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Accelerating Net-Zero: Critical Opportunities in Asia Pacific's Climate Policy

Policy levers to accelerate the transition

Chapter Snapshot: Industrial transformation

Foreword: The Defining Decade For Asia Pacific's Climate Ambition

The next decade will define Asia Pacific's climate transition. Asia Pacific has the most to gain from reaching net-zero, and the most to lose from this not happening fast enough.

The region has the natural resources, technology, human and financial capital needed to provide leadership and effect change, but governments, businesses and society at large must act decisively and accelerate the next wave of decarbonisation.

This paper represents a chapter in the complete report 'Accelerating Net-Zero: Critical Opportunities in Asia Pacific's Climate Policy'. The complete paper details the four pillars and related policy considerations Deloitte recognises as critical to meet the rising decarbonisation needs for our region in the next decade. To access the full report or the other chapter snapshots, see here.

Achieving net-zero ambitions has the potential to grow the Asia Pacific economy by almost US$50 trillion by 2070 but at the same time requires us to scale up emerging technologies, build new industries and unlock US$80 – US$90 trillion in investment by 2050[1].

Government policy will make or break this transition.

Clear direction can facilitate investment through the design of regulatory environments that remove barriers and encourage private capital. In many cases, success will depend on coordinating complex industry and infrastructure shifts – modernising electricity grids to meet growing demand for renewable energy, scaling up charging and future fuel distribution to decarbonise both industry and transport – and supporting difficult industry and workforce transitions. Technologies needed for the transition remain comparatively immature, creating commercial uncertainty with capital not sure where to look, or which technology to back. Most critically, governments must create viable markets and visible demand signals, while also supporting early-stage innovation.

While each nation faces different circumstances, three common imperatives stand out:

- Accelerate, commercialise, and scale up emerging clean energy technologies
- Mobilise private capital for large-scale net-zero investment
- Close the price gaps between low-carbon and conventional options.

Solar and wind are now the lowest cost sources of electricity, so the economics of the transition are already working in its favour. **This paper focuses on the next wave of decarbonisation: future fuels, critical minerals, batteries, and industrial transformation.** These are the building blocks of the future economy.

This next wave of transition will be harder than the last. With increasing interdependence for energy, resources, and technology, governments across Asia Pacific need to balance national interests with greater regional integration. Shared standards, trade, and investment agreements can grow new markets and accelerate change. Facing structural shifts, governments must balance competition with collaboration to secure shared prosperity.

This is our moment to act, and we must accelerate.

Will Symons

Asia Pacific Sustainability Leader

Aloysius Teh

Asia Pacific Public Policy Leader

Introduction
Pathways to net-zero require policy ambition

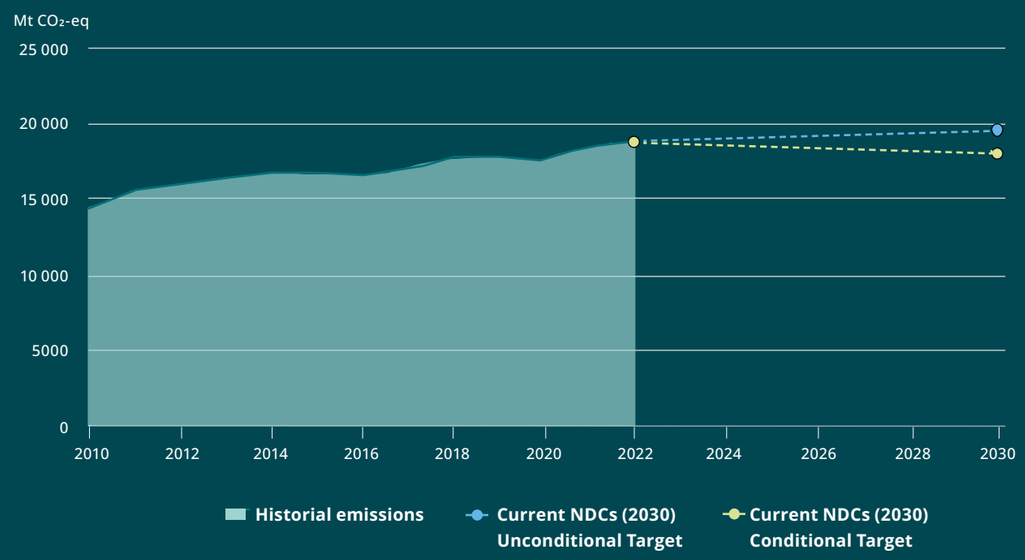
Asia Pacific's Ambition

Economies across Asia Pacific have set ambitious emissions reduction targets through Nationally Determined Contributions (NDCs) under the Paris Agreement and are embedding targets into laws, aligning policy, and mobilising resources to close the gap.

They have launched transition roadmaps and rallied investment. From China's dominance in decarbonisation technologies to Australia's clean energy export potential, the region is positioning itself as a global climate leader.

Yet the Intergovernmental Panel on Climate Change (IPCC) data is clear, and emissions in Asia Pacific, which account for nearly 60% of the global total, continue to rise (see Figure 1). While momentum for change is growing, we are not on track to keep warming within a 1.5°C limit.

Figure 1: Asia Pacific emissions continue to rise
Asia Pacific historical and implied greenhouse gas emissions from energy by NDCs (mid-point projection)



Source: International Energy Agency Climate Pledges Explorer

The current state of play: growing risk of stalemate

Most transition plans rely on a mix of proven solutions and emerging technologies. With rising electricity demand, energy security concerns, hard-to-abate sectors, and challenging investment demands, there is a growing risk of delay or stalemate.

