APEC Policy Support Unit
POLICY BRIEF No. 54
December 2022

Transitioning to a Sustainable Economy while Ensuring Inclusion

by Glacer Niño A. Vasquez and Rhea Crisologo Hernando

KEY MESSAGES

- Just transition is a framework that aims to maximise the advantages of transitioning to a low-carbon economy while promoting equity and inclusivity.
- The catastrophic impacts of climate change could lead to significant human and economic costs, globally and in APEC. Decarbonisation and the reduction of greenhouse gas (GHG) emissions are crucial factors in the fight against climate change.
- Digitalisation has the potential to hasten the transition to a low-carbon economy. Across industries, digital technologies can be harnessed to improve energy efficiency and reduce GHG emissions.
- Vulnerable groups like women, the poor, workers, people with disabilities and Indigenous Peoples will be disproportionately affected by the climate crisis. The transition to low carbon should ensure their inclusion, particularly their capacity to access decent work opportunities.
- Policy responses and support initiatives in the transition period could vary, and would be largely dependent on prevailing economic conditions, available resources and priorities. However, it remains imperative that economies must prepare for the shift to low carbon.
- Many APEC economies have led the way through initiatives and stakeholder dialogues to ensure that the transition to a low-carbon economy is equitable and inclusive.
- Employment policies, social dialogue, structural reforms and investments, carried out in parallel, are crucial toward a transition process that is inclusive and addresses inequalities.
- Labour policies should include financial support and social protection for job losses and worker displacements, and at the same time, open up and/or widen opportunities for education, training, reskilling, upskilling and career development.
- Structural reforms are essential to the success of the transition, particularly if focused on promoting sustainable practices, supporting vulnerable groups, stimulating enterprise innovation and boosting the growth of green industries.
- The guiding principles of a just transition are useful in helping the APEC region achieve both climate action and inclusion, and are already embodied in APEC's Future of Work Agenda and the APEC Putrajaya Vision 2040 of Strong, Balanced, Secure, Sustainable and Inclusive Growth.

Introduction

Just transition is a framework that seeks to maximise the benefits of greening the economy while promoting equity and inclusivity. To ensure inclusion, the prime directive of a just transition is to create 'decent work' opportunities, support people whose livelihoods are highly dependent on carbon-intensive sectors, and reduce the negative impact of the shift to a low-carbon economy on marginalised groups.

Employment policies, social dialogue, structural reforms and investments, carried out in parallel, are crucial in ensuring that the transition is inclusive and inequalities are addressed.

This Policy Brief seeks to provide a better understanding of the critical factors that need to be put in place to ensure that APEC's transition to low carbon does not leave anyone behind.

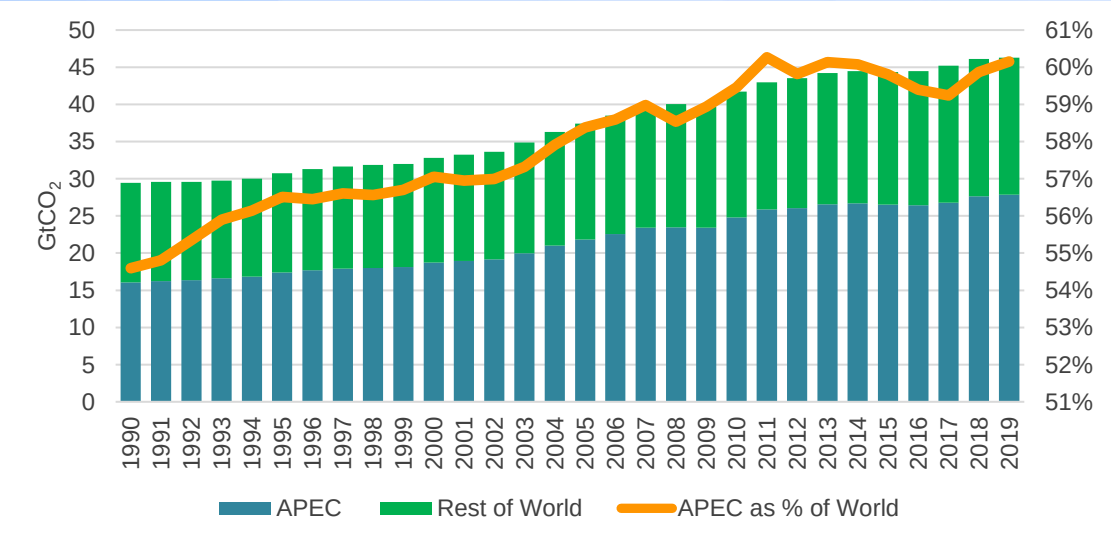
Human and Economic Costs of Climate Change

Climate change, and its catastrophic impacts, poses significant human and economic costs. Aside from heat stress, higher temperatures combined with poorer air quality could worsen respiratory illnesses while frequent rainfall could contribute to outbreaks of malaria and dengue fever. The World Health Organization estimates that, between 2030 and 2050, climate change could result in an additional 250,000 deaths annually from malaria, diarrhoea, malnutrition and heat stress.[1] By 2030, the direct costs of climate change to health could reach around USD 2-4 billion per year.[2]

