Mobilising Asia Pacific Talent

Southeast Asia Clean Economy Workforce Action Plan

Discussion paper 11 November 2025

THE AUSTRALIAN APEC STUDY CENTRE
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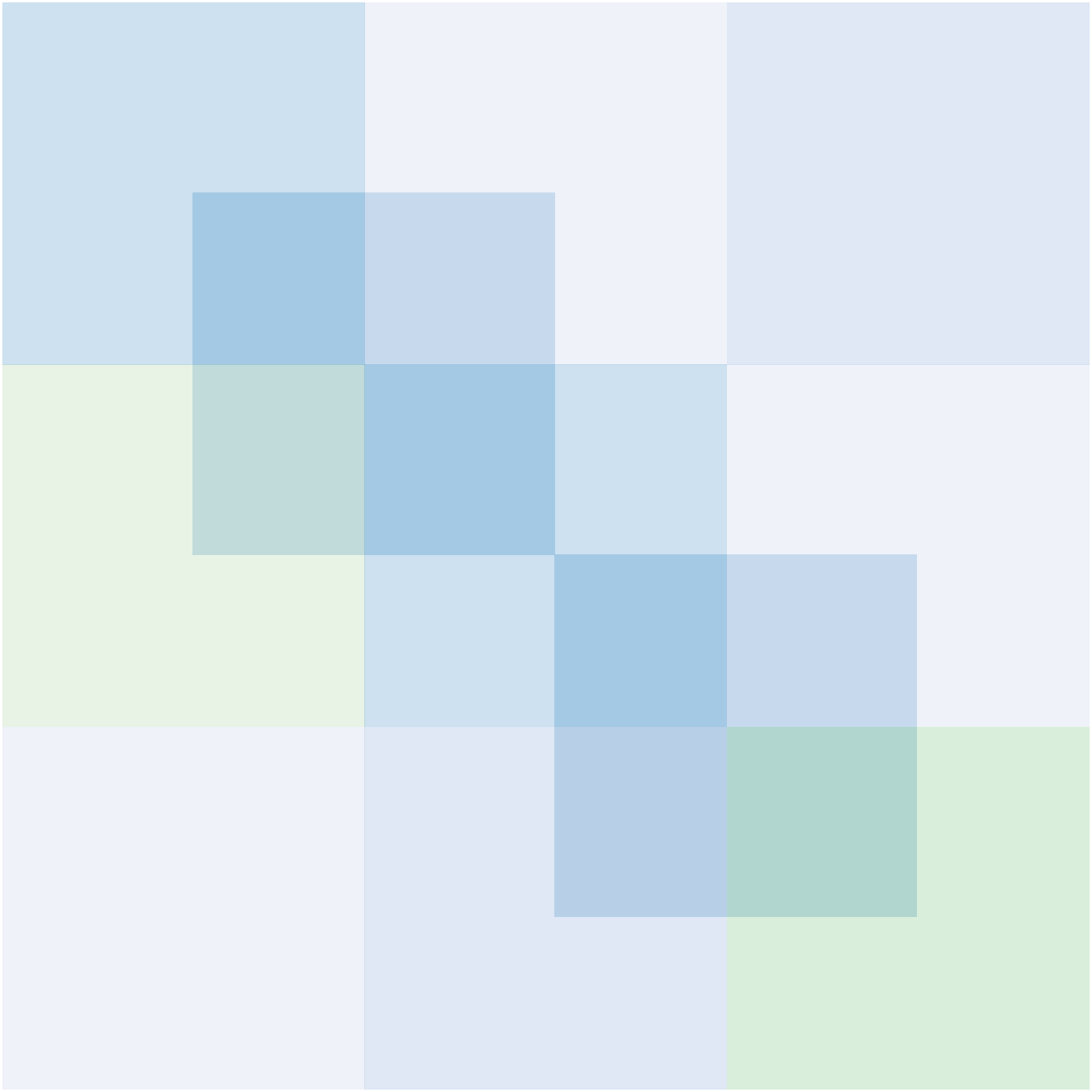

The Australian APEC Study Centre, RMIT University, with the Australian Committee for the Pacific Economic Cooperation Council (AusPECC)

This paper was prepared by the Australian APEC Study Centre with the Australian Pacific Economic Cooperation Council (AusPECC) to inform discussions for the RMIT Roundtable on "Southeast Asia Clean Economy Workforce Action Plan" held in November 2025.

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Foreword

The efficient and effective transition to a clean economy is a common goal for Australia and countries in Southeast Asia. And this brings many shared challenges for the region – mobilising the talent needed to make that transition and maintain a clean-economy is one such key challenge.

The Asian Development Bank points to 30 million clean economy jobs that will be needed in Southeast Asia by 2030. The 30 million-strong clean economy skilled workforce will be distributed both *within* economies and *across* the region. It demands the attention of government policy makers, businesses and education institutions. A fundamental question that arises is – how can Australia and Southeast Asia cooperate to mobilise this clean economy workforce?

RMIT University convened a Roundtable in Melbourne in November 2025 to begin a conversation about this issue. The "*Southeast Asia Clean Economy Workforce Action Plan*" Roundtable brought key stakeholders together to RMIT's City North Social Innovation Precinct to explore the essential elements – such as skills, education, training, and data-driven policy – needed for the development of a domestic and regional workforce, and to share perspectives and knowledge.

In attendance were representatives from RMIT University, the Australian APEC Study Centre (AASC), the Australian Committee for the Pacific Economic Cooperation Council (AusPECC), RMIT Sustainable Cities Hub Vietnam, the Victorian government, Climateworks at Monash University, Asia Society Australia, the Australian Productivity Commission, Deloitte Access Economics, Asialink Business, Jobs and Skills Australia, the Department of Foreign Affairs and Trade, Engineers Australia, and the City of Melbourne among others.

A core focus of the Roundtable was the value of taking collaborative approaches towards building a regional workforce to accelerate the adoption of clean and renewable technologies in Australia and Southeast Asia.

This paper was initially prepared by the AASC at RMIT University in partnership with AusPECC as background for the Roundtable. Intended as a conversation starter on collaborative approaches, it outlines the changing landscape in which clean-economy talent will need to be advanced and mobilised. It explores the nature and types of barriers holding this back and sets out ten recommended pathways that could be taken to meet the challenges in developing a future ready clean-economy workforce. The key conclusions were presented at the Roundtable to inform the discussion.

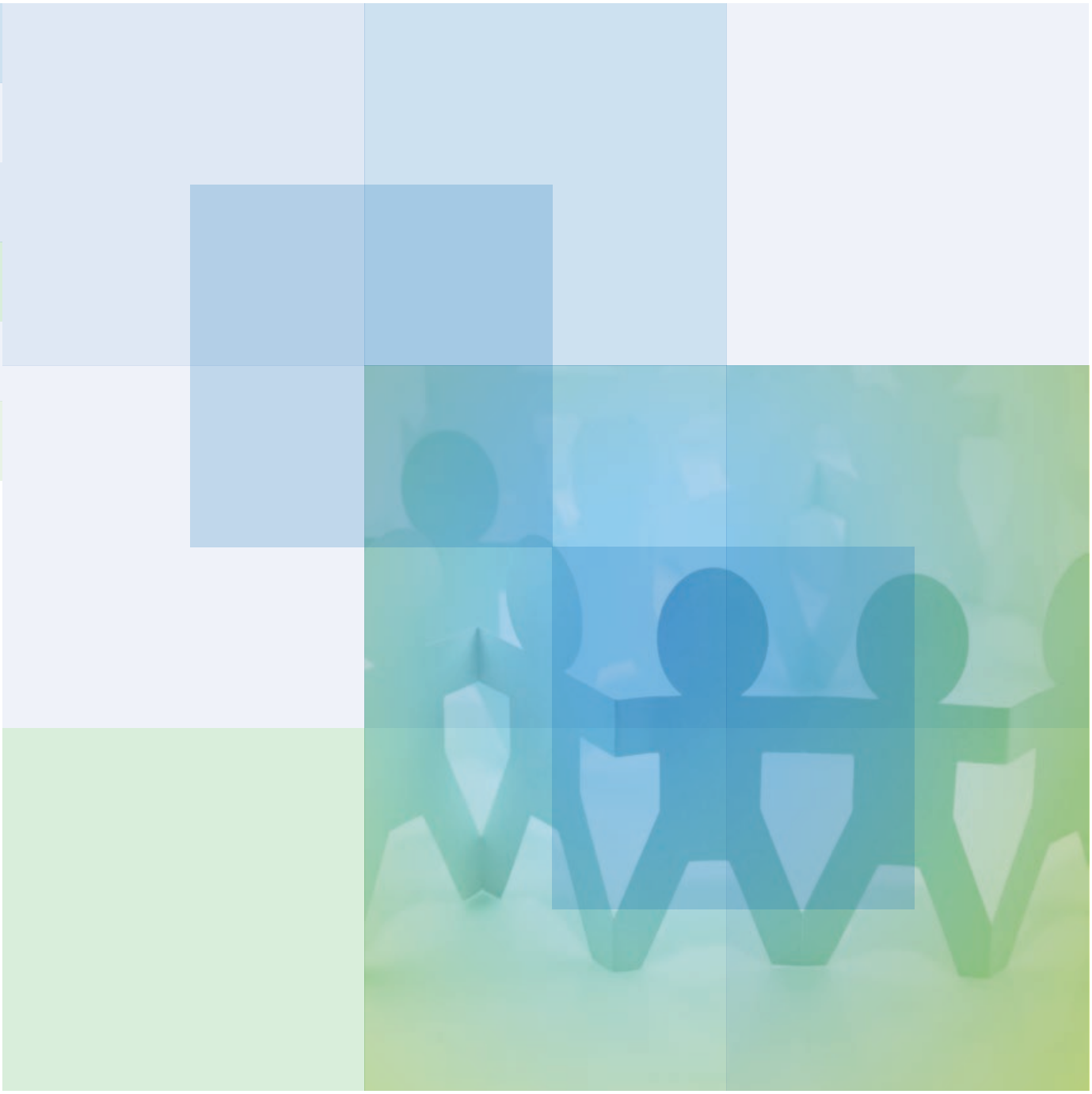
Among the pathways presented, those that resonated most with the group were:

- The need to create national skills taxonomies that include green skills and align systems at the regional level, and with international best practice.
- Opportunities to enhance regional mobility across borders through 'Green skills project passports' that could provide temporary and enabling economic access for foreign professionals and workers along value chains involved in clean economy projects.
- The importance of enhancing engagement between education institutions and business to improve transitions from education to work and help meet the shifting workforce needs in areas of industry demand.

It is hoped that the Roundtable and this paper will spark meaningful discussions on this essential topic and generate further initiatives to develop coordinated, data-driven approaches to mobilising a regional clean economy workforce that meets both national and regional needs. The AASC, AusPECC and RMIT look forward to progressing the conversation as part of a continuing body of collaborative work.

Arjuna Nadaraja
Chair, Australian Pacific Economic Cooperation Council (AusPECC)

Executive Summary



Sharing a green talent pool

The transition to a clean economy is a shared goal for Australia and Southeast Asia and vital for growth and competitiveness. It will create 30 million new jobs in Southeast Asia by 2030. The challenge is how to mobilise the skilled workforce to power it. Green jobs are expanding at twice the rate of the available workforce and half of them may go unfilled by 2050. So the size of the green talent pool must at least double by 2050 to keep pace with projected demand.

This must be done in a changing landscape of technological innovation, digitalisation, regulatory policy, and borderless models of work delivery. The green jobs 'talent' will be more digital, more interconnected across borders, and reliant on interoperable standards. Amid rapid climate, trade, digital, and workforce transformation a regional response is needed. Australia and Southeast Asia can cooperate to develop a regional clean economy workforce.

An Action Plan for a regional clean economy workforce

CHALLENGE:

Regional talent mobility across borders and value chains

Work is now more interconnected across borders, delivered through a mix of remote and physical activity, increasingly involves services, and is part of wider value chains. However, occupational entry requirements, lack of streamlined qualifications, and fragmented visa/immigration rules are barriers to a mobile workforce. Easier visa controls and reduced occupational entry barriers are needed to enhance mobility.

ACTION 1

Specific programs for clean economy labour mobility

'Green skills project passports' could provide temporary access for foreign professionals and workers along value chains involved in clean economy projects.

ACTION 2

Qualifications and skills recognition arrangements across the region

These arrangements should be with key partners in key professions to be fit for purpose in the new landscape – competency based, proportionate, and regionally or internationally aligned.

CHALLENGE:

Aligned standards and interoperable systems

New tasks and professions are arising from the adoption of technology, data, and artificial intelligence (AI). Interoperability and alignment of standards is important as the workforce becomes more digitalised. However, diverging qualification and practice standards are inhibiting talent mobility and contributing to skills gaps. Lack of common frameworks for green skills make it hard for students or workers to match qualifications with jobs and for employers to match skills needs with supply. Standards for qualifications, licensing and credentials at the national and regional level should be aligned and updated for green skills. Digital tools should be used to improve interoperability.

ACTION 3

Align national qualifications frameworks

Work toward a regional framework as national frameworks develop and are updated.

ACTION 4

Create national/regional skills taxonomies that include green skills

Align systems between Australia and ASEAN, and with international best practice.

ACTION 5

Experiment with pilot programs for use of digital credentialling

Develop these tools with key professions and partners.

CHALLENGE:

Adaptable skills outcomes matched with industry needs

Climate change and energy transition policies are demanding a large skilled talent pool that can meet workforce demands across sectors and economies. New green jobs are emerging and existing jobs are changing. More workers and upskilling of the workforce is needed to meet labour shortages and technological changes. But there is no reliable mechanism for matching skills and training requirements with labour demands at the regional level. This inhibits the ability of educational institutions and employers to make informed workforce decisions.

ACTION 6

Create mechanisms to better match labour and skills supply and demand

A data-based regional level 'market exchange' reflecting real supply and demand needs.

ACTION 7

Enhance engagement between education institutions and industry

This would improve transitions from education to work and help meet the shifting workforce needs in areas of industry demand.

CHALLENGE:

Flexible and open policy settings for open education markets

A clean economy workforce must be underpinned by regulatory policy settings which are conducive to the mobility of talent and the investments that are needed. Open and predictable frameworks matter in an increasingly interconnected region, with responses to them impacting on workforce needs. Restrictive regulatory settings, including in education, are holding back the skilled labour participation, expertise, and investment needed to support the clean economy.

ACTION 8

Ease regulatory barriers to professionals and services providers

This requires best practice regulation of education providers, professions, people movement, and investments.

CHALLENGE:

A coordinated multistakeholder approach across the "whole of value chain"

A coordinated, regional, and long-term approach to a clean economy workforce, involving all stakeholders along the value chain is lacking. Fragmented responses on skills, qualifications, education and training pathways are impeding the mobility, upskilling and investment needed for the green transition. Australia can work with Southeast Asian partners to develop a shared understanding of the issue and take collaborative action by government, industry and universities to address it.

ACTION 9

A Taskforce for a coordinated, regional approach

This would support collaboration and partnerships among state and national governments, professional bodies, business, and education providers.

ACTION 10

Advocacy and capacity building initiatives

These would improve understanding of the challenge and support the above initiatives.

1. The Clean Economy Workforce – a regional challenge

The transition to a clean economy is a common goal for both Australia and Southeast Asia. It is vital for securing growth and competitiveness as a region.

The shift will create 30 million new jobs in Southeast Asia by 2030.[1] It offers huge opportunities. But it also presents a huge challenge - mobilising a skilled workforce to power it. Green jobs are expanding at twice the rate of the workforce available with necessary skills.[2] Half of these clean economy roles may go unfilled by 2050.[3] We will need to double the size of the green talent pool by 2050, at a bare minimum, to keep pace with projected demand.[4] And we will need to do it within a rapidly changing landscape. Technological innovation, digitalisation, regulatory policy and increasingly borderless models of work delivery are impacting how we think about and plan for this workforce. The 'talent' needed to mobilise it will be more digital and more interconnected across borders. It will be reliant on interoperable standards and need to be resilient to changing policy settings.

Against this backdrop, the challenge is a shared one, requiring a regional response. And in a time of rapid climate, trade, digital, and workforce transformation a regional response is crucial and more pressing than ever. Now is the time to act. Australia and Southeast Asia can work together to develop talent for a regional clean economy workforce.

How will changes in the regional landscape shape the 'talent' needed for a clean economy workforce? What does this 'talent' of the future look like? What barriers and impediments are stopping us from achieving this? What will it take to enable it?

1 Aus4ASEAN, Digital Transformation Future Skills Initiative, Promotion of Business Engagement Models for Upskilling and Reskilling the ASEAN Workforce, ASEAN Secretariat, June 2025.

2 Ibid.

3 LinkedIn, Global Green Skills Report 2024.

4 Aus4ASEAN, Digital Transformation Future Skills Initiative, Promotion of Business Engagement Models for Upskilling and Reskilling the ASEAN Workforce, ASEAN Secretariat, June 2025.

2. The Changing Landscape for a Clean Economy Workforce

Australia and Southeast Asia are pursuing their green economy transition within a rapidly changing international landscape. These changes impact on how we think about and plan for the workforce to meet clean economy needs.

Structural shifts are occurring in how work is being delivered, particularly in services

Digitalisation is driving remote delivery of work – location matters less. This is especially so for services. Trade in 'digitally delivered services' is now the fastest growing component of world trade.[5] Services are not only drivers of trade[6] but are essential enablers of innovation and economic activity, including in the clean economy.[7] Professional services[8] as well as transport, construction, finance and education, for example, are important for the green transition.

Growth of digital and services led activity means work is more networked between local and global firms. Local firms remain relevant for deployment of local skills and location-specific expertise, use of talent and access to networks, while global firms bring expertise, standards, and participation in international markets. This interconnectedness increasingly underpins how work is being delivered: a mix of remote and physical, increasingly via services (but also involving goods and data), across borders, and as part of wider value chains.

Digitalisation is impacting on the nature and type of work

Online work practices and clean technology innovation are also upending traditional roles and occupations. New tasks, applications and professions are arising from the creation and adoption of new technologies, data and the use of AI in the clean economy. For example, AI platforms are being used for scalability and real-time monitoring and forecasting of emissions and resource usage, and in precision agriculture AI applications support data driven predictive analytics in irrigation systems.[9]

Work is becoming increasingly task-oriented, with occupations shifting toward competency-based outcomes. Trusted standards, and their interoperability across borders, will be important for underpinning the quality of work (such as to verify qualifications and credentials) as the workforce becomes more digitalised.

