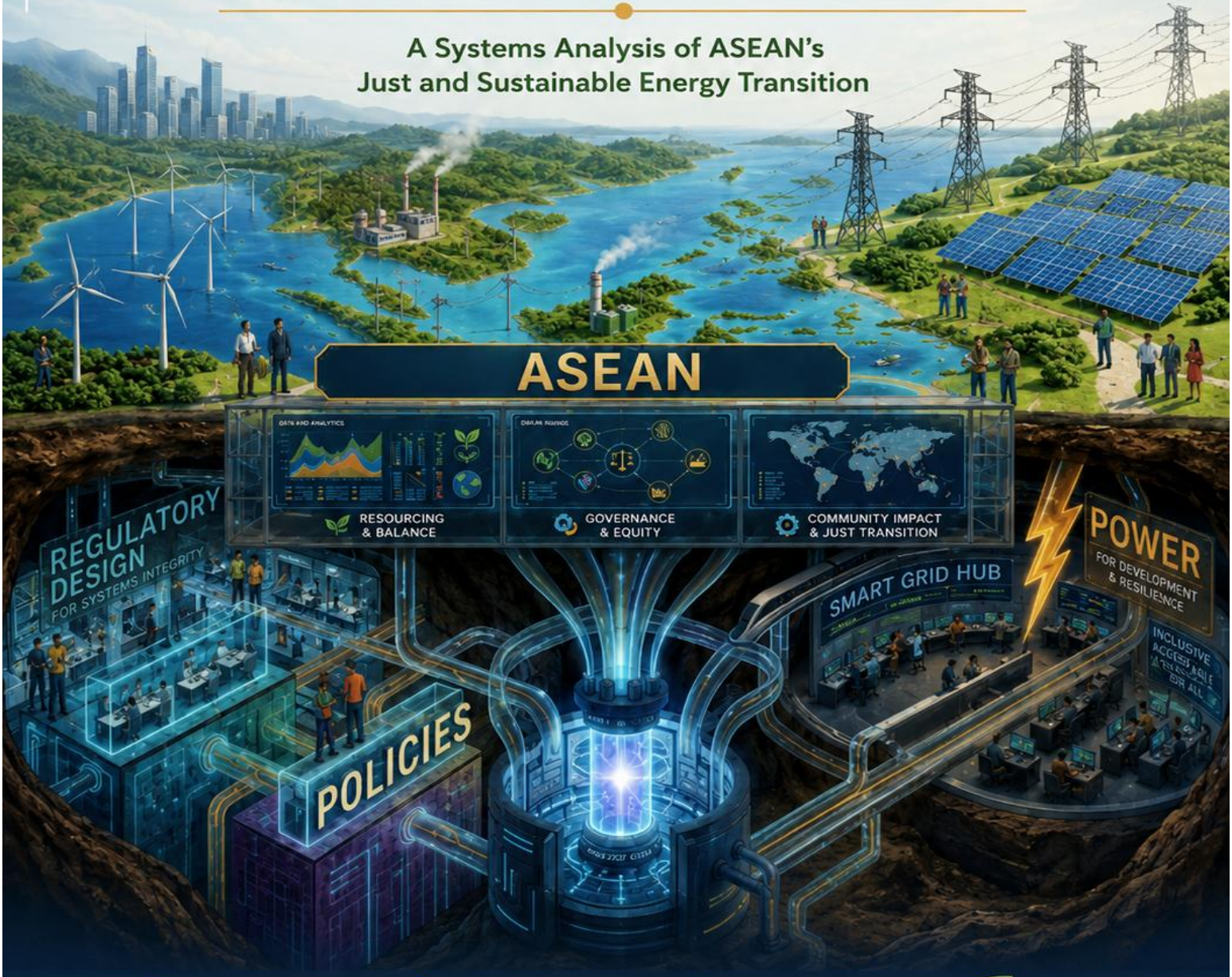
The Transition Beneath the Transition

Rules, Power and the Future of ASEAN Energy Transition

A Systems Analysis of ASEAN's Just and Sustainable Energy Transition



RULES for integrity and accountability

POWER to decide, influence and deliver

PEOPLE at the center of a just transition

PLANET for a sustainable future

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The Transition Beneath the Transition - Rules, Power and the Future of ASEAN Energy Transition

A Systems Analysis of ASEAN's Just and Sustainable Energy Transition

Southeast Asia's energy transition is often presented as a race to install more renewable energy; meaning more solar panels, more wind turbines, more hydropower, more electric vehicles and eventually more regional electricity interconnections. This story is not wrong. But it is incomplete in its narrative.