The APEC region, where almost 3 billion people live (accounting for 38 percent of the global population)[3] could suffer an additional 350,000 deaths annually by 2100 from changes in the number of extreme hot and cold days compared to the present.[4]

The costs to economic progress are just as staggering. The global economy is expected to be adversely affected by climate change, without exception. The World Bank estimates that, without climate change adaptation measures, APEC could absorb losses amounting to 7.3 percent of GDP.[5] Lending support to this is an APEC Policy Support Unit (PSU) report showing that, by 2050, gross domestic product (GDP) losses for the APEC region could range from 0.6 to 11.3 percent in a best-case scenario where temperature increase is

Figure 1. Total GHG emissions (CO_2 equivalent) in APEC and Rest of World, 1990–2019



CO_2=carbon dioxide; GHG=greenhouse gas; $GtCO_2$=billion tonne of carbon dioxide
Source: World Resources Institute, "Historical GHG Emissions," Climate Watch, accessed 24 November 2022, https://www.climatewatchdata.org/; APEC Policy Support Unit (PSU) staff calculations.

[1] World Health Organization (WHO), "Climate Change and Health," 30 October 2021, https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Climate%20change%20affects%20the%20social,malaria%2C%20diarrhoea%20and%20heat%20stress
[2] WHO, "Climate Change and Health."
[3] APEC, "APEC in Charts 2022" (Singapore: APEC, November 2022), https://www.apec.org/publications/2022/11/apec-in-charts-2022
[4] World Bank, "Climate Change in APEC: Assessing Risks, Preparing Financial Markets, and Mobilizing Institutional Investors" (Washington, DC: World Bank, 2020), https://openknowledge.worldbank.org/handle/10986/33423
[5] World Bank, "Climate Change in APEC."

kept at or below 2.0°C; and could go as high as 18.3 percent in the business-as-usual setting where temperature increase reaches 3.2°C.[6]

Fossil fuels contribute significantly to climate change, accounting for more than 75 percent of GHG emissions. The APEC region represented about 60 percent of global GHG emissions in 2019 (Figure 1). To combat climate change, reducing GHG emissions is crucial and decarbonisation is necessary.

Digitalisation and Decarbonisation

Digitalisation has the potential to accelerate decarbonisation. Digital technologies could be applied across sectors to improve energy efficiency and reduce GHG emissions, such as by harnessing renewable energy and improving power grids to better manage large volumes of variable renewable energy, boosting battery storage capacity as well as enabling efficient charging of electric vehicles, and implementing smart heating and cooling systems in buildings.[7]

Across sectors, digitalisation could be a game changer. Since digitalisation necessitates the collection of vast volumes of higher quality data, transforming these data for systems-based approaches could boost efficiency and productivity. For example, analysing data using artificial intelligence (AI) can improve the accuracy of forecasts. A more accurate consumer demand forecast in turn could reduce waste in the food industry, while improved generation forecast could maximise solar and wind resources. Data could also be used for predictive maintenance in the oil and gas sector, preventing emission leaks that are environmental hazards, and cutting operations costs in the process.[8] In the manufacturing sector, innovative and sustainable approaches could help optimise energy and resource use. This could include adopting a circular approach in production and consumption to reduce biodiversity loss and wastage, or using low-carbon industrial infrastructure and services.[9]

The transport sector could develop integrated transport systems and build high-quality public transit systems to encourage a shift away from private vehicle use, while also promoting the use of electric vehicles. Moreover, switching to low-carbon transport modes in the freight sector could support decarbonisation efforts. However, digitalisation also has its own carbon footprint, estimated to account for around 4 percent of global GHG emissions. Indeed, accelerated digitalisation has translated into increased power demand and resource consumption.[10] The challenge is to ensure that digital solutions bring about net benefits, including transforming systems into approaches that preserve biodiversity, minimise waste and improve resource efficiency.

Impact on Vulnerable Groups

The climate crisis will disproportionately affect the already vulnerable, and a just transition should support their inclusion and their capacity to access decent work. Women, for example, are already lagging: globally, young women were more than twice as likely to be not engaged in education, training and employment compared to young men in 2019.[11] In addition, women use digital services less intensively and less frequently and access the internet less often.[12] The gender gap in digital access and use makes women less likely to acquire digital skills.

It is important to ensure that these gender inequalities are addressed adequately as part of the just transition. Policies that would enable women to access decent work opportunities include establishing a legal framework (with accountability) that institutionalises women's rights, gender equality, non-discrimination based on gender in access to education, skills training and employment, and the development and collection of sex-disaggregated data to better inform policymaking. For example, Chile is updating its climate change commitments to incorporate the guiding principles of a just transition, and in parallel, has institutionalised

[6] APEC, "APEC Regional Trends Analysis – APEC's Climate Change Challenge" (Singapore: APEC, November 2021), https://www.apec.org/publications/2021/11/apec-regional-trends-analysis-november-2021-apec-s-climate-change-challenge-toward-a-resilient-recovery-policies-matter

