion. This project aims to address this question and is being conducted in collaboration with ADB and the Institution for a Global Society Corporation (IGS).

The project focuses on three key aspects:

- (1) Evaluation of STEM enquiry skills. Comparing STEM enquiry skills, autonomous enquiry skills, and collaborative problem-solving skills of students in grades 7-12 in various Asian countries and Japan. The aim is to identify similarities and differences in the skills of students across the target countries.
- (2) Identification of factors affecting STEM enquiry skills. Identifying effective educational methods or events which foster STEM enquiry skills. The project aims to understand the factors which contribute to the development of these skills among students.
- (3) Experimental analysis of STEM enquiry skills improvement. Investigating the causal relationship between specific educational approaches and the improvement of STEM enquiry skills. Through experimental analysis, the project aims to determine which educational interventions lead to enhanced STEM enquiry skills.

Policy Implications

Contribute to developing the teaching abilities of teachers and enhance the STEM and inquiry skills of students in Asian countries, by giving the results of the study to policymakers and teachers in each country.

Geographic Scope

ASEAN

Partner Organisation

The Asian Development Bank and the Institution for a Global Society Corporation



Sustainable Economic Development

47

Evaluating Energy Security, Climate Change, and Resource Efficiency Policies of G20 and Just Transition Aspirations of the Global South

Venkatachalam Anbumozhi, Han Phoumin, Alloysius Joko Purawonto, Kei Suido

Summary

The G20 India sherpa track identified energy transition, environment, and climate change as part of the 13 working groups and two initiatives designed to discuss priorities and provide recommendations. As a theme under the sherpa track, the Presidency is also keen on engaging Business 20 (B20) as an important dialogue partner, as the global transition to a carbon-neutral economy will lead to enormous structural changes within industries, and just transition encompasses a complex web of drivers and uncertainties.

B20 India has formulated seven task forces and two action agendas in support of G20 deliberations, and identified energy, climate change and resource efficiency as the work of Task Force 3. This task force is mandated to examine the just transition pathways enabled by low-emission and carbon-neutral technologies; and circular approaches to production processes and energy usage should be just, sustainable, and inclusive. It recognizes that the pace and scope of such transitions are put at risk when there is a decline in global energy investment. Several studies reveal that between now and 2050, significant annual energy investment is required globally across all energy sectors to meet targets aligned with SDGs and the Paris Agreement. The task force also believes that promoting a shift toward cleaner energy carriers and other efficient technologies can foster enhanced quality of life and help achieve the long term decarbonization goals. Moreover, B20 Indonesia acknowledges climate change is a defining issue which requires immediate and radical action, as it continues to impact current and future generations. However, the task force deliberations during the B20 inception meeting recognised the energy transition to net-zero is very complex, given the required global scale of change options to established technology, financial markets, supply chains, business models, governance frameworks and entrenched political and economic considerations. More regional and global insights are needed on the importance of accelerating transitions to net-zero, while addressing issues such as enhancing the quantum, predictability and ease of financing flows, supporting technology innovation, and ensuring a just transition. This study and associated activities support the B20/G20 deliverables by examining the key challenges faced by the Global South, and proposes business solutions for inclusive and suitable G20 solutions that take into consideration energy security concerns. This is done by:

Evaluating energy security policies in India, Indonesia, Japan, China, Korea, and Australia.

A comparative analysis of energy utilization and resource efficiency improvement patterns in ASEAN, G20, and G7 economies.



Examining possible technical and financial cooperation between G20 and the Global South for emerging technologies such as carbon capture, utilization and storage (CCUS); variable renewable energy technology; green hydrogen etc.

Formulating a common strategy for gas security and recommending successful and sustainable energy transition pathways .

Policy Implications

The policy paper and associated B20 side events will explore how G20 as a platform for international partnerships can shape the evolution of a people-centred just transition. Drawing lessons from the ongoing programs in the Global South, it proposes a leadership agenda for this objective. Key recommendations include: reforming multilateral financial and bilateral development institutions to ensure the implementation of a people-centric carbon neutral agenda/SDGs; resetting the priorities of the clean technology transfer and green investment agenda with a systematic approach to include social inclusion such as affordability, employment and SMEs; and integrated policy support for enhancing the capacity of market (private sector) forces to create positive synergy between economic and social goals.

Geographic Scope

G20, G7 and ASEAN

Partner Organisation

Confederation of Indian Industries

Related Publications

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IX. Circular Economy

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Circular Economy Road Map for ASEAN

Venkatachalam Anbumozhi, Han Phoumin, Alloysius Joko Purawonto, Kei Suido



Summary

The current linear production process or take–make–dispose economic model leads to waste of raw materials and resources, which the Association of Southeast Asian Nations (ASEAN) can no longer afford. To remain competitive, ASEAN Member States (AMSs) have no choice but to move towards a more circular economic model, under which the value of products and materials is maintained for as long as possible and production of waste is minimised. At the ASEAN level, the formulation and elaboration of this concept are found in many recent ministerial statements and in ASEAN Socio-Cultural Community and ASEAN Economic Community sub-sector group working agendas. Discussed at an abstract level, however, such grand vision risks becoming a buzzword, disconnected from the sectoral needs and aspirations of keeping ASEAN production networks sustainable and competitive. Conversely, several initiatives on circular economy exist at the global level. Finland, for example, has developed a blueprint, 'Leading the cycle: Finnish road map to a circular economy 2016–2025', which outlines a multi-pronged strategy that Finland and the European Union could take to become a 'truly' circular economy by 2025. The proposed Finnish approach looks holistically at developing initiatives and policies in various stages of the life cycle of products and materials: resource use, consumer, retail, distribution, firm-to-firm transactions, manufacturing, material processing, primary sector, transport, and logistics.

The study aims to design such a framework (2020–2040) for ASEAN (or perhaps a more eclectic one based on studies of other leading nations as well) to study the extent to which ASEAN and other benchmark countries (Australia, China, Germany, Japan, the Republic of Korea, New Zealand, etc.) have developed road maps, either explicitly or implicitly, for transitioning to circular economies. The study method involves three steps: (i) developing a standard format in which the previous study results of the Economic Research Institute for ASEAN and East Asia will be integrated to create a template of collected data and information, (ii) identifying experts from AMSs and benchmark countries to prepare circular economy road maps for each AMS, and (iii) using the collected information that provides insights on new policies needed and the science technology and innovation (STI) interface approaches to foster a circular economy in participating countries at different stages of their life cycle.



Policy Implications

- A rationale and analytical framework with critical analysis on benchmark country studies
- A road map report presenting the findings that will provide understanding of the level of policy sophistication attained by each country and the STI interface needed at various stages of the circular economy
- A formulation of South–South and North–South cooperation projects to enable AMSs to transition to circular economies

Geographic Scope

ASEAN and East Asia

Partner Organisation

Institute for Development Economics

Related Publications

Anbumozhi, V., K. Ramanathan, H. Wyes (eds.), (2020), Assessing the Readiness of Industry 4.0 and the Circular Economy. Jakarta: ERIA.

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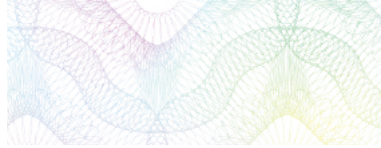
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X. Environment

49

Lifestyle for Environment (LiFE) and Integrity for Infrastructure and Financing

Members of TF3 of T20, and G20/T20 Task Force 3 Co-Chairs



Summary

India's 2023 presidency of the Group of Twenty (G20) has emphasised North–South and South–South cooperation and an inclusive and sustainable growth strategies across the globe. Infrastructure financing has been given special attention, with financial institutions and infrastructure financing and planning being blended with quality of life and well-being, and with principles of inclusiveness, equity, and sustainability. The finance track meeting in India has already started discussions on reforms in financial institutions. The Task Force 3 (TF3) of Think20 (T20) is working on these themes and its policy papers, especially undertaken by the co-chairs of the task force, and their recommendations are to be fed into the G20 process in 2023 and in the next. Indian Prime Minister Narendra Modi's policy announcements on Lifestyle for Environment (LiFE) are the lead principle behind the publication of policy writings and recommendations, later to be published in book form, and a high-level policy dialogue where the key recommendations of the papers will be presented to the prime minister.

The study is being undertaken under the aegis of the G20 Research Forum, in which the papers will be presented in a 1-day high-level policy dialogue. The book advocates the overall objective of the G20 2023: *Vasudaiva Kutumbakam* or 'the world is a family' and attempts to establish a Group of Twenty (G20)–Group of Seven (G7) connect to sync the development agenda of the two groups.

The Research and Information System for Developing Countries (RIS) in India will lead the book project and the high-level policy dialogue, with support from the T20 Secretariat in the Observer Research Forum. The Asian Development Bank Institute, as the lead of Think7, will support the G20–G7 exchange of policy recommendations. Other organisations supporting the work of TF3, such as the Global Solutions Summit, will be active in the project through RIS.



Policy Implications

The policy focus on infrastructure will be on small towns, integrated infrastructure development, rural–urban connectedness, and peer learning between North–South and South–South experiences in infrastructure development that are sustainable, ethical, and inclusive of people and environment. Measurement of growth is another important aspect of the study, and the study will recommend the central elements of LiFE to be integrated into infrastructure financing reforms being undertaken in the finance track. Supporting the role of G20 Finance Track in reforming the role of multilateral development banks and financial institutions within the G20 process is an important deliverable. Another important aspect is Japan’s G7 presidency, which is examining the infrastructure financing and development policies articulated in the G20 meetings. It is expected that policy brief inputs on issues of future cities and habitat, mobilisation of capital and capacity, and disaster-resilient infrastructure with focus on small island developing states and developing countries will be made and fed into the G7 process through interactive think tank forums.

Geographic Scope

Africa, Asia, Australia, Europe, North America, South America

Partner Organisation

Economic Research Institute for ASEAN and East Asia; Research and Information System for Developing Countries, India; Observer Research Forum; Asian Development Bank Institute

Related Publications

Prakash, A (2022), *Multilateral Cooperation for Investment Can Mobilize Infrastructure Funds and Link Needs of Investors, Governments, and People*, Policy Brief, Task Force 3: Infrastructure Investment and Financing. Riyadh: T20.

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ASEAN Blue Economy Framework

Intan Ramli, Pierre Failler, Leila Choukroune, Antaya March, Dionisius Narjoko, and Fauziah Zen



Summary

The ASEAN Blue Economy Framework is ASEAN's answer to the growing economic and sustainability potentials of its oceans, and new engine of growth. A concrete follow-up of the ASEAN Leaders' Declaration on Blue Economy was adopted at the 38th ASEAN Summit in 2021. It affirms, amongst others, ASEAN's commitments to take the lead on regional cooperation in relation to the Blue Economy. The framework aims to provide the strategic direction and broad guidelines of ASEAN's work on Blue Economy across the three pillars of the ASEAN Community; identify the region's Blue Economy initiatives and actions, including strategic sectors; outline ASEAN's stakeholder engagement approaches to maximise the region's Blue Economy potentials; and recommend monitoring and evaluation approaches and mechanisms to ensure effective implementation of the region's Blue Economy priorities and agenda. Importantly, The ASEAN Blue Economy Framework will complete the concept of ASEAN's Blue Economy, which was mentioned in the Leader's Declaration but did not discuss value creation, inclusiveness, and sustainability as the main elements of the Blue Economy.

Policy Implications

Setting out the policy for blue economy implementation in ASEAN

Geographic Scope

ASEAN countries

Partner Organisation

Indonesian Ministry of National Development Planning (BAPPENAS); Centre for Blue Governance, UK



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Financing the Green and Just Transition: A Common Fiscal Policy Framework

Fauziah Zen, Ridwan Rusli, A. Joko Purwanto, Khoirunurrofik, Norasikin A Ludin, Fairuz SM Chachuli, Nattapong Puttanapong, Joni Jupesta, and Keigo Akimoto



Summary

Several reasons exist to adopt green practices, including reducing environmental effects, adapting climate-resilient practices to minimise risks, saving the planet, and increasing the quality of life. Whilst these benefits are globally recognised, the current situation pushes us to take more immediate and impactful actions. The challenge lies not in willingness but in the efforts and sacrifices required to commit to environmental goals. Transforming the existing practices requires a trade-off with the pace of growth, replacement costs, and resources to build capacity. As a result, advanced economies have an advantage over emerging economies in adopting green transition.

This reality necessitates concrete contributions from advanced countries to fulfil global commitments to green transition. In parallel, development financing patterns are shifting from general funds to earmarked funds. Bilateral official development assistance (ODA) is exceeding multilateral ODA.

This study aims to analyse and synthesise key features of green financing in developing East Asia and identify barriers to adopting green financing. The study will explore key measures on how the interactions between consumers, the public sector, and private investments can result in benefits for a sustainable economy. With the below-promised funds from international development partners, blended finance or funds from development partners, government, and the private sector will be increasingly crucial to funding the green transition. Blended finance aims to lower investment risks and costs to attract private financing for sustainable projects in emerging markets.

The study will explore the impact of fiscal policy on the green transition. The following key analyses will be used as empirical basis for the policy: welfare changes, impact of green investment, and government spending. Because of the broad range of green policies, the study will limit the scope to green credits for investment, energy subsidy, and household consumption. Specifically, the study will focus on Rapid Coal Phase-out in Indonesia, The Effect of Environmental Factors on Renewable Energy Development in Malaysia, The Impacts of Electric Vehicle Transition Policy on Thailand's Economy, Benchmark Case from Advanced Economy: The European Union Transition to Green Energy, Benchmark Case from Advanced Economy: Japan's Transition Policy to Green Energy, and Financing Green Transition.



Policy Implications

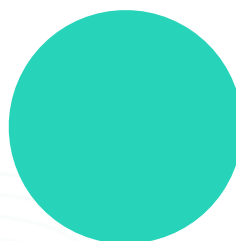
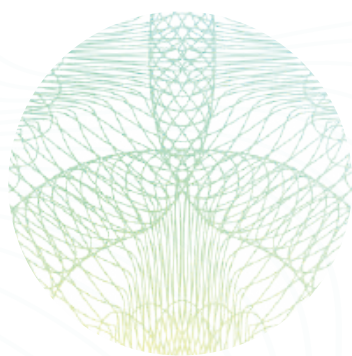
- Provide feasible fiscal instruments for the green transition.
- Suggest feasible attractive schemes for investment credits.
- Suggestions on policy context.

Geographic Scope

Germany, Indonesia, Japan, Malaysia, Thailand

Partner Organisation

The Research Institute of Innovative Technology for the Earth, Kyoto; United Nations University Institute of Advanced Studies; Universiti Kebangsaan Malaysia; Chulalongkorn University; Institute for Economic and Social Research, Faculty of Economics and Business, University of Indonesia



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Climate Change Vulnerabilities, Social Impacts, and Education for Autonomous Adaptation

Venkatachalam Anbumozhi, Eiji Yamaji, Meinhard Breiling, and Jacob Kumaresa



Summary

Southeast Asia is one of the most vulnerable regions to climate change due to its long coastlines, high concentration of population and economic activity in coastal areas, and heavy reliance on agriculture, fisheries, forestry, and other natural resources. Climate hazards such as temperature increases, erratic rainfall patterns, and extreme climatic events (such as strong typhoons and severe droughts) cause adverse effects and impacts on ecosystems' livelihoods and on many other aspects of human societies. Climate change threatens agricultural production and, indirectly, food security, ecological stability, and sustainable development. Climate variability and change present many risks to the well-being of the populations of the Association of Southeast Asia Nations (ASEAN). The vulnerability, capacity, and adaptation assessments conducted at provincial to national scales are designed to provide information to decision- and policymakers on the risks of climate variability, and on the options for managing those risks. Conducting an integrated assessment is an essential input in developing national adaptation plans. Ensuring that climate change scenarios are integrated into national policies and programmes will prepare stakeholders for and manage the risks of climate variability and climate change.

The main objective of the study is to strengthen the capacity of officials from ASEAN Member States to assess climate change vulnerability and implement successful autonomous and planned adaptation measures.