This paper focuses on four critical pillars: **future fuels, critical minerals, batteries, and industrial transformation.** Each pillar must scale up now, reducing emissions or enabling other transition levers, to drive meaningful decarbonisation by 2030 and beyond.

Some areas of transition are accelerating. Renewable energy is scaling as solar photovoltaic (PV) and wind become the least expensive generation sources in almost all markets. Electric vehicle sales (EV) are growing across the region, making up 48% of new car sales in China[2].

Renewables now account for almost 30% of the region's energy generating capacity and are growing faster than fossil fuels. Despite this success, the region's power mix remains reliant on fossil fuels, which still generate 67% of electricity. As energy demand surges and energy security concerns rise, fossil-based generation – and associated emissions – continue to rise.

To meet net-zero commitments decarbonisation must also begin delivering material emissions reductions beyond power generation.

The global energy transition will succeed or fail on Asia Pacific's efforts

The region accounts for 60% of the world's population, nearly 40% of global GDP and around 60% of carbon emissions[3]. Its scale and trajectory of change is pivotal. How Asia Pacific responds will shape the world's net-zero outcome.

The opportunity is historic, and the risks are significant. Asia Pacific can lead a zero-carbon industrial revolution as transformative as its recent decades of economic growth.

Deloitte's Turning Point analysis shows decarbonising the region could unlock a 7.5% increase in GDP by 2070 – equivalent to a US$9 trillion gain, or US$47 trillion in net present value[3]. That's more than the combined economies of Australia, India, and Japan today.

The economic risks of failing to act are stark. If action is not taken, Asia Pacific's GDP will shrink by 5.5% or by US$3.4 trillion annually by 2050. By 2070, losses could reach 12% of GDP – US$16 trillion per year – or US$96 trillion in net present value.

What comes next is more difficult and requires deep changes in industrial policy, energy systems and technology adoption.

The challenges are complex:

- **Future fuels** are essential for decarbonising transport, heavy industry, and power, but remain costly and in limited supply.
- **Critical minerals** are rising in demand, but supply is geographically concentrated and growth faces environmental constraints.
- **Battery production** must scale up rapidly to meet EV demand and support renewable grids, but faces resource bottlenecks and margin pressures.
- **Industrial transformation** – core to economic growth – must shift away from emissions intensive processes and fuels, but lacks viable, commercially scalable alternatives.

Net-zero is unattainable without policy intervention

The scale, pace and complexity of change is unprecedented. Asia Pacific's current NDCs target a reduction of nearly half a billion mega-tonnes of CO_2-equivalent emissions by 2030, or 3% of total emissions. Reaching net-zero implies cutting emissions by 2.6% per year. And every year of delay requires steeper cuts in future years to meet net-zero by 2050 and decreases the likelihood that we will avoid dangerous climate change.

Across Asia Pacific, the impact and implication vary nation to nation. Developed economies, with greater historic emissions, must make deeper cuts to offset rising emissions from developing countries, as their economies grow.

The logic of transition is conceptually simple: Electrify wherever possible, decarbonise the electricity supply, and tackle residual emissions through efficiency, behaviour change and new technology.

With progress on decarbonised electrification accelerating, focus needs to expand to emissions sources which cannot be electrified. These transitions are more difficult. Heavy transport and industrial production face many entrenched barriers and, while technologies exist in areas like low-temperature industrial heat, many sectors still lack viable, scalable decarbonisation pathways. This is where targeted, creative policy becomes essential.

It is estimated that achieving global net-zero will require between US$150-200 trillion in investment by 2050[4]. Asia Pacific alone will need US$79 - 89 trillion. In 2023, investment in low-carbon technologies across the region hit a record US$840 billion. But this must nearly triple to around US$2.3 trillion per year by 2030 and increase further thereafter.

Capital investment is needed to scale up generation and grid infrastructure, replace transport fleets, transform industrial processes, and build resilient supply chains. And the financing challenge is significant. Many projects are not economically viable under current market conditions. Investors need returns on their investments, and consumers need affordable options.

This is where policy becomes critical – to set direction, offer public funding support, and reduce risks to make transition projects bankable. Targeted policy needs to address bottlenecks in each pillar to unlock private capital and accelerate change.

Five key actions for policy makers stand out:

1. **Accelerate policy and regulation**
   Provide clear, stable frameworks that signal a long-term direction and commitment to industry and reduce risk for investors.

2. **Establish sector strategies and institutions**
   Develop targeted roadmaps that clarify what to build, when and where – and assign institutional responsibility for delivery.

3. **Develop new markets**
   Support research, innovation and early-stage investment – but most importantly, build the market infrastructure that allows industry to scale up.

4. **Remove barriers to growth**
   Address financing gaps, infrastructure bottlenecks and execution risks that are slowing progress.

5. **Foster regional cooperation**
   Collaborate across borders to pool demand, share technology, and attract capital at the scale necessary for net-zero transition.

Across the following chapters these five themes return again and again in offering a roadmap for governments, policy makers, business leaders and regulators across the region to meet their NDCs and accelerate decarbonisation.