Green transition is driving skills gaps and labour shortages

The green transition is demanding a large skilled talent pool across many sectors and economies, extending from agriculture, energy, manufacturing and urban development. However, there are skills gaps and shortages for green occupations in almost all countries. For example, half of Australian businesses are struggling to hire the talent needed to prepare for the climate crisis, across all skills levels, including leadership, management and operations.[10] Southeast Asia is also facing shortages of green-skilled workers as the region tries to transition to the clean economy.[11]

There is a need to better match skills with labour, and a cross value chains, to ensure skilled workers are available where and when they are needed. While both ASEAN and Australia are each actively promoting and mapping clean economy employment and skills capabilities, real time knowledge at the regional level is now more pressing.

5 Digitally deliverable services include (DDS) include service categories that can be delivered over computer networks. They span a broad range of services including insurance and pensions, financial services, telecommunications, IT, research and development, consultancy, engineering, trade-related activities, and a host of personal, cultural, and recreational services. This is aligned with the scope defined in the IMF-OECD-UNCTAD-WTO Handbook on Measuring Digital Trade (2023). See Wenxiao Wang 'Exports of digitally deliverable services in APEC and the World", APEC, 2025 (forthcoming).

6 Across APEC, trade in services growing faster than trade in goods. See Wenxiao Wang, 'Trends in APEC Professional Services Exports, APEC, 2025 (forthcoming)

7 Wenxiao Wang, 'Trends in APEC Services Value Chains Development' APEC, 2025 (forthcoming).

8 For example, across APEC, trade in professional services has nearly quintupled since 2005. In 2005, exports of professional services for APEC as a whole were USD100 billion. By 2022, they were USD458 billion. The share of professional services in total services exports across APEC also nearly doubled from about 12% to 23%, with the COVID19 pandemic years accelerating this shift. See Wenxiao Wang, ' Trends in APEC Professional Services Exports', APEC, 2025 (forthcoming).

9 See Annex 1- Sectors and activities impacted by clean technologies.

10 Deloitte Access Economic and RMIT Online, Towards a Green-Skilled Workforce, 2025.

11 The International Labour Organization (ILO) warns that the Philippines faces a critical shortage of skilled labour in its renewable energy sector. As of 2025, the sector employs around 120,000 workers, but an additional 350,000 skilled workers will be required by 2030 to meet the needs of upcoming clean energy projects. See BusinessWorld, "Philippines expected to require 350,000 more workers for RE", July 9, 2025.

Green job opportunities and workforce demands

The Asian Development Bank (ADB) projected in 2022 that a shift to a green economy in Southeast Asia could create 30 million new jobs by 2030, with particular advantages for women and girls. However, we will need to double the size of the green talent pool by 2050—at a bare minimum—to keep pace with projected demand. Roughly half of jobs in the 2050 green economy will lack qualified candidates if we don't focus on strategic, expansive upskilling. According to LinkedIn's Global Green Skills Report 2024, the demand for green jobs is expanding at nearly twice the rate of the available workforce with the necessary skills. Between 2023 and 2024, worldwide job postings requiring green skills increased by 11.6%, while by contrast the supply of qualified workers grew by only 5.6%.

Sources: LinkedIn, Global Green Skills Report 2024; Aus4ASEAN, Digital Transformation Future Skills Initiative*, Promotion of Business Engagement Models for Upskilling and Reskilling the ASEAN Workforce,* 2025.

Policy measures are shifting clean economy markets and investments

Evolving geopolitics are creating uncertainty and unpredictability in trade[12] and supply chains, shifting investments and clean economy activity. There is growing regulatory fragmentation between different countries, for example on approaches to digital technologies and AI. There are longstanding impediments to services market access in some countries.

All of these matter more in an increasingly interconnected region. Responses to them impact on workforce needs; business as they adjust supply chains and business models; and governments as they pivot toward trusted trading partners with predictable policy frameworks. Australia for example, has a key objective of increasing investment with Southeast Asian partners, including in the clean economy, and of working with ASEAN countries to advance this, including through the rules-based framework of the ASEAN-Australia-New Zealand Free Trade Agreement work program.

12 Global rules-based trade frameworks are being upended by unilateral actions of some countries. Restrictive border controls are being imposed on labour and student mobility amid concerns about immigration and employment. For example, the United States has recently tightened its visa system for foreign students and workers. See WorldVisa, "Major Immigration Policy Changes Coming into Effect from October 1, 2025" September 29, 2025.

3. Talent for a Regional Clean Economy Workforce

Changes in the international landscape will shape the talent that is needed for a regional clean economy workforce. What does this workforce look like?

Whole of economy and whole of value chain

Talent to power the clean economy will be multidisciplinary, involving teams of skilled workers that can come together flexibly along the value chain in efficient and scalable ways.

Clean technologies will need to be mobilised across the whole of the economy, impacting workforce needs in activities across many, if not all sectors. For example, technologies for sustainable urban development of cities entail cleaner infrastructure for buildings, transport systems, data centres, and charging infrastructure. Technologies will be used for productive, regenerative and precision agriculture to improve farming practices and nutrient management. Services and data act as important 'enablers' of this activity. For example, data analytics, business consulting, and finance will be used to enable power generation, agriculture, manufacturing and urban development for the green transition.

A mix of skills and occupations will need to be deployed at each point in the value chain to develop, adopt and implement this activity, both remote and physically delivered, at home and across borders. See table below and Annex 1.

Sectors and activities impacted by clean technologies

Industry	Technologies	Activities
Energy production and utilities	Technologies for development of renewable energy including production, generation and scaling up, storage, distribution and transmission.	Solar distribution and utilities. Hydrogen production, distribution, transmission, use and export. Demand management and interconnection of grids.
Agriculture	Adoption of technologies for productive, regenerative, and precision agriculture in farming practices, crop health, nutrient management, and land restoration.	Practices for vertical farming, greener fertiliser and pesticides; micro-irrigation, gene editing, selective cropping and breeding; restoring pollinator habitats.
Urban development	Technologies for sustainable urban development of cities and cleaner infrastructure, transport systems, buildings and charging infrastructure, and data centres.	Energy-efficient transport modes and models. Design, construction, retrofitting of buildings, ports and infrastructure, data automation and storage.
Manufacturing	Applying circular economy technologies to manufacturing to minimise resource input, waste, emissions, and energy leakage.	Waste management treatment and remediation. EV, battery, other fuel cell manufacturing, refurbishing and storage. Manufacturing of renewables and low emissions technologies.
Enabling industries	Services and data to enable clean technologies and mobilise activities, such as software and data analytics, finance, and business consulting.	Data analytics and AI platforms real-time emissions and resource monitoring and forecasting; energy trading; energy management systems; and carbon footprint tracking.

Source: See Annex 7 – References.

Digital and interoperable

The clean economy workforce will also be tech knowledgeable and digital. This is not only so for the talent which will power 'green tech' industries, or the clean economy sector, but for all economic activities, reflecting the new reality of cross border and digital ways of working.

Growth of the green tech industry

The Green Technology & Sustainability Market Report of 2025 forecasts the global green tech market reaching US$73.9 billion by 2030. The green technology and sustainability market is driven by advancements in AI-driven energy management software, cloud-based carbon footprint tracking solutions, and blockchain-enabled sustainability reporting.

The Asia-Pacific region is expected to experience the fastest growth from 2025 to 2030, fuelled by rapid urbanisation, rising environmental concerns, and increasing government initiatives for sustainable development. The rising demand for sustainable solutions across industries, coupled with advancements in digital technologies such as AI-driven climate solutions and blockchain for carbon tracking, will accelerate market expansion in the region, making it the fastest-growing globally.

This market expansion translates into tangible benefits for regions willing to embrace green tech. First, job creation is booming. The report suggests AI-driven green tech could generate 1.5 million new jobs globally by 2030, with a significant share in regional hubs adopting these innovations. Roles range from renewable energy technicians to data analysts, boosting green tech jobs 2025 and beyond.

Source: Green Technology and Sustainability Market Report 2025.

Interoperability and alignment of standards are increasingly important in this environment. Tasks and occupations need to be underpinned by trusted standards to maintain quality both domestically and internationally. This includes who is undertaking the task or practising the occupation, as well as from where, and are they qualified to do so. It will cover verifying qualifications, credentials and expertise across jurisdictions; overseeing remote work delivery; managing AI-augmented roles and outputs; and regulating access to data and systems. New digital ways of working will also rely on standards for transactions to take place, including for example e-invoicing, digital identity, and provider liability. All of this becomes much easier when standards are aligned and compatible across borders.

Evolving roles and adaptable skills

Adoption of clean technologies will demand new roles and responsibilities of existing occupations and see new occupations and roles emerge. It will involve both professional and technical talent across a range of industries. Some examples are below. See Annex 2 for more detail.