Policy Implications

- New knowledge on national and local vulnerability assessment and adaptation
- Innovative policy experiences on vulnerability assessment and autonomous adaptation

Geographic Scope

ASEAN

Partner Organisation

Ministry of Environment, Government of Cambodia



Related Publications

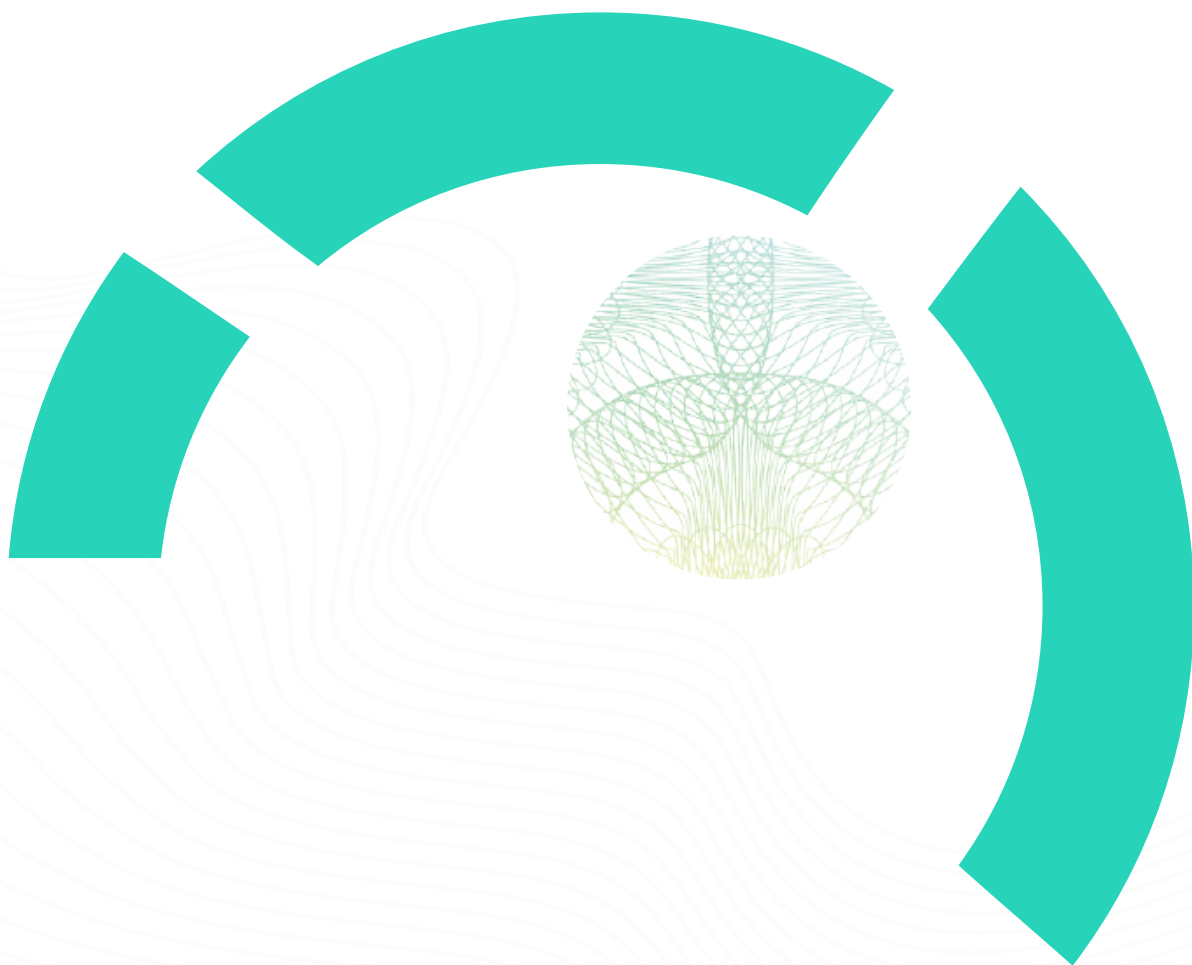
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Carbon Energy Taxation, Revenue Recycling, and Competitiveness

Venkatachalam Anbumozhi, Xianbin Yao, Takashi Hongo, and Kaliappa Kalirajan



Summary

Conceptual and policy interest in carbon pricing mechanisms is emerging across the East Asia Summit region in recognition of serious climate challenge, notably those highlighted in the 6th Intergovernmental Panel on Climate Change assessment report on the risk associated with greenhouse gas (GHG) emissions. As a part of the Glasgow Climate Conference, several (6 out of 10) governments in ASEAN have pledged to achieve Net Zero targets by 2050, 2060, and 2070. To this end, they have placed greater focus on meeting their revised nationally determined contributions (NDCs) by 2030. However, previous ERIA studies indicated that public financing can cover only 20%–30% of NDC efforts, and cross-sector support in carbon pricing and markets will help AMSs create incentives and revenues to support low-carbon technology deployment and, ultimately, carbon reduction, as well as other developmental co-benefits. An assessment of various carbon pricing and market-based instruments globally revealed that carbon tax and emission trading systems (ETS) represent a cost-effective opportunity for achieving GHG emission reductions. In addition to reducing GHG emissions, the advantage of putting a price on carbon increases investments and innovation in low-carbon technologies, direct economic benefits, and other co-benefits such as increased resilience. In countries as diverse as Australia, Indonesia, Japan, Malaysia, New Zealand, Singapore, and Thailand, carbon pricing and energy taxation are being placed on the political agenda, and governments are beginning to grapple with the economic implications of carbon tax or ETS. Whilst carbon energy pricing or tax applied in isolation faces opposition due to concerns about its potential negative economic impacts, the wider principle of environmental tax reforms offers a new macro-economic climate in which the shift in the tax burden allows for more immediate benefits in addition to the long-term containment of carbon emissions. Lowering the tax on labour or corporate incomes in return for taxation of carbon as a part of more comprehensive and revenue-neutral tax reform would offer opportunities not only to tackle negative economic impacts but also to improve social benefits and employment whilst setting out on a trajectory to Net Zero economy. In reality, carbon-pricing schemes in Asia have adopted a cautious and incremental approach to increase the carbon-energy tax, whilst at the same time increasing social safety nets and labour and corporate taxes to mitigate the competitiveness impacts. The principle of revenue neutrality has been at the heart of academic and policy proposals, implying that the methods used for shifting taxes are key to the possible success of carbon pricing. In many cases, concerns presented on competitiveness grounds refer to the budget-economic implications for individual firms, without considering the recycling of tax revenue attached to energy-efficiency improvements. Nevertheless, even a small carbon pricing and associated tax shifts will produce some structural effects, with some companies that adopt low-carbon technology winning and others losing. Rather than the short-term impact on individual companies, however, it is the overall impact on a country's competitiveness that should be in focus for Net Zero targets and associated carbon tax. More comprehensive analysis of possible dynamic impacts of carbon pricing, revenue recycling, and their implication on competitiveness are needed.



Policy Implications

This study will develop an appropriate and inclusive carbon-pricing mechanism and a framework for green financing, as appropriate, for developing and emerging economies of Asia, with a focus on ASEAN+.

The main policy outcomes of the project would be enhanced, sustained, and inclusive action on carbon pricing, a combination of tams and trading systems with a revenue-recycling component to protect industries' competitiveness.

The study is expected to ensure a policy outlook and consensus on continental issues related to carbon tax, established through a series of targeted workshops

Geographic Scope

ASEAN and East Asia

Partner Organisation

Australian National University

Related Publications

Anbumozhi V., K. Kalirajan, and X. Yao (eds.) (2022), *Rethinking Asia's Low-carbon Growth in the Post-Covid World: Towards a Net-Zero Economy*. Jakarta: ERIA. Downloadable from:

<https://www.eria.org/publications/rethinking-asias-low-carbon-growth-in-the-post-covid-world-towards-a-net-zero-economy/>

Anbumozhi V., K. Kalirajan, and F. Kimura (2019), *Financing of Low Carbon Green Growth: Mobilizing Private Capital* Downloadable from:

<https://link.springer.com/book/10.1007/978-981-10-8582-6>



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Digital Innovations for the Deep Sustainability Transformation

Venkatachalam Anbumozhi, Cyn Yong Park, PD Jose



Summary

G20 India has identified digital public infrastructure (DPI) as one policy agenda for the deliberation of the Digital Working Group. The working group has asked the Think 20 and Science 20 engagement groups to make evidence-based policy recommendations. Accordingly, Think 20 has formulated the Our Common Digital Future: Affordable, Accessible and Inclusive Digital Public Infrastructure task force. It is mandated to discuss how G20 countries can incubate a framework for global digital commons. It has identified four workstreams: affordable and accessible digital public infrastructure; digital financial inclusion and sustainability; interoperability of digital services and standard setting; and digital entrepreneurship, skills, and jobs. The taskforce will conceive how technology can be made affordable and accessible, and work toward an interoperable system for payments, lending, and entrepreneurship. It will also look at ways DPI can support the broader United Nations' Sustainable Development Goals (SDGs). How can DPI be made inclusive, trustworthy, and serve the global good? The task force will consider the importance of open source and open application programming interfaces (APIs), for accountable and equitable digital evolution across various sectors which are rapidly digitalizing. It will also discuss how to ensure supply chains which support the digital global commons are uninterrupted, resilient, and decentralized. It will discuss how to promote inclusive entrepreneurship, jobs, and livelihoods in the digital domain. This research aims for a policy brief and conducting a supporting workshop, given that G20 governments are currently putting forward new policy initiatives to govern digital technologies and data flows, but most disregard the implications of digitalization for environmental sustainability. At the same time, as the world is facing multiple simultaneous sustainability challenges, several multilateral environmental agreements have been signed by the global community. Nevertheless, the recent stimulus packages of the EU, Korea, and the US to aid the COVID-19 pandemic recovery with digital transformation as a core strategy, did not systematically address the question of what digital public infrastructure means for SDGs such as climate resilience, green energy transition, and sustainable consumption. Several important regulatory initiatives, including the digital services act, data governance act, and artificial intelligence act in countries such as Brazil, China, India, and South Africa are seldomly connected to policies governing sustainable development. Research on digitalization as public infrastructure and its manifold implications on environmental integrity has been gaining momentum, but not enough policy debates are occurring on the overlap between the domains of digitalization and sustainability. It is unclear how digital public infrastructure can contribute to enabling sustainability actions, and identifying the blind spots. What are core policies which ensure sustainable digitalization? This research aims to fill the knowledge gaps.



Policy Implications

Policy recommendations may be aimed as lodestars for the taskforce, embarking on the journey toward a deep sustainability transformation through digital innovations based on digital transition plans for industries (including the agriculture and service sectors) and integrating with appropriate key performance indicators for sustainability, market creation for low carbon digital products, a services finance mechanism for carbon neutral digital technology deployment, and advanced international governance.

Geographic Scope

G20, ASEAN and East Asia

Partner Organisation

Indian Institute of Management, Bangalore
Asian Development Bank, Manila

Related Publications

V. Anbumozhi, et al. (2022), Smart Cities, Standardization and DX Challenge for Digital Government. TF2-PB
Downloadable from https://www.t20indonesia.org/wp-content/uploads/2022/11/TF2_SMART-CITIES-STANDARDIZATION-AND-DX-CHALLENGE-FOR-DIGITAL-GOVERNMENT.pdf

V. Anbumozhi, et al. (2021), Enhancing Food Supply Chain Resilience through the Utilisation of Digital and Sequence Information Technologies. TF4.

Downloadable from <https://www.t20italy.org/2021/08/30/enhancing-food-supply-chain-resilience-through-the-utilisation-of-digital-and-sequence-information-technologies/>



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Regional Knowledge Centre for Marine Plastic Debris

Michikazu Kojima, Ayako Mizuno, Ellen Putri Edita, Aulia Salsabella Suwarno and Fusanori Iwasaki



Summary

The Regional Knowledge Centre for Marine Plastic Debris (RKC-MPD) is a regional information hub on marine plastic pollution for the ASEAN+3 countries, which aims to facilitate national and regional cooperation by promoting relevant policies and good practices amongst the Member States. The centre was established in October 2019 under the Economic Research Institute for ASEAN and East Asia (ERIA). RKC-MPD is expanding its data-gathering and resource network for capacity development by identifying key local experts in the plastic policy and marine plastic leakage, identifying national and regional networks on ocean environmental studies, identifying and enhancing capacity development of national hubs for material flow analysis, and identifying private sector partners for gathering information as well as for outreach activities. Several projects grouped into four pillars are for consideration under the RKC-MPD: capacity development of ASEAN governments and support for policy formulation; capacity development on information, administration, research, and investigation that contribute to policy formulation; information sharing for international frameworks or initiatives; and information sharing to raise awareness and promote efforts by the private sector and citizens. The region needs a knowledge centre for circular economy and ERIA could propose that the RKC-MPD fulfil the role.

In 2021, the RKC-MPD has developed a private sector platform on its website (rkcmpd-eria.org). In ASEAN+3 countries, the private sector has been helping reduce plastic waste and marine plastic debris. The platform hosts information submitted by private companies from all ASEAN+3 countries to showcase their products, services, or technologies that help reduce plastic waste and marine plastic debris. The RKC-MPD website also contains good practices, including ASEAN+3 national frameworks, government initiatives, scientific knowledge, and voluntary initiatives to reduce plastic waste and marine plastic debris.

Policy Implications

To tackle marine plastic debris, each government should expand waste collection and proper disposal, raise awareness, reduce single-use plastics, promote the circular economy of plastics, and others. The region has various good practices, which should be shared.

Geographic Scope

ASEAN+3 countries

Partner Organisation

Institute for Global Environmental Strategies (IGES)



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Technical Guidelines for Prevention of Plastics and Resin Pellets Leakage from Factories and Informal Recycling Sector in ASEAN

Project under supervision of Michikazu Kojima



Summary

The project will assess the current status of informal recycling groups in handling and pre-processing recovered plastic waste. It will identify the sources of leakage and examine pellet losses that occur during logistical handling and factory processing operations. To achieve this, the project will conduct situational and operational assessments of the recycling activities in the informal sector and selected factories across five hotspot cities in 3–4 ASEAN Member States.

Policy Implications

Develop context-appropriate guidelines and best practices that actively prevent plastics leakage during pre-processing and handling by informal recyclers, as well as resin pellet losses within factories.

Geographic Scope

ASEAN

Partner Organisation

Regional Resource Centre for Asia and the Pacific,
Asian Institute of Technology



57

Data-driven Policy Research Programme on Marine Plastic Debris

Project under supervision of Michikazu Kojima



Summary

Any national strategic priority setting and policymaking should be based on accessing accurate data and translating them into actionable recommendations. However, in ASEAN countries, data availability on plastic at many stages of its life-cycle has big gaps and insufficiently and expertise surrounding it is poorly coordinated to be able to make integrated policy recommendations on national and regional levels. This group, comprising experts from a diverse set of disciplines, assists in the establishment of baselines and offer a multidisciplinary assessment of marine plastics in the ASEAN region.

Policy Implications

Future contribution to the Asian Plastic Outlook report of the Organisation for Economic Co-operation and Development

Geographic Scope

ASEAN

Partner Organisation

Institute for Global Environmental Strategies

Related ERIA Publications

Asokan V.A., Abeynayaka A. and Hotta Y. 2023. Building Data on the Plastics Value Chain in ASEAN Member States Report. Economic Research Institute for ASEAN and East Asia (ERIA)



58

Surveying and Piloting the Application of Behavioral Insights Approach for Plastic Production

Project under supervision of Michikazu Kojima



Summary

Plastics have become an unavoidable component of our everyday lives, thanks to their strong, versatile, light, and affordable qualities, which have made them the vehicle for globalised trade and economic growth. However, the same qualities that make plastics useful are also what make them harmful to nature and mankind. Despite being too resilient to biodegrade, the production of plastic continues to grow, resulting in ever-increasing waste that accumulates even when no longer serviceable. To reduce the use of single-use plastics, behavioural insights can be applied as a complementary or precursor approach to traditional policy instruments such as regulations, economic incentives, and awareness campaigns.

Policy Implications

Provide practical knowledge on applying behavioural insights in concrete settings and an easy-to-use toolkit for local governments, businesses, and schools.

