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

Policy levers to accelerate the transition

Chapter Snapshot: Batteries

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

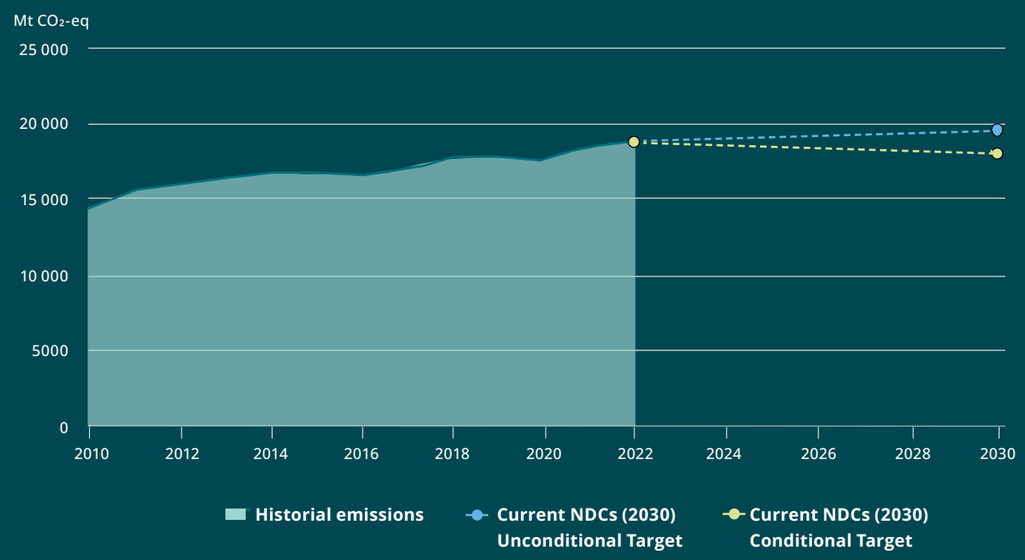
Asia Pacific's Ambition

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.

Batteries

Batteries are at the heart of the electrification challenge

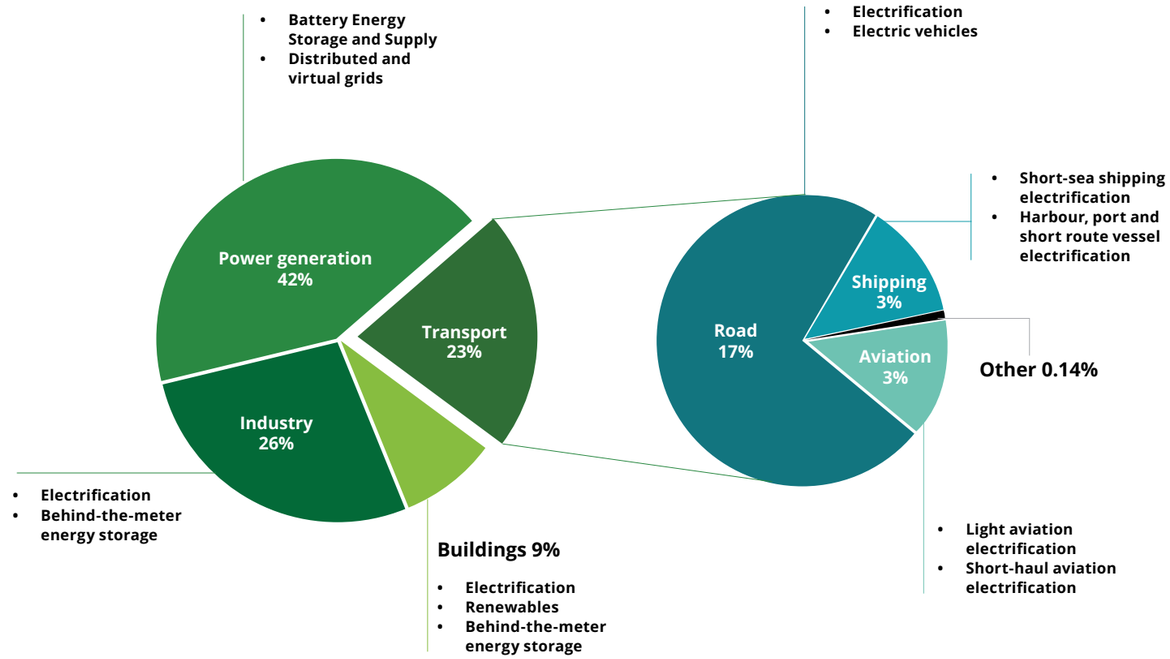
Batteries are essential for decarbonisation.