Industrial transformation

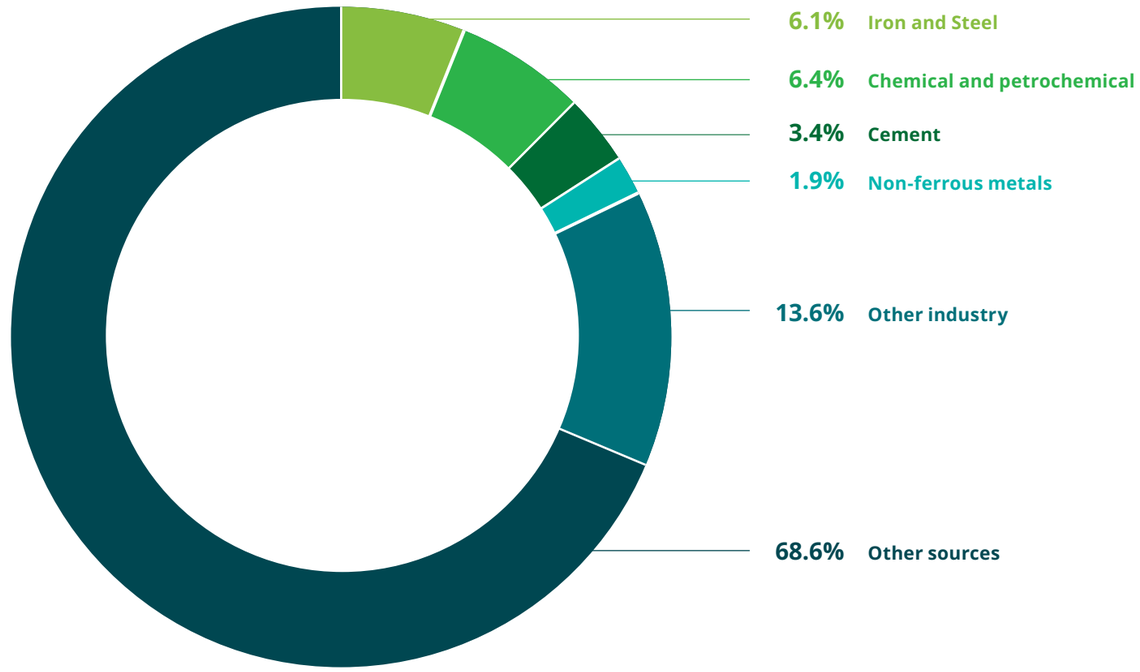
Asia Pacific dominates global industrial production and emissions

Industry accounts for a substantial share of global greenhouse gas emissions, making their decarbonisation essential for meeting net-zero targets

Industries like steel, cement, and aluminum are fundamental to modern economies and have limited substitutes, necessitating their decarbonisation rather than replacement. Asia Pacific dominates global industrial production – accounting for 74% of steel, 77% of cement, 65% of chemicals and 50% of fertiliser output[55].

Globally, industrial end-use emissions make up about 31% of total emissions, with iron and steel, chemicals and petrochemicals, and cement make the largest industry emissions (see Figure 9). The figure is higher in Asia Pacific with the UNEP estimating around 40% of the region's total end-use emissions[56].

Figure 9: GHG emissions, by industry (%)



Source: Deloitte analysis based on Climate Watch, World Resources Institute Data (2021)

Most national strategies prioritise power sector decarbonisation. But as 2035 targets approach, industrial emissions need to be on the agenda. Many industrial operations rely on burning fuels for heat and emissions-intensive methods like blast furnaces. The challenge is these industries are high-emitting, hard to abate and expensive to change.

Industrial decarbonisation is complex. Two-thirds of industrial emissions come from process heat, three-quarters of which require temperatures above 400°F/752°F with few low-carbon alternatives. Many processes, such as those in cement and fertiliser production, are inherently carbon-intensive[57].

Unlike decarbonising the power sector, where renewables are outcompeting fossil fuels on cost, industrial decarbonisation remains commercially challenging. Key low-carbon industrial technologies are early-stage, and alternatives are energy-intensive. Retrofitting, replacing, or retiring emissions-heavy assets add further cost and complexity.

The job for policymakers is to help make the necessary transformation more affordable by providing strategic direction and investment to encourage innovation and market growth. Investment and incentives are needed through the supply chain to drive the transition, addressing price gaps and boosting customer demand.

Achieving deep emissions cuts requires concerted action

Global demand for industrial goods continues to increase. Achieving deep emissions cuts requires action across five fronts:

Boost material and process efficiency

Improve industrial operations, product design and end-use efficiency. For example, the Global Cement and Concrete Association targets 22% emissions reductions via smarter construction[58].

Electrify with renewable energy

Powering industry with renewable electricity is critical – especially for industrial process and low temperature heat. High-temperature processes, such as steel, glass and cement making, have few viable alternatives to combustion and will likely require future fuels.

Develop alternative processes

Emissions intensive industrial processes need new feedstocks and chemistries. Innovations like direct reduction of iron with hydrogen, or green ammonia fertiliser are emerging. For cement, where ~88% of emissions come from clinker production, alternatives remain limited[59].