The deeper challenge is not simply to replace one collection of energy technologies with another (fossil fuel to renewable). Rather**, it is to transform a system of infrastructure, institutions, subsidies, contracts, markets, skills, political interests and social expectations that has developed over decades around fossil fuels and centralised electricity production**.

Renewable technologies are now being rapidly introduced into energy systems already shaped by existing power plants, infrastructure, contracts, regulations and commercial interests. Whether they replace coal, oil and gas, or simply add another layer of energy supply, depends largely on how these underlying systems are designed and governed.

Technology alone, therefore, will not determine the character or outcome of the transition. Its effects are also shaped by the ownership models, market rules, public policies and social priorities surrounding it.

Solar power can democratise electricity by enabling households, communities and small enterprises to generate their own energy. It can also become another centrally controlled industry in which large investors capture most of the value. Regional electricity trade can strengthen energy security and allow countries to share complementary renewable resources. Yet it can also transfer environmental and social burdens from wealthier electricity-consuming countries to poorer energy-exporting countries. Electric vehicles can reduce dependence on imported petroleum, but they may do little to improve mobility for low-income households if public transport remains weak and cities continue to be designed around private cars.

The central issue is therefore not whether renewable energy will grow. It almost certainly will. The question is what kind of energy system will grow around it.

A transition inside an expanding system

ASEAN is not attempting to decarbonise a stable energy system. It is trying to transform one of the world's fastest-growing centers of energy demand. Industrialisation, urbanisation, rising incomes, expanding mobility, cooling, digital infrastructure and changing consumption patterns are all rapidly pushing energy use upward. Southeast Asia's total energy demand is already around 40 per cent higher than it was in 2015. Fossil fuels have supplied most of that increase, while coal demand has grown particularly quickly.[1]

This creates a fundamental systems problem. Renewable deployment may accelerate significantly and yet fail to reduce fossil-fuel consumption if total demand expands even faster. A government can easily celebrate record solar installations while simultaneously approving new gas terminals, coal plants or captive power facilities to meet rising industrial loads. From a narrow technology perspective, the said country appears to be transitioning.

From a systems perspective, it may be constructing two energy systems at once.

The first transition challenge is therefore to change the objective. ASEAN does not need energy for its own sake. People need cooling, lighting, mobility, communication, food preservation, healthcare and productive economic opportunities. Businesses need reliable power, heat, transport and digital services. Meeting these needs does not always require producing more energy. Building efficiency, passive cooling, public transport, compact urban form, demand response, circular production systems and efficient industrial equipment can deliver better services with less energy.

If the region treats all projected demand as inevitable, the transition becomes an endless supply problem. If it asks how energy-service needs can be met more intelligently, demand-side change becomes one of the most powerful and least disruptive forms of new energy infrastructure.

Catalysts create openings, not outcomes

Several of the strongest pressures for change are now emerging from beyond conventional climate and energy policy. Geopolitical instability, slowing economic growth, volatile fuel prices, carbon-related trade measures and pressure from multinational supply chains are turning energy transition into a question of national competitiveness and security.

The disruption of fuel flows through the Strait of Hormuz has been a particularly sharp warning. Before the crisis, around 60 per cent of Southeast Asia's crude-oil imports and one-third of its gas imports came from the Middle East. The immediate regional response has understandably included securing alternative suppliers, supporting vulnerable consumers,

stabilising prices and increasing strategic reserves. Fossil-fuel subsidies, already around US$40 billion before the crisis, are expected to rise substantially.[2]

The Hormuz Strait crisis has also revealed a deeper truth: energy systems built around imported fossil fuels cannot be fully secured through supplier diversification alone. Countries may change where their oil and LNG come from, but they remain exposed to international prices, shipping routes, currency fluctuations and geopolitical pressure and conflict. The International Energy Agency (IEA) estimates that without structural change, Southeast Asia's fossil-fuel import bill could rise from more than US$80 billion in 2024 to approximately US$245 billion by 2035. Meeting announced climate pledges would reduce that projected bill by about half.[3]