Clean economy roles – examples of new, existing and emerging

Occupation	Green occupations	Existing occupations	Emerging occupations
Engineering and construction	Environmental, renewable energy, biomass, fuel cell, and waste engineers and draftspersons.	Civil, electrical chemical, industrial mining, mechanical engineers and draftspersons.	Solar energy systems, blade, and energy efficiency engineers and professionals.
Architecture and planning	Environmental architects	Landscape architects. Building and surveying technicians. Urban planners and officers.	Passive building architects and designers. Circular architects and designers.
Consulting and business analysts	Carbon trading analysts. Energy auditors. Green finance advisers. Sustainability practice consultants.	Accountants and auditors. Financial data analysts. Legal and business advisers. Software developers.	Energy Brokers. Energy Auditors. Embodied carbon assessors. Carbon capture and storage specialists.
Scientists	Industrial ecologists. Environmental scientists.	Agricultural, fisheries and forestry scientists. Chemists. Geophysicists.	Sustainable agricultural scientists.
Teaching and educators	Environmental education officers.	University and vocational education teachers.	Community climate change educators.
Trades	Electric vehicle mechanics. Solar and battery electricians.	Mechanics, electricians and electrical distribution trades. Plumbers.	Robotics mechanics.
Technicians	Solar panel installers, remote sensing technicians, EV repair and aftersales service technicians, and solar technologists	Monitoring maintenance personnel, waste and recycling technicians, metal fitters, machinists, welders, and 3D printer operators.	Weatherisation installers. Fuel cell, wind turbine and grid optimisation technicians. Battery storage recycling specialists.
Workers/labourers	Solar operator and installation workers.	Construction and agricultural workers. Machine, plant and power operators.	

Source: Jobs and Skills Australia, 2023. See also Annex 6- References.

A mix of skills and qualifications will be required across these roles to deliver green activities and underpin a clean economy. Occupations and professionals of all kinds will need to keep adapting their competencies to keep pace with the transforming landscape and new technologies.

Clean energy workforce demands

It is estimated that **Australia** will likely need 32,000 more electricians in the next seven years and close to two million workers in building and engineering trades by 2050, to prepare Australia's energy grid and industrial base for net zero. Occupations with the highest growth rates (2023-2030) include telecommunications trades workers, electronics trades workers, electrical engineering draftspersons and technicians, structural steel construction workers, construction managers, plumbers and electricians. Growth in these occupations is also likely to be concentrated in regional Australia.

Southeast Asian countries are also experiencing growing demand for green roles and occupations. A 2024 report found that nearly one in five jobs in **Malaysia** are now linked to the green economy, with growing demand for workers with necessary skills in carbon accounting, sustainability reporting, and stakeholder engagement. The Institute for Labor Studies in **the Philippines** identified six sectors with strong demand for green jobs: agriculture, forests, and fisheries, construction, ecotourism, manufacturing, renewable energy, and transport.

Sources: Jobs and Skills Australia; World Bank; Ministry of Human Resources Malaysia; Philippines Institute for Labor Studies.

Similarly, the frameworks to ensure requisite standards are met will also need to be adaptive. For example, static qualifications may not be sufficient or workable in a fast-evolving environment demanding new and regularly updated and upgraded skills and competencies (for example, in the use of AI).

Flexible policy settings, trusted partners

A multidisciplinary, skilled clean economy workforce will require policy settings which are conducive to the mobility of talent and the investments they are seeking to operationalise.

Domestic policy settings are not only important for regulation of workers, but also those impacting on the capital, services and data required for trade and investment in clean economy technologies. Regulatory and policy settings matter in the context of matching supply and demand of talent across borders.

Advancing services mobility in ASEAN

ASEAN is moving forward with intra-regional efforts to facilitate business mobility as part of ongoing services liberalisation for the ASEAN Economic Community (AEC). The AEC Strategic Plan 2026-2030 outlines the objective to facilitate mobility of businesses and people in ASEAN through commitment to streamlining processes and reducing barriers to facilitate seamless movement of businesses and people across ASEAN Member States.

ASEAN will continue to enhance mobility and improve the employment potential of professionals and talent in the region, including by developing plans to further refine and expand agreements to foster greater ease of travel, promote cross-cultural exchanges, and bolster the socio-economic ties binding the ASEAN community. These efforts will unlock the full potential of human capital and contribute to the dynamism and interconnectedness of the region.

Source: ASEAN, AEC Strategic Plan 2026-2030.

4. Barriers to a Regional Clean Economy Workforce

Despite the need for workers, there are barriers to the deployment of workers and skills. Licensing and qualification requirements; standards frameworks; educational systems; and skills and labour mobility settings are yet to sufficiently adapt to permit flexible, scalable and agile ways of working.

Licensing and qualifications requirements

The lack of streamlined and objective processes to 'recognise the competency' of professionals and those in 'regulated occupations' is a barrier to mobility of skilled services providers across the region.

Licensing and qualification requirements for occupations are intended to protect consumers, workers, the public, and the environment by ensuring that practitioners meet minimum standards of training, competence, and ethics.[13] However, where they are overly burdensome, non-transparent, or fail to recognise equivalent qualifications obtained in other jurisdictions they make it harder and costlier for workers from another country to enter or practice a profession (even where they may have the capability to do so) limiting the pool of workers available.[14]

'Regulated occupations' are those which require workers to have specific education or training qualifications in order to perform a job. They include both professions (such as engineers and architects) as well as trades (such as plumbers and electricians) that will be needed in the clean economy. While licensing requirements can in some cases be met when a worker has overseas qualifications that are 'recognised' as being equivalent, recognition agreements to facilitate this (termed mutual recognition agreements or MRAs) don't exist for all occupations nor apply between all countries.

For example, in Australia, for an electrician or plumber from Southeast Asia to work in Australia, lengthy technical skills testing, training and provisional licensing is required, as well as registration at state level. Foreign professionals such as engineers and architects must also undertake additional competency assessment before applying for registration. Similarly, Australian professionals face barriers due to licensing and practice requirements in countries in Southeast Asia.[15] Even within Australia, there are barriers for skilled workers in some technical occupations due to varying requirements across states, including those in which there are labour shortages and which are key to the clean economy, such as plumbers, mechanics, and engineers.[16] See Annex 3 for more details of qualifications and licensing requirements.

These barriers are at odds with the need for a more mobile and regional clean economy workforce: qualified professionals and tradespeople in Australia and in countries in Southeast Asia cannot be easily deployed across borders to meet demand along value chains in flexible and efficient ways.

Standards divergence

Diverging qualification and practice standards also impact on workers needed for the clean economy workforce, impeding talent mobility and contributing to skills gaps.

Standards underpin qualifications and practice requirements for occupations. These standards are necessary to determine the education, training or experience that is needed to ensure quality and competence. Different standards and approaches may be needed in different jurisdictions to reflect differences in risk, regulatory systems or levels of development but these differences can also create uncertainty, add complexity, and impede interoperability across borders.[17]

For example, in Australia, there is a national policy for regulated qualifications (the Australian Qualifications Framework or AQF) which education and training providers use when developing their qualifications to ensure their learning programs match the broad learning outcomes determined for each qualification type.[18] This supports alignment of qualifications requirements for occupations at the national level.

In Southeast Asia however, education qualifications are not yet aligned across ASEAN Member States. Diversity in educational systems, policies, and developmental levels among ASEAN countries mean there are considerable differences in standards for curriculum content, teaching methodologies, assessment practices, and quality assurance mechanisms among the members. Differing credit transfer systems in use by universities result in use of different grading scales and a lack of consensus among existing credit systems.[19] This is combined with varying national regulations and accreditation requirements for various occupations.[20]

13 Australian Productivity Commission, Building a Skilled and Adaptable Workforce, Interim Report, August 2025.

14 Ibid.

15 See AANZFTA, MAFTA, IACEPA. See Department of Foreign Affairs and Trade, Australia.

16 Australian Productivity Commission, Building a Skilled and Adaptable Workforce, Interim Report, August 2025.

17 Ibid.

18 Department of Education, Skills and Employment Australia, University-Industry Collaboration in Teaching and Learning Review, December 2021.

19 Carvajal, Pangilinan and Sanchez, Professional Regulation Commission, Philippines, University of Makati, Philippines, ETCOR Educational Research Center, Inc A Roadmap on Harmonizing Education in the ASEAN Region: Challenges and Strategies, October 2024.

20 Asian Association of Open Universities (AAOU), 'Transforming ASEAN's Skills and Education Future through Cross-Border Learning and Harmonised Education', April 2025.

ASEAN regional efforts to align and recognise qualifications

The ASEAN Qualifications Reference Framework (AQRF), which serves as a common reference point for comparing qualifications across Member States, has sought to promote a common understanding of qualifications across ASEAN members through the recognition of qualifications and the use of educational standards that meet both regional and global benchmarks. However, progress is slow and the process is not yet complete.

ASEAN also has MRAs which seek to recognise professional qualifications, experience obtained, or licenses/certifications across ASEAN countries. There are MRAs in seven professional occupations covering engineering, nursing, architecture, quantity surveying, medical practitioners, dental practitioners, and accountancy services. However, participation has been limited, for a range of reasons, including the challenge of recognising widely divergent regulatory approaches and standards across the Member States.