Capture residual emissions

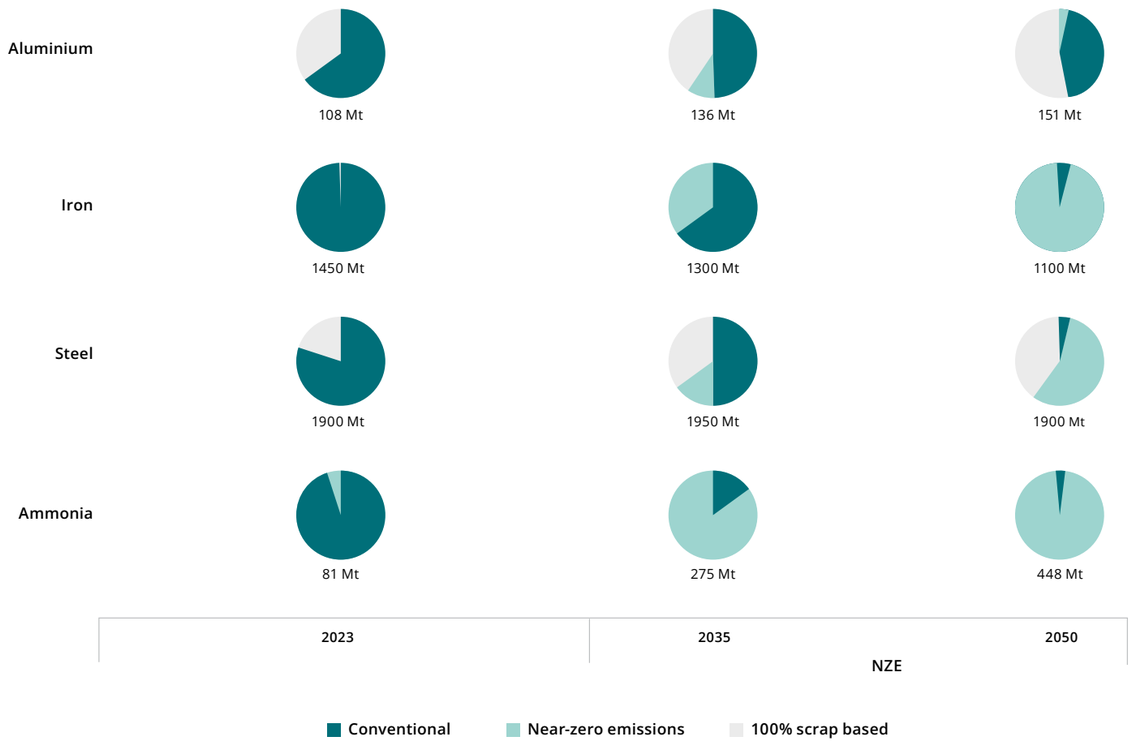
Full decarbonisation of production processes won't be possible for all sectors. Carbon Capture, Utilisation and Storage (CCUS) will be necessary – along with emerging negative emissions technologies – that can turn carbon emissions from a liability into a resource.

Offset where needed

Given slow transformation timelines, offsets will play a role in meeting near-term targets – particularly through funding reductions elsewhere or boosting natural capital.

Today, near-zero carbon industrial production is virtually non-existent for heavy industries. Most green steel, cement and chemical plants remain at pilot or demonstration stage (see Figure 10). Rapid scale-up is essential.

Figure 10: Global materials production with near-zero emissions and conventional technologies



Notes: NZE = Net Zero Emissions by 2050 Scenario. The figures for ammonia exclude the portion destined for urea production with fossil CO_2 as a feedstock. The figures for alumina include only metallurgical alumina. Values for iron and steel are rounded to the nearest 50 Mt.

Source: Deloitte analysis adapted from International Energy Agency (IEA)

Globally, decarbonising heavy industry could require US$54 billion annually in additional capex to 2050 – plus US$140 billion per year for the supporting infrastructure, including renewables, future fuels, and carbon capture[60]. With Asia Pacific accounting for most of global industry, much of this capital needs to be mobilised in

Decarbonising industry is an immense challenge

Low-carbon industrial technologies are early stage and alternatives are costly. Few buyers are paying low-emission premiums at scale, and while initiatives like the First Movers Coalition (a global coalition of companies leveraging their purchasing power to decarbonise heavy-emitting sectors) show intent, actual investment and support for innovation lags far behind the need.

Governments must step in to bridge the gap. Policy support and funding are critical, but difficult. Targets must drive change without undermining competitiveness or burdening consumers. Incentives must be large enough to address price differences – but how to pay for them remains unresolved.

Delay carries risk too – early movers are shaping markets and slow-movers risk being stranded. The growing interest in applying carbon taxes on imports, such as in the EU, is a clear indicator that emissions intensity will be priced into market access.

This challenge holds opportunity. Much of the cost gap stems from fossil fuel subsidies and unpriced externalities. In addition to progressively eliminating these subsidies, carbon pricing will be critical in driving industrial decarbonisation. Where it has been deployed, it has driven fuel-switching choices. We must redevelop the industrial economy to decouple growth and emissions while unlocking growth and jobs.

Key issues for policymakers

1) Set clear industry policy goals

Policy uncertainty is a risk for early movers. Governments need to establish long-term targets and collaborate with industry on transition plans. Roadmaps must align across sectors, underlying power and fuel infrastructure, and along supply chains. And critically, industrial companies and investors need clarity on carbon pricing, incentives, and funding mechanisms to support long-life assets.

Industrial policy is re-emerging as a driver of economic growth. The EU Green Deal and similar initiatives signal a new wave of public investment targeting industrial decarbonisation.

2) Manage industrial electricity demand

Electrification is the first step in decarbonising industry – but it relies on access to clean power. In Asia Pacific, electricity demand is rising rapidly, forecast to grow 5.2% annually to 2027 and potentially triple or more by 2050[61].

While renewables are growing fast, fossil fuel generation is also increasing to meet both demand and energy security needs.

The growth of energy-intensive industries – alongside surging demand from AI and data centres (435 TWh by 2030, or 2.6 times 2023 levels[62]) – makes coordinated planning critical.

Industrial companies need policymakers to align industrial and power generation strategies to ensure access to renewable electricity. This includes co-locating industry alongside new supply, mandating renewable purchasing (as Germany does for new data centres), and prioritising direct use of renewable electricity over less efficient sources – such as converting clean electrons to clean molecules for industrial combustion whilst also undertaking long term planning to enable future fuel production.

As energy and emissions costs increasingly shape industrial competitiveness, access to low-cost renewables will become a key competitive advantage. Some economies, like Australia, aim to leverage this by building value-added exports powered by renewable electricity (see box).