Geographic Scope

ASEAN

Partner Organisation

Institute for Global Environmental Strategies



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Pilot Project of Floating and Drifted Marine Plastics in Mangrove

Keita Uchida, under supervision of Michikazu Kojima



Summary

Indonesia is considered as the world's second-largest discharger of marine plastic litter, dumping an estimated annual volume of 480,000 to 1.29 million tonnes. Urgent action is needed to understand the actual state of marine plastic litter in Indonesia and to reduce it. One of the top concerns raised by the Government of Indonesia is the negative effects of plastic debris on mangrove forests. These mangrove areas are often visibly littered with plastic waste, and their ecological well-being is quite important for their conservation and healthy growth.

As one of the activities of the Comprehensive Environmental Cooperation Package on Climate-Biodiversity Conservation-Circular Economy-Nexus Between Japan and Republic of Indonesia, agreed upon in August 2022, a project to promote measures to reduce marine debris, including plastics, will be implemented in some regions of the nine priority provinces: North Sumatra, Riau, Riau Islands, Bangka Belitung, West Kalimantan, East Kalimantan, North Kalimantan, Papua, and West Papua.

This project will investigate the amount and composition of marine litter in mangrove forests, assess the current plastic wastes impacts on the growth of target mangrove forests, involve the local community in conducting clean up activities, and establish guidelines for local clean-up activities model and investigation of marine debris in mangrove forests, and promote good practices in clean-up activities that will be widely disseminated in Indonesia.

Policy Implications

This project will (1) investigate the amount and composition of marine litter in mangrove forests, (2) assess the current plastic wastes impacts on the growth of target mangrove forests, (3) engage with local community to conduct clean up activities, and (4) establish guidelines for local clean up activities model and investigation of marine debris in mangrove forests, and (5) promote good practices in clean-up activities that will be widely disseminated in Indonesia.

Geographic Scope

Indonesia

Partner Organisation

Japan NUS (JANUS)



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Protecting Mangroves from Plastic Pollution: Some Good Practices

Ellen Putri Edita, Michikazu Kojima, and Aulia Salsabella Suwarno



Summary

Mismanaged marine debris resulting from anthropogenic activities often ends up in coastal habitats (Cundell, 1973). Plastic is the most prevalent type of debris found in these areas (Derraik, 2002).

Unfortunately, marine plastics have detrimental impacts on coastal habitats, including mangroves. A recent study conducted on the north coast of Java has shown that plastic entanglement in mangroves can have a range of impacts on plant growth, from stunted root growth to death, depending on the amount of plastic covering the flora (van Bijsterveldt et al., 2021). Despite the potential negative effects of plastic pollution, mangroves play an essential role in the ecosystem. They serve as a source of raw materials and food, offer coastal protection and erosion control, help carbon sequestration, and function as recreational and educational platform. Of these benefits, coastal protection has the highest value (Barbier et al., 2011).

Recognising the impacts of plastic pollution to mangroves and the fundamental role the latter play in the ecosystem, this research aims to propose good practices that can be adopted to prevent plastic pollution from harming mangroves.

Geographic Scope

ASEAN





XI. Technology

61

Technology Needs Assessment and Financing Solutions for ASEAN Smart Cities

V. Anbumozhi, S. Kumar, Suhono, Bundit Lim, and KC Tay

Summary

The smart city concept embeds an element of urban design that uses highly advanced technologies wherein energy services become one big and highly complex cyber-physical system, in which computer-based algorithms improve the quality of life of residents and build a sustainable and clean environment. The study adopted a gap analysis of converting a city into a smart city by reviewing what had been done in major cities with regard to the energy revolution: energy access and resilience, conceptualising a smart city based on the level of development and willingness to adapt and reform. Learning from these experiences, a plan of action and a public-private community protocol are proposed for smart city programmes in East Asia Summit (EAS) countries. The study selected six cities to form the Association of Southeast Asian Nations (ASEAN) Smart Cities Network (ASCN), a collaborative platform where ASEAN cities can learn from one another's experiences in adopting smart technology, identify solutions, and, more importantly, engage industry and global partners to work towards the common goal of making urban development sustainable and their cities liveable. The study established key performance indicators for the introduction of sector-wide smart technologies. It developed an assessment tool that can be applied to 26 pioneer cities in the network to assess energy saving and avoid emissions. The study analysed 10 digital applications and found that cities could use them to improve energy conservation by 10%–30%. The study found that even the most cutting-edge smart cities are still at the beginning of their journey. Smart cities add digital intelligence to existing urban systems, making it possible to do more with less. Connected applications put real-time, transparent information into the hands of users to help them make better energy choices. Users can save time, reduce energy use, and even help boost social connectedness. When cities function more efficiently, they also become more productive places to do business. Amongst other positive economic and social outcomes in Singapore, the study found that these tools could reduce emissions by 8%–10%, shorten an average commute by 15%–20%, and cut greenhouse gas emissions by 10%–15%. Still, many cities have yet to implement some of the applications that could have the biggest impacts.

Policy Implications

- Operational definition of smart cities and key performance indicators for assessing the readiness of ASEAN cities to become smart cities enabled by information and communications technology
- A methodology to assess energy saving and emission reduction under digital city conditions
- Policy integration at different levels of government for operationalisation of smart cities in ASCN



Geographic Scope

East Asia Summit countries

Partner Organisation

Asian Institute of Technology

Related Publications

Realising Smart Cities Workshop, 23-24 July, Chiang Mai.

<https://www.eria.org/database-and-programmes/enhancing-the-readiness-of-asean-smart-cities/>

Global Solutions Journal Journal 7

<https://www.global-solutions-initiative.org/wp-content/uploads/2021/05/Global-Solutions-Journal-7-Summit-2021-Edition.pdf>



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Adaptability of ASEAN to Disruptive Technologies Driving Circular Low-carbon Economy in the Post-COVID-19 Era

Venkatachalam Anbumozhi, Xianbin Yao, Henry Wyes, and Kaliappa Kalirajan



Summary

Experts largely agree that the challenge of achieving climate goals and resource-efficiency targets, such as those set forth in the Paris Agreement, will be nearly impossible to achieve without pursuing all options, including adoption of the disruptive digital technologies to manage greenhouse gas (GHG) emissions and bring resource efficiency. The integrated circular low-carbon economy concept builds on the principles of circular economy and applies them to managing GHG emissions: to reduce carbon that must be managed in the first place, to reuse carbon as an input to create feedstocks and fuels, to recycle carbon through the natural carbon cycle with renewable energy, and, unique to circular economy, to remove excess carbon and store it for alternate uses. For ASEAN, the digitally aided circular low-carbon economy is an integrated and inclusive approach to accelerate the transition towards more comprehensive, resilient, and climate-friendly energy and industry systems that support and enable green recovery in the post-pandemic era. This would enable Association of Southeast Asian Nations (ASEAN) Member States (AMSs) to take advantage of all emerging disruptive digital technologies, forms of energy, and climate mitigation opportunities and resource-efficiency opportunities according to resource availability, economic costs, and national circumstances. The study is intended to provide an impulse for embracing emerging digital, resource-efficient, and zero-emission technologies in developing and emerging economies of ASEAN and East Asia in support of the implementation of the ASEAN Comprehensive Recovery Framework (ACRF), the consolidated pandemic exit strategy for the region. The objectives of the study are to review the progress made in AMSs in the implementation of ACRF strategic priority areas and identify enabling factors and the role of disruptive technologies; to enhance understanding on how a combination of advanced ICTs are being utilised by the private and public sectors to promote the adoption of circular low-carbon approaches; and to provide insights on policy measures in the context of ACRF such as stakeholder engagement and partnerships, financing and resource mobilisation, and institution and governance to address the challenges in scaling up disruptive technologies in support of decarbonisation and circular economy approaches.

Policy Implications

- A set of policy recommendations to AMSs and their dialogue partners to address the challenges in scaling up regional response to the emerging-to-disrupting digital, resource-efficient, and low-carbon technologies in support of decarbonisation and circular economy
- Proposition of a new regional cooperation architecture within the context of ACRF to support, help, and build green economic recovery in the aftermath of the COVID-19 pandemic



Geographic Scope

ASEAN and East Asia

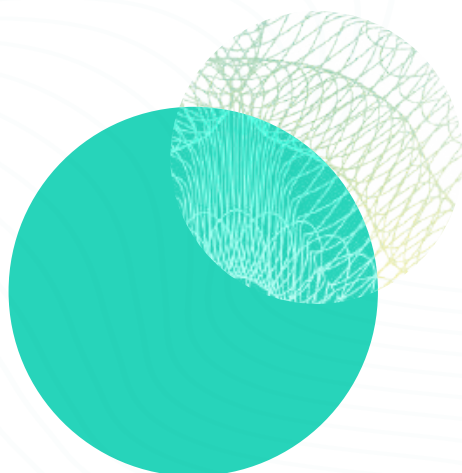
Partner Organisation

Australian National University

Related Publications

Anbumozhi V. K. Kalirajan, X. Yao (Eds), (2022), *Rethinking Asia's Low-Carbon Growth in the Post-Covid World: Towards a Net-Zero Economy*. Jakarta: ERIA. Downloadable from:

<https://www.eria.org/publications/rethinking-asias-low-carbon-growth-in-the-post-covid-world-towards-a-net-zero-economy/>



Energy





XII. Effective Use of Energy

63

Global Principles and Practices of Nuclear Regulatory Framework

Venkatachalam Anbumozhi, and Tomoko Murakami



Summary

All over the world, public acceptance of nuclear power is crucial in deciding on public and private investment in nuclear power plants. It is important, therefore, to understand the determinants of public acceptance of nuclear power and the driving factors behind individual perceptions. The report examines the effects of local economic benefits, social inclusion, and effective communication on risk management. Different levels of stakeholder acceptance and related driving factors to effect changes in perceptions are identified through field visits and interactive workshops in Finland, Japan, the United Kingdom, and the United States. Local economic wealth creation, lower cost of generating electricity, and low-carbon energy provision appear to have the strongest positive effect on public acceptance of nuclear power. The report identifies and recommends an effective communication and risk-sharing mechanism amongst sub-regional authorities and non-governmental organisations that could lead to positive changes in community perception.

Policy Implications

- Develop effective communication channels across stakeholders on differing perceptions and stance on required safety and local economics of nuclear power plants.
- Third-party non-governmental players could provide better understanding on key safety issues affecting trust and perceptions amongst stakeholders.

Geographic Scope

ASEAN and East Asia

Partner Organisation

Institute for Energy Economics, Japan

Related ERIA Publications

Murakami, T. and V. Anbumozhi (eds.), (2017), *An International Analysis of Public Acceptance of Nuclear Power*, ERIA Research Project Report 2017-03. Jakarta: ERIA. Downloadable from:

<https://www.eria.org/publications/an-international-analysis-of-public-acceptance-of-nuclear-power/>

Murakami, T. and V. Anbumozhi (eds.) (2020), *Improving Nuclear Safety and Use: An International Analysis*, ERIA Research Project Report 2020-10. Jakarta: ERIA. Downloadable from:

<https://www.eria.org/research/improving-nuclear-safety-and-use-an-international-analysis/>

Murakami, T. and V. Anbumozhi (eds.) (2020), *Securing the Resilience of Nuclear Infrastructure against Natural Disasters*, ERIA Research Project Report 2020-06. Jakarta: ERIA. Downloadable from:

<https://www.eria.org/research/securing-the-resilience-of-nuclear-infrastructure-against-natural-disasters/>



64

Impacts and Interlinkages of ESG Investments on Low Carbon Economy Transition in ASEAN

Venkatachalam Anbumozhi, Jootae Kim



Summary

Environmental, social, and governance (ESG) investment has evolved in recent years, to become a leading sustainability approach for investors seeking to pursue different elements of the circular low carbon economy. East Asian countries such as Japan and Korea, and ASEAN economies like Singapore and Malaysia, witnessed strong increases in ESG investment during the pandemic, while other economies such as India, Indonesia, and Thailand progressed less quickly, and at varying stages of adoption. Recent research suggests investors in Europe and the US are willing to pay higher fees for Asian funds with an ESG mandate, and institutional investors are ready to accept lower financial returns for accruing both its physiological and societal benefits. Nonetheless, progress in ASEAN has been made through regulatory and reporting guidance. ASEAN Taxonomy for Sustainable Finance has been developed as a common building block to enable an orderly transition by ASEAN member states (AMS). In practice, ESG investments are flowing at noticeably different speeds across AMS. ESG performance across ratings and investment products varies widely, illustrating the complexity of understanding the drivers of performance in ESG-based portfolios and funds, which can depend on a multitude of factors. Moreover, while ESG is growing in importance and size, rating providers appear to be giving a higher weight to metrics on the disclosure of company policies, targets, and objectives, rather than reduction-specific goals such as achieving Paris climate agreement targets for carbon emissions and carbon intensity, the adaption of a circular economy and meeting renewable energy capacity etc, raising questions on the extent to which companies will be able to implement a low-circular carbon transition. This reflects the wider policy discussion on ESG, but the lack of data on its impact on circular low-carbon investments means empirical evidence is needed to show ESG investment produces better and more resilient long-term risk-adjusted returns. Where the relationship between ESG and financial performance has been widely studied, findings were mainly based on equities, for which the pool of data is the deepest. Efforts are also needed to strengthen ESG practices so they are transparent and comparable – at the national, regional or global level where appropriate – involving line ministries such as energy and environment, as well as financial authorities and standard-setters for corporates, end-investors, and other stakeholders helping to shape ESG practices in ASEAN and East Asia. The objective of this study is to analyse the trends and investigate interlinkages among the ESG evaluation scores and financial performances. The return on asset (ROA); return on equity (ROE); Tobin's Q – the ratio between a physical asset's market value and its replacement value; and the impact of carbon emissions for ASEAN+ countries, will be investigated



Policy Implications

In general, ASEAN is slow in the uptake of ESG investment when compared to East Asia, the US, and Europe, which are more advanced in their approaches and policies. The study will lead to the following policy recommendations. After assessing ASEAN countries in terms of carbon emission/resource efficiency gains and ESG performance in relation to other nations, many policy insights can be provided.

Wider discussion on financing the low carbon and circular energy transition by identifying enabling factors of ESG investments in the context of ASEAN member states.

Enhanced ESG reporting practices as a voluntary framework in support of future regulations controlling ASEAN focused carbon markets.

More meaningful data standards and principles to integrate ESG factors into low-carbon/circular investment decisions.

Geographic Scope

ASEAN and East Asia plus USA

Partner Organisation

Donkook University

Related ERIA Publications

Anbumozhi V., K. Kalirajan, and X. Yao (eds.) (2022), Rethinking Asia's Low-carbon Growth in the Post-Covid World: Towards a Net-Zero Economy. Jakarta: ERIA.

Downloadable from: <https://www.eria.org/publications/rethinking-asias-low-carbon-growth-in-the-post-covid-world-towards-a-net-zero-economy/>

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Downloadable from: <https://www.eria.org/publications/financing-for-low-carbon-energy-transition-unlocking-the-potential-of-private-capital/>



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Study on Demand and Supply Potential of Hydrogen Energy in East Asia: Phase 4

Yanfei Li, Shintaro Onishi, Setsuo Miyakoshi, Shigeru Kimura and Alloysuis Joko Purwanto



Summary

Phase 4 of the hydrogen study is working on the following components: 1. effectiveness of hydrogen value chain, 2. efficiency of hydrogen production and estimation of liquid hydrogen transport cost, 3. an optimal solution to hydrogen transport from origins to destinations and simulation of hydrogen transport in the East Asia Summit (EAS) region, and 4. a series of hydrogen workshops and lectures.

Policy Implications

Once a hydrogen supply chain is set up in the EAS region, hydrogen supply cost will go down through high utilisation of hydrogen across the sectors, encouraging clean energy investment. The current hydrogen production efficiency is around 50%–70% and is expected to improve to more than 90%. Moreover, the cost of transporting large volume of liquid hydrogen over long distances is competitive compared to that of modified conventional hold (MCH) mode.