[7] J. Ye, "Using Digitalisation to Achieve Decarbonisation Goals" (Arlington, VA: Center for Climate and Energy Solutions, September 2021), https://www.c2es.org/document/using-digitalization-to-achieve-decarbonization-goals/; World Bank Group, "Climate Change Action Plan 2021–2025: Supporting Green, Resilient, and Inclusive Development" (Washington, DC: 2021), https://openknowledge.worldbank.org/handle/10986/35799

[8] Ye, "Using Digitalisation to Achieve Decarbonisation Goals;" B. Teufel and C.M. Sprus, "How Digitalisation Acts as a Driver of Decarbonisation" (Switzerland: EY, 29 October 2020), https://www.ey.com/en_ch/decarbonization/how-digitization-acts-as-a-driver-of-decarbonization

[9] World Bank Group, "Climate Change Action Plan 2021–2025."

[10] Teufel and Sprus, "How Digitalisation Acts as a Driver."

[11] V. Karkee and M. Sodergren, "How Women Are Being Left Behind in the Quest for Decent Work for All," ILOSTAT, 29 March 2021, https://ilostat.ilo.org/how-women-are-being-left-behind-in-the-quest-for-decent-work-for-all/

[12] A. Tyers-Chowdhury and G. Binder, "What We Know about the Gender Digital Divide for Girls: A Literature Review," UNICEF Gender and Innovation Evidence Briefs, 2021, https://www.unicef.org/eap/media/8311/file/What%20we%20know%20about%20the%20gender%20digital%20divide%20for%20girls:%20A%20literature%20review.pdf

gender-equitable approaches and synergies that recognise the role of women as agents of change for climate action.[13]

Also at risk are the extreme poor, defined as those who subsist on USD 2.15 per person per day in 2017 purchasing power parity (PPP) terms, who represent around 8.9 percent of the world's population.[14] Children from the poorest wealth deciles are seven times less likely to finish school than those in richest wealth deciles, placing them at a disadvantage in terms of obtaining decent work.[15] A key strategy as economies shift toward low carbon and adopt cleaner energy measures is the provision of social protection and financial incentives that target low-income households. For example, in the US state of Maryland, rebates were introduced to encourage the adoption of energy-saving measures, helping about 30,000 low-income households.[16]

People with disabilities are also disproportionately affected by climate change as they are not usually included in societal planning and decision making. Inclusive policies must be put in place so that this segment of society is not left behind. This could mean, for example, the implementation of legal standards that promote disability inclusion as well as skills training, and attitudinal transformation that fosters decent work opportunities for persons with disabilities.

Indigenous Peoples are among the first to be directly affected by climate change even though they contribute very little to global carbon emissions themselves. To ensure a just transition, vital strategies could include sustainable enterprise creation and livelihood generation, Indigenous Peoples rights recognition, and coordination and collaboration. For example, securing collective land rights for Indigenous Peoples has been found to be integral to halting deforestation in Peru.[17] Forestlands held by Indigenous Peoples were found to be well-preserved compared to lands managed otherwise.

Just Transition Actions in APEC Economies

Social dialogue. Initiatives and various forms of a just transition, to ensure that the transition to a low-carbon economy is equitable and inclusive, have already taken place in many APEC economies. An example is the Public Utility Vehicle modernisation programme in the Philippines. The programme, intended to reduce carbon emissions and air pollution by replacing jeepneys that run on internal combustion engines with cleaner or electric vehicles, put the welfare of workers at the core of its implementation.[18] Through social dialogue, a worker-led transition came about and resulted in a drop in capital costs and the formation of transport cooperatives that provided stability, security and collective ownership among public transport workers.

In Jakarta, Indonesia, the introduction of automated ticket vending machines put at risk the jobs of train workers. A series of negotiations among the stakeholders followed, and new positions were created, allowing the workers to remain employed with the same working conditions.[19]

In the US state of California, the conduct of social dialogue among labour unions, environmental groups and employers was deemed crucial in ensuring a just transition during the closure of the Diablo Canyon power plant.[20] The initial closure plan had threatened the welfare of the hundreds of workers and surrounding communities that benefited from the power station. A series of discussions among stakeholders staved off the abrupt shutdown of the plant, allowed generous retrenchment packages, retraining and redeployment for the workers, and, at the same

[13] World Resources Institute, "Chile: Incorporating a Just Transition into Chile's Nationally Determined Contribution," 1 April 2021, https://www.wri.org/update/chile-incorporating-just-transition-chiles-nationally-determined-contribution

[14] R.A.C. Aguilar et al., "September 2022 Global Poverty Update from the World Bank: 2017 PPPs and New Data for India," World Bank Blogs, 14 September 2022, https://blogs.worldbank.org/opendata/september-2022-global-poverty-update-world-bank-2017-ppps-and-new-data-india

[15] Oxfam International, "Poor Children 7 Times Less Likely to Finish School than Rich Children: New Oxfam Report," 17 September 2019, https://www.oxfam.org/en/press-releases/poor-children-7-times-less-likely-finish-school-rich-children-new-oxfam-report