The ASEAN Credit Transfer System (ACTS) facilitates the transfer of academic credits earned by students across institutions in member countries, however its use by higher education institutions across ASEAN is not widespread, adversely impacting on student mobility and exchange of knowledge and skills. That ASEAN Member States are at different stages in the development of their respective national QA frameworks also creates further challenges to the development of a CTS that can be widely adopted by such institutions in the region.

Sources: EU-ASEAN SHARE; AAOU.

Lack of common frameworks create challenges for regulatory bodies and educational institutions in setting compatible qualification and practice standards. This discourages standardisation in education and training outcomes and across occupation requirements – making it harder for students and workers to match their qualifications with employment opportunities, and for employers to mobilise the talent they need to match skills demands with supply across value chains.

Skills gaps and shortages

It is well understood that almost all countries are experiencing skills gaps and labour shortages in the clean economy. A key problem is matching skills and training requirements with labour demands, and thereby upskilling workers to activate a clean economy.

In ASEAN, for example, considerable efforts are already under way in Member States to improve and modernise the availability, quality and relevance of labour market information, in particular with regard to skills. However, there is a certain level of fragmentation, and labour market information is not specifically linked to competencies required.[21]

This is complicated by the absence of a common framework for standardising green skills and qualifications. In Australia, there is no single framework or taxonomy that consistently describes the range of skills employers and individuals need across the Australian labour market and education system. Work is currently underway to develop a National Skills Taxonomy (NST).[22] Malaysia and Singapore have national skills taxonomies, but there is no ASEAN-wide framework. The Malaysia National Skills Registry (MyNSR) for example, has a standardised skills taxonomy and classification that acts as a national reference for skills definition, including new and emerging skills.[23]

21 ASEAN and ILO, Regional Mapping of Labour Market Information for Skills and Employment Policies in ASEAN Member States, 2024.

22 Jobs and Skills Australia, National Skills Taxonomy Discussion Paper, June 2024.

23 See MYNSR, Ministry of Economy and Ministry of Human Resources (MOHR) and TalentCorp. Open access skills taxonomies also already exist in other countries including the US, EU and the UK. See Department of Education, Skills and Employment Australia, University-Industry Collaboration in Teaching and Learning Review, December 2021. The World Economic Forum (WEF) has also developed a global skills taxonomy.

As such, there is no reliable mechanism or data for forecasting labour market supply and demand across the region, or a common language for matching skills with shortages at the regional level. This inhibits the ability of educational institutions, students and employers to make informed workforce decisions in a changing landscape – what to teach, what skills to seek, and what talent to match the task? It can exacerbate bottle necks and shortages that otherwise might be resolved or anticipated by drawing on a known regional pool of talent.

Regulation of services

Overly restrictive regulation of services sectors are holding back the potential for skilled labour to contribute to the clean economy.

The efficient and competitive functioning of services, including digitally delivered services, is necessary for all aspects of the clean economy. Regulatory settings which unnecessarily restrict the participation of skilled labour and investment in services, also limit the mobility of talent to support the clean economy along the value chain. This also applies to education sectors. How these services are regulated matters for shaping a workforce that is skilled, mobile, and 'ready' for the clean economy.

Professionals and businesses in Australia and Southeast Asia continue to face barriers in delivering services in each other's economies; constraints from inflexible policy settings; and significant regulatory barriers. For example, in Indonesia, there are barriers to Australian professional services providers in legal, health, environmental, education and accounting professions, due in large part to general regulations that apply more broadly across sectors.[24] In Thailand, there are restrictions on foreign entry, residency requirements for directors and managers, and restrictions related to cross-border transfer of personal data.[25]

Regulatory challenges for mobility in ASEAN

Data shows that there are large numbers of competent professionals being trained and produced in the region's economies, but this isn't translating into increasing mobility.

A major reason for this is that the suite of ASEAN MRAs is still bottlenecked by restrictive domestic regulation. Intra-ASEAN mobility is stymied by this, as is the opportunity for mobility beyond the region, so for the time-being, domestic regulatory reform is still a major project that developing economies need assistance with.

There is recognised opportunity to leverage the digital transformation of trade for the benefit of developing economies but some classic market entry barriers remain (for example the cost of pursuing recognition) and these barriers still need to be addressed to unlock this opportunity. Building digital systems won't be enough if recognition remains less accessible to developing economies.

Source: Dr Muhammad Faliq Abd. Razak, APEC GOS: EC-GOS Joint Workshop on Services and Structural Reform, 2025.

In the education sector, the expansion of Australian providers and provision of course offerings in Southeast Asia can be challenging. Barriers to establishing physical campuses, and to course provision and recognition, continue to persist in parts of the region. There are controls on the type and nature of higher education courses that can be offered and or/accredited, as well as on educators and professionals who may engage in teaching. These policy settings limit the course offerings and training which is targeted to new skills and competencies needed for the clean economy workforce, and the sharing of this knowledge across borders. See Annex 4.

24 OECD, STRI Country Note for Indonesia, February 2025.
25 OECD, STRI Country note for Thailand, February 2025.

Labour and migration controls

Visa and immigration requirements both in Australia and Southeast Asia impact on workers physically moving across borders to engage in clean economy activities. Frameworks in both Australia and Southeast Asia remain fragmented and difficult to navigate. Both skilled and unskilled workers face lengthy, costly, and inconsistent procedures, inhibiting talent from mobilising in sectors of the economy where it is needed.

While there are some specific initiatives which help ease migration (for example, skilled visa schemes and temporary entry for certain skilled workers under free trade agreements), they tend to be the exception to otherwise costly, opaque requirements; are limited in scope; and generally country specific. When combined with licensing requirements in the regulated occupations, the barriers to workers can be considerable, and act as a significant deterrent to talent mobilisation.

For example, professionals from Southeast Asia migrating to Australia face lengthy and opaque processes for skilled visas and subsequent licensing. While experienced professionals are sought after, on arrival in Australia professional bodies tend to undervalue professional experience and create inconsistencies between professional qualifications and experience versus practical skill levels.[26] Unskilled or low-skilled workers from Southeast Asia have very limited migration pathways to Australia. Demand for this labour in Australia remains high in clean-economy sectors such as agriculture, construction, and manufacturing,[27] yet visas have not adapted to meet this need.

For Australians seeking to deploy their talent in Southeast Asia, there is no regional ASEAN visa. Each country maintains its own work-permit regime, creating a patchwork of rules that constrain regional (and intra-ASEAN) labour mobility. For example, Indonesia's visa procedures remain complex.[28] Recent regulatory reforms to Vietnam's visa system have simplified but not eliminated some administrative barriers.

See Annex 5 for further details of visa entry requirements and pathways.

Fragmentation and lack of cooperation

Despite clean economy workforce needs impacting across economies and value chains, a coordinated approach to the issue is lacking. Fragmented responses to skills and qualifications architecture as well as education and training pathways impede the mobility, upskilling and investment needed for the green transition.

Mobilisation of a skilled workforce requires the participation of a wide range of stakeholders. This includes governments which set relevant policies and the regulators and professional bodies which administer them. It includes educational institutions, both higher education and vocational, which train future workers. It includes industry that makes the investments to employ them and the community, which requires them for the green transition to happen. These stakeholders do not always work together, nor fully understand where their goals and objectives align to make this possible. This applies both within and among economies. For example, engagement between education institutions and industry could be enhanced to improve transitions from education to work and meet the shifting workforce needs in areas of industry demand for skilled workers.[29] The urgency with which this needs to occur in order to operationalise the clean economy, is also not always appreciated. Now is the time to act.

26 Engineers Australia, Barriers to employment for migrant engineers, 2021 and Enhancing Australia's migration program, Engineers Australia submission to the Department of Home Affairs, 2022.

27 Jora, 'How to apply for unskilled jobs in Australia', July 2025.

28 Falaah Saptura Siregar, A Guide to Obtaining an Indonesia Work Visa for Australians, 2025.

29 Department of Education, Skills and Employment Australia, University-Industry Collaboration in Teaching and Learning Review, December 2021.

Case Study:
Vietnam's Clean Economy Workforce: Challenges and pathways

Huong Pham and Trung Nguyen, Sustainable Cities Hub, RMIT Vietnam

The importance of the clean economy

Vietnam's development trajectory is profoundly shaped by the dual imperatives of climate vulnerability and sustainable growth. The country has been identified as one of the world's major sources of marine plastic pollution, with between 0.28 and 0.73 million tonnes of plastic discharged into the ocean annually.[30] Cities such as Hanoi and Ho Chi Minh City are also among those with the poorest recorded air quality. At the same time, Vietnam was the 13th most climate-vulnerable nation out of 180 assessed in the Germanwatch Global Climate Risk Index covering 2000–2019, with climate-related losses equivalent to 3.2% of GDP each year.[31] These pressures underscore the urgency of transitioning to a clean economy.

The government has made ambitious commitments through the National Strategy on Green Growth for 2021–2030[32] and its accompanying Action Plan.[33] These policies not only signal an environmental commitment but also frame the clean economy as a competitive advantage, strengthening Vietnam's position in global supply chains. Delivering on these commitments requires urgent investment in human capital across renewable energy, smart environmental management, digital technologies,
and green finance.