Geographic Scope

EAS16 countries (Australia, Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, Republic of Korea, Lao People's Democratic Republic, Malaysia, Myanmar, New Zealand, the Philippines, Singapore, Thailand, Viet Nam)

Partner Organisation

The Institute of Energy Economics, Japan; Kawasaki Heavy Industry

Related ERIA Publications

Kimura, S., Y. Li (2018). Demand and Supply Potential of Hydrogen Energy in East Asia. ERIA Discussion Paper 2018-01. Jakarta: ERIA. Downloadable from: <https://www.eria.org/publications/demand-and-supply-potential-of-hydrogen-energy-in-east-asia/>

Kimura, S., I. Kutani, O. Ikeda, R. Chihiro (2020). Demand and Supply Potential of Hydrogen Energy in East Asia – Phase 2. ERIA Discussion Paper 2020-16. Jakarta: ERIA. Downloadable from: <https://www.eria.org/publications/demand-and-supply-potential-of-hydrogen-energy-in-east-asia-phase-2/>

Kimura, S., A.J. Purwanto, I. Kutani, T. Hiruma, D. Lutfiana, C. E. N. Setyawati (2022). Demand and Supply Potential of Hydrogen Energy in East Asia – Phase 3. ERIA Discussion Paper 2022-04. Jakarta: ERIA. Downloadable from: <https://www.eria.org/publications/demand-and-supply-potential-of-hydrogen-energy-in-east-asia-phase-3/>



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Analysis on Changes of Water, Energy, and Food toward Sustainable Biomass Utilization in EAS Member States

Yuki Kudoh , Shabbir H. Gheewala , Glenn Baticados, Shinichirou Morimoto, Ruth Anne Gonocruz, Rex Demefelis, Ngo Thi Thanh Truc, Hady Hadiyanto, Marietta M. Quejada, Marlia Mohd Hanafiah

Summary

Biomass is the most significant renewable energy source today, accounting for 6% of the global energy supply and 55% of the renewable energy supply. Most biomass is utilized for small-scale conventional domestic heating and cooking, while only 10% is used on an industrial scale to produce fuels or electricity. In 2050, it is anticipated the role of biomass will triple and slightly surpass the level of coal consumption. Where accessible, local modern bioenergy resources can be leveraged to augment the supply of electricity while meeting the local need for power and heating. It is crucial to ensure sustainability when biomass is utilized in the future bioeconomy for energy, chemicals, and materials. This applies to the entire value chain, not just feedstock, which is a typical focus in traditional biomass evaluations. However, the challenge of meeting the demand for food owing to the 50% increase in the global population in 2050 necessitates substantial changes in the agricultural and forestry sectors. Close coordination is required between developing and using high-yield crops, water and soil management; land use regulations; and ecological sustainability issues subjected to biomass production. This study will examine the current situations for selected EAS countries, considering the potential of biomass resource utilization. Understanding the linkages between energy, water, and food policy and tackling them holistically in an integrated manner is imperative for real policymaking. Using the nexus concept, resource management for the biomass supply chain should encompass intricate interactions and possible impacts in all phases, from biomass cultivation to biomass product production and distribution. Thus, this project aims to analyse EAS biomass utilization from the whole supply chain of biomass resources to generate energy and other biomaterials, which may impact some economic sectors, particularly land usage for food and water resources.

Policy Implications

The results of this study will highlight the impacts of utilizing biomass in the nexus of water-energy-food (WEF). In order to make policy recommendations, this project is expected to: develop inventory matrices to observe the best way to utilize biomass and identify its interactions among WEF sectors; map the impacts and risks of biomass utilization in selected EAS countries; and discuss and recommend policies to accelerate the utilization of biomass resources, while simultaneously ensuring biomass utilization does not incur unfavourable social and environmental consequences.



Geographic Scope

ASEAN and East Asia

Partner Organisation

National Institute for Advanced Industrial Science and Technology

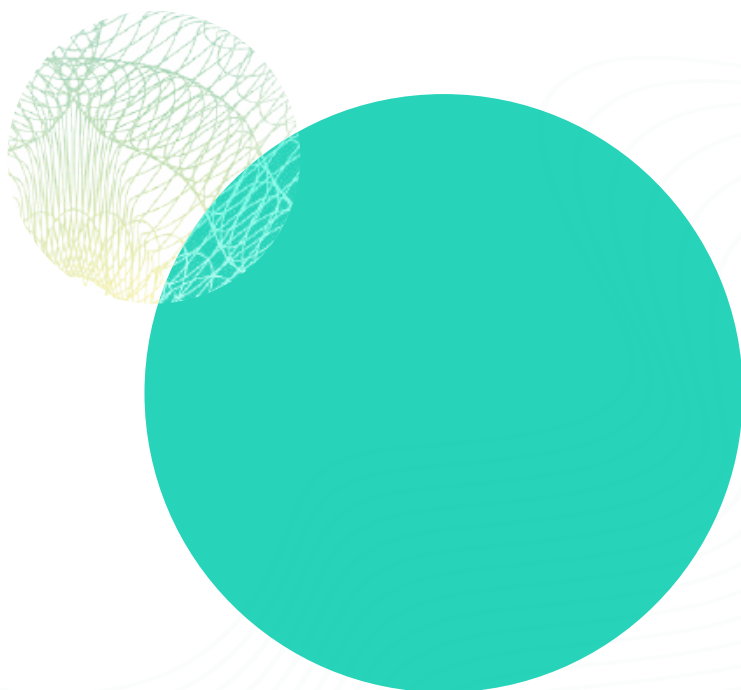
Related ERIA Publications

Bollino, C. A., V. Anbumozhi, S. Babu, Y. Eiji, M. Galeotti (2023), Integrated Policies to Improve Food System Nexus to Achieve the SDGs. T20-TF10-PB10.

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Downloadable from: <https://www.eria.org/research/selecting-the-best-mix-of-renewable-and-conventional-energy-sources-for-asian-communities/>



67

Organizing a Workshop to Promote Stakeholder Involvement in Hosting Municipalities of Nuclear Facilities

Venkatachalam Anbumozhi and Tomoko Murakami

Summary

Several countries in Asia are considering the introduction of nuclear power to meet the rapidly increasing demand for energy, while addressing climate change. In introducing and operating nuclear power, it is necessary to respond appropriately to stakeholders. In the US, which has the world's largest nuclear power capacity, the regulator and operators have overcome various troubles, such as the Three Mile Island Unit 2 incident, to achieve improvement of both nuclear safety and effective use. In Asia, on the other hand, in the wake of the Fukushima Daiichi accident, some countries have reduced or withdrawn nuclear power, and in Japan, where the nuclear capacity factor had been improved, restarts have been delayed due to the judicial process following the accident.

For Asian countries considering the introduction of nuclear power, it is important to learn the best regulatory practices from countries with accumulated experience of nuclear power. It is also important to improve social acceptability of nuclear power and promote mutual discussions on its use. It would be useful for Asian countries to learn best practices from precedents in Japan, France, Finland, Sweden, the UK, Canada and the US, to establish a model for the optimized use of nuclear power and proper public acceptance schemes. This study will organize a workshop to promote stakeholder involvement in hosting municipalities with nuclear facilities.

Policy Implications

This study provides an opportunity for discussing social acceptance among stakeholders and the proper use of nuclear power in Asia in the future, recommend action on an ASEAN plan of action for energy cooperation, and contribute to deepened insights on securing low carbon energy sources.

Geographic Scope

ASEAN and East Asia

Partner Organisation

Institute for Energy Economics, Japan



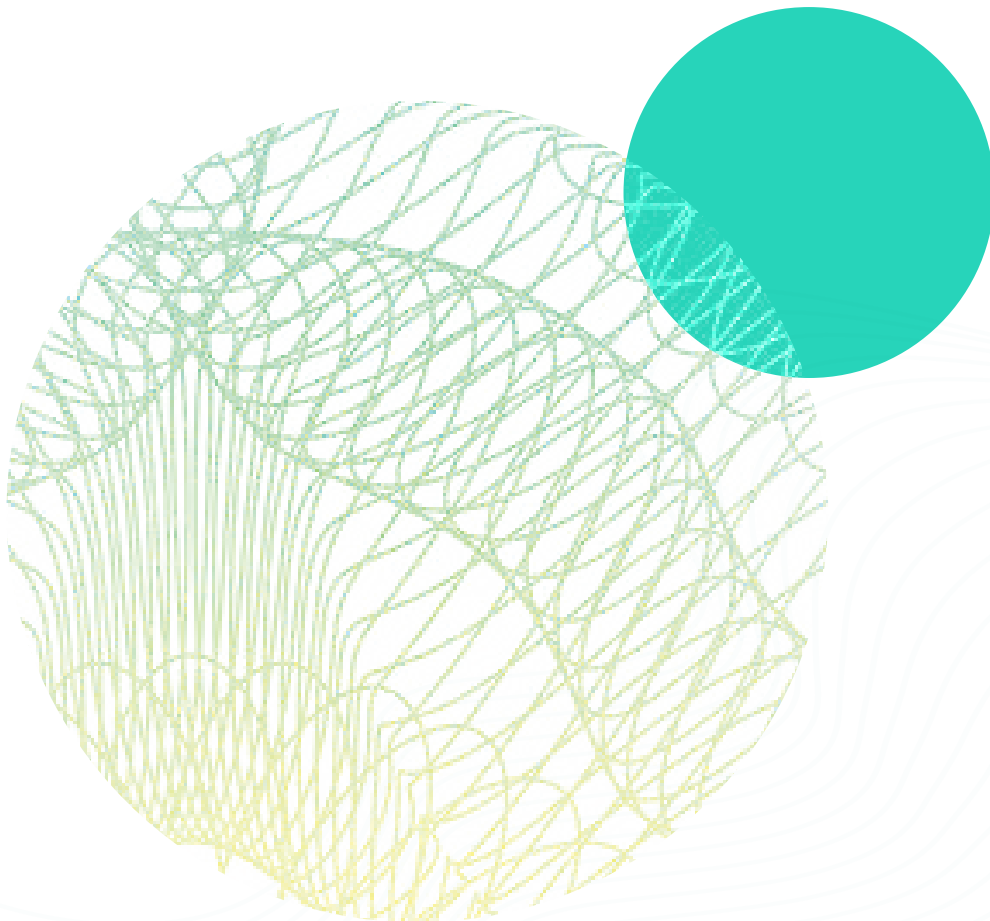
Related ERIA Publications

Murakami, T. and V. Anbumozhi (eds.), (2017), An International Analysis of Public Acceptance of Nuclear Power, ERIA Research Project Report 2017-03. Jakarta: ERIA.

Downloadable from: <https://www.eria.org/publications/an-international-analysis-of-public-acceptance-of-nuclear-power/>

Murakami, T. and V. Anbumozhi (eds.), (2018), Public Acceptance of Nuclear Power Plants in Hosting Communities: A Multilevel System Analysis, ERIA Research Project Report 2018-18. Jakarta: ERIA.

Downloadable from: <https://www.eria.org/publications/public-acceptance-of-nuclear-power-plants-in-hosting-communities-a-multilevel-system-analysis/>



68

Support on Carbon-neutral Pathways in ASEAN and South Asia

Shigeru Kimura, Soichi Morimoto, Seiya Endo, Kei Shimogouri, and Han Phoumin



Summary

The second year of the ASEAN carbon-neutral pathways project focuses on Malaysia, the Philippines, Thailand, and Viet Nam. Also, Thailand will develop a specific carbon-neutral model for this study, which in due time will extend its coverage to India and Bangladesh.

Policy Implications

The carbon-neutral pathways of Malaysia, the Philippines, Thailand, and Viet Nam are differ substantially due to various factors such as economic growth, available energy sources, and topography.

Geographic Scope

ASEAN 10 countries (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam), India and Bangladesh

Partner Organisation

The Institute of Energy Economics, Japan

Related ERIA Publications

S. Kimura, Y. Shibata, S. Morimoto, K. Shimogori, Y. Mizuno (2022), *Decarbonisation of ASEAN Energy Systems: Optimum Technology Selection Model Analysis up to 2060*. ERIA Research Project Report 2022-05. Jakarta: ERIA.

Downloadable from: <https://www.eria.org/publications/decarbonisation-of-asean-energy-systems-optimum-technology-selection-model-analysis-up-to-2060/>



69

Energy Outlook and Energy Saving Potential in East Asia

Members of EAS Energy Outlook, Energy Saving Potential Working Group from EAS 17 countries, Shigeru Kimura and Han Phoumin



Summary

The main work is to brush up on the low carbon energy transition-carbon neutral (LCET-CN) scenario that was developed in 2021-22 and to conduct cost-comparison analysis between the business-as-usual (BAU) scenario and LCET-CN. The project will focus on examining the increase in hydrogen demand for power generation and increasing the hydrogen production to minimise hydrogen imports.

Policy Implications

This project clears a different pathway to carbon neutrality for each East Asian Summit country until 2050.

Geographic Scope

EAS17 countries (Australia, Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, Republic of Korea, Lao People's Democratic Republic, Malaysia, Myanmar, New Zealand, the Philippines, Singapore, Thailand, United States and Viet Nam)

Partner Organisation

The Institute of Energy Economics, Japan

Related ERIA Publications

Kimura, S. H. Phoumin (eds) (2020). Energy Outlook and Energy Saving Potential in East Asia 2020. Jakarta: ERIA.

Downloadable from: <https://www.eria.org/publications/energy-outlook-and-energy-saving-potential-in-east-asia-2020/>



70

Study on Liquefied Petroleum Gas (LPG) Supply Master Plan for Cambodia

Shigeru Kimura, Takahisa Hiruma, Nong Monin, and Han Phoumin



Summary

From 2000 to 2019, the demand for liquefied petroleum gas (LPG) in Cambodia experienced a rapid annual growth rate of approximately 20%. It is projected that the demand will triple by 2050, reaching 1,400 ktoe. However, there are concerns about the sustainability of Cambodia's current LPG supply chain up until 2040.

The objective of this project is to establish an optimal LPG supply chain in Cambodia that will remain sustainable up until 2040. The project will conduct an LPG consumption survey in the final sectors, review the existing LPG supply chains, forecast the LPG demand by province up until 2040, select primary and secondary LPG terminals, use LP code to determine the most efficient LPG supply chains, and draw implications from the results of optimisation.

Policy Implications

The study's critical outcomes will include the identification of optimal locations for secondary terminals and stations, the number of large LPG trucks required, and the feasibility of a pipeline transport system between Phnom Penh and Sihanoukville.

Geographic Scope

Cambodia

Partner Organisation

ASIAM Research Institute, Cambodia Development Research Institute

Related ERIA Publications

Cambodia Petroleum Master Plan 2022–2040. ERIA Research Project Report 2021-21. Jakarta: ERIA. Downloadable from: <https://www.eria.org/uploads/media/Research-Project-Report/2021-21-Cambodia-Petroleum-Master-Plan-2021/Cambodia-Petroleum-Master-Plan-2022-2024-final-March.pdf>



71

Study on Green Hydrogen Production in Brunei Darussalam

Shigeru Kimura, Takeshi Miyashita, and Alloysuis Joko Purwanto



Summary

Brunei Darussalam has initiated the production of hydrogen using by-product gas from the liquefied natural gas (LNG) production process and has exported it to Kawasaki city, Japan, via modified conventional hold (MCH) containers. However, the Energy Department of the Prime Minister Office is focused on producing green hydrogen through solar photovoltaic (PV) electricity.

This study will explore the potential for the installation of a floating solar PV system in Brunei, estimate power generation through solar PV and hydrogen production through electrolysis plants, and the possibility of blue hydrogen production. It will also investigate the social and economic impacts of the hydrogen business in Brunei.

Policy Implications

The production of green hydrogen in Brunei is limited and is therefore indispensable. As the use of LNG will be phased out of the energy market after 2040, hydrogen will be an important export material for Brunei.

Geographic Scope

Brunei Darussalam

Partner Organisation

Chiyoda Corporation

Related ERIA Publications

Brunei Darussalam: Shifting to a Hydrogen Society ERIA Research Project Report 2020-04. Jakarta: ERIA.