[16] M. Bouyé, D. Grinspan and A. Tankou, "Ensuring a 'Just Transition': 5 Priorities to Make Climate Action Benefit Low-Income and Disadvantaged Groups," World Resources Institute, 20 December 2019, https://www.wri.org/insights/ensuring-just-transition-5-priorities-make-climate-action-benefit-low-income-and

[17] M. Bouyé, A. Tankou and D. Grinspan, "Growing Momentum for Just Transition: 5 Success Stories and New Commitments to Tackle Inequality Through Climate Action," World Resources Institute, 6 August 2019, https://www.wri.org/insights/growing-momentum-just-transition-5-success-stories-and-new-commitments-tackle-inequality

[18] International Transport Workers' Federation (ITF), "A Just Transition for Urban Transport Workers: Issues and Experiences from Unions in Cities of the Global South" (ITF, 2022), https://www.itfglobal.org/sites/default/files/node/resources/files/A%20Just%20Transition%20for%20Urban%20Transport%20Workers_Report.pdf

[19] ITF, "A Just Transition for Urban Transport Workers."

[20] Just Transition Centre, "Just Transition: A Report for the OECD," May 2017, https://www.oecd.org/env/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf

time, resulted in significant enhancements to the power plant's energy efficiency and storage portfolio as well as its renewable energy.

Similarly, social dialogue involving labour unions, environmental organisations, businesses and the government was crucial in ensuring a just transition in the US state of Washington.[21] The closure of Centralia Big Hanaford power plant put at risk the livelihoods of hundreds of power station workers and the vibrancy of the local economy. With strong political will, an agreement was reached between the government and the power plant, resulting in a sufficient lead-time for adjustment, an endowment of USD 30 million for a community investment fund, and a USD 25 million energy-technology transition fund.

In Chile, to meet decarbonisation targets, Enel Group's last coal power plant halted its operations in October 2022.[22] It became the first company in Chile to shut down all coal-fired electricity generation. A transition strategy for the plant employees, contractors and local communities was carefully planned to ensure inclusion. The company organised relocation packages for plant workers as well as social, economic and commercial development initiatives for local communities. An important part of the company's plan is to reforest a 10-hectare area of the coal power plant's ash landfill.

Government-formed institutions. In 2018, Canada committed to eliminate coal-fired electricity generation by 2030.[23] The imminent phase out has fuelled growing concerns from coal workers and local communities largely reliant on coal. To mitigate the negative impacts on these communities, the government launched a high-level task force for a just transition. The task force consists of decision makers and representatives from labour, the private sector, civil society organisations, academe and local governments. Ensuring inclusion, listening to affected stakeholders, clear commitments and strong support from high-level federal officials were enabling factors in achieving a fair and inclusive transition.

Similarly, in New Zealand, a Just Transitions Unit was formed to coordinate efforts in transitioning to a low-emissions economy while ensuring that the effects and opportunities from the transition are fairly distributed.[24] The agency, housed under the Ministry of Business, Innovation and Employment, aims to make sure that regions are engaged and supported in order to plan and manage the social, economic and environmental impacts of the transition to low carbon.

High-level partnerships and commitments. To promote green jobs and a just transition in the garment and textile industry in China, the International Labour Organization (ILO) partnered with the China National Textile and Apparel Council.[25] An international summit and capacity-building workshop was organised in Guangdong to push the digital and green transformation of the textile sector and ensure inclusion in the process toward a sustainable future. The event provided a platform for the diverse set of participants and stakeholders to exchange and share knowledge, and propose initiatives to ensure inclusion amid the transition.

The Maritime Just Transition Task Force, which was launched by the ILO, the International Chamber of Shipping, the International Transport Workers' Federation, the International Maritime Organization and the United Nations Global Compact announced its first partnership with the Singapore Maritime Foundation in April 2022.[26] The objectives are to make a decisive transition toward sustainable shipping, contribute to the global conversation and ensure a just transition in the maritime industry. Moreover, the Singapore Maritime Foundation recognises the need to equip the workforce with new skills to ensure a just transition.

At the United Nations Climate Change Conference 2021, the governments of Canada; New Zealand;

[21] J.M. Cha, "Just Transition: Tools for Protecting Workers and Their Communities at Risk of Displacement due to Climate Policy," in C. Zabin, ed., *Putting California on the High Road: A Jobs and Climate Action Plan for 2030* (Berkeley, CA: UC Berkeley Center for Labor Research abd Education, 2020), https://laborcenter.berkeley.edu/wp-content/uploads/2020/08/Chapter-4-Just-Transition-Putting-California-on-the-High-Road.pdf

[22] Enel Green Power, "Our Last Coal-fired Power Plant in Chile Has Been Shut Down," 7 October 2022, https://www.enelgreenpower.com/stories/articles/2022/10/achieved-decarbonization-target-chile

[23] International Institute for Sustainable Development, "Real People, Real Change: Strategies for Just Energy Transitions," December 2018, https://www.iisd.org/system/files/publications/real-people-change-strategies-just-energy-transitions.pdf

[24] Ministry of Business, Innovation, and Employment, New Zealand, "Just Transition," accessed 5 December 2022, https://www.mbie.govt.nz/business-and-employment/economic-development/just-transition