Emerging occupations and talent demand

The World Economic Forum projects that structural labour market transformation could create new employment equivalent to 14% of today's workforce globally between 2025 and 2030.[34] For Vietnam, the World Bank identified 39 occupations already classified as green jobs, representing 3.6% of total employment.[35] These roles are heavily concentrated in utilities (23%), mining (5%), and services (5%). Projections suggest up to 88 occupations—accounting for 41% of the labour market—could transition into green jobs by 2030.

Critical occupations include product and process designers, materials and chemical engineers, renewable energy experts, and biological scientists.[36] Beyond technical expertise, the participation of women in STEM fields has been highlighted as a decisive factor for a more inclusive and resilient transition.[37] Together, these fields will underpin the technological and institutional foundations of Vietnam's clean economy.

30 World Bank, Green Jobs: Upskilling and Reskilling Vietnam's Workforce
for a Greener Economy, 2023

31 Germanwatch, Global climate risk index 2021, 2023; International Finance Corporation, 2022

32 Decision No. 1658/QĐ-TTg, 2021

33 Decision No. 882/QĐ-TTg, 2022

34 World Economic Forum, Future of Jobs Report, 2025

35 World Bank, 2023

36 ManpowerGroup, Demand for green skills grows, 2024

37 International Finance Corporation, 2025

Barriers to workforce development

Despite progress, several structural barriers impede the development and deployment of green talent. Informal employment continues to dominate the labour market, with 64.6% of workers outside formal contracts and social protection in 2024.[38] Although the share of trained workers with professional qualifications reached 28.3% in 2024, this remains inadequate for the scale of the transition required. Highly skilled labour accounted for only 11.67% of the workforce in recent years.[39]

At the systemic level, Vietnam's vocational and higher education systems are yet to fully integrate green competencies. The OECD notes that more than 60% of curricula lack sustainable development content, especially in construction, agriculture, energy, and technology.[40] This results in a mismatch between labour market demand and worker capacity. The World Bank found that only one in five workers in green-related sectors possesses skills aligned with future requirements.[41]

Soft skills remain another challenge. English-language proficiency and workplace communication are reported to be low, with only 5% of the workforce estimated to have adequate levels for international

competitiveness.[42] Digital competence, crucial for smart and sustainable industries, remains at an average level across the workforce.[43]

Limited digital literacy also constrains workforce readiness. Research by the Smart and Sustainable Cities Hub demonstrates that Vietnam's workforce displays only moderate levels of digital competence, including data processing, digital communication, and problem-solving that are needed to support green competencies.[44]

Cross-border labour mobility further constrains Vietnam's green economy ambitions. ASEAN's Mutual Recognition Arrangements were designed to facilitate professional mobility, yet implementation has been uneven, and licensing remains nationally controlled.[45] These inconsistencies compel professionals to undergo lengthy and complex approval processes, delaying the transfer of talent across borders.

Unlocking value beyond barriers

Analyses of Vietnam's renewable energy trajectory underline the potential gains from workforce development. The International Energy Agency identifies Vietnam as a regional leader in solar and wind expansion.[46] The Ministry of Planning and Investment estimates that scaling renewable power could add USD 70–80 billion to GDP and create 90,000–105,000 jobs.[47] Beyond these macroeconomic benefits, reducing mobility barriers would enable faster deployment of clean energy infrastructure, greater technology transfer, and deeper regional integration. These outcomes directly support the 2050 net-zero commitment.

Policy directions

The following policy priorities emerge from the evidence:

- **International partnerships:**
  - Bilateral cooperation such as the Vietnam–Denmark Green Strategic Partnership exemplifies how joint initiatives can foster knowledge exchange, capacity building, and technology transfer.[48] Enterprise-level examples, such as Duc Thanh Wood Company's solar panel adoption, demonstrate both environmental
    and cost-saving benefits.[49]
- **Regional talent mobility & fast-track recognition:**
  - Attract expertise from Australia/ASEAN to plug skills gaps and speed clean-economy investment. Pilot a Green Skills Visa (trusted sponsors); operationalise ASEAN MRAs with expedited licensing/temporary practice; create a single-window portal for recognition and project secondments; clarify tax/insurance portability for short/hybrid assignments; fund expert exchanges and co-supervised fellowships tied to flagship clean-energy projects.

38 General Statistics Office of Vietnam, 2025
39 Vietnam Social Insurance, 2022
40 OECD, 2023
41 World Bank, 2023
42 World Bank, 2023
43 Nguyen et al., 2023
44 Nguyen et al., 2023
45 Asian Development Bank, 2019
46 International Energy Agency, 2024
47 Ministry of Planning and Investment, 2023
48 Nguyen, 2023
49 Ha, 2025

- **Education and training reform:**
  - Vocational and higher education curricula must be comprehensively revised to integrate sustainability content. The German-supported TVET program in Ninh Thuân illustrates the potential of international cooperation to develop industry-standard training for renewable energy sectors.[50]
- **Improved digital competence:**
  - Strengthening regional mobility and collaboration would allow Vietnamese professionals to access advanced training in digital competencies and participate in cross-border projects. Such engagement accelerates not only clean energy initiatives but also broader digital infrastructure development, thereby enhancing national competitiveness in the regional green transition.
- **University–industry–government collaboration:**
  - Coordinated efforts are required to build a pipeline of work-ready graduates equipped with both technical and soft skills. Incentives for firms to invest in workforce training will be essential to scaling green talent.[51]

Conclusion

Vietnam's clean economy transition is both a necessity and an opportunity. The evidence shows significant potential for employment growth, GDP gains, and sustainability benefits if structural barriers to workforce development and mobility are addressed. Policy action that combines international cooperation, systemic education reform, and tripartite coordination can position Vietnam as a regional leader in green growth. The challenge now is to align ambition with implementation, ensuring that human capital development keeps pace with the scale of transformation required.

Acknowledgement: An AI-based writing assistant (ChatGPT) was employed to enhance clarity and refine the language of this case study while all ideas and analyses remain the authors' own. Sources: See Annex 6

50 Technical and Vocational Education and Training, 2024
51 Hoang, 2025

5. Toward a Regional Clean Economy Workforce

A coordinated and forward-looking approach is needed to address barriers and enable a regional clean economy workforce. What should Australia and Southeast Asia do to meet this challenge?

Looking forward – what it will take

To meet the regional workforce challenge for the clean economy, it will take:

Regional talent mobility across borders and value chains

- Easing barriers and impediments to occupational entry and mobility within and across borders
- Shifting the focus of regulation of professions to competencies rather than formal qualifications to account for new ways of working

Interoperable standards

- Improving alignment of standards for qualifications, licensing and credentials at both the national and regional level
- Updating standards to account for green skills and competencies

Digitally enabled systems

- Adopting digital tools and technology to reduce costs, improve efficiencies and create interoperability. But they will only be effective where regulatory and entry barriers are eased, and standards divergence is minimised.

Adaptable skills outcomes matched with industry needs

- Upskilling the workforce with skills to meet requirements for changing roles, new ways of learning and market needs, including digital competence
- Better matching skills needs with labour demands at national and regional levels

Flexible and open policy settings, open education markets

- Addressing regulatory barriers and improving market access for both workers and professionals, and trade and investment in the clean economy

A coordinated approach across the "whole of value chain"

- Developing a shared understanding of the challenge and its importance among stakeholders
- Partnerships for collaborative action among government, industry and universities.

Acting now - what can be done

Australia can work with trusted partners in Southeast Asia to facilitate cross border opportunities for talent to mobilise the clean economy. Targeted actions that could be taken include:

1. **Develop specific programs for clean economy labour mobility such as 'Green skills project passports.'** These programs could provide temporary access (visa entry and streamlined occupational recognition) for foreign professionals and workers along value chains involved in clean economy projects.

2. **Establish qualifications and skills recognition arrangements across the region with key partners in key professions.** This includes mutual, or unilateral recognition that is 'fit for purpose' in the current landscape – competency based, proportionate, regulation that is regionally or internationally aligned.

3. **Align national qualifications frameworks** as they develop and are updated. Progress alignment within ASEAN under the AQRF, ensure compatibility with the AQF, to work toward a regional framework.

4. **Develop national or regional skills taxonomies that take into account green skills.** Ensure systems are aligned between Australian and ASEAN partners, and with international best practice.

5. **Experiment with pilot programs for use of digital credentialling** and tools involving key professions and partners.

6. **Create mechanisms to more dynamically match labour and skills supply and demand** at the regional level - a data-based regional level 'market exchange' reflecting real supply and demand needs. Draw on aligned skills taxonomies and quals frameworks.