Downloadable from: <https://www.eria.org/uploads/media/Research-Project-Report/RPR-2020-04-Brunei-Shifting-Hydrogen-Society/Brunei-Darussalam-Shifting-to-Hydrogen-Society-new.pdf>



72

Study on Cogeneration Potential in Indonesia's Industry Sector

Shigeru Kimura, Setsuo Miyakoshi, Leong Siew Meng, Luk Bang Chow, and Alloysuis Joko Purwanto



Summary

The cogeneration system (CGS) is a highly efficient energy consumption system that generates electricity and heat from fossil fuel combustion. Indonesia's Ministry of Environment and Mineral Resources is seeking opportunities to install CGS in the final energy consumption sector.

This study will draw on the CGS systems in Japan and Malaysia as a reference to introduce CGS to Indonesia.

Policy Implications

The CGS system uses fossil fuels like oil and gas to generate electricity and heat for factories and buildings that require both. CGS is not suitable for situations where either electricity or heat is required exclusively. Whilst heat recovery can be costly, generating heat through fossil fuel consumption results in significant cost savings. Therefore, if fossil fuels are marketed in Indonesia without subsidies, the economic feasibility of CGS is high.

Geographic Scope

Indonesia, Japan, Malaysia



73

Study on the Potential and Promotion of Utilization of Hydrogen and Ammonia

Shigeru Kimura, Yoshiaki Shibata



Summary

This year sees the following studies: review of hydrogen and ammonia policies of the initial East Asia Summit (EAS 16) countries; forecast of the economically feasible hydrogen production potential of EAS 16 countries; implementation of a hydrogen or ammonia mode case study in Indonesia, an international hydrogen and ammonia workshop, a site visit to hydrogen facilities and EAS hydrogen working group (WG) meetings; research studies on exploring hydrogen demand applying a bottom up approach and forecast of hydrogen supply cost; trace technology development of hydrogen and ammonia on both the demand and supply sides.

Policy Implications

Increase of correct understanding of hydrogen and ammonia, forecast of future hydrogen and ammonia demand and supply, exploration of hydrogen and ammonia projects, and updated hydrogen supply cost .

Geographic Scope

EAS region

Partner Organisation

Institute of Energy Economics, Japan; Itochu Corporation



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Preparation of Energy Outlook and Analysis of Energy Saving Potential in East Asia Region

Han Phoumin, Alloysius Joko Pruwanto, members of EAS 17 countries



Summary

This year, the ERIA EAS Energy Outlook Working Group (WG) is conducting: an update of the dataset to include both energy and economic data; re-estimation of energy demand formulas using the updated dataset; tuneup of energy outlook model to correctly reflect new energy technologies and fuels; and produce three scenarios – business as usual (BAU), Announced Pledges Scenario (APS) (aggressive energy efficiency and renewable energy) and low-carbon energy transition–carbon neutral (LCET-CN) – including an energy cost comparison among the three scenarios.

Policy Implications

Seek a carbon neutral pathway for each EAS 17 country, extract policy implications from the outlook results and energy cost comparison results.

Geographic Scope

EAS region

Partner Organisation

Institute of Energy Economics, Japan



75

Strategic Oil Stockpiling in Myanmar

Tetsuo Morikawa, Shigeru Kimura and Han Phoumin



Summary

Oil demand in Myanmar will increase significantly, on the other hand, more than 90% of oil demand will be imported especially from Singapore continuously. Thus, Myanmar's oil supply security should be maintained and strategic oil stockpiling will be an option for Myanmar regarding oil supply security. This project studies a. kinds of stockpiling, b. appropriate stock level, c. sharing of private/public stock and d. legal and policy framework and e. roadmap of setting stockpiling system until 2040.

Policy Implications

Indicate appropriate roadmap to setup oil stockpiling system on the short, middle and long-term points of view.

Geographic Scope

Myanmar

Partner Organisation

Institute of Energy Economics, Japan



76

Green Finance and Renewable Energy in ASEAN and East Asia

Han Phoumin, Farhad Taghizadeh-Hesary, Fukunari Kimura, and Around 10–12 lead authors



Summary

The current investment levels in renewable energy and energy efficiency projects in the ASEAN region and East Asia are insufficient to achieve carbon neutrality goals by 2050. Compared to fossil fuel projects, renewable energy projects have more difficulties in accessing finance. The main challenges for accessing finance are lack of long-term financing, the existence of various risks, lower rate of return in renewable energy projects, and lack of capacity in market actors. Hence, to achieve energy transition and carbon neutrality goals, green financing needs to be scaled up through innovative ways. In the wake of COVID-19, the importance of innovative ways and policies for enhancing investments in renewable energy projects to achieve climate-related goals is highlighted. The book provides several empirical policy-oriented studies with new data on ASEAN Member States and East Asian economies that deal with innovative and market-based solutions for unlocking private investments in renewable energy projects. The chapters cover various aspects and means of green finance for renewable energy development, including identifying the financing barriers and solutions for mitigating them, cleantech finance and energy transition, green investment risks, green technology financing, market development, carbon taxation, green bonds, FinTech, and green digital finance. The book provides policy recommendations for designing funding strategies for renewable energy development in ASEAN and East Asia and lessons to end-users, policymakers, and market players in ASEAN, East Asia, and the rest of the world on access to finance for renewable energy development.

Policy Implications

Focus on the enabling policy environment and green financing climate to support large-scale deployment of renewables and clean technologies.

Geographic Scope

Global

Partner Organisation

Several universities and institutions



77

Navigating the Complexities of Energy Transitions in ASEAN and East Asia Region

Han Phoumin, Xunpeng Shi, and Fukunari Kimura, and Around 10–12 lead authors



Summary

To avoid climate catastrophe, the world needs an urgent system-wide transformation, including the transition to low-carbon energy (UNEP, 2022). Climate action failure is the number one long-term threat to the world and the risk with potentially the most severe impacts over the next decade. (World Economic Forum, 2022) The planet is fast approaching tipping points that will make climate chaos irreversible. Transitioning the world's energy system towards low carbon is critical for safeguarding sustainability and securing a just energy future. The 2022 UN annual assessment concluded that the international community is falling far short of the goals of the Paris Agreement, and there is no credible pathway to 1.5°C. (UNEP, 2022).

A 'just transition' approach that puts people and communities at the centre of the energy transition is also urgently needed. The concept of a 'just transition' is firmly embedded in mainstream global discourses about mitigating climate change. Central to just energy transition is mitigating the risk of job losses, economic recession, poverty, and other adverse effects that disproportionately impact vulnerable groups and regions. (Clarke et al, 2022).

In climate change and energy transitions, delays in action could have catastrophic consequences. Hence, there is an ethical imperative, not to mention an economic and political need, to devise transition strategies to low-energy carbon that are 'just' and that respond to the needs of those communities expected to bear a disproportionate cost for the transition to Net Zero by 2050.

Whilst the timeline may be diversified across countries, the goals and direction of energy transitions are clear. That substantive action on climate change must occur now is a global consensus. Transitioning from fossil fuel-based energy systems to renewables is urgently needed to limit global warming as fossil fuel consumption contributes to more than three-quarters of the global greenhouse gas emissions. Energy transitions are complicated and challenging. Implementing the energy transition is complex, involving not only technological changes in the energy systems but also deep socioeconomic and political structural changes (Shen et al, 2022). It also requires investment in related infrastructure, as well as market incentives, public education, and other policy and governance support measures (Geels et al, 2017, 2016; Shi et al, 2020).

The Russian Federation–Ukraine war and the ongoing COVID-19 pandemic create more complications. Although the Russian Federation and Ukraine are relatively small in terms of economic output, they are large producers and exporters of key food items, minerals, and energy (OECD, 2022a). Since the Russian Federation accounts for 5.35% of the world's energy supply, especially 12.43% of natural gas*, its invasion of Ukraine has disrupted global energy markets and damaged the global economy.



Compared with what took place in the 1970s, the shock has led to a surge in prices across a broader set of energy-related commodities (World Bank, 2022). At the same time, COVID-19 has changed the world permanently and exposed the supply chain vulnerability (Shi et al, 2021). Since the East Asian region heavily relies on imported energy, the surge in energy prices and threats from supply chain disruptions renew the traditional concerns of availability and affordability and such changes will have an impact on energy transition policies.

Despite a booming in the literature on energy transition issues, numerous gaps remain. A recent review of just transition policies and programmes identified several urgent questions and knowledge gaps: How deep are the inequalities associated with a low-carbon energy transition? Which communities are at the frontlines? What measures/resources are in place to assist adversely affected individuals and communities? And, with the above questions in mind, how should energy transition programmes be designed for maximum effectiveness? (Carley and Konisky, 2020).

Besides other concerns raised in the research questions, the Appropriate Transition Financing Technologies for developing countries may be the key for smooth transition, and it is often neglected in the discussion of energy transitions. ERIA has just released an important document named, 'The Technology List and Perspectives for Transition Finance in Asia' that aims to support the smooth energy transitions in developing Asia with realistic approaches that can facilitate many countries in Asia to embark on pathways to carbon neutrality whilst considering energy security, affordability, accessibility, and environmental protection simultaneously (ERIA, 2022). The list of potential transition technologies can be very useful for the financial institutions as it will serve as reference point to assess potential transition technologies submitted by project developers. The list can still serve the financial institutions until when the stakeholders/regulators (e.g. ASEAN and the governments of member states) are ready and have in place their technology roadmaps or taxonomies that can guide the energy investment towards net-zero emissions. Thus, it is very welcome as potential researchers can also address this issue.

The project aims to bring top scholars within and beyond the East Asian region to investigate how to navigate the complexities in the energy transition. It aims to investigate those common and regional-specific challenges and advance the energy transition collectively.

Policy Implications

Provide recommendations of multi-pathways of carbon neutrality

Geographic Scope

Global

Partner Organisation

Several universities and institutions



78

Collectives of Best Practices and Policies to Promote Carbon Capture, Utilisation, and Storage (CCUS) Development and Deployment: Policy Implications for ASEAN and East Asia

Han Phoumin, Rabindra Nepal et al.



Summary

The Asia Carbon Capture, Utilisation, and Storage (ACCUS) Network was successfully launched on 22–23 June 2021 by ASEAN member countries, Australia, Japan, and the United States and more than 100 international organisations, companies, and financial and research institutions that share the vision of carbon capture, utilisation, and storage (CCUS) development throughout the Asian region. The network's members have expressed their intention to share the vision of the Asia CCUS Network that aims to contribute to the decarbonisation of emissions in Asia through collaboration and cooperation in developing and deploying CCUS. The network's mission is to facilitate deployment of CCUS by promoting knowledge sharing through forums, conferences, workshops, and meetings; conducting research studies on technical, economical, and legal standards of CCUS in the East Asian Summit region; and holding capacity-building training workshops to bridge the knowledge gap on CCUS. The Asia CCUS Network provides opportunities for countries in the region to work and collaborate on the low-emission technology partnership that will eventually help to build capability of countries, through research collaboration and innovation, to lower the cost of CCUS technology and its deployment.

At the 1st Asia CCUS Network Forum held on 22–23 June 2021, it was concluded that CCUS and carbon recycling are crucial technologies for the ASEAN region to achieve carbon neutrality amidst climate and energy security concerns. Also discussed were the need to bring more CCUS projects to the commercialisation stage, issues such as the lack of an adequate legal framework to address liability, and the need to resolve a technical framework through pilot projects. It was expected that to accelerate the deployment of CCUS in the ASEAN region, there was a need to bridge the gap and to implement knowledge and experience sharing amongst the ASEAN and Asian regions.

The role of CCUS is crucial in clean energy transition as it is the only technology that contributes to directly reducing emissions in the identified economic sectors with high energy intensity and to removing CO₂ to balance unavoidable emissions. One way to reduce emission is carbon recycling. After capturing CO₂, it is used to create new materials and products. Instead of just sequestering CO₂, it will be utilised to make everything, from fuel, concrete, and shoes, to cleaning products, plastics, and food. This allows actual recycling of emissions and creating a circular carbon economy.



Policy Implications

Deployment of CCUS needs appropriate supporting policies and investment. Thus, in supporting the development of a CCUS policy, technical experts will need to understand the technical aspect of CCUS and its technologies. To help policymakers develop policies in support of CCUS development and deployment, the study will bring the best collective practices in terms of policies and CCUS technologies that can be adopted for ASEAN and East Asia.

Geographic Scope

Global

Partner Organisation

Several institutions that are members of ACCUS

Related ERIA Publications

Kimura, S., K. Shinchi, S. Kawagishi, U. Coulmas (eds.), (2020), Study on the Potential for the Promotion of Carbon Dioxide Capture, Utilisation, and Storage in ASEAN Countries: Current Situation and Future Perspectives. ERIA Research Project Report 2020-21. Jakarta: ERIA.

Downloadable from: <https://www.asiaccusnetwork-eria.org/publications/study-on-the-potential-for-the-promotion-of-carbon-dioxide-capture-utilisation-and-storage-in-asean-countries>

Kimura, S., K. Shinchi, U. Coulmas, A. Salmura (eds.), (2020), Study on the Potential for Promoting Carbon Dioxide Capture, Utilisation, and Storage (CCUS) in ASEAN Countries Vol. II. ERIA Research Project Report 2021-25. Jakarta: ERIA.

Downloadable from: <https://www.asiaccusnetwork-eria.org/publications/study-on-the-potential-for-the-promotion-of-ccus-in-asean-countries-volii>



79

Economic Analysis of Large-scale Deployment of Solar Photovoltaic (PV) with Battery Storage in ASEAN

Han Phoumin, Fukunari Kimura et al, Around 10–12 lead authors to be identified



Summary

Despite some contradictions on the timeline for net zero emissions and other climate policies, the 26th UN Climate Change Conference of the Parties (COP 26) set a path to achieve climate goals such as phasing out coal, ending fossil fuel subsidies, putting a price on carbon, protecting vulnerable communities, and delivering \$100-billion climate finance commitment. Translating these into policy actions will have enormous impact on investment in clean technologies, renewables, and clean fuels. The outcome of COP 26 will influence national policies across the globe and work towards formation of low-carbon societies, with global warming limited to below 2°C.

To achieve energy transitions towards carbon neutrality by 2050, ASEAN needs to move from its heavy dependence on fossil fuel towards a clean energy system. It is predicted that ASEAN will continue to see a rise in energy demand until 2050. ASEAN's energy mix shows that coal, oil, and natural gas make up 80% of its primary energy supply. Any policy for a clean energy system, therefore, will need to redesign the system to accommodate renewable energy sources, i.e. wind, solar, hydropower, geothermal, and biomass. The increase in renewables will need to be combined with deployment of clean technology that is still costly and thus requires solutions. The emission rates in ASEAN and India continue to rise, which go against the Paris Agreement. Hence, to avoid harm from the rising temperature, ASEAN Member States (AMSs) need to immediately lower their emission rates to achieve the climate-reduction or carbon neutrality goal. It is important for ASEAN to look at the types of renewable and locally available resources and ensure that the transition is cost affordable.

Solar energy has good potential to be included in the ASEAN energy mix whilst wind energy can only work for some countries such as Indonesia, the Philippines, and Viet Nam. Some important barriers to large-scale deployment of wind power and solar power remain. Wind power and solar power are intermittent and require battery support and backup from other renewable sources to prevent outages. Compared with other resources such as thermal and coal, deployment costs of these renewable energy sources are high. However, if ASEAN electricity integration progresses faster, resources from other regions can be used to support intermittent energy from sun and wind. For example, countries in the Mekong sub-region with hydropower energy resources could provide power backup for AMSs that utilise solar power and wind power. This would allow a higher integration of solar power and wind power into the ASEAN infrastructure of power connectivity given the status of energy infrastructure and policy stage.



With innovation in technology and policy changes, however, ASEAN could see net-zero emission by 2050 and the energy mix would include a higher share of solar, wind, biomass, geothermal, and hydropower energy. Since solar resource is abundant in all ASEAN countries, it is important for the region to deploy large-scale solar PV renewable resources with battery storage.

Policy Implications

Focus on the effective policy and programmes to support large-scale solar PV and battery storage.