[25] ILO, "ILO and China Held an International Summit in Humen to Promote Green Jobs and Just Transition in Textile and Garment Sector," 18 November 2022 https://www.ilo.org/asia/media-centre/news/WCMS_861766/lang--en/index.htm

[26] International Chamber of Shipping, "Singapore Maritime Foundation Becomes First Partner of Maritime Just Transition Task Force," 7 April 2022, https://www.ics-shipping.org/press-release/singapore-maritime-foundation-becomes-first-partner-of-maritime-just-transition-task-force/

the US; and other economies signed the Just Transition Declaration which aimed to support the conditions for a just transition internationally.[27] In addition, high-level officials from Australia; Brunei Darussalam; Canada; Chile; Indonesia; Korea; New Zealand; Philippines; Singapore; Viet Nam; and other economies supported the Global Coal to Clean Power Transition Statement. The declaration aimed to scale up the use of clean and renewable energy, and at the same time, ensure a just and inclusive transition for affected workers, sectors and communities.[28]

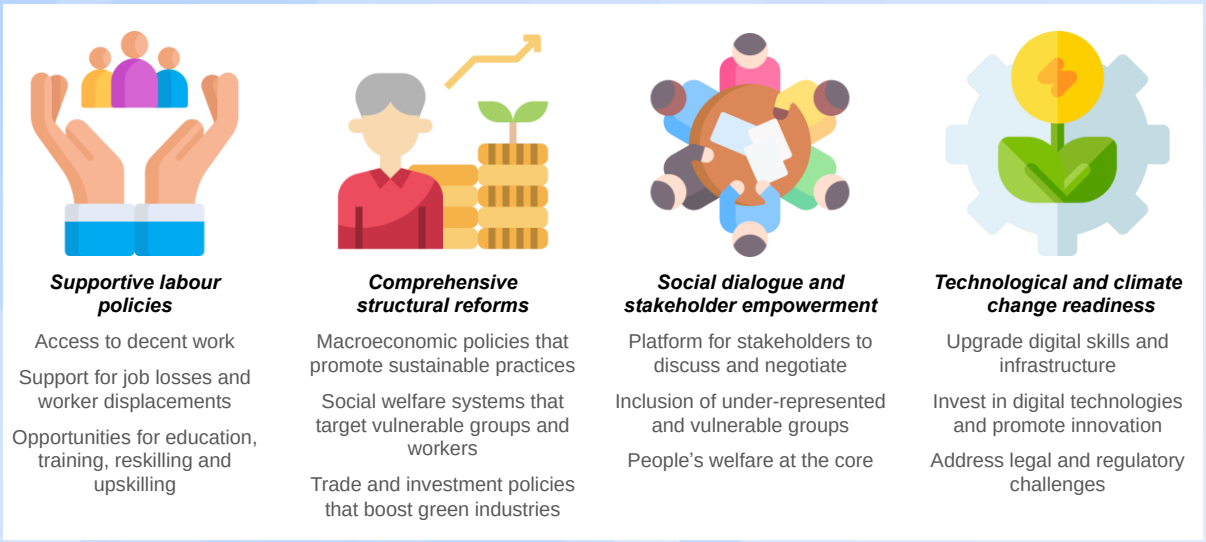
Transitioning Imperatives: Policy Options

The just transition concept revolves around seven principles: (1) actively encouraging decarbonisation in line with globally agreed goals to address the costs associated with climate change; (2) avoiding new sources of carbon lock-in by investing in or providing subsidies and other forms of support to carbon-intensive industries or fossil fuel production; (3) generating opportunities to preserve economic stability, especially providing support to those facing challenges in transitioning and those who have lower responsibility for historical GHG emissions; (4) providing assistance to workers and communities affected by the shift to low carbon; (5) addressing environmental damage, particularly making sure that costs are not transferred from the private to the public sector; (6) implementing support measures to mitigate economic and social inequities; and (7) ensuring an inclusive and transparent planning process based on social dialogue.[29] [30]

At the economy level, policy responses and support initiatives (Figure 2) in the transition period could vary, and would be largely dependent on prevailing economic conditions, available resources and priorities. At the international level, cooperation and an open dialogue are needed to discuss financial, technological and other related issues to boost the global economy's resilience amid the transition period.

Nevertheless, it remains imperative that economies must prepare for the shift to low carbon by nurturing a conducive environment that enables a smooth, steady, and especially inclusive transition. This requires comprehensive, coherent and coordinated policies across economic, environmental, social and labour policies.

Figure 2. Climate Change and Inclusion: Some Policy Options



Source: Authors.