They are essential to decarbonising power systems, industry, and transport – three sectors crucial to achieving national emissions targets (see Figure 7).

However, to curb emissions growth, battery adoption needs to accelerate, from grid storage to electric vehicle (EV) adoption, and the supply of batteries must scale up rapidly.

Most Asia Pacific economies have emissions targets for power generation, but fewer have specific strategies for battery storage and transport.

Figure 7: Global CO_2 emissions from energy combustion addressable through battery technology



Source: Deloitte analysis based on Deloitte,[3] IEA[9] and Our World in Data[10]

Battery costs have dropped sharply, with average storage prices reaching US$100/kWh – a threshold often seen as critical for cost parity with internal combustion engine (ICE) vehicles[35].

This price drop boosts commercial viability for both EVs and grid storage. But cost alone won't deliver transformation.

The role of batteries in net-zero

The core role of batteries is to store electrical energy. Lithium-ion technology has made batteries integral to modern electronics and electric vehicles, and their application is growing and increasingly foundational to the energy transition. As new technologies and chemistries improve cost, and storage capacity, batteries are reshaping energy systems. These include alternative metal-ion batteries (like sodium-ion or zinc-ion), solid state batteries, and flow batteries.

Batteries can now stabilise grids, enable consistent supply from intermittent renewables like wind and solar, and bridge power outages. Large-scale Battery Energy Storage Systems (BESS) are becoming core infrastructure for decarbonised electricity grids, while Behind-the-Meter (BTM) solutions power homes, businesses, and industry.

In 2024, annual battery demand exceeded 1 terawatt-hour (TWh), and global manufacturing capacity surpassed 3 TWh, on track to triple by 2030[35]. As a result, the global market is forecast to grow from US$120 billion to US$330 - US$500 billion by 2030[36].

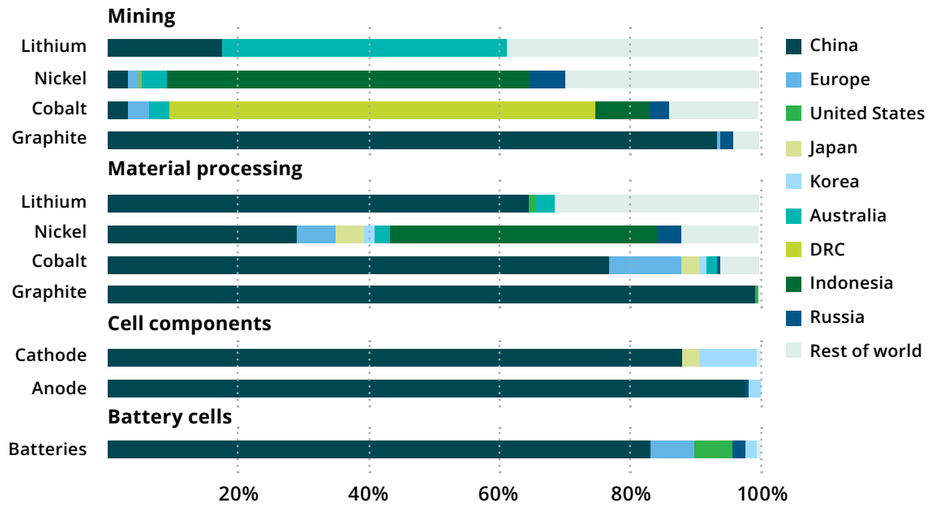
EVs are the primary driver of battery demand. Their share of new car sales is expected to jump from around 22% in 2024 to 40% by 2030[37]. While growth has fluctuated with the availability of subsidies, the sales trend continues upwards. Unlike many other clean energy technologies, EV conversion has been largely consumer-led. Asia Pacific's EV fleet could reach 671 million by 2050 under a net-zero scenario[38].

Battery storage in electricity grids is also accelerating. Installed capacity across the globe rose from 1 GW in 2013 to 85 GW in 2023 – half of it added in the last year[39]. By 2040, Asia Pacific alone could host 2.2 TW of storage, over 60 times today's level – significantly increasing renewable potential[40].

Scaling battery supply requires a major investment boost. The IEA estimates battery-related investment was over US$150 billion in 2023. But this remains well short of the US$500 - US$800 billion needed by 2030 to meet transition targets[41].

China dominates the global battery value chain, from raw material inputs to chemical processing and manufacture, controlling 83% of current production and over 2 TWh capacity[42] (see Figure 8). Outside of China, manufacturing capacity is concentrated in the US, EU, Japan and South Korea – but more countries are seeking to build their own capacity, often in partnership with the leading global manufacturers.