Geographic Scope

ASEAN, East Asia

Partner Organisation

Several universities and institutions



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Study on the Investment Opportunity to Low-Carbon, Cutting-Edge Technology Deployment in Asia

Kenji Kimura, Takehiro Iwata, Kazuki Yamamoto



Summary

Every country in Asia has been planning and/or implementing low-carbon, cutting-edge energy technologies such as solar power, wind power, hydrogen, fuel ammonia, smart networks, and so on, to meet the rapidly increasing energy demand, while addressing carbon neutrality during the mid-21st century.

Appropriate and timely financing of low-carbon, cutting-edge technologies is one of the key issues for business entities and stakeholders in ASEAN and East Asia countries. Advisory services by professional financial institutions with excellent risk analysis capabilities are highly recommended for a smooth introduction of these cutting-edge technologies in Asia.

Firstly, broad market research on cutting-edge, low carbon energy technologies under development and commercialization in ASEAN and East Asian countries. Not only collecting information on those technologies but also focusing on customer needs – economic competitiveness, stable supply chain, environmental impact and so on – are the unique points of this research.

Secondly, the business risks of these projects by economic status, political steadiness, regulation, policy etc of each country were analysed, followed by in-depth analysis by finding and/or defining risks and opportunities in each country.

Finally, implications were suggested to mitigate the risks and smoothly proceed the projects to commercialization. Sound investment backed by a firm and steady policy, a stable supply of commodities and raw materials, and social infrastructure are crucial for sustainable, win-win investment in ASEAN and East Asia countries.

Policy Implications

Provide an opportunity for investment decision-making in a timely and appropriate manner by technology vendors in advanced countries.

Recommend energy policy to EAS ECTF/EMM through ERIN and ERIA.

Contribute to secure energy and achieve carbon neutrality in ASEAN countries.

Geographic Scope

ASEAN and East Asia



81

The Socio-Economic Implications of Coal Transition in ASEAN

Mai Kojima, Junko Ogawa, Toru Shimizu, Asamu Ogawa



Summary

Coal use is strategically important to ASEAN countries as a stable source of electricity. However, there is global pressure to phase out its use. The impact of coal use on the environment has been widely discussed for many years. Scaling down its use to mitigate climate change is a vital issue which requires immediate attention. Therefore, a transition away from coal in the coming years should be carefully considered. The coal transition argument aims to reduce coal dependency without causing harm to societies. Indonesia is a major coal producer and exporter on the supply side; while on the demand side, coal-fired power plants are the main sources of electricity generation in ASEAN member states. Considering these facts, the socio-economic implications of the post-transitional situation need detailed investigation.

We would like to explore the potential measures that can be taken to ensure a sustainable coal transition in ASEAN, using the policy implementations of other countries as an example.

The study will be conducted by both quantitative and qualitative analysis, as follows:

First, we will investigate the current situation of ASEAN member states. Literature review, internet research and interviews with key stakeholders (government officials, related businesses) will be conducted to collect related information.

Second, we will analyse the transition policies and practices of forerunner countries (for example, the UK, US, and Japan. We can examine other countries upon your request). We can gain insights from those countries to develop and implement transition policies.

Finally, we will make recommendations for future transition policies, such as financing mechanisms, supporting workers, investing in communities, and protecting the environment.

Policy Implications

The policy recommendations will be provided based on the above-mentioned study with the following aspects:

Extracting institutional issues for energy transition and implementing policy proposals.

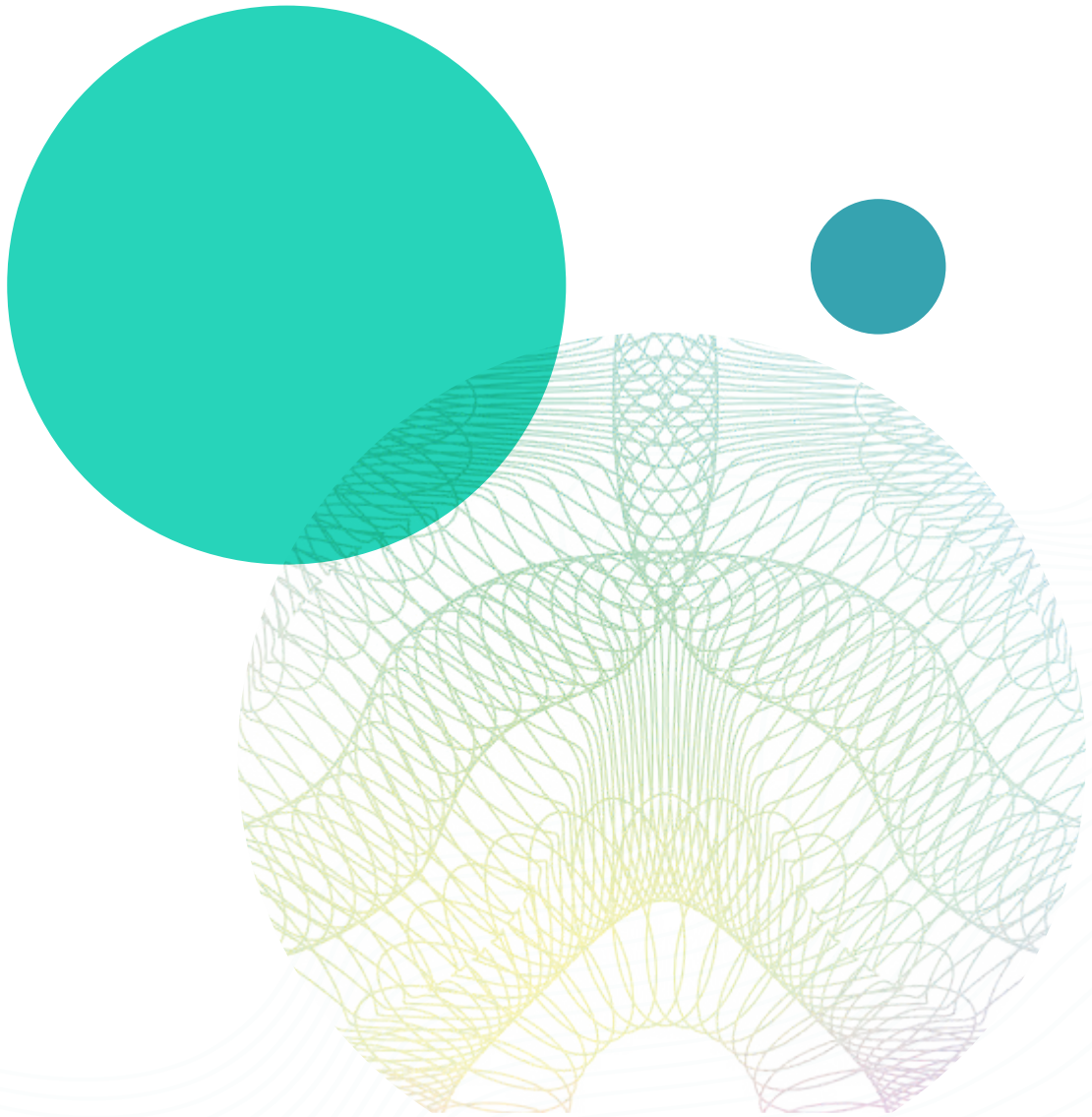
Ensuring sustainable future coal transition policies for ASEAN countries.

We believe the experiences of ASEAN countries may be replicated in other countries where coal transition will occur in the near future. By accelerating the decarbonization of ASEAN member states, this project will enlarge the scope of coal transition policies from the socio-economic perspective.



Geographic Scope

ASEAN (focusing on Indonesia). UK, US and Japan as reference countries.



82

Study on Economic Impacts of Early Retirement of Fossil Fuel Power Plant in ASEAN

Ichiro Kutani, Yoichi Namba, Hakyun Shin



Summary

When aiming to mitigate climate change, it is better to reduce fossil fuel consumption as soon as possible. However, in terms of investment, we can see this in different way. For instance, an owner of a project or financier will suffer losses if existing fossil power plants stop operating before they recoup their investment. ASEAN member states have a relatively large number of young fossil power plants which were constructed to supply rapidly growing electricity demand in recent years. Earlier retirement of such young power plants will cause economic losses and thus impact a country's economy. If a power plant is an independent power producer (IPP) with a power purchase agreement, economic losses would see a claim for compensation. If a power plant is owned by a national company, economic losses would see a reduced capability for re-investment or an increase in the fiscal burden. As such, it is essential to have an accurate understanding of negative economic impacts when designing an early retirement policy for fossil power plants.

The analysis revealed that the early retirement of existing thermal power plants has no small impact. Under the conditions of the estimation, a significant operation period reduction of 15 years would result in losses equivalent to a few percent of GDP. Under the assumed conditions, even if replaced by a solar PV power plant after the decommissioning of a coal-fired power plant, losses will not be mitigated. In theory, losses could be compensated by higher carbon prices, at around USD 50-60/ton-CO₂ for coal-fired thermal power and about USD 100/ton-CO₂ for gas-fired thermal power.

It should be noted that this analysis does not include commercial losses such as the cancellation of existing PPAs and associated compensation.

With these analyses, the study came up with three policy recommendations.

Careful consideration is required before implementing a policy for the early retirement of existing fossil power plants. Carbon pricing can be a mechanism to compensate anticipated economic losses arising from early retirement. The need to consider preventing reduction of resilience of energy systems due to loss of diversity.



Policy Implications

Carbon pricing can be a mechanism to compensate anticipated economic losses arising from early retirement.

Geographic Scope

ASEAN member countries

Partner Organisation

The Institute of Energy Economics, Japan



83

Mitigating Extreme Volatility of LNG Prices in ASEAN

Hiroshi Hashimoto, Yusuke Hidaka, and Takafumi Yanagisawa, as well as Hisao Kawakami, Yoshimasa Mori and Hideaki Akashi



Summary

After several years of relatively low, and one year of extremely low, spot LNG prices, the world entered a prolonged period of unprecedented extreme high spot LNG prices. Such volatility has caused harm to healthy development of the LNG market in the ASEAN region.

This study investigated the causes and impacts of the extreme volatility of spot LNG prices, to establish future mitigation measures and make recommendations to policy makers to promote a better LNG market. The study team investigated economic and social impacts, structural and one-time causes, and mitigation and preventative measures of such extreme volatility in individual economies, in collaboration with other research organisations mentioned in the Partner Organisations column.

One of the focuses was on the use of alternative energy, mainly for power generation, reflecting particularly high prices.

The assumption is that the dependence on coal for power generation is increasing, but due to the lack of timely and up-to-date monthly statistics, the study team continues communicating with and gathering information from power experts, coal experts, and external organizations.

As for the impact on LNG imports, South Asia (Pakistan, Bangladesh, India) saw a significant short-term decline; and ASEAN, which also has LNG production in the region, did not directly decrease LNG imports, but instead saw a visible increase (a slowdown in the rate of increase can be estimated). In Malaysia, LNG production and exports reached record highs in 2022.

PV GAS in Viet Nam said LNG import plans were delayed due to the pandemic and high LNG prices. Negotiations with LNG suppliers have been also difficult.

Due to the higher international price of coal, domestic production increased, imports decreased, and fuel shortages occurred at several coal-fired power generation facilities.

The study team continues collecting information on the impact on long-term energy supply development through hearings and the proposed workshop in the middle of June.

In the workshop, the potential of external gas supply, notably LNG from the United States, will also be investigated.



Policy Implications

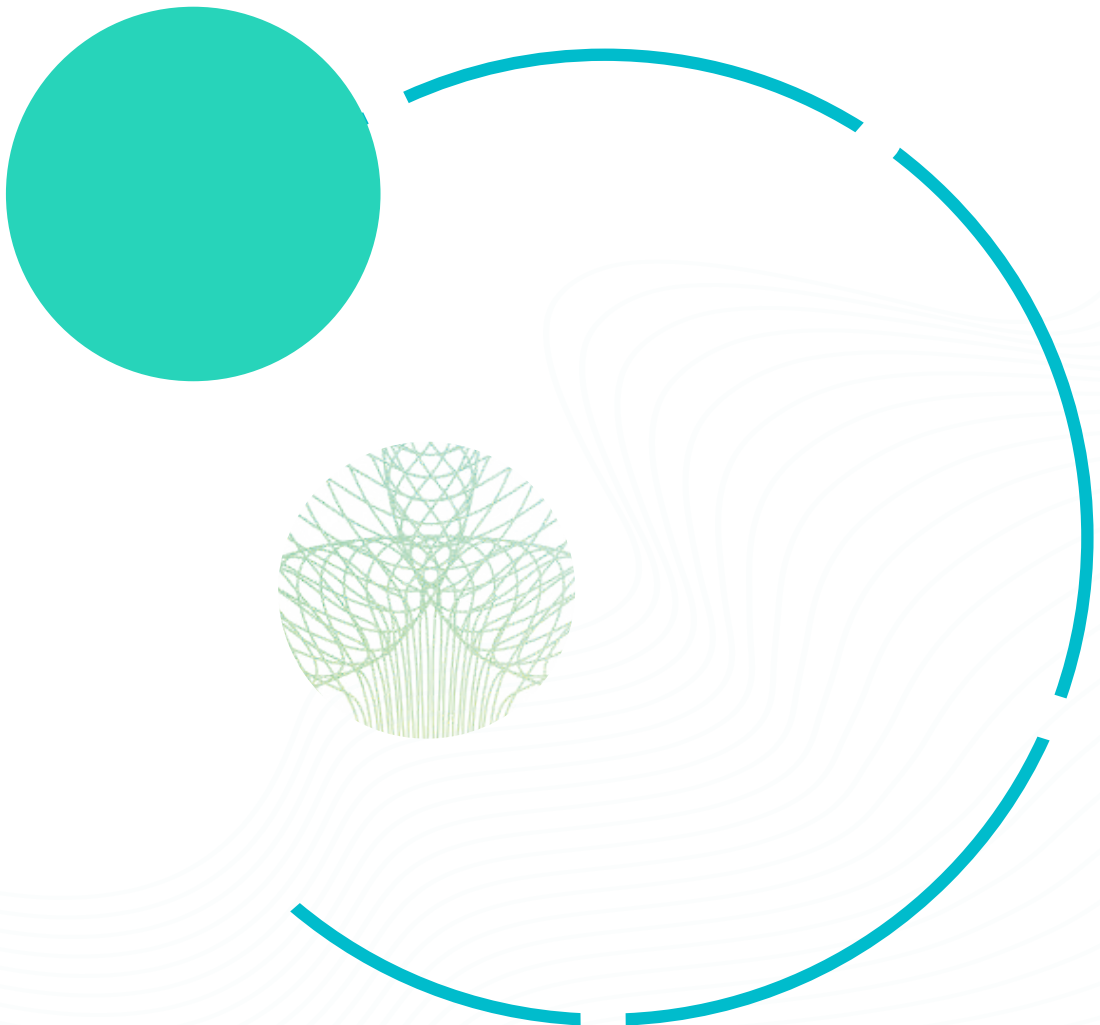
It is recommended to enhance financial and institutional support to LNG related project activities. It is also recommended to enhance the visibility of regulatory frameworks, clearer standards for energy sources - including LNG - for energy transition as a transitional or destination energy source.