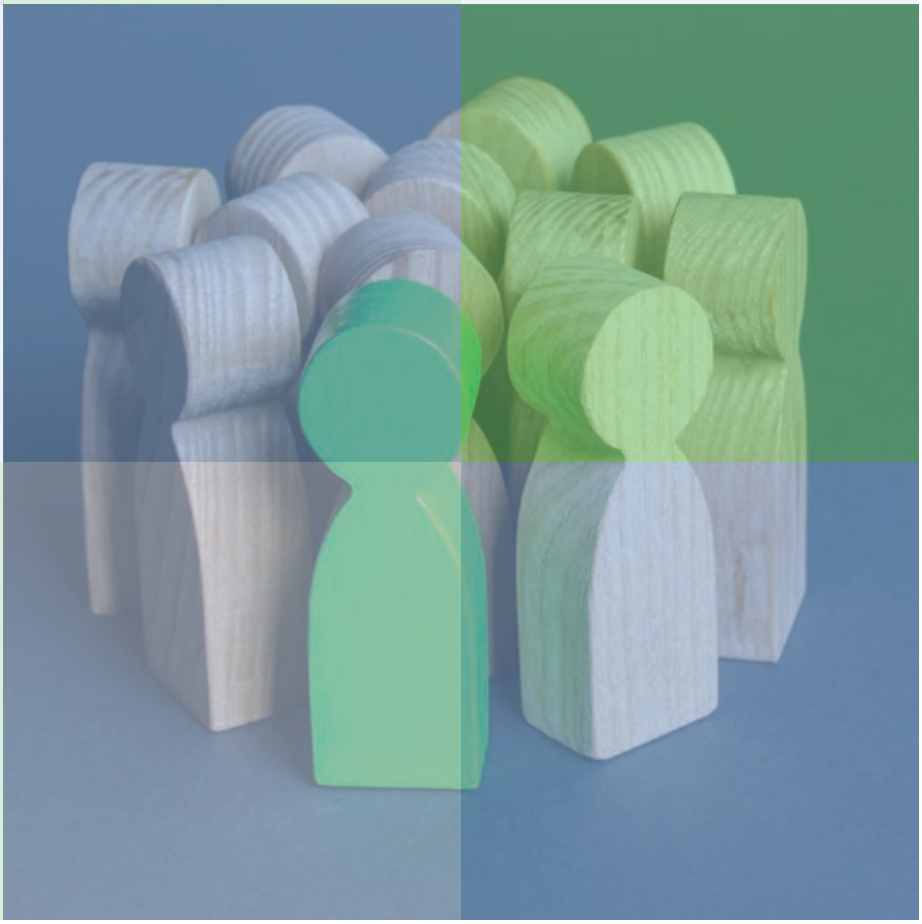
7. **Enhance engagement between education institutions and industry.** This would improve transitions from education to work and help meet the shifting workforce needs in areas of industry demand.

8. **Remove and ease domestic regulatory barriers** to professionals and services providers, including education and training providers. Adopt best practice regulation of professions, people movement and investments.

9. **Set up a Taskforce** to facilitate a coordinated, regional approach and support continuing collaboration and partnerships among stakeholders including state and national governments, professional bodies, business, higher education and VET providers.

10. **Undertake advocacy and capacity building initiatives** to further understanding of the challenge, support above initiatives, and share experiences, information and lessons learned.

6. Annexes



Annex 1: Sectors and activities impacted by clean technologies

Sector/Industry	Technology and activities
Energy production and utilities	Technologies for development of renewable energy including production, generation and scaling up, storage, distribution and transmission
Hydrogen	Hydrogen production, distribution, transmission use and export
Solar	Solar distribution and utilities
Wind	Offshore and onshore wind
Other energy	Hydroelectric energy, bioenergy / biomass, geothermal energy
Utilities & distribution	Demand management and interconnection of grids
Agriculture	Adoption of technologies for productive, regenerative and precision agriculture involving technologies to support improved farming practices, improved yields, crop health and nutrient management, and irrigation systems
Farming practices	• High-tech agricultural innovation including vertical farming, automation, robotics, and modern greenhouses • Farming practices including reduced GHG emissions; greener fertiliser and pesticides; and micro-irrigation
Crop health and nutrient management	Biotechnology innovation such as gene editing, selective cropping and breeding; and using biochar as a soil amendment
Land management and restoration	• Restoring pollinator habitats, forest corridors, and riparian ecosystems near working lands • Integrating native non-crop vegetation (such as trees or shrubs) within cropland
Urban development	Technologies for sustainable urban development of cities which entails cleaner infrastructure including energy efficient buildings, transport systems, data centres, and charging infrastructure
Transport systems	• Sustainable public transport systems and last-mile connectivity • Energy-efficient modes and models of private transport such as electric vehicles and ride sharing (or mobility-as-a-service) • Renewable hydrogen and electric vehicle infrastructure (charging and repair)
Buildings	• Energy efficient design, construction and retrofitting of buildings, ports and other infrastructure and urban spaces • Building electrification (Residential, commercial, industrial)
Data centres	Energy efficiency data automation and storage

Sector/Industry	Technology and activities
Manufacturing	Applying circular economy technologies to manufacturing to minimise resource input, waste, emissions, and energy leakage through design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling.
Waste management	• Waste management, treatment, remediation for biofuels production, plastic, and water • Recycling for plastic and water • Sewage treatment and remediation
Battery production and value chain	• EV battery and other fuel cell manufacturing, refurbishing and storage (residential and commercial) • EV manufacturing
Renewables manufacturing	• Manufacturing renewables and low emissions technologies eg: green metals (steel, alumina and aluminium), clean energy component manufacturing, hydrogen electrolysers and fuel switching, agriculture methane reduction and waste reduction. • Solar components manufacturing • Wind components manufacturing
Enabling industries	Using services and data to enable clean technologies and mobilise activities above (power generation, agriculture, manufacturing, urban development) which support the green transition.
Software and data analytics	Using data analytics and AI platforms for scalability and real-time monitoring and forecasting of emissions and resource usage. Use of blockchain for secure and tamper-proof data management for carbon credit trading, supply chain monitoring, and renewable energy transactions. Examples: • Power and utilities: Smart grids/use of smart meters, predictive analyses for energy efficiency, maintenance, emergencies • Manufacturing: AI-powered waste optimisation and supply chain transparency tools • Precision agriculture applications: Data-driven predictive analytics; smart irrigation systems; aerial imagery to optimise crop health and yields • Transport: Analysis of traffic data to reduce fuel consumption and route optimisation; smart EV chargers • Buildings: Control and monitoring systems for real-time energy consumption; setpoint automation; smart lighting; occupancy analytics for efficient space utilisation
Finance	• Energy trading to analyse market data for trading decisions • Economic forecasts and models to predict crop yields and harvests to optimise resource use
Business and consulting	Energy management systems, carbon footprint tracking, and AI-driven analytics to help businesses comply with environmental regulations and achieve sustainability goals.

Sources: See Annex 6 – References.

Annex 2: Clean economy roles – examples of new, existing and emerging

Occupation	'Green' occupations	Existing occupations	Emerging occupations
Engineering and construction	• Environmental engineers • Renewable energy engineers • Biomass engineers • Fuel cell engineers • Waste management engineers	• Civil engineers • Electrical engineers • Chemical and materials engineers • Civil engineering professionals • Industrial, mechanical and production engineers • Mining engineers • Aircraft maintenance engineers • Other engineering professionals, draftspersons	• Solar energy systems engineers • Blade engineers • Energy efficiency engineers • Battery design engineers (grid and residential)
Architecture and planning	• Environmental architects	• Architects • Landscape architects • Surveyors • Building planning officers • Building project officers • Architectural, building and surveying technicians • Urban and regional planners	• Passive building architects and designers • Circular architects and designers
Consulting and business analysts (including financial and legal)	• Carbon trading and climate change analysts • Energy auditors • Energy policy analysts • Green finance advisers • Sustainability practice consultants	• Accountants and auditors • Financial data analysts • Policy analysts • Lawyers, legal advisers and analysts • Software developers and programmers • Business advisers and consultants	• Energy brokers • Energy auditors • Embodied carbon assessors • Demand management programmers • Machine learning programmers • Carbon capture and storage specialists
Scientists	• Industrial ecologists • Environmental scientists	• Agricultural, fisheries and forestry scientists • Chemists • Food and wine scientists • Geologists, geophysicists and hydrogeologists	• Sustainable agricultural scientists

Occupation	'Green' occupations	Existing occupations	Emerging occupations
Teaching and educators	• Environmental education officers	• University lecturers and tutors • Vocational education teachers	• Community climate change educators
Managers		• Project managers and coordinators • Construction managers • Facilities managers • Engineering managers • Policy and planning managers • Research and development managers • Production managers • Agricultural practice managers	• Community transition coordinators • Carbon managers / Emissions reduction managers • Building energy managers • Microgrid markets managers • Zero carbon facilities manager • Recycling coordinators
Trades	• Electric vehicle mechanics • Solar and battery electricians •	• Motor mechanics • Airconditioning and refrigeration mechanics • Automotive electricians • Electrical distribution trades workers • Electronics trades workers • Plumbers (energy efficiency, electrification activities, and biogas and renewable hydrogen investment)	• Robotics mechanics

Occupation	'Green' occupations	Existing occupations	Emerging occupations
Technicians	• Solar panel installers and technicians • Remote sensing technicians • EV repair and aftersales service technicians • Solar technologists	• Monitoring personnel • Maintenance personnel • Electrical technicians • Mechanical technicians • Waste and recycling technicians and sorters • Metal fitters and machinists • Telecommunications trades workers • Structural steel and welding trades workers • 3D printer operators	• Weatherisation installers and technicians • Hydrogen fuel cell technicians • Wind turbine technicians • Geothermal technicians • Synthetic biology plant technicians • Grid optimisation technicians and specialists • Household electrification advisors • Energy efficiency retrofit specialists • Battery storage technicians • Battery recycling specialists
Workers/ labourers	• Solar operator and installation workers	• Construction workers (circular practices in product manufacturing / remanufacturing) • Machine operators • Crop protection applicators • Agricultural workers • Plant floor and assembly workers • Waste pickers • Waste collection drivers • Chemical, gas, petroleum and power generation plant operators	
Other	• Resource recovery specialists • Environmental certification specialists • Occupation and environmental health advisers	• Energy assessors • Sales representatives • Farmers and breeders	• Sustainable transportation specialists

Sources: See Jobs and Skills Australia; Victorian Government, Department of Jobs, Skills, Industry and Regions.
See also Annex 6 – References.