[27] "Supporting the Conditions for a Just Transition Internationally," UN Climate Change Conference UK 2021, 4 November 2021, https://ukcop26.org/supporting-the-conditions-for-a-just-transition-internationally/

[28] "Global Coal to Clean Power Transition Statement," UN Climate Change Conference UK 2021, 4 November 2021. https://ukcop26.org/global-coal-to-clean-power-transition-statement/

[29] Stockholm Environment Institute, "Seven Principles to Realize a Just Transition to a Low-carbon Economy" (Stockholm: Stockholm Environment Institute, June 2020), https://www.sei.org/publications/seven-principles-to-realize-a-just-transition-to-a-low-carbon-economy/

[30] International Labor Organization (ILO), "Guidelines for a Just Transition toward Environmentally Sustainable Economies and Societies for All" (Geneva: ILO, 2015), https://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_432859.pdf

Ensure that labour policies support workers and the vulnerable. Creating opportunities to ensure decent work for all is an important aspect of just transition. The ILO identifies four pillars in its Decent Work Agenda: social dialogue, social protection, rights at work, and employment. Parallel to economies' pursuit of environmentally sustainable growth and progress is safeguarding people's rights to decent work along with contributing to the goals of social inclusion and poverty eradication.[31]

Key labour market policies to ensure that affected groups and communities thrive in a low-carbon future are essentially two-pronged and must be implemented at the same time. On the one hand, labour policies should take into account the provision of financial support and social protection for job losses and worker displacements; and on the other, policies should also open up and/or widen opportunities for education, training, reskilling and upskilling, and career development.

Implement structural reforms. Structural reforms are also vital to the success of a just transition. These reforms require macroeconomic policies that promote sustainable production and consumption, a conducive environment for sustainable enterprises, incentive designs that stimulate enterprise innovation, as well as an appropriate mix of taxes, subsidies and loans to encourage the shift. Where feasible, economies can also consider implementing environmental tax reforms to finance social protection programmes.

Indonesia, for example, announced in August 2022 that it is considering to reallocate its budget for fossil fuel subsidies to social welfare programmes, including cash transfers to more than 20 million households. [32] In addition, the European Environment Agency finds that the transition to a climate-neutral economy by 2050 could benefit from revenues generated by environmental taxes.[33]

Complementing these reforms is the development of financial, agricultural or social welfare infrastructure to counter the risk of people and enterprises being displaced. This necessitates investments to build or upgrade existing infrastructure and to retrain or reskill workers. In parallel, resources need to be allocated to improve social safety nets and implement subsidy or support measures that effectively target sectors and workers (including their families) rendered vulnerable by the transition.

In the agriculture industry, for example, the United Nations Environment Programme acknowledges the importance of repurposing present subsidies and matching financial incentives with sustainability goals in ensuring a just transition to sustainable agriculture and food production. [34] Equally important is the institutionalisation of just transition bodies at the economy level to ensure that the objectives of a just transition are met such as Canada's task force on just transition for coal power workers and communities and New Zealand's Just Transitions Unit.

At the same time, trade and investment policies could be adjusted to stimulate the growth of green industries, including boosting green jobs and innovation.

Commit to social dialogue and empower stakeholders, especially the vulnerable. From a larger perspective, paramount to the success of a just transition are respect for basic labour rights, the conduct of effective social dialogue among concerned parties and the empowerment of vulnerable and under-represented groups like women, the poor, workers, people with disabilities and Indigenous Peoples.

Commitment to social dialogue and stakeholder engagement has turned out to be an important factor to achieve a just transition. Representatives from labour, the private sector, civil society organisations, academe, communities and local governments must be given a platform to come together, discuss and negotiate strategies to carry out a just transition. The inclusion of vulnerable and under-represented groups in social dialogue is crucial to ensure that these groups are not left worse off in the transition to low carbon. In addition, in July 2022, the APEC Human Resources Development Working Group published a report emphasising the importance of social dialogue in addressing the challenges in the labour market.[35]

[31] ILO, "Guidelines for a Just Transition."
[32] "Indonesia to Shift $1.6 Bln Portion of Fuel Subsidy Budget to Welfare Programmes," *Reuters*, 29 August 2022, https://www.reuters.com/world/asia-pacific/indonesia-shift-16-bln-portion-fuel-subsidy-budget-welfare-programmes-2022-08-29/
[33] European Environment Agency, "The Role of (Environmental) Taxation in Supporting Sustainability Transitions," 7 February 2022, https://www.eea.europa.eu/publications/the-role-of-environmental-taxation/the-role-of-environmental-taxation
[34] United Nations Environment Programme, "Supporting a Just Transition to Sustainable Agriculture," accessed 5 December 2022, https://www.unep.org/explore-topics/green-economy/what-we-do/economic-and-fiscal-policy/fiscal-policy/policy-analysis-6
[35] APEC, "Social Dialogue as a Tool to Address Labour Market Challenges," July 2022, https://www.apec.org/docs/default-source/publications/2022/7/social-dialogue-as-a-tool-to-address-labour-market-challenges/222_hrdwg_social-dialogue-

The guiding principles of a just transition are useful in helping the APEC region achieve both climate action and inclusion. In fact, these principles are already embodied in APEC's Future of Work Agenda. [36] Specifically, the agenda puts the welfare of people at the core in an increasingly digitalised world. It also covers key policy recommendations on skills development and redevelopment, including update of labour market regulations. Moreover, the third pillar of the APEC Putrajaya Vision 2040 on Strong, Balanced, Secure, Sustainable and Inclusive Growth emphasises sustainability, climate action, human resources and skills development, and inclusion as its priorities.