Australian green steel and iron exports

Australia dominates global iron and metallurgical coal exports, supplying 40-70% of key inputs to its major Asian trading partners. It is now charting a new course to move up the value chain by leveraging its renewable energy resources to produce low-emissions iron and steel.

Australia aims to become a major exporter of hot briquetted iron (HBI), offering its trading partners a lower emission and lower cost alternative to domestic production. Replacing 10% of Asia's steelmaking with Australian green HBI could cut 268 Mt CO_2 annually from the region's emissions[63].

Trade agreements that align economic growth, investment and emissions reduction are central to this strategy. In July, the Australian Prime Minister led a mining delegation to Shanghai to position Australian green iron as strategic input to decarbonisation of China's steel industry. Achieving a high-level agreement between China and Australia shows the growing role of bilateral value chain collaboration to accelerate net-zero progress across the region.

Government support includes investment in hydrogen and renewables infrastructure. Australia is also pushing for regional carbon pricing and harmonised green steel standards – recognising that without policy intervention, commercial viability may not arrive before the 2040s[64].

Several projects are underway, with more in the pipeline:

- Green Steel of Western Australia is building an AUD$2.5 billion direct-reduced iron (DRI) facility that will initially be powered by natural gas with plans to transition to hydrogen.
- Fortescue Future Industries is developing an AUD$50 million hydrogen DRI trial plant using clean hydrogen, powered by its own renewable generation, to produce near-zero emissions HBI[65].
- Liberty's Whyalla steelworks received AUD$2.4 billion federal and state package to support the transformation of the plant. The project aims to produce iron and steel for domestic and export markets powered by local renewable energy and clean hydrogen[66].

3) Accelerate transition technologies

Many industrial decarbonisation technologies are at pilot, demonstration, or first-commercialisation stages. Few are ready for full-scale deployment, and there are few standard industry solutions to the major decarbonisation challenges. As a result, many companies are focused on incremental efficiencies, still trialling technology or building pilot plants.

Even promising technologies face hurdles. In steel making, hydrogen-based direct-reduced iron (DRI) offers huge promise but depends on uncertain hydrogen supply. In cement, clinker alternatives exist, but supply chains are sub-scale and regulatory approvals for construction are still being developed.

Recycling technology is also important – from established use of recycled steel and aluminium, to emerging areas in plastics and concrete – but getting the right policies to improve collection rates, or create end-use markets is key. Policymakers can play a role in setting direction for the full product lifecycle – from increasing recycled and waste inputs as industrial feedstock, to product design, material use and repairability.

Companies need support to invest in first-of-a-kind retrofits or facilities, particularly as early-stage projects carry the most technical risk. Venture-funding and support for demonstration plants and pilots can be the necessary bridge from the lab to production.

Cooperating on industry decarbonisation – Japan's Joint Crediting Mechanism

Access to decarbonisation technology remains a barrier for many emerging economies. Japan's Joint Crediting Mechanism (JCM) addresses this by linking export credits and project support for Japanese clean energy technologies with low-carbon development in partner countries.

Japan has established 23 bilateral agreements, including with Indonesia, Vietnam, and the Philippines, and is supporting over 240 projects. The JCM blends foreign aid with market-based mechanisms, enabling Japan to count emissions reductions towards its own targets.

The JCM offers a model for technology transfer and accelerating industrial decarbonisation in emerging markets – and scaling advanced clean technology industries at home.

4) Create markets for low-emissions industry

New industrial products require markets. Clear definitions of low-carbon products like green steel or low-carbon cement are essential for procurement, trade and performance standards. Regulations need to be adapted from production-stage to end-use product and construction standards. Emissions transparency is becoming critical for supply chain reporting and carbon pricing.

Without addressing the externalities of fossil-fuels and levelling the economics of low-emissions industry, other policy measures will be less efficient. The EU's Carbon Border Adjustment Mechanism (CBAM) is incentivising decarbonisation of Asia Pacific industries by requiring the pricing of carbon in their value chains. By 2040 it could raise US$80 billion annually by taxing imports based on carbon-intensity[67].

5) Build demand for low-emissions industry

Corporate climate pledges are growing, but without clear price and demand signals, investment will lag. Low-emissions industrial products face higher costs, and willingness to play a premium remains limited. Policymakers must close the cost gap and stimulate demand, especially for early-stage projects.

Governments can lead with procurement. Programs like Australia's Sustainable Procurement Policy and China's Green Building Materials initiative set clear market signals.

Product mandates and low-carbon content quotas – already common for fuels and recycled materials – can also drive demand, provided they align with realistic supply and manage end-user costs. For instance, a 25% premium on green steel is estimated to add just 1% to vehicle prices[68].

Managing price differences is critical. Production and purchase incentives, like India's Production Linked Incentives and long-term offtake agreements help producers secure demand and pricing stability that can unlock investment.

6) Manage industrial asset lifecycles

Industrial facilities are long-lived which complicates decarbonisation investment decisions. Many high-emission assets will remain economically viable for a long time, and retrofitting is costly. Policymakers must evaluate how to incentivise retrofits, mitigate ongoing emissions, or accelerate retirement – while preserving jobs and economic activity.

Building capacity also carries risks. With zero-carbon solutions still emerging, new projects often rely on interim technologies. In steelmaking, oxygen and blast furnaces still outpace investment in electric arc furnaces or direct reduced iron – locking in emissions for decades[69].

In response, governments are increasingly turning to industrial policy and public capital to accelerate towards low-carbon industry (see box).