Figure 8: Geographical distribution of the global battery supply chain



China dominates across the entire downstream battery supply chain

Note: DRC = Democratic Republic of the Congo. Graphite refining is only refining of natural graphite tospherical graphite. Mining and processing are based on production data. Cathode, anode and batteries are based on manufacturing capacity data.

Source: International Energy Agency (IEA)

Yet momentum is fragile. EV demand has proven volatile, battery prices have fallen faster than input costs, and profit margins – especially for small and mid-size firms – are under pressure. Project failures and delays in some markets have increased uncertainty.

However, economies with strategic public support continue to drive progress. Across Asia Pacific, India, Malaysia, Vietnam and Indonesia are all targeting growth in battery manufacturing.

Scaling up both production and adoption is the core challenge

To fully realise batteries' potential, policymakers must help scale up both production and adoption. Yet shifting EV demand, falling prices, tight margins, and uncertain trade conditions complicate investment and supply chain decisions. And in many countries, the regulatory, market, and grid infrastructure is not yet in place to support large-scale EV charging, grid storage or more distributed power-systems.

Governments face a strategic choice: build domestic capacity or rely on low-cost imports from a concentrated global market. And in many cases, they will need to do both. Across Asia Pacific, broader deployment of both demand-side incentives and supply-side strategies will be essential.

Key issues for policymakers

1) China – maintain market access

China's rise as a global leader in EVs and batteries has delivered low-cost clean energy technology at scale. But growing protectionism in its key export markets, through tariffs and industrial policy, now threatens the continued growth of its EV and battery industries, which has relied on high overseas margins to offset lower domestic prices.

To maintain market access, Chinese firms are expanding production overseas. Although current offshore battery capacity is modest (~30 GW) and concentrated in Europe, Japan, Thailand and Vietnam, it provides a foothold to bypass some trade barriers, build strategic partnerships and integrate into local EV ecosystems. Trade tensions may require a rethink of global footprints, but China's scale and technology remain strategic assets – and an opportunity to support the development of low-carbon industries across the region.

New regulatory challenges are also emerging. The EU's 2023 Battery Regulation imposes strict lifecycle requirements: including carbon footprint disclosures, content and performance standards, and end-of-life obligations. While China's domestic recycling system is mature, meeting EU standards demands greater transparency, data sharing and supply chain collaboration with new partners.

In the long run, these pressures will catalyse innovation. Chinese firms that adapt quickly have the potential to export circular economy solutions globally.

2) Diversify production capacity

More governments are recognising battery manufacturing as a strategic industry to support electrification, and new projects are launching across Asia Pacific. But with China's scale capacity depressing global prices, building local capacity remains challenging. Europe has seen major projects stall, while the US expanded rapidly (see box).

Approaches for regional battery independence in the US and EU

The US and EU have major policy efforts underway to develop domestic EV and battery industries, recognising their strategic value in the net-zero transition.

The US relied on significant financial incentives through the Inflation Reduction Act (IRA) that have now been curtailed, with over US$245 billion targeted at EV and battery development.

Key policies included tax credits for battery inputs and manufacturing investment grants across the battery value chain, and tax credits for battery storage projects. With the phase out of IRA incentives, it is unclear whether the pace of development will be sustained.

The EU's approach emphasises targets and regulatory mandates over direct subsidies. The EU Batteries Regulation sets targets for domestic production, EV adoption, recycling, and storage. Financial support is focused on improving access to private capital through innovation and transition funds, and tariffs have also been imposed on Chinese EVs and batteries to boost the competitiveness of European manufacturers.

Both the EU and the US are adding capacity – each account for about 150 GW or 6% of global production today. But while US projects were accelerating, Europe is experiencing setbacks – including NorthVolt's failure and delays across several major battery projects.

Japan and South Korea, with advanced battery manufacturing industries, are well-positioned to meet rising demand through overseas expansion. Across Southeast Asia and India, interest in domestic and export-oriented production is rising (see box).

However, success will depend on strategic partnerships, investment support and targeted industrial policy leveraging labour or material resources to compete globally.

Developing Indonesia's EV and battery industry

Indonesia is pursuing a nation-building clean energy industrial strategy. The starting point was a ban on raw mineral exports, particularly nickel, to drive domestic processing and attract foreign investment. Backed by strong resource reserves and an established auto manufacturing industry, the country aims to become Southeast Asia's leading EV and battery hub, targeting 140 GWh of battery production and 600,000 EVs by 2030[43].