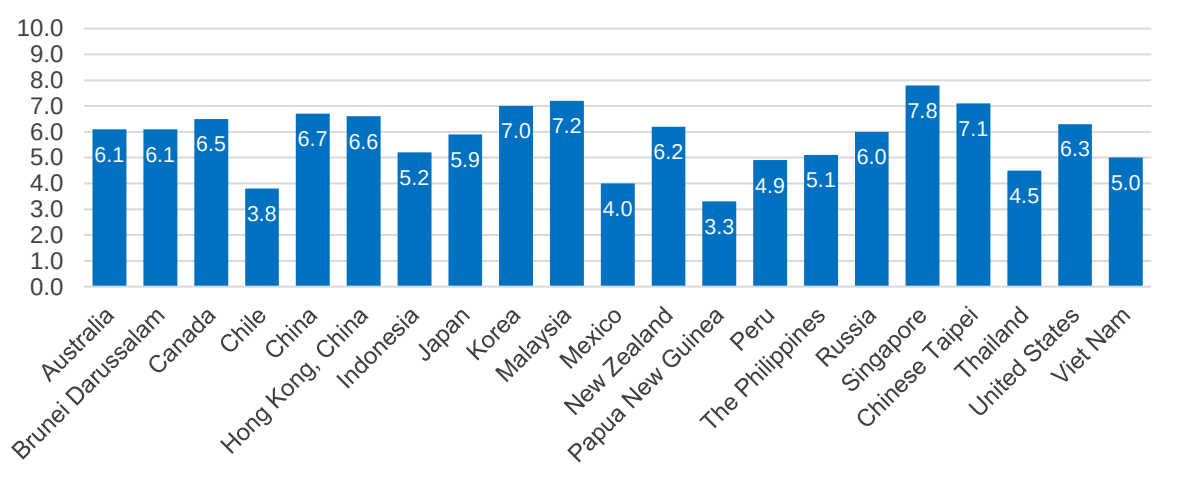
Boost APEC's technological and climate change adaptation readiness. Digitalisation has the potential to significantly hasten the shift to low carbon. However, it is worthwhile to highlight that digitalisation also brings to the fore constraints such as lack of digital skills and inadequate infrastructure; risks relating to cybersecurity and data privacy; as well as legal and regulatory challenges that need to be sufficiently addressed to keep up with the dynamic digital changes and prevent risks from materialising.

Given the crucial role of digitalisation, the level of digital skills and technological readiness of APEC economies play a key role in transitioning toward low carbon. Building information modelling applications, business intelligence and data analytics, technology road mapping, and artificial intelligence applications are some examples of digital skills that support the transition to low carbon.[37]

One way to measure the digital skills capacity of economies to achieve sustainable growth is through the use of the Digital Skills Gap Index (DSGI). The DSGI is a summary measure of key pillars of digital skills, namely, (1) digital skills institutions; (2) digital responsiveness; (3) government support; (4) supply, demand and competitiveness; (5) data ethics and integrity; and (6) research intensity.[38]

Singapore, which ranks first in APEC and globally in terms of DSGI, has one of the world's best digital skills institutions, digital research intensity, government support, and digital competitiveness (Figure 3). Collectively, APEC economies have performed well in the digital skills institutions pillar where eight APEC economies belong to the global top 20. They also perform well in the supply, demand and competitiveness aspect where nine APEC members are part of the world's top 20.

Figure 3. Digital Skills Gap Index in APEC economies, 2021



Source: The Digital Skills Gap Index, Wiley, accessed 24 November 2022, https://dsgi.wiley.com/global-rankings/

as-a-tool-to-address-labour-market-challenges.pdf?sfvrsn=191b4aef_2

[36] APEC, "APEC Framework on Human Resources Development in the Digital Age," 15 May 2017, updated December 2022, https://www.apec.org/groups/som-steering-committee-on-economic-and-technical-cooperation/working-groups/human-resources-development/framework; APEC, "APEC Economic Policy Report: Structural Reform and the Future of Work" (Singapore: APEC, 2021), https://www.apec.org/publications/2021/11/2021-apec-economic-policy-report

[37] SkillsFuture Singapore, "The Green Economy Explained: Trends, Skills & Jobs You Need to Know About," 6 December 2022, https://www.myskillsfuture.gov.sg/content/portal/en/career-resources/career-resources/job-skills-insights/the-green-economy-explained--trends--skills---jobs-you-need-to-k.html

[38] Wiley, "Digital Skills Gap Index 2021" (Wiley, 2021), https://dsgi.wiley.com/wp-content/uploads/2021/10/DSGI-whitepaper.pdf

However, many APEC economies have yet to bridge the divide between the demand for digital skills and the capability of educational institutions and corporate trainers to provide the necessary skills as well as the capacity of policymakers to address the talent deficit.

There is a need to improve in the digital responsiveness pillar wherein only one APEC economy had managed to be part of the world's top 20 and none in the top 10. The responsiveness of skills development and education systems, and science and technology skills are some areas for improvement. There is a need to address these digital skills deficits and inequities to further accelerate the shift toward low carbon.