Thailand offers a clear case example. A recent economic analysis argued that the country imports energy worth nearly 10 per cent of GDP and proposed reduced fossil-fuel import dependence as a central transition indicator. The argument was not based primarily on climate responsibility as has been the norm in such articles. Rather, it was based on the recognition that fossil dependence had become a structural vulnerability affecting growth, inflation, fiscal stability and industrial competitiveness.[4]

Trade policy is creating another external pressure. Carbon border measures, corporate emissions requirements and demands for traceable low-carbon supply chains increasingly affect where companies invest and source their products. Export-oriented economies such as Thailand, Malaysia and Vietnam may find that access to reliable renewable electricity becomes a condition for retaining manufacturing investment. Climate policy is moving from the environmental margins into the operating logic of trade and industry.

But catalysts do not determine outcomes. The same fossil-fuel shock that strengthens support for renewable energy can also revive coal, accelerate domestic oil and gas exploration, justify new LNG terminals or trigger expensive untargeted subsidies. Trade pressure can stimulate industrial modernisation, but it can also shift costs onto smaller producers without providing them with finance or technical support. A crisis opens a policy window; it does not decide what passes through it.

External pressures are filtered through a mishmash of internal structures: institutions, market rules, ownership patterns, infrastructure, political interests, technical capabilities and social relationships. Those structures determine whether disruption reinforces the existing system or becomes an opportunity to change it.

The feedback loops holding the current system in place

The persistence of fossil-fuel dependence is not simply a failure of political will. It is also reinforced by interacting feedback loops.

A feedback loop occurs when one change in a system sets off a chain of effects that eventually circles back to influence the original change. Some loops reinforce the direction of change, making it stronger over time. Others counteract change and help keep the system stable.

In energy systems, these loops can become especially powerful because infrastructure, investment, regulation and political interests are closely connected. For example, building a new coal or gas plant creates financial commitments, jobs, contracts and institutional interests that then increase pressure to keep that plant operating for many years. Continued operation generates revenue and reinforces the case for further investment in the same system. What began as a decision to meet short-term energy demand can therefore create a self-reinforcing pattern of long-term fossil dependence.

Understanding these loops helps explain why energy systems can resist change even when cleaner technologies are available and political leaders have adopted ambitious targets. The system is not static; it continuously reproduces the conditions that keep it in place.

The first such feedback energy transition loop is a growth and fossil lock-in loop.

Economic growth increases electricity and transport demand. Governments respond by approving power plants, fuel infrastructure and long-term supply contracts that appear capable of providing reliable energy quickly. Once constructed, these assets must operate for decades to recover their costs. Utilities, investors and governments then have a financial interest in maintaining their use. The infrastructure built to solve today's shortage becomes tomorrow's barrier to change.

A second dynamic is the renewable-grid bottleneck.

Falling costs and supportive policies encourage solar and wind investment. But when grid expansion, storage, demand response and system-management reforms fail to keep pace, projects face connection delays or even may stopped altogether. When this happens, revenues become uncertain, risk increases and investment slows. The region may appear to have a renewable-resource problem when it actually has an infrastructure and coordination problem.

This distinction matters. ASEAN's electricity consumption has increased ninefold since 1990 and is expected to continue growing by 3–4 per cent annually through 2040. More than US$300 billion may be needed for grid expansion and modernisation between 2025 and

2040.[5] The transition cannot be built by financing generation while treating transmission, distribution and flexibility as secondary.

A third loop is created by emergency fossil-fuel subsidies.

International fuel prices rise, placing pressure on households and businesses. Governments intervene to stabilise prices. The intervention protects people in the short term, but broad subsidies weaken incentives for efficiency and electrification, consume public resources and preserve fossil dependence. Continued dependence then leaves economies exposed to the next international shock, generating renewed pressure for subsidies.

However, the social problem is real and has a strong influence on decisions, as abrupt subsidy removal can increase transport, electricity and food costs for people who have few alternatives. The system leverage point is therefore not simply to eliminate subsidy support. It is to shift from subsidising fuels to protecting people through targeted income support, affordable public transport, efficient housing, lifeline electricity tariffs and access to clean technologies.

A fourth loop dynamic concerns legitimacy.