Accelerating the green steel transition

Europe's ageing steel infrastructure – averaging over 40 years old – needs urgent modernisation to remain competitive and meet emissions targets. The EU is mobilising support through the Innovation Fund (covering up to 60% of project costs) and the Important Projects of Common European Interest (IPCEI), which backs hydrogen and green steel infrastructure. The European Commission has also approved €9 billion in state and for low- and zero-emission steel projects. Market demand is strong with 54 of the 59 green steel offtake commitments globally being inked in the EU[70].

Several flagship projects have been funded that will test both the technology and policy frameworks for scaling green steel across Europe:

- HYBRIT (Sweden): following its successful pilot, HYBRIT is developing a demonstration plant to produce 1.2 Mt of hydrogen-based, zero-emissions steel per annum[71].
- Stegra (Sweden): A €6.5 billion project integrating clean hydrogen, iron and steel is aiming for 5 Mt of green steel per annum by 2030[72].
- tkH2Steel (Germany): A €3 billion green steel plant aims to produce 2.5 Mt of steel and save 3.4 Mt of CO_2 annually – but faces uncertainty over whether it can obtain the required supply of hydrogen[73].

7) Mitigate residual emissions

Even with deep decarbonisation, heavy industry, particularly cement and concrete, face unavoidable residual emissions. CCUS is essential to address this gap, but current deployment is limited with just 50Mt CO_2 captured annually across 45 global facilities[74]. To reach net-zero targets, CCUS must scale rapidly, and industry will need to lead much of that acceleration.

CCUS is viable today through geological storage, but remains costly, energy intensive and requires proximity to suitable geology. Infrastructure, including pipelines and improved capture technologies are urgently needed. New negative emissions options such as direct air capture (DAC), enhanced rock weathering and mineralisation must also advance.

Faced with high costs and energy demands, adoption of carbon capture risks stalling without robust price or investment support. The EU is backing infrastructure and industry investment, the US has offered tax credits, but in Asia Pacific, most support remains at the research and pilot stage[75].

Nature-based solutions also have an immediate role to play. Afforestation, wetland and mangrove protection and land-use management all offer ready and viable carbon mitigation with broader environmental and biodiversity benefits. While costs are lower than most CCUS options, policymakers need to ensure that nature-based solutions are valued, additional, robust and credible – with support for standards, measurement, certification.

Coordinating industrial transformation across Asia Pacific

Industrial policy risks being pursued for national interest alone. The scale of the challenge demands regional coordination through integrated supply chains and on policy, standards, and investment.

Rethink value chains

Asia Pacific governments should work towards common frameworks for certifying low-carbon products, measuring emissions, and pricing carbon. Harmonisation can lower market and technical risks, support cross-border trade and investment, and enable more efficient industrial development.

Build regional hubs

As carbon intensity shapes industrial inputs and outputs, governments and industry can focus on sourcing the most efficient clean electrons and molecules. This opens the door to more integrated, cross-border industrial supply chains – and raises a strategic question: is it time for a pan-Asia Pacific industrial strategy?

Industrial strategy for the net-zero economy

Industrial decarbonisation is costly and complex – but delaying action risks leaving economies and net-zero targets behind. For most governments, considerations of economic growth, security and prosperity are paramount. Policymakers must design credible transition roadmaps that align climate goals with economic strategy. This means mobilising capital, setting clear market incentives, supporting rapid innovation and, critically, pricing carbon.

As the EU races to build future-fit industrial capacity, Asia Pacific governments must act decisively to avoid falling behind. Done right, net-zero industrial transformation won't just meet climate targets – it can preserve existing jobs and help create up to 180 million new jobs across the region[76].

Policy Approaches

Government policy is crucial for achieving net-zero emissions

Without government intervention, the transition will stall

Accelerating the next wave of net-zero transition in Asia Pacific requires around $2.3 trillion in annual investment by 2030 – more than triple today's US$840 billion.

Governments cannot close this gap alone. They must act as catalysts, creating the conditions to crowd in industry participation and private capital.

The role of policymakers

Meeting emerging 2035 NDC targets requires deep and systemic transitions. Growth in renewable energy has shown what's possible when technology cost curves and the right policy mix align. That success must now be replicated across harder-to-abate sectors.

To scale the next wave of net-zero transition, policymakers must focus on four priorities:

1. **Targets:** Set clear and credible targets backed by robust policy frameworks, industry roadmaps and the incentives needed to achieve them.
2. **Innovation:** Fund R&D and early-stage innovation to de-risk emerging technologies.
3. **Investment:** Provide upfront investment support and targeted policy for high-cost projects.
4. **Carbon pricing:** Phase out fossil fuels subsidies and implement carbon pricing.

Policy is the critical accelerator. But strategies must reflect local context.

Access to renewable energy, mineral resources, the industrial base, and capital vary widely across Asia Pacific. So too does institutional capacity to design and orchestrate change. Developing economies in the region will require support from developed partners to close investment gaps, build capacity, and drive economic growth. (see box).

Catalysing investment into developing economies

Emerging and developing economies require 70-75% of global decarbonisation investment[77]. Yet weaker financial markets and higher country risk make capital scarcer and more expensive. It is in the global interest to support these transitions. While development finance plays an important role, real progress depends on partnerships that de-risk private investment.

Just Energy Transition Partnerships (JETP) offer a model for aligning transition plans, public funding and private investment. Both Indonesia and Vietnam launched JETP agreements in 2022 – Indonesia securing US$20 billion and Vietnam US$15 billion in pledges to decarbonise power systems and accelerate the shift from coal[78].

These plans combine ambitious targets, regulatory reform, long-term infrastructure roadmaps. Progress, however, has been mixed. The US withdrawal of funding created gaps, but other partners have moved to fill them. As of May 2025, US$1.1 billion has been committed to projects in Indonesia and US$700 million in Vietnam, spanning renewables and electrification[79]. While investment has been slower than expected, momentum is building as the project pipelines mature.