Another key factor to consider in the shift toward a low-carbon economy is the level of readiness of APEC economies to adapt to climate change as well as the level of vulnerability to extreme weather events that APEC economies face. The interaction between these two important factors provides insights on the urgency to address climate change and further advance climate change adaptation efforts.

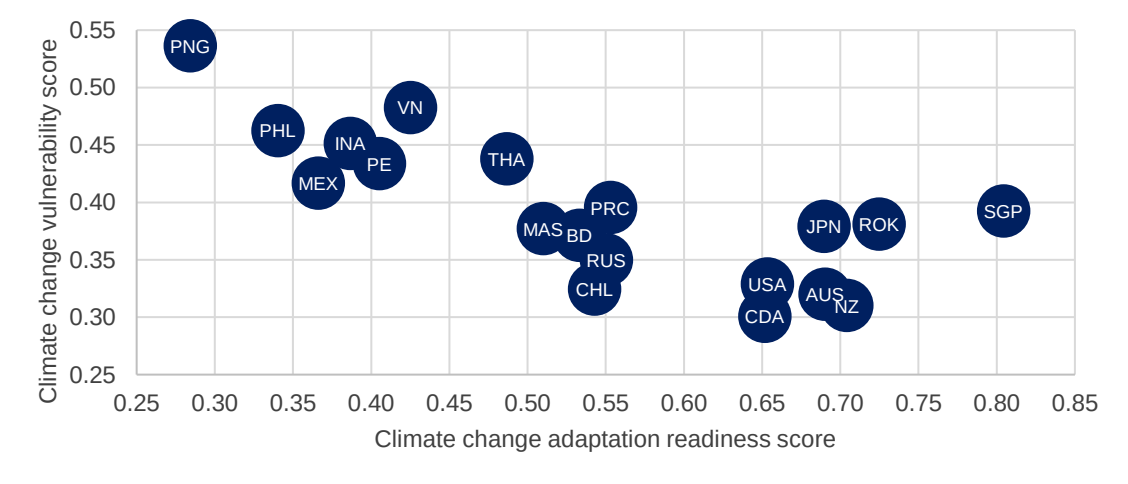
The Notre Dame Global Adaptation Initiative (ND-GAIN) Index captures the latter two features.[39] The ND-GAIN Index vulnerability component measures an economy's sensitivity, exposure, and capacity to adapt to the negative impacts of climate change, while the readiness component measures an economy's economic, governance and social capacity to turn investments into adaptation actions.

More than half of economies in APEC are already well positioned to respond to climate change (Figure 4, lower right). These economies have low levels of vulnerability combined with high levels of readiness to address climate change.

On the other hand, there remain a few APEC economies that need to take urgent action (Figure 4, upper left). These economies face the biggest risk exposure to climate change coupled with low level of readiness. The need to invest in climate change adaptation measures and improve an economy's business environment, institutional factors, Information and Communications Technology infrastructure, education, and innovation are essential to enhance the readiness of these APEC economies.

One way for APEC economies to improve its climate change adaptation readiness is to invest in digital skills and technologies. Digital technologies have been identified as an important factor in climate change adaptation in the Asia-Pacific region.[40]

Figure 4. Climate change adaptation readiness and vulnerability in APEC economies, 2020



AUS=Australia, BD=Brunei Darussalam; CDA=Canada; CHL=Chile; INA=Indonesia; JPN=Japan; MAS= Malaysia; MEX=Mexico; NZ= New Zealand; PE=Peru; PNG=Papua New Guinea; PHL=the Philippines; PRC=China; ROK=Korea; RUS=Russia; SGP=Singapore; THA=Thailand; USA=United States; VN=Viet Nam
Note: Data for Hong Kong, China; and Chinese Taipei are unavailable.
Source: Notre Dame Global Adaptation Initiative (ND-GAIN), accessed 24 November 2022, https://gain.nd.edu/our-work/country-index/download-data/

[39] Notre Dame Global Adaptation Initiative (ND-GAIN), accessed 24 November 2022, https://gain.nd.edu/our-work/country-index/download-data/

[40] C.B. Aparicio and S.V. 'Ofa, "Digital Technologies for Climate Change Adaptation in Asia and the Pacific," UN Economic and Social Commission for Asia and the Pacific (ESCAP) Information and Communications Technology and Disaster Risk Reduction Division Working Paper Series, December 2021, https://www.unescap.org/sites/default/d8files/knowledge-products/Digital%20technologies%20for%20climate%20change%20adaptation%20in%20Asia%20and%20the%20Pacific.pdf

Glacer Niño A. Vasquez is a Consultant and **Rhea Crisologo Hernando** is a Senior Researcher with the APEC Policy Support Unit.

The authors would like to thank Emmanuel A. San Andres and Andre Wirjo for their valuable inputs.

The APEC Policy Support Unit (PSU) is the policy research and analysis arm for APEC. It supports APEC members and fora in improving the quality of their deliberations and decisions and promoting policies that support the achievement of APEC's goals by providing objective and high quality research, analytical capacity and policy support capability.
Address: 35 Heng Mui Keng Terrace, Singapore 119616
Website: www.apec.org/About-Us/Policy-Support-Unit
E-mail: psugroup@apec.org

APEC#222-SE-01.20