When communities participate meaningfully in energy decisions, receive a fair share of benefits and see their rights protected, trust can grow. Greater trust can reduce conflict and improve project quality. But when consultation is superficial and costs are imposed on communities that receive few lasting benefits, opposition, delay and mistrust reinforce one another. Governments may then respond by weakening safeguards or centralising decisions, making future conflict more likely.

These loops demonstrate why the renewable energy transition cannot be reduced simply to the cost of electricity. Energy systems succeed or fail partly through the relationships of trust, authority and legitimacy surrounding them.

Where are the highest systemic leverage points found for a ‘just and sustainable transition to renewable energy future in ASEAN’?

ASEAN has adopted collective ambitions for 2030, including a 30 per cent renewable share in total primary energy supply, a 45 per cent share in installed electricity capacity and a 40 per cent reduction in energy intensity relative to 2005.[6] These targets matter. But targets alone do not alter system behaviour. **Deeper leverage lies in changing the conditions that shape millions of investment, planning and consumption decisions.**

In the language of systems thinking, leverage points are places where a relatively well-targeted intervention can produce wider changes across the system. Donella Meadows argued that not all leverage points are equally powerful. Some interventions operate near the surface; for example, changing a tariff, increasing a subsidy or adding a new renewable-energy target. These actions can improve performance, but they may leave the deeper structure of the system intact.

Deeper leverage lies in changing the rules, goals, information flows and decision-making power that shape how the system behaves over time. In the energy transition, this could mean changing who is allowed to generate and sell electricity, how investment decisions are made, which outcomes governments measure, whose interests are represented in planning, and whether the primary goal is simply to expand energy supply or to provide secure, affordable and sustainable energy services.

This is why deeper leverage is so important. A government can install more renewable capacity and still remain locked into fossil fuels if utilities are rewarded for selling more electricity, long-term contracts protect coal and gas assets, communities have little influence over siting decisions, and success is measured only in megawatts. By contrast, changing the system's underlying goals, rules and flows of information can alter many decisions at once and create conditions in which cleaner, fairer and more resilient outcomes become more likely.

Below are eight such possible deep leverage points for the renewable energy transition

1. **Change what the system is trying to achieve and what is measured**

Installed capacity is an inadequate measure of success. A more meaningful regional scorecard would include fossil-fuel import dependence, energy-service affordability, reliability, energy intensity, avoided pollution, ecosystem impacts, community benefit-sharing and access to decent transition employment.

What governments choose to measure strongly influences what institutions prioritise, what projects receive funding and how success is judged. If progress is assessed mainly by the number of megawatts installed, decision-makers are likely to favour large projects that can add capacity quickly and produce visible results. This may encourage rapid renewable deployment, but it can also overlook whether that electricity actually replaces fossil fuels, reaches underserved communities, reduces import dependence or causes unacceptable ecological and social harm.

A broader set of indicators would lead to different choices. Success could also be measured through lower fossil-fuel imports, improved energy affordability, reduced power outages, greater access for rural and low-income communities, fewer pollution-related health impacts, stronger local employment, and protection of forests, rivers and biodiversity. Once these outcomes are included, options such as energy efficiency, rooftop solar, community-owned systems, public transport, grid modernisation and demand management become more visible and more valuable.

The point is simple: if the system measures only how much new energy capacity is built, it will mainly reward construction. If it measures resilience, fairness and ecological integrity, it begins to reward better outcomes.

2. **Reform the rules governing energy generation participation and pricing**

In many ASEAN electricity systems, incumbent utilities and single-buyer structures determine who may generate electricity, access the grid and sell power. These arrangements were often designed for an era of large centralised power stations. They become barriers in a world of distributed solar, storage, community energy and corporate renewable procurement.

Thailand's current debate illustrates the leverage available in clarifying net-billing or net-metering rules, third-party grid access and the sale of surplus rooftop electricity. Clear rules can mobilise private investment more effectively than subsidies alone.[7] Similar principles apply regionally: transparent connection procedures, competitive procurement, predictable

tariffs and fair compensation for flexibility can change the economics of thousands of projects without governments financing each one directly.