Geographic Scope

ASEAN, notably Viet Nam, Thailand, Malaysia, Indonesia, the Philippines

Partner Organisation

EPRINC (Energy Policy Research Foundation inc.) and APERC (Asia Pacific Energy Research Centre)



84

Assess Energy Efficiency & Conservation (EE & C) Indicators and Policies to Ensure a Low Carbon Development Path

Ichiro Kutani, Mitsuru Motokura, Masaru Kawachino



Summary

ASEAN countries are promoting energy efficiency policies to cope with the increase in energy consumption associated with economic development. However, over the 20-year period from 2000 to 2020, countries with large populations and economies, such as Indonesia, Malaysia, the Philippines, and Viet Nam, steadily increased their energy efficiency while their carbon intensity worsened. The primary factor contributing to the worsening carbon intensity in these four countries is coal. The total energy supply (TES) of coal increased from 2000 to 2020, as did coal-fired power generation and coal consumption in the industry, especially in the iron and steel sector. Energy consumption in the road transport sector is increasing, as are CO₂ emissions. The increase in the number of vehicles using fossil fuels as their energy source, along with the development of motorization, has contributed to the worsening carbon intensity. The four countries studied commonly decided upon policies such as phasing out coal-fired power generation in the future and halting the construction of new coal-fired power plants. Measures to bridge the gap between the current situation and future targets include early shutdown of ageing coal-fired power plants, conversion to high-efficiency gas-fired power plants, co- or mono-firing of ammonia and hydrogen, and the introduction of carbon capture and storage (CCS) and renewable energy. The increase in CO₂ emissions in the iron and steel sector was the result of industrial policies such as using domestic blast furnaces. But there is a shift from the blast furnace method to the electric furnace method or the direct reduction method, and the region may consider following this trend. The road sector should also promote the spread of zero-emission vehicles such as electric vehicles (EVs). It is desirable not just to introduce EVs, but also to combine decarbonization and industrial development through electrification and zero-emissions in vehicle production, aiming to become an EV hub in the ASEAN region, while ensuring critical mineral security. Energy efficiency is steadily improving in the four countries studied. Energy service companies (ESCOs) and energy audits can visualize various energy situations, contribute to performance improvement, achieve systematic energy management, and support energy conservation and decarbonization activities.

To promote the upgrading of coal-fired power generation in ASEAN, decarbonization of steel, production of EVs and zero-emission vehicles, and further energy conservation, it is necessary to promote energy efficiency policies from a broad perspective, including energy transition financing, technology development, industrial structure transformation, housing performance improvement, and implementation of systematic energy management such as ESCOs and energy audits. The countries studied, except for the Philippines, aim to be carbon neutral (CN) in 2050 or 2060. Carbon neutrality must be maintained after it is achieved, and these broad policies can help achieve long-term sustainable carbon neutrality. For ASEAN to realize a low-carbon society at an early stage, international cooperation in technology and finance is necessary.



Policy Implications

Policies are required from a broad perspective, including energy transition financing, technology development, industrial structure transformation, infrastructure development and transforming society, and the implementation of systematic energy management.

Geographic Scope

Indonesia, Malaysia, Philippines, and Viet Nam

Partner Organisation

The Institute of Energy Economics, Japan



85

Study for Possibility of Promoting Quantitative Evaluation Indicators for Strengthening Energy Resilience in East Asia Region

Alloysius Joko Purwanto and Hiroki Kudo



Summary

East Asia has continually faced natural disasters such as earthquakes, volcanic eruptions, tsunamis, hurricanes, heavy snows, and man-made disasters that pose risks and threats to global energy supply chains. Energy resiliency can be defined as the ability to maintain access to reliable and affordable energy for communities affected by conflicts and crises, including natural disasters. Maintaining energy resiliency should help East Asia achieve energy security and sustainable development, which contains economic prosperity and environmental sustainability.

The quantitative evaluation indicators on energy resiliency are calculated by modelling risks against natural disasters and others based on information on facilities related to various demand sectors. By referring to the average value of the indicators of the sectors, consumers can use it as a guide to what should be improved to ensure energy supply in the event of a natural disaster.

The study team will investigate the possibility of introducing quantitative evaluation indicators for energy resilience in major East Asian countries, focusing on disaster resilience and sharing and discussing the results amongst the countries concerned. The aim is to help promote efforts to strengthen energy resilience in East Asia.

The methodology will include online workshops and surveys amongst the participating countries, data and information-based analysis, and building of quantitative indicators.

The APEC Energy Security Principle (2020) assumes that the APEC member economies that agree with the principle (Australia, China, Chinese Taipei, Hong Kong, Indonesia, Malaysia, Singapore, Thailand, the United States, and Viet Nam) will be leading candidate countries in initiatives.

By clarifying the risks to the energy supply chain of natural and man-made disasters in the surveyed countries and introducing quantitative evaluation indicators for energy resilience that focus on disaster's impacts, the study is expected to help promote policies to strengthen energy resilience in East Asia.

Policy Implications

Strengthening and improving energy resilience-related policies

Geographic Scope

Major East Asian countries

Partner Organisation

Institute of Energy Economics Japan



86

Hydrogen Demand and Supply in ASEAN's Industry Sector: Current Situation and the Potential of a Greener Future

Alloysius Joko Purwanto, Dian Lutfiana, Citra Endah Nur Setyawati, Ryan Wiratama Bhaskara, Ridwan Rusli, Reza Ulum, Badrul Munir, Zainal Abidin, Hafis Pratama Rendra Graha, and Sirichai Koonaphapdeelert



Summary

In its 'The Future of Hydrogen: Seizing Today's Opportunities' report (2019), the International Energy Agency pointed out that the top-four single uses of hydrogen today are found in industry, such as oil refining (33%); hydrocracking, hydrotreating, and biorefinery processes in ammonia production (27%); production of urea and other fertilisers, and methanol and its derivatives (11%); and steel production via direct reduction of iron ore (3%).

The main goal of this study is to provide a set of policy recommendations for policymakers in the ASEAN Member States to accelerate the greening of the hydrogen supply in the industry sector.

The main goal can be broken down into two objectives:

- Understand hydrogen use in the ASEAN countries for the last 10 years and its supply to industry.
- Analyse how to make the supply of hydrogen greener in the ASEAN countries by producing hydrogen with methane steam using carbon capture, utilisation, and storage, and electrolysis, with electricity coming from renewable sources in the ASEAN countries, amongst others. This would also include analysis of future production, storage and transport costs, and capacity development in both hydrogen production pathways.

Policy Implications

Improving hydrogen development policies in ASEAN

Geographic Scope

10 ASEAN Countries

Partner Organisation

Private/independent consultants,
Chiang Mai University



87

Study on Green Hydrogen Production in Brunei Darussalam

Shigeru Kimura, Alloysius Joko Purwanto, and Takeshi Miyasugi



Summary

Low-carbon energy transition is an important issue in ASEAN. Hydrogen is a possible option for Brunei Darussalam to achieve a low-carbon energy transition. Hydrogen production from natural gas by applying reforming technologies is highly probable. Green hydrogen production through electrolysis technologies using renewable electricity is also an option. The study seeks to explore opportunities for Brunei Darussalam to produce green hydrogen with focus on the following:

- a) Potential of renewable energy capacities in Brunei Darussalam, particularly the solar photovoltaic system
- b) Electrolysis technologies to produce green hydrogen
- c) Brunei Darussalam's internal and external demand for green hydrogen
- d) Economics of green hydrogen production, storage, transportation, and other infrastructure environment
- e) Business and investment ecosystem required to support green hydrogen industry in Brunei Darussalam

Policy Implications

Improved strategy and roadmap of Brunei Darussalam in developing green hydrogen economy

Geographic Scope

Brunei Darussalam

Partner Organisation

Chiyoda Corporation



88

Policies and Lifecycle Assessment of Wider Penetration of Electric Vehicles in ASEAN Countries

Alloysius Joko Purwanto and Naoko Doi



Summary

East Asia Summit (EAS) countries have progressed in recent years towards electrifying transport. If coupled with low-carbon power generation, electric vehicles (EVs) can be an important technological option to improve air quality in urban areas, enhance energy security by shifting away from oil dependence, and mitigate climate change.

The study will conduct quantitative and qualitative analyses, focusing on six EAS countries (India, Indonesia, Malaysia, Singapore, Thailand, and Viet Nam), in relation to the wider diffusion of EVs. The methodology shall include analysis of EV-related policies and regulations in the six EAS countries, some outstanding cases of the introduction of EV-charging infrastructure development, and the lifecycle impact of EV deployment on carbon dioxide (CO₂) emissions by 2040. Lifecycle assessment will include CO₂ emissions from production, usage, and disposal of internal combustion engines, hybrid electric vehicles, battery electric vehicles, and plugin hybrid electric vehicles.

The study will draw up policy recommendations on the wider diffusion of EVs and the development of the necessary infrastructure, and implications on the current status of EV deployment, infrastructure development, and economic incentives.

Policy Implications

Improved policies to widen EV penetration in ASEAN countries, especially from the lifecycle analysis perspective

Geographic Scope

ASEAN countries

Partner Organisation

Institute of Energy Economics Japan



89

Energy Security Risks with Modern Perspectives in ASEAN Countries

Alloysius Joko Purwanto and Kei Shimogori



Summary

Some ASEAN countries have committed to address climate change with ambitious greenhouse gas (GHG) emission-reduction targets such as carbon-neutral declarations. One of the biggest challenges for ASEAN countries is how to balance their economic growth and climate change actions. Even if ASEAN countries expand the share of renewables, energy security of fossil fuels is still important for their energy policy. In recent years, soaring prices of fossil fuels and climate finance pressures on fossil fuels have been added to energy security issues.

The study will analyse energy security risks of ASEAN countries, focusing on fossil fuels, based on new scenarios such as the high prices of fossil fuels due to the Ukraine invasion by the Russian Federation and high financial pressure on fossil fuels from international institutions.

The study shall include the following steps.

First, conduct a literature survey of nine ASEAN countries from 2000 to 2020 to collect statistical data for risk analysis and policy information.

Second, summarise background information of ASEAN member countries.

Third, conduct a risk analysis based on the following perspectives:

- self-sufficiency and import partner risk (qualitative analysis: identifying import partners based on International Energy Agency [IEA] data and describing country risks related to energy of those partners);
- infrastructure risk (qualitative analysis: diversification of import infrastructure, inter-regional gas and electricity connectivity, referring to publications related to latest information on infrastructure construction by the ASEAN Centre for Energy);
- domestic response risk (level of stockpiling, qualitative analysis referring to previous studies by ERIA and Institute of Energy Economics Japan, dual fuel rate for thermal power, using a commercial data service);
- price spike risk (oil and gas dependency in electricity supply, using IEA's World Energy Balances); and
- climate finance risk (coal dependency in electricity supply; using IEA's World Energy Balances, foreign independent power producers' dependency for thermal power generation; using a commercial data service).

Fourth, derive policy recommendations that (i) clarify current energy security risks related to fossil fuel; and (ii) strengthen inter-regional connectivity, energy conservation, and domestic energy companies and finance.



Policy Implications

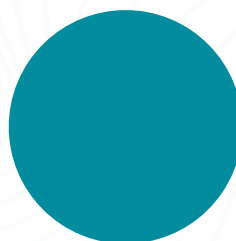
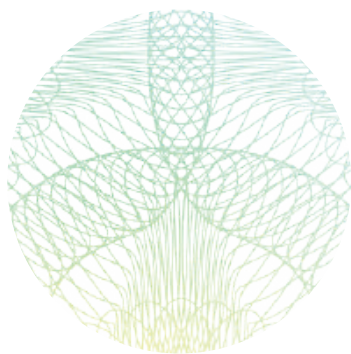
Improved policies and strategies of ASEAN Member States in the perspective of energy security, conservation, and connectivity

Geographic Scope

ASEAN member countries

Partner Organisation

Institute of Energy Economics Japan



90

Potential Utilisation of Fuel Ammonia in ASEAN Countries

Alloysius Joko Purwanto and Yoshikazu Kobayashi



Summary

ASEAN countries are considering the continued use of coal-fired power generation, a stable power source in the energy mix, and are expected to make effective use of fuel ammonia in their transition initiatives towards a decarbonised society. On the other hand, to commercialise ammonia co-firing for coal-fired power generation, it will be important to extract and analyse issues such as technological development, e.g. improvement of co-firing rate, establishment of ammonia supply chain, and appropriate supporting policies.

As a successor to previous year's study, this project will study the possibility of production and consumption of fuel ammonia in ASEAN, including further investigation of the possibility of ammonia co-firing and collaboration with resource-exporting countries outside ASEAN. The study shall analyse the following aspects: supply potential of fuel ammonia in five ASEAN countries (Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam); cost analysis of ammonia co-fired power generation; updates of demand potential analysis of the above five ASEAN countries reflecting the latest development of their power development plans; and the latest technological development of ammonia co-firing (including co-firing with natural gas and ammonia mono-firing).

In the short term (2030), the study shall develop the road map for hydrogen and ammonia adoption; a plan to procure fuel ammonia from domestic and external supply sources; cultivate domestic ammonia production potential; and review and modify the regulations and standards for safety, health, and environment for ammonia utilisation as a fuel.

In the long term (beyond 2030), the study shall elaborate policies that minimise the adverse impacts on existing ammonia and fertiliser markets; accelerate the adoption of hydrogen and ammonia by the power sector; and build the domestic supply chain infrastructure (production capacity, port facilities, transportation, etc).

Policy Implications

Improved ASEAN country policies that serve to minimise the adverse impacts on existing ammonia and fertiliser markets, accelerate the adoption of hydrogen and ammonia by the power sector, and build the domestic supply chain infrastructure

Geographic Scope

ASEAN Member States

Partner Organisation

Institute of Energy Economics Japan



91

Effective Management of Methane Emissions

Alloysius Joko Purwanto and Hiroshi Hashimoto



Summary

As demonstrated by international initiatives, including the Global Methane Pledge and the International Methane Emissions Observatory and the Oil and Gas Methane Partnership 2.0, the methane emission issue has been attracting more attention, with the natural gas value chain being targeted as low-hanging fruit for emission reduction.

The study aims to promote understanding of the issue by parties, primarily in the 10 ASEAN countries, by conducting literature studies, as ASEAN countries and companies will ask for information in the form of a paper inquiry or interviews, and by conducting at least one workshop.

The study will pay special attention to how emissions have been monitored, managed, and reduced throughout the natural gas value chain in the region, and to the establishment of a road map by a task force consisting of major regional players in the natural gas business. The road map should be consistent with transition aspirations and in line with the global trend of methane mitigation initiatives.

The expected strategy to reduce and manage methane emissions resulting from this study should enable natural gas and liquefied natural gas (LNG) to survive the energy transition and enhance energy security and resilience in the ASEAN region, as well as in Northeast Asia (which is expected to continue relying on ASEAN LNG supply, albeit to a lesser extent).

Policy Implications

Improved policies and strategies of ASEAN countries to reduce and manage methane emissions

Geographic Scope

ASEAN Countries

Partner Organisation

Institute of Energy Economics Japan



Electric Vehicles in ASEAN: Total Cost of Ownership, Externalities, and Sustainable Strategies

Alloysius Joko Purwanto and Yanfei Li



Summary

This study aims to assess the following aspects of electric vehicles in the Association of Southeast Asian Nations (ASEAN): total costs of ownership, global warming potential, potential environmental impacts, and strategies for a sustainable EV ecosystem.

The study covers not only electric vehicle operation, fuelling, fabrication, and scrapping; but also charging installation deployment, battery fabrication including critical mineral mining extraction, and processing until recycling or repurposing or waste management of those batteries when they reach their end-of-life and, propose a working framework to build strategies for a sustainable EV ecosystem. The study will cover the ASEAN region, and deal with electric cars and powered electric two-wheelers (e-motorbikes).

Policy Implications

The study will provide decision makers in ASEAN with policy recommendations on EV penetration which consider: the whole life cycle of batteries and electric vehicles, including their climate and environmental externalities when using EV penetration to mitigate climate change, environmental problems, and to boost the automotive industry; and the total cost of ownership (including externalities) when determining a policy to subsidise EVs.

Geographic Scope

ASEAN Member States



93

Switching from Diesel Fuel Use in Power Generation in Remote Islands in Indonesia

Shigeru Kimura and Alloysius Joko Purwanto



Summary

The study aims to analyse the opportunities to de-dieselize 33 power plants in remote islands in Indonesia through two pathways. First, proposing LNG-based electric power generation systems in the 33 targeted power plants by identifying the possible configuration of a small-scale LNG supply chain. This will contribute to a stable electric power supply and provide affordable electricity in those islands in a sustainable way, following the national development plan. Second, by proposing renewable electricity generation systems in the islands where the targeted power plants are located.

Policy Implications

The study will provide Indonesia's Ministry of Energy and Mineral Resources with a better strategy and plan to switch from diesel-fired power generation to gas-fired power plants or to renewable resources based power generation in its remote islands.

Geographic Scope

Indonesia

Partner Organisation

Indonesia National Energy Council (NEC/DEN)



94

Toward Green Hydrogen Production Pathway in Indonesia

Shigeru Kimura and Alloysius Joko Purwanto



Summary

This study seeks to explore and analyse the different hydrogen production pathways in Indonesia, with a focus on finding the most economical and feasible methods to produce green hydrogen by 2050.