The next stages of transition will be expensive and politically challenging. Decarbonising fuels, transport, and industry risk rising prices, economic and social disruption – all of which can threaten public support. The most economically efficient way to decarbonise our economies at least cost is generally accepted to be carbon pricing (see box).

Getting it right is a major opportunity. Asia Pacific's net-zero transition could add US$47 trillion to the region's economy by 2070[80]. Effective policy can increase the pace of change – and reduce the cost. Deloitte estimates that policy interventions can de-risk the low-carbon finance premium and reduce global investment costs by US$2 trillion annually – saving US$50 trillion by 2050[81].

Carbon Pricing

At the heart of the economic challenge of net-zero transitions is the absence of meaningful carbon pricing. Without it, governments must pick winners and subsidise low-carbon technologies – an approach that is expensive and unsustainable. Carbon pricing can correct market distortions, enabling more efficient solutions to emerge and improve the effectiveness of other policy actions whilst reducing risks to taxpayers.

Fossil fuels currently benefit from US$7 trillion annually in implicit and explicit subsidies – around 7% of global GDP[82]. These include climate and health externalities, tax breaks, and direct subsidies.

Yet as of 2024, only seven Asia Pacific countries have carbon taxes or emissions trading schemes in place. And carbon prices remain well below the IPCC's recommended US$170 - US$290 per ton CO_2 by 2030 to meet the 1.5oC pathway[83]. Coverage is limited, with trading schemes excluding key sectors and only 24% of global emissions priced[84].

Under Article 6 of the Paris Agreement, international carbon markets are beginning to take shape – but progress is slow. In the meantime, Asia Pacific economies must expand carbon pricing to accelerate transitions. Concerns over carbon pricing persist, driven by fears of rising costs, industry impacts and public perception. Yet emissions intensity is becoming an important measure of competitiveness – one best tackled through international cooperation.

Carbon pricing can level the playing field for clean energy technologies – it can also generate up to US$4 trillion in public revenues to reinvest in transition[85].

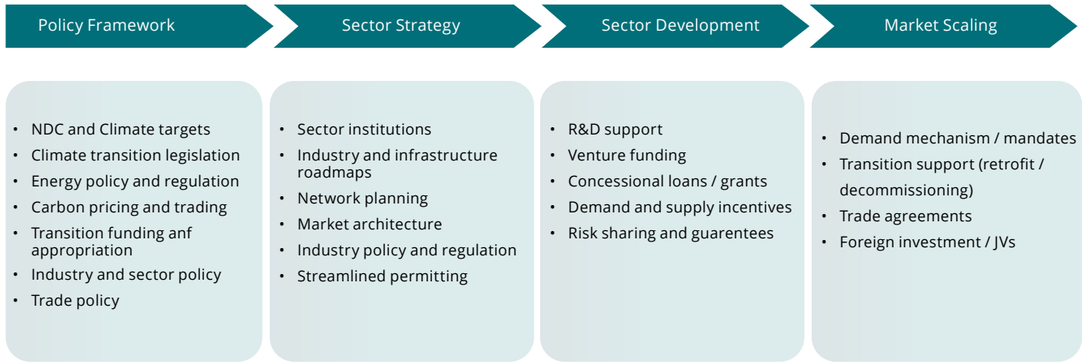
Policy making must set direction and mobilise industry and capital

Policy making must set direction and mobilise industry and capital. Delivering system-wide change in energy and industry requires a coordinated policy mix and effective execution.

This means strengthening government capacity to design, implement, and iterate policy. And there is no one-size-fits-all solution. While each pillar of the transition faces specific challenges, policymakers must also tailor interventions to their context– using the right levers at the right time.

A lifecycle approach – targeted by sector and maturity – can create policy certainty and drive faster, more effective transition outcomes (see Figure 11).

Figure 11: Transition lifecycle policy approach



Source: Deloitte

1) Establish vision, targets, and policy framework

To drive least cost decarbonisation, governments must set clear, long-term targets – anchoring NDC commitments in legislation and backing them with credible roadmaps and transparent reporting. Industry and investors need confidence in stable policy settings to commit to large-scale, long horizon investments.

A credible framework includes enabling policies: sector strategies, funding mechanisms, carbon pricing, international cooperation, and investment in infrastructure and skills. Where possible, this should be underpinned by cross-party political support to build lasting confidence and reduce sovereign risk.

2) Empower independent agencies to set sector strategies and infrastructure plans

Delivering system-level transitions requires sector-specific policy, regulation, and infrastructure planning. Governments should empower independent institutions to lead this work in close collaboration with industry.

These institutions can develop regulation, set industry standards and coordinate infrastructure planning. As system operators, they can manage critical market mechanisms, such as procurement auctions, planning consents and funding disbursement (see box on the next page: Accelerating progress through focused agencies).

Accelerating progress through focused agencies

Accelerating progress through focused agencies

Net-zero transitions are cross-cutting, requiring coordinated execution beyond traditional policymaking. Independent agencies with technical expertise can accelerate policy execution, operate outside the sphere of political influence and build industry confidence.

The Australian Renewable Energy Agency (ARENA) drives technology deployment across solar, hydrogen, battery storage, transport, and low-emissions metals. It supports research, innovation and project commercialisation through grants, co-funding, and knowledge sharing. ARENA has backed 735 projects with AUD$2.6 billion, leveraging AUD$12.6 billion in total investment. Flagship initiatives include large-scale solar and battery projects, and the Murchison Green Hydrogen project[86].