This reform must be carefully designed. Allowing large companies to secure renewable electricity while leaving utilities with stranded costs and households with expensive legacy assets would not constitute a just transition. **Market opening must be paired with fair cost allocation and strong universal-service obligations.**

3. Treat grids, storage and flexibility as public transition infrastructure

Solar panels and wind turbines are visible symbols of transition. Grids are less visible but more consequential. Without stronger transmission, distribution, storage, forecasting and demand management, variable renewable energy cannot reliably displace fossil generation.

The ASEAN Power Grid represents one of the region's most significant opportunities. By linking different demand patterns and renewable-resource profiles, regional trade could reduce curtailment, lower reserve requirements and improve resilience. The Lao PDR–Thailand–Malaysia–Singapore project has already demonstrated the technical and commercial feasibility of multilateral electricity trade.[8]

Yet physical interconnection alone is not enough. The region needs compatible grid codes, transparent pricing, common certification systems, credible sustainability standards and mechanisms for resolving disputes. It also needs agreement on who pays for infrastructure and who bears interruption, currency and political risks.

The grid should not become a pipeline through which environmental burdens flow from wealthier consumers to poorer exporting communities. **Regional power trade needs a social and ecological operating system, not only an electrical one.**

4. Redirect financial flows and finance a fair fossil-fuel exit

ASEAN's central financing challenge is not simply to attract more energy investment. It is to redirect capital away from continued fossil-fuel expansion and towards the full infrastructure of the renewable energy transition. The target of this investment should be renewable generation, modernization of electricity/transmission grids, storage, energy efficiency, electrification and support for affected workers and communities.

Although many renewable technologies are already commercially competitive, investment can be slowed by high borrowing costs, currency risk, uncertain regulations, poorly prepared projects and concerns about the financial strength of utilities. Public and concessional finance can play a catalytic role by absorbing part of these risks, improving project preparation and making it easier for private capital to participate. At the same time, markets

alone are unlikely to provide adequate funding for shared grids, remote and rural energy access, workforce reskilling, ecological restoration or the early closure of fossil-fuel assets.

Financing the transition must therefore address both what ASEAN needs to build and what it needs to phase out. Coal plants, mines and associated infrastructure are embedded in long-term power-purchase agreements, debt obligations, utility revenues, local economies and people's livelihoods. Closing them early is not simply a technical or financial transaction. Unless retirement strategies also protect workers, diversify local economies and replace lost public revenue, they risk shifting the costs of transition onto communities least able to absorb them.

The objective should not be merely to compensate asset owners for closing fossil facilities. It should be to finance an orderly and socially just transition from fossil-dependent industries and regions towards more resilient economic futures

5. Place ecological limits inside energy planning

Renewable does not automatically mean sustainable or "nature positive". Hydropower can disrupt river flows, sediment movement, fisheries and food systems. Wind development can fragment mountain forests through access roads, transmission corridors and construction activity. Utility-scale solar can compete with agriculture or biodiversity if poorly located. Bioenergy can accelerate land conversion, while mineral extraction for batteries can create pollution and community displacement.

The emerging Laos–Vietnam electricity corridor illustrates the issue. Laos has long pursued its "Battery of Asia" strategy through hydropower exports. It is now adding large-scale wind generation, including the 600 MW Monsoon project, whose 133 turbines export electricity directly to Vietnam. A wider independent project inventory identifies a wind pipeline approaching 9 GW, much of it along the eastern mountain belt.[9]

Wind could diversify Laos away from excessive hydropower dependence and help Vietnam meet growing electricity demand with less fossil fuel. But if projects are assessed one by one, their combined effects on Annamite forests, watersheds, wildlife and local livelihoods may remain invisible. Hydropower pressures river systems; wind development extends the energy frontier into mountain landscapes.

This is not an argument against renewable development. It is an argument for cumulative-environmental impact assessment, biodiversity-sensitive spatial planning, enforceable no-go areas, environmental flows, community consent and transparent benefit-sharing. The region must refuse the assumption that some ecosystems and communities are expendable because the electricity carries a green label.

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6. Build the capabilities to participate in the transition

Human capability is as important as physical infrastructure. The region needs technicians, engineers, energy planners, regulators, financiers, environmental specialists, grid operators, community facilitators and skilled tradespeople. It also needs institutions able to negotiate complex contracts, assess cumulative impacts, manage regional markets and protect public interests.