Incentives, such as import duty waivers and lower sales taxes for locally produced EVs, have created a favourable investment environment. Major players have responded: China's Contemporary Amperex Technology Co., Limited (CATL) is developing a US$6 billion mining-to-battery project; LG Energy is leading a US$9 billion EV battery value chain project; and Hyundai, Toyota, and BYD are all building EV manufacturing capacity in Indonesia.

This strategy serves a dual-purpose: establishing a high-value industry and supporting Indonesia's broader goals to electrify power and transport systems.

3) Support EV adoption

EVs made up 22% of global passenger car sales in 2024, but most Asia Pacific markets still lag, except China, where EVs reached 48% of new sales[44]. With transport emissions rising and decarbonisation timelines tightening, policymakers must act to accelerate adoption. This is critical not only for emissions goals, but also to stimulate investment in battery manufacturing.

While high upfront costs have slowed EV adoption in many markets, affordability is improving. Battery prices, once 30-40% of an EV's cost, have fallen tenfold over the past decade. And with well-to-wheel efficiency three to four times higher for EVs over ICE vehicles, EVs offer immediate efficiency gains, with or without renewable generation.

Policy must now tackle adoption barriers.

Range anxiety, limited charging infrastructure and entrenched customer preferences remain obstacles. Incentives, such as tax rebates and purchase subsidies, have proven effective, including for market leaders like Norway and China. Infrastructure investments including public charging networks and battery swapping schemes, can also shift perceptions. Beijing provides a model for EV adoption as part of its wider air pollution policies (see box).

Governments also need to provide clear direction to industry. Fuel economy standards, ICE phase-out targets and public fleet procurement can all accelerate the shift.

Public sector EV procurement can increase visibility, build trust, and act as an early market anchor.

Clean air and EV adoption in Beijing

Beijing's air quality has improved significantly over the past two decades, driven by a comprehensive strategy targeting industrial emissions, construction, residential energy use and transport. EV adoption has been a central pillar of the city's transport reforms.

Since 2009, Beijing has led with electrification of public fleets, followed by incentives for private and public EV adoption. These have combined national and local purchase subsidies, tax exemptions, and preferential licencing, toll waivers and discounted parking. Policies have steadily expanded electrification of bus and taxi fleets and scale charging infrastructure.

EVs now account for around 50% of new vehicle sales in Beijing, compared to 37% nationally, and the city's EV stock is nearly double the national share[45]. Between 2013 and 2020, PM 2.5 air pollution concentrations fell by over 50%.

4) Integrate batteries into future grids

As battery storage becomes central to expanding renewable electricity generation, policymakers can accelerate regulatory and infrastructure reform. In competitive markets with clear price signals, battery storage can shift from being a grid-stability cost to a profit driver. But in regulated markets, weak price signals limit efficient investment in both battery storage and broader power sector upgrades.

It's not just about cost. Effective adoption requires modernised regulation: defining how markets work with increased storage, who pays for it, and integrating storage into grid planning and management. This also means preparing for emerging opportunities such as distributed grids and leveraging EVs in the overall power network.

Where policy and market conditions align, growth is surging. Texas added 4.4 GW of battery storage in 2024 – three times the 2023 total. Driven by abundant renewable energy and incentives, Texas is on track to lead the US in battery capacity[46].

Whether this momentum continues as federal support tapers remains uncertain.

Asia Pacific is also beginning to scale quickly. China leads globally, with 23 GW added in 2023 toward its 2025 40 GW target[47]. India aims to install 47 GW by 2032, supported by US$2.2 billion in Production-Linked Incentives (PLI) and its Viability Gap Funding Mechanism covering up to 40% of capital costs for new projects[48].

Australia's Capacity Investment Scheme (CIS) has launched tenders for 9 GW of storage capacity as part of its overall renewables plan. The CIS has provided support for 3.9 GW of battery storage[49]. A new AUD$2.3bn residential and small commercial battery subsidy complements the policy that has seen four million Australian households adopt solar PV. These moves align with Australia's National Battery Strategy which aims to add value to its mineral resources by supporting battery manufacturing in targeted segments – such as grid storage and heavy vehicles.

5) Increase recycling and circularity

Battery recycling is becoming essential as demand for battery mineral inputs rises. With recovery rates exceeding 90% for critical metals in a battery pack, recycling offers a lower-emissions alternative to raw material extraction. Yet recycling remains complex and costly. Currently 85% of global recycling capacity is in China, but the US and Europe are now advancing their capabilities[50].

To prepare, policymakers must set clear roadmaps – defining targets and expectations for industry. The EU's regulations, for greater producer responsibility and take-back obligations, are prompting greater coordination across the value chain.