The UK's National Energy System Operator (NESO), launched in 2024, oversees both systems operations and long-term planning for a net-zero grid. As a central authority, it can adapt rules quickly and manage key mechanisms like the Capacity Market and renewable energy procurement auctions - facilitating investment in 39 GW of generation projects[87]. NESO has already delivered reforms to clear grid-connection backlogs, published the future network plan and delivered the UK's first zero-coal winter.

3) Support research and innovation

Accelerating transitions requires innovation to scale - strong R&D and commercialisation capability is essential.

Governments can support early-stage R&D, sponsor innovation hubs, and build foundational research capability. Beyond grants and tax incentives, policy can drive innovation by convening partnerships, setting challenges, and creating the enabling environment.

Early-stage commercialisation often faces funding gaps. With a higher risk appetite, governments can act as venture partners – catalysing private investment through co-funding, offtake agreements, production incentives, and regulatory sandboxes. This can de-risk innovation and accelerate market formation where private capital is hesitant.

Given the high risk inherent with early-stage innovation and commercialisation, and the urgency of the net-zero transition, innovation support is not optional – it is essential.

4) Unlock investment to scale up net-zero solutions

The underlying need across the net-zero transition pillars in this paper is unlocking investment. Policy uncertainty, technology risk, and challenging economics continue to drive up the risk premium for low-emissions finance.

While there are many financial risks and financing mechanisms to consider, (see figure 12) policymakers should focus on five broad considerations:

Direct investment support

Use public finance tools (e.g. equity, concessional debt, risk-sharing) to lower capital costs and attract investors.

Establish and structure markets

Set standards and certification that create transparency and support trade. Sponsor markets through competitive tenders or auctions for low-emissions commodities to catalyse demand and price discovery.

Stimulate demand

Drive early adoption through mandates, incentives, and infrastructure investment to overcome price, technical and behavioural barriers.

Bridge the price gap

Where low-emissions options are more expensive, targeted production or tax incentives can buy time for cost curves to fall. Incentives alone are unlikely to resolve residual cost differences without addressing fossil fuel subsidies

Motivate industry

Support industry-led initiatives and embed climate disclosures, to increase transparency, focus and accelerate private sector action.

The policy imperative

The right policy mix depends on a clear view of national starting points and transition goals. At the core is a singular challenge: rapidly scaling finance for system-wide energy and technology shifts. Governments must act as catalysts – mobilising capital, reducing risk, and enabling market formation.

The next wave of technologies will not scale without support. This demands bold policy – accepting high costs, complexity, and political risk. Without it net-zero targets will remain out of reach.

For Asia Pacific, regional cooperation is growing in importance. Governments must align supply chains, market standards, capital flows and infrastructure. Strategic partnerships are needed to balance economic efficiency with national security and development goals. These are hard choices, but the scale of opportunity and the cost of inaction, demand decisive leadership.

Figure 12: Policy levers

	Policy Tools	How does it work?	Impacts
Policy frameworks	Climate and energy strategy	Provides market transparency and regulatory clarity	Sets clear direction, reduces political risk
	Carbon pricing	Put a price on carbon emissions	Reduce price gap between green / fossil fuel alternatives
	Remove fossil fuel subsidies	Stop implicit/explicit support for fossil fuels	Make fossil alternatives more expensive by internalising costs
	Infrastructure planning (grid, industry, CCUS)	Provide market clarity and timelines	Reduces policy and technical risk, accelerates project readiness
	Streamline planning	Accelerate project timelines	Reduces cost and technical risk, accelerates project readiness
	Trade policy / Investment policy	Improve access to overseas markets	Access additional demand, access additional sources of capital
Market architecture	Market creation (e.g. auctions, domestic financial market)	Facilitate access to tradeable markets	Reduces revenue risk, sets pricing signals
	Industry standards (definitions, product and end-use)	Set common industry and product standards	Reduces technical risk
	Climate and sustainability reporting	Increases industry transparency	Reduces financing costs and enables more efficient and aligned capital allocation
Technology and infrastructure	R&D support (e.g. funding, innovation hubs)	Accelerates technology learning	Reduces investment and financing costs
	Venture funding	Accelerates technology commercialization	Reduces investment and financing costs
	Infrastructure investment (e.g. grid, distribution and trade, CCUS)	Provides market clarity, accelerates access to required infrastructure	Reduces technical risk, stimulates demand, reduces investment and financing costs
Market incentives	Offtake contracts (PPA, CfD, FIT etc.)	Guarantee demand / price for producers	Reduces revenue risk, sets pricing signals
	Production incentives (tax-incentives, production incentive, green premium)	Increase revenue for producers	Reduce price gap between green / fossil fuel alternatives
	Demand incentives (rebates, mandates, procurement)	Stimulates demand and reduces purchasing barriers	Reduces revenue risk, increases demand
Finance support	Risk sharing and guarantees	Protect investors against losses	Reduce risk of default and cost of capital
	Public private partnerships	Mobile private capital for public infrastructure	Shares risk and cost of investment
	Green bonds	Targeted end-use bonds	Increased transparency, lower borrowing costs
	Concessional finance / grants	Co-finance in transition projects	Reduce investment and financing costs
	Equity and debt structures	Co-invest in transition projects with greater risk exposure	Reduce investment and financing costs
Implementation support	Industrial strategy	Develop industry ecosystem and skills	Reduces implementation barriers and technical risk
	Support training / job transition	Develop human capital for green transition	Reduce economic impact on society, reduces implementation barriers and technical risk
	Transition support	Fund retrofitting/ decommissioning and compensation for stranded assets	Reduce economic impact on industry

Source: Deloitte

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