IRENA estimates that a pathway consistent with limiting warming to 1.5°C could support approximately 14.3 million ASEAN energy-sector jobs by 2050, compared with around 11 million under the current planned-energy pathway. Jobs in renewables could reach 4.6 million, while employment in efficiency, grids and system flexibility would also expand significantly.[10]

These numbers describe potential, not destiny. New jobs may emerge in different countries, provinces and occupations from those that disappear. A coal worker does not automatically become a solar technician, and a community dependent on mining cannot be revitalised through a short training course.

Reskilling must begin before closures occur and be linked to funded projects, recognised qualifications, income protection and actual recruitment commitments. ASEAN could add value through common competency standards, mutual recognition of qualifications, regional centres of excellence and cooperation on labour-market forecasting. Green jobs must also be decent jobs, providing safety, fair wages, social protection and genuine opportunities for women, young people, migrants and marginalised groups.

Capacity development should extend beyond workers. Communities need the knowledge and resources to interpret project proposals, negotiate benefits and monitor impacts. Regulators need the ability to challenge powerful utilities and investors. Local governments need skills in spatial planning and community engagement. A just transition requires a more widely distributed capacity to understand and shape the energy system.

7. Build and retain more value within ASEAN

Replacing imported oil with imported solar panels, batteries and electric vehicles can improve energy security while creating a new form of technological dependence. No ASEAN country needs to manufacture every component, but the region should ask where value can be retained through installation, maintenance, engineering, software, battery repair and recycling, green construction, component production and community enterprise.

Thailand’s experience again illustrates the challenge. The economics of rooftop solar are improving, but imported equipment means that some of the investment immediately leaves

the domestic economy. The answer is not protectionism for its own sake. It is to connect energy policy with industrial policy, skills development, research, enterprise support and circular-economy systems. A socially legitimate transition must be experienced as an expansion of economic possibility, not simply as the replacement of one imported technology with another.

8. Build governance systems that survive political cycles

ASEAN countries already have many energy targets, strategies and public commitments. The larger challenge is turning them into consistent action. Progress is often slowed when regulations change, government agencies work in isolation, responsibilities overlap, procurement is delayed or a new administration reverses earlier decisions.

The energy transition will take decades, so it cannot depend on the priorities of a single government, minister or political champion. It needs stable rules, clear responsibilities, reliable public data, long-term funding and transparent ways to track progress. These foundations give investors, utilities, workers and communities greater confidence that policies will not suddenly change.

Regional agreements, trade requirements, climate-finance conditions and corporate clean-energy commitments can help keep governments moving in a consistent direction. But external pressure is not enough. Lasting progress depends on strong domestic institutions that can coordinate across sectors, learn from experience and remain accountable to the public.

Good governance also means being able to adapt. Energy prices, technologies, climate risks and patterns of demand will continue to change. Institutions must be able to recognise when a plan is no longer working, address unexpected consequences and adjust course without abandoning the overall direction of transition—or losing public trust.

The Laos–Thailand–Vietnam nexus: a regional system in miniature

The relationship among Laos, Thailand and Vietnam reveals many of these tensions in a single connected system.

Thailand and Vietnam have growing electricity demand and strong incentives to reduce exposure to imported fossil fuels. Laos possesses substantial hydropower and wind resources and seeks export earnings, foreign investment and a larger role in regional electricity trade. Cross-border renewable electricity can therefore create shared value: lower fossil dependence in importing countries, income for Laos and greater regional system diversity.

But benefits and burdens are not distributed automatically. Electricity may flow toward industrial and urban demand centres while much of the ecological footprint remains in Lao river basins and mountain landscapes. Export-dedicated generation and transmission may expand national capacity without strengthening the electricity available to Lao households or enterprises. Financial benefits may accrue to developers, lenders and national institutions, while affected communities experience land loss, livelihood disruption or reduced access to forests and rivers.

The systems question is therefore not whether electricity trade is good or bad. It is what rules govern it. Are environmental and social costs reflected in project decisions? Do local communities have meaningful influence? Are revenues invested in domestic services, skills and economic diversification? Can Laos retain more value than concession payments and construction activity? Are Thailand and Vietnam accountable for impacts embedded in the electricity they import?

A regional transition becomes just only when responsibility crosses borders with the electricity.

Innovation must move beyond technology

Technology will remain indispensable. Cheaper solar, larger wind turbines, battery storage, smart grids, digital forecasting