Automotive and battery manufacturers, and increasingly miners and processing companies, are collaborating to close the loop. BHP is working with carmakers to reclaim key metals from spent batteries. Redwood Materials is building a US$3.5 billion plant in South Carolina with an array of automaker customers[51].

But to get started, policymakers need to motivate the industry to improve recycling collection rates and incentivise the development of the first facilities.

6) Support R&D for alternative chemistries

Battery price declines have been driven by falling raw material costs, economies of scale and advances in lower-cost technologies. Continued R&D is critical, not only to improve battery performance and energy density but also to reduce dependence on scare minerals through alternative chemistries, improved material efficiency and recycling. Emerging technologies reaching commercial viability include sodium-ion, solid-state and zinc-based chemistries.

As China leads both production and innovation, new technologies are key for other nations aiming to build competitive domestic industries. The EU is backing battery R&D through the Net-Zero Industry Act. India's Atmanirbhar Bharat[52] strategy combines 'Made In India' programme funding domestic innovation and funding[53].

Rather than competing solely on lowest-cost EV batteries, policymakers should identify technology niches and support their commercialisation. Australia, for example, has emerged as a leader in Vanadium Flow Batteries (VFBs), ideal for grid and off-grid storage due to long life, fast response and reliability. The Australia Renewable Energy Agency (ARENA) backed the country's first grid-scale VFB at Yadlamalka in South Australia, with AUD$5.7 million grant in 2020[54].

Meeting Asia Pacific's rising battery demand

Asia Pacific can accelerate EV adoption and battery storage deployment to deliver major emissions reductions while building a competitive regional industry. But to do so, countries must collaborate on investment, policy, and infrastructure.

Coordinate on recycling standards

Battery recycling is essential for resource security and sustainability. Global supply chains call for common standards for battery design and recycling approaches that can support efficient, regional circular value chains. Policymakers should align domestic strategies with global initiatives – such as the Global Battery Alliance.

Build regional hubs

Not every country can support a domestic battery industry given the scale required for commercial success. Instead, governments should identify strategic niches and forge long-term partnerships. With China, South Korea and Japan expanding their manufacturing footprint, and trade access becoming more uncertain, some Asia Pacific economies can position themselves as regional hubs.

EV adoption – learn from the best

Direct incentives, such as purchase subsidies and public procurement, and vehicle emissions standards have been shown to drive adoption. But indirect measures like charging infrastructure and congestion pricing also matter. Asia Pacific economies can accelerate progress by adapting proven policy methods to their local context – and aligning on roadmaps to make sure they are not left behind.

Breaking through adoption barriers

The economics of EVs and battery storage favours rapid adoption. But social and practical barriers remain – policymakers must address these while enabling investment to build momentum.

Weighing the cost of supporting EV uptake and battery production against broader public benefits – reduced congestion, cleaner air, and lower fossil fuel dependence – is essential. The core task is designing mechanisms to account for the costs and benefits of these shifts.

China's dominance in EVs and batteries offers affordable, advanced technology that can accelerate consumer adoption across the region. Yet it also raises strategic questions about how to grow domestic industries – and the jobs that come with them. For most countries, the key tension is managing open market access with local industrial development.

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].

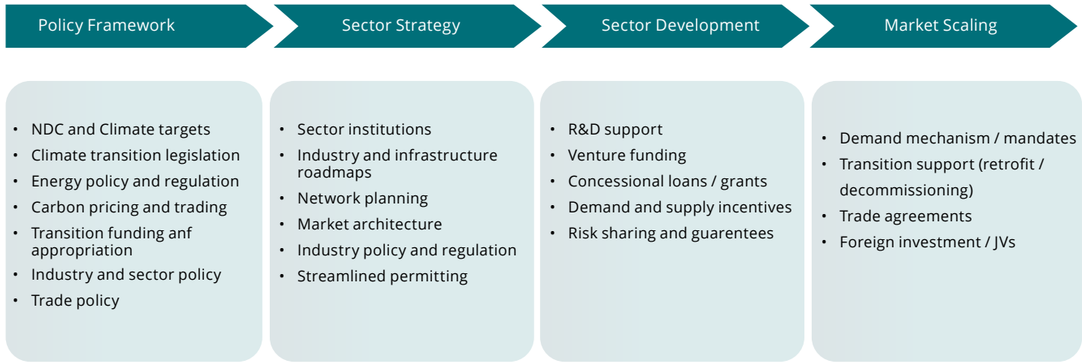
Policy making must set direction and mobilise industry and capital

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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