Annex 3: Licencing requirements for select foreign trades and professions in Australia and Southeast Asia

AUSTRALIA

Electricians and plumbers: Require specific licenses and qualifications to practice. An Australian Qualification Framework (AQF) III Qualification or equivalent is needed to work in most trades.

Foreign workers are required to undertake an offshore technical skills record (OTSR) to determine that they have the technical skills required to work in the occupation in Australia. This allows them to obtain a provisional license where they can work under the supervision of a licensed trade worker. The worker must then undertake further training at a registered training organisation and complete supervised work in order to obtain their full license.

Most regulated, tradebased occupations require the completion of an apprenticeship, for which there can be long training times. Most tradebased apprenticeships take three to four years for a level 3 qualification (certificate III) under the Australian Qualification Framework.

Engineers: There are several pathways for an engineer from Southeast Asia to work in Australia, depending on whether an MRA is in place. Where an MRA is in place, qualifications can be accredited (such as specific associate degrees or advanced diplomas) where they are recognised by one of the accords from Engineers Australia (EA). Engineers Australia evaluates the courses against the entry-to-practice competencies for the levels of a professional engineer, engineering technologist, or an engineering associate. The specific qualifications that are eligible for accreditation depend on which country the qualification was awarded in and the recognition of the country's engineering qualifications.

For example, an Indonesian engineer can practice in Australia, under an MRA between EA and the Institution of Engineers Indonesia (PII) allowing for a streamlined assessment process to gain Chartered status and professional registration. However, engineers need to formally apply for skills assessment and potentially register with the relevant Australian state or territory board to practice, even if already a member of PII.

Where there is no MRA, foreign engineers must apply through the Competency Demonstration Report (CDR) pathway. This involves demonstrating engineering knowledge and skills through detailed reports based on qualifications and work experience. For workers with qualifications in engineering-related fields that are not recognised but have post-graduate qualifications and substantial engineering-related experience, 'Entry-to-Practice' competency assessment is required.

In addition, in Australia, each state and territory has its own rules and requirements for registration of engineers.

Architects: Southeast Asian architects can practice in Australia, but they must register with a state or territory architect registration board after meeting certain requirements. Architects with qualifications from countries that have a MRA with the Architects Accreditation Council of Australia (AACA), such as Singapore, have a clearer pathway. Others may need to go through the Overseas Qualifications Assessment (OQA) to ensure their credentials are equivalent and to gain access to the Architectural Practice Examination (APE), a competency assessment, which may include a logbook, a written paper, and an interview. Successful completion of the APE is required before applying for registration as an Architect with an Australian state or territory Architect Registration Board.

Registration requirements and processes can differ slightly between Australian states and territories.

SOUTHEAST ASIA

Indonesia: Different barriers to practice by Australian professional services providers apply across a range of professions including legal, environmental, education, and accounting. For example, licensing requirements for some service suppliers of environmental services may vary from that applicable to Indonesian service suppliers.

Malaysia: The supply of engineering, quantity surveying, land surveying and architectural services requires persons to be resident in Malaysia and registered with the relevant professional boards. Engineering services and architectural services must be authenticated by a registered professional in Malaysia.

Philippines: The practice of professional services is highly regulated. In general, professions are reserved for Filipino nationals, unless an MRA applies. Economic needs tests also apply. Any employer who desires to engage a foreigner for employment in the Philippines must obtain the approval of the government, which is subject to the non-availability of a local person; understudy training for Filipinos; and percentage of employment of foreign nationals vis-à-vis the total workforce.

Thailand: specific authorisation is needed to provide construction services, distribution services and computer services.

Vietnam: Licensing and qualification requirements apply to professional services providers including in the legal, education and engineering sectors. For example, urban planning and landscape architecture services by foreign professionals must be authenticated by an architect who has appropriate practicing certificate. Australian engineers can be licensed in Vietnam, but they must go through a Vietnamese regulatory process, which may involve obtaining APEC Engineer credentials or other forms of qualification and registration to prove their eligibility for independent practice.

Sources: Pathway to Australia; Engineers Australia; Australian Architects Accreditation Council, ACPECC; Australian Productivity Commission.

Annex 4: Market access barriers to Australian education providers in Southeast Asia

Australian education providers face several impediments offering services in Southeast Asia.

Indonesia: Unless otherwise provided, commercial presence of a foreign service provider is permitted only through an education institution which is registered in Indonesia and which meets certain conditions:

1) There is a mutual recognition arrangement between relevant institutions on credits, programs, and certifications;

2) Foreign education institutions providing service establish a partnership with a local partner; Foreign language instructors are native and Indonesian speakers;

3) Foreign education institutions must be listed in the Ministry of Education and Culture's List of Accredited Foreign Education and its local partner must be accredited;

4) Commercial presence shall be established in the form of a foundation;

5) Foreign education institutions in cooperation with local partners may open education institutions in the cities of Jakarta, Surabaya, Bandung, Yogyakarta, and Medan;

6) The number of educators must include at least thirty per cent Indonesian educators; and

7) The number of employees, other than educators and the head, shall be at least 80% Indonesian employees.

There are conditions to be able to offer work training (technical and vocational education) through a presence in Indonesia, including on Australian Qualifications Framework qualifications, Indonesian Qualification Framework qualifications levels 1-5 and non-award courses. Australian requirements for trainers are accepted. There are also certain conditions for higher education related to priority areas including maths, science and engineering.

Philippines: Cross border delivery of higher education can be limited. Higher education institutions can be established but must be 60% Filipino owned and controlled and administered by citizens of the Philippines. Foreigners must not be more than one third of enrolments and must be part of an approved twinning arrangement with an accredited HE institution for offerings in the fields of agriculture, industry, environment, natural resource management, engineering, architecture, and science.

Thailand: The establishment of physical campuses is limited to 49% Australian ownership for higher education. Cross border (digital delivery) can be limited for higher education, adult education, and foreign language tuition. Natural persons may enter Thailand to supply education services provided that they: (a) are invited or employed by education institutions duly established and registered in Thailand; and (b) possess qualification and experiences set by such institutions as well as meeting other criteria that may be set by Ministry of Education, where applicable.

Sources: AANZFTA, IACEPA

Annex 5: Labour mobility and immigration requirements in Australia and Southeast Asia

Migration pathways to Australia from Southeast Asia

Engineers from Southeast Asia can qualify for several skilled migration categories, including the Skilled Independent visa (subclass 189) and the Skilled Nominated visa (subclass 190). These visas operate under Australia's points-based system, which allocates points based on age, English language skills, work experience, and qualifications. To be invited to apply, candidates must first submit an Expression of Interest (EOI) through SkillSelect and score above a threshold that varies depending on the occupation and annual quotas. Processing times for skilled visas can exceed 12 months, and competition for invitations is high.

The Graduate Work visa (subclass 476) is another pathway, aimed at recent engineering graduates from recognised institutions. However, this category favours less experienced applicants over seasoned professionals, raising questions about the consistency and intent of the skilled migration framework.

Unskilled or low-skilled workers from Southeast Asia can apply for Working Holiday visas or Temporary Work visas, but these are usually restricted by age limits, nationality, and employer sponsorship requirements.

Programs that do allow low-skilled labour (such as the Pacific Australia Labour Mobility scheme) are quota-based, geographically limited, and generally exclude Southeast Asian countries. Even where workers are eligible, visa holders are typically tied to a single employer, making it difficult to change jobs or report exploitation. Application processes often require employer nomination, English tests, and proof of funds, which are disproportionately burdensome for low-income applicants.

Migration pathways from Australia to Southeast Asia

In Indonesia, the foreign-employment process involves four sequential approvals: 1) Government authorisation for a company to employ foreign staff; 2) Issuance of a work permit for the foreign worker's specific role; 3) A limited-stay visa for entry; 4) A temporary stay permit (KITAS) for residence and work. Australians may apply for short-term (6 months), long-term (2 years), or Special Economic Zone work visas.

Australian professionals seeking to work **in Vietnam** must obtain a work permit issued by the Department of Labour, Invalids and Social Affairs. Applications must be lodged with employer sponsorship, and the permit is required before applying for a temporary residence card or working visa. Recent regulatory reforms allow work permits to apply nationwide rather than being restricted to one province and have reduced experience thresholds (technical workers now need two years experience instead of three). Nonetheless, the process remains bureaucratic and paperwork-heavy, often taking several months and requiring authentication of foreign qualifications.

Foreign experts and executives can now undertake short-term assignments (up to 90 days per year) without a full work permit, which improves flexibility for project-based work, but longer-term placements still require full compliance with local employment regulations.

Sources: Department of Home Affairs, Australia; Engineers Australia; Vietnam Visa; Tilleke & Gibbins.

Annex 6: References

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