The purposes of the study are as follows. First, to update the analysis of potential of renewable energy (RE) source capacities in Indonesia. Second, to analyse the most economical options to produce green hydrogen from each of the renewable electricity resources. Third, to analyse the potential of green hydrogen supply and hydrogen demand in Indonesia. Fourth, to propose a business/investment ecosystem to develop the green hydrogen industry in Indonesia, and the required government policy measures to support that ecosystem.

Policy Implications

The study will provide the Ministry of Energy and Mineral Resources with a set of policy recommendations for stimulating and developing the required business/investment ecosystem to develop the green hydrogen industry in Indonesia, and the required government policy measures to support that ecosystem.

Geographic Scope

Indonesia

Partner Organisation

ERIA and Indonesia National Energy Council



95

Study on Decarbonization in the Transportation sector of ASEAN

Naoko Doi



Summary

The great impact of EVs on energy security enhancement, air quality improvement, and climate change mitigation, means ASEAN countries are trying to increase their use. In the ASEAN context, the role of biofuels is important for decarbonizing the transport sector. Meanwhile, faced with the recent economic downturn from COVID-19, and the subsequent energy crisis, progress for the wider diffusion of EVs and biofuels has slowed compared to previous targets. Discussions on the introduction of fuel economy standards have widely taken place among ASEAN countries, as an important means for lowering oil demand and the short- and mid-term options for reducing CO₂ emissions.

To create a set of policy recommendations, the study has three objectives. First, to analyse policies for wider EV penetration, including targets, incentives, and their progress. Second, to explore policies and programs for the use of biofuels and the status of fuel economy standards in the ASEAN transport sector, and understand progress as well as hurdles. Third, to make a quantitative analysis of EVs, the use of biofuels, and the introduction of fuel economy standards for calculating CO₂ emissions reduction by 2040. The study will consider the “cost” of different types of vehicles to identify the areas of policy implementation and economic incentives.

Policy Implications

From the policy perspective, the study will provide a comparison of policies and progress on EV deployment among the analysed countries, to develop a better understanding of the popular types of EVs in ASEAN, the impact of biofuels for transport sector decarbonization in ASEAN, and other policy implications such as the need for economic incentives for the wider diffusion of EVs and use of biofuels in ASEAN.

Geographic Scope

ASEAN

Partner Organisation

Institute of Energy Economics Japan (IEEJ)

Related Publication

Fromn



96

Different Impacts on LNG Market Shifts on ASEAN

Hiroshi Hashimoto



Summary

One year after the Russian invasion of Ukraine, the impacts on the LNG market of Southeast Asian economies, some of which started even before the invasion, are now emerging. Along with difficulties in procuring LNG in the international market, there has been encouragement to develop more gas resources in the region. This study's objectives are two-fold. First, to identify bottlenecks to advance the energy transition and stable energy supply through utilization of LNG. Second, to enhance partnerships between Asian markets and LNG supplying countries, including the United States, to pursue a more stable supply of LNG.

Policy Implications

In terms of policy, this study shall:

Review the policy directions of ASEAN economies on the liberalisation of electric power and retail gas markets in conjunction with supply security. While Japan does not have a monopoly of gas imports with electric power and gas retail market liberalisation, Korea and Chinese Taipei have de facto monopolies of gas imports by single entities.

Compare different combinations of LNG imports, electric power and gas supply business frameworks and consider future directions.

Seek opportunities to present the study's interim findings during its course, through making presentations or participating in industry conferences, as well as holding one or multiple workshops on the LNG industry in close coordination with METI/ERIA, leading to healthy discussions among stakeholders over steady and practical energy transitions in Asia.

Geographic Scope

ASEAN Member States

Partner Organisation

Institute of Energy Economics Japan (IEEJ)



97

Study on Measures to Evaluate and Reduce Methane Emissions in the LNG Value Chain in ASEAN

Hiroshi Hashimoto



Summary

The Global Methane Pledge is gaining strength in creating a global trend to reduce and manage methane emissions, focusing on the oil and gas industry. Although there has been general recognition of the need to take care of the issue, industry players do not know how to move forward as the science is not well established.

This study will analyse and verify whether effective methane emission management could lead to an increase in the natural gas supply, and help a better energy transition and energy supply stability. It will also promote common understanding over the necessity of effective methane emission management in Southeast Asia; review various measurement, reporting and verification (MRV) methodologies and initiatives from around the world; provide the information to ERIA and METI; and then share the relevant knowledge with stakeholders in the LNG industry in Asia and Japan, leading to further understanding and practical applications of better MRV methodologies in the region.

Finally, it will facilitate information exchanges at international events, including COP28.

Policy Implications

In terms of policy recommendations, the study will review existing initiatives and activities on methane emission management and mitigation, and include them in reporting to ERIA and METI. It will identify best practices, including advanced company activities and relevant government regulations and incentive frameworks, which ASEAN economies could look at when they develop their own methane emission management measures and policies.

The study will also submit a report to ERIA and METI to contribute to productive discussions between relevant governments, and provide government officials with useful information and expertise based on the above-mentioned study and related activities, aiming for realisation of the main goals.

Geographic Scope

Southeast Asian countries

Partner Organisation

Institute of Energy Economics Japan (IEEJ)



98

Accelerate Energy Technology Development in ASEAN

Ichiro Kutani



Summary

Many ASEAN member countries have announced their ambition to become carbon neutral in the future. However, currently countries rely on imports for many carbon neutral technologies. From the industrial policy perspective, it is clearly better for a country to hold the technologies in their own hands because development of their own technology can be a strong engine for green growth.

For this reason, every country should look at the research and development of new technologies. Each country has different advantages and disadvantages, or different focused areas of R&D activities. If member countries can join hands to complement each other by combining their knowledge and techniques, the region can accelerate technological development and thus attain mutual benefits.

Based on this, the study will map the status of clean technology development conducted by each country. With this map, the study aims to identify areas of possible collaborations and areas which complement each other.

Policy Implications

In terms of policy recommendations, the study will show:

Cost optimal pathways to achieve carbon neutrality are estimated quantitatively with sensitivity analyses.

The results imply that:

Energy saving and electrification in end-use sectors, combined with a low-carbon power supply, are core strategies for decarbonizing a country's energy system.

During transition periods, various kinds of "low-carbon" technologies can reduce CO₂ emissions effectively. Simulation results imply significant economic challenges associated with decarbonization.

Cost reduction and international cooperation are key to efficiently achieving carbon neutrality. Future research and development, in cooperation with advanced economies is crucial.

Geographic Scope

ASEAN Member States

Partner Organisation

Institute of Energy Economics Japan (IEEJ)



99

Development of Bioenergy Supply Chain in the AZEC Partner Countries

Yasushi Ninomiya



Summary

Under the global trend toward decarbonization of the economy, Southeast Asia countries are generally lagging behind in deploying variable renewable energy (VRE) resources. Under these circumstances, it is crucial to consider effective utilisation of potentially abundant bioenergy resources in Southeast Asia. Bioenergy is inherently non-intermittent energy which can play a critical role in providing flexible resources required by power grids in supporting an increasing share of VRE.

The objectives of this project are as follows: collect and analyse information/data related to bioenergy resources in Southeast Asia, and create a list of stakeholders and companies with related technology and expertise for the formation of a bioenergy supply chain in each country concerned; with the outcome of the first object, to then consider a feasible approach to develop a bioenergy supply chain to promote effective utilization of bioenergy in the region.

Policy Implications

This study will provide guidelines, as its recommendations are expected to provide policy direction to develop the bioenergy supply chain, by knowing the overall picture of the potential for supply/demand of bioenergy in these countries. Using these guidelines, the countries are expected to form relevant policy and regulation frameworks to create an adequate business environment for companies located in the region who need bioenergy to decarbonise their activities .

Geographic Scope

Countries within Asia Zero Emission Community (AZEC)

Partner Organisation

Institute of Energy Economics Japan (IEEJ)





XIII. International Cooperation

100

Solar Supply Chain Development in the North East India and ASEAN

Venkatachalam Anbumozhi, Bhupendra Singh, V.G.R. Chandran, and K. Yamaguchi



Summary

Securing regional supply chain for solar energy will play an important role in meeting regional energy security in the coming years. The growing energy needs of the Northeastern Region (NER) of India, the focus of photovoltaic component manufacturing in several ASEAN Member States (AMSs), have created unique opportunities in securing regional solar supply chain. Given the speed of change in cost reduction and increasing demand, a strong case can be made for the international community to participate and build a strong regional supply chain and/or production networks. The study examines the demand opportunities and identifies key structural issues affecting solar manufacturing and provides policy insights to enable the creation of a regional supply chain and develop a framework for improved energy access through solar power mini-grids in NER, and its implications on neighbouring Myanmar. The key objectives of the study include identifying and formulating strategies, standards, and requisites for development of regional solar supply chain involving NER and major ASEAN economies, and assessing the potential for multilateral cooperation for technology upgrade, capital expenditure support for regional solar manufacturing, development of integrated solar manufacturing hubs, promotion of clustered research and development project funding, and low-cost financing to support solar photovoltaic-based mini-grid systems in NER.

Policy Implications

- Estimation of demand opportunities over the next 20 years across solar supply chain in NER and ASEAN
- Value-added analysis on key elements for securing a regional solar supply chain and/or international production networks

Geographic Scope

India, ASEAN

Partner Organisation

Confederation of Indian Industries

Related Publication

Anbumozhi, V., I. Kutani, and M. P. Lama (eds.) (2019), *Energising Connectivity between Northeast India and its Neighbours*. Jakarta: ERIA.

<https://www.eria.org/publications/energising-connectivity-between-northeast-india-and-its-neighbours/>





Summary

The international community is making efforts towards the Paris Agreement's objective of stabilising temperature increase between 1.5° and 2.0° Celsius since the Industrial Revolution. Studies suggest that global greenhouse gas (GHG) emissions need to be reduced by 45% by 2030 to achieve the 1.5° target. With this in mind, there is a growing call for more ambitious nationally determined contributions (NDCs) for 2030, commitment to 2050 carbon neutrality, phase out of fossil fuels, and massive introduction of renewable energy. Financial institutions and investors are also taking action, such as stopping finance and making coal-related investment. The European Union and the United States are considering introducing carbon border adjustment measures to secure a level playing field with their trading partners whilst pursuing more ambitious mitigation actions.

In the coming decades, the Asian region is expected to occupy the bulk of the incremental GHG emissions. Countries in this region prioritise poverty alleviation, job creation, good education, healthcare and economic growth over climate action. Whilst they strive to promote energy efficiency and energy transition to cleaner fuels, it is realistic to assume that they will continue to be dependent on fossil fuels, including domestic coal. Lower per capita gross domestic product could also reduce people's willingness to pay for additional costs for climate actions. Whilst achieving the 1.5° target calls for a 45% reduction of GHG emissions by 2030, China's target is to peak out GHG emissions for 2030, whilst India's intensity target suggests continuous growth of GHG emissions beyond 2030.

There is a huge gap between the 'ideal' world under the Paris Agreement and the energy reality in the Asian region, most notably the ASEAN region. Bridging this gap in global endeavor is crucial for tackling climate change. Energy transition in ASEAN calls for a pragmatic solution through enabling policy and business environment that introduces lower and zero-emissions technologies with affordable cost whilst preventing undue energy cost increases.

To explore viable paths to a low-zero carbon future there need to be a scrutiny of the priorities given to climate action amongst the 17 sustainable development goals (SDGs) in the ASEAN region. Priorities should differ between the ASEAN region and, for example, the European region. There could be differences across ASEAN member countries depending on their economic development stage. The study will look into different priorities amongst the 17 SDGs across ASEAN Member States by using past and ongoing My World 2030 Survey.



Policy Implications

This study aims to place climate action and energy transition in the context of the sustainable development goals that reflect ASEAN countries' national circumstances. It also suggests the necessity of investment criteria that reflect the region's energy reality as it transitions to decarbonisation.

Geographic Scope

ASEAN



Shigeru Kimura, Ir. Usman, M.Eng, Iex Zapantis, Chris Consoli, Ian Havercroft, Eric Williams and Han Phoumin



Summary

The Vision of Asia CCUS Network (ACN) is actively working to start a carbon capture and storage (CCS) pilot project in the ASEAN region by 2025 and transitioning CCS to a commercial basis by 2030. To achieve this, ACN will conduct the following research studies on 1. carbon dioxide (CO₂) storage potential in ASEAN region; 2. carbon capture and storage/carbon capture, utilisation, and storage (CCS/CCUS) policy and regulation framework; 3. CCS/CCUS financial framework; 4. and effectiveness of CCS/CCUS value chain. To accelerate CCS/CCUS activities in the East Asia Summit (EAS) region, ACN held the 2nd ACN forum in September 2022 and a series of knowledge-sharing conferences on CCS/CCUS.

Policy Implications

EAS countries are committed to achieving carbon neutrality by 2050 or beyond, and CCS/CCUS is a promising decarbonisation technology. Thus, ACN will activate a platform in the EAS region to develop and deploy CCS/CCUS through research studies and knowledge-sharing.

Geographic Scope

EAS region (Australia, Cambodia, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, United States and Viet Nam)

Partner Organisation

The Institute of Energy Economics, Japan; National Research and Innovation Agency, Global CCS Institute

Related Publication

Study on the Potential for Promoting Carbon Dioxide Capture, Utilization, and Storage (CCUS) in ASEAN Countries Vol. I and II



Study on an Enabling Agreement Amongst ASEAN Member States for Establishing the MPT/APG Institutions

Kei Sudo, Yanfei Li, Han Phoumin, et al



Summary

The Economic Research Institute for ASEAN and East Asia (ERIA) has implemented a number of projects providing technical and advisory services to the heads of the ASEAN power utilities and authorities. This project includes the identification of two institutions to be formed to advance the ASEAN power grid (APG):

1. The APG generation and transmission planning function (AGTP), and
2. The APG transmission system operator function (ATSO).

To establish these institutions, a combination of high-level regional agreements will be required, together with more detailed agreements giving authority to the institutions and defining their functions. ERIA will research how to develop a high-level intergovernmental agreement to facilitate the implementation of the institutions.

The primary objective of the project is to develop the outline content of a high-level intergovernmental agreement between the ASEAN Member States (AMSs) supporting the formation of AGTP and ATSO. The most efficient and appropriate reporting structure for the AGTP and ATSO institution in the wider ASEAN Secretariat is to be proposed. The tasks align with item action plans from the ASEAN Plan of Action for Energy Cooperation Phase II: 2021–2025, Programme Area No. 1 ASEAN Power Grid, which are defined as follows:

- o Action Plan 2.1: Establish intergovernmental coordination and facilitation mechanism and develop institutional and regulatory capacities of the multilateral power trade (MPT) and APG institutions.
- o Action Plan 2.2: Assess the need and feasibility of existing and new regional institutions for implementing MPT.

The project will include the establishment of a platform for discussion between the stakeholders in the ASEAN power sector (including, but not limited to, policymakers, electricity market regulators, and utilities in the AMSs). The platform is to be convened by ERIA under the guidance of the consultant to discuss the principles, framework, and terms of the enabling high-level intergovernmental agreement and to seek consensus amongst the AMS representatives regarding the above as well as the way forward.

Policy Implications

High-level intergovernmental draft agreement on MPT to accelerate discussions on the realisation of MPT in ASEAN



Geographic Scope

ASEAN

Partner Organisation

Several institutions related to ASEAN power grid

Related Publication

ERIA (2020), *Study on the Formation of the ASEAN Power Grid Generation and Transmission System Planning Institution*. Downloadable from: <https://www.eria.org/research/study-on-the-formation-of-the-asean-power-grid-generation-and-transmission-system-planning-institution/>

ERIA (2020), *Study on the Formation of the ASEAN Power Grid Transmission System Operator Institution*. Downloadable from: <https://www.eria.org/research/study-on-the-formation-of-the-asean-power-grid-transmission-system-operator-institution/>



SUMMARY OF ERIA RESEARCH PROJECTS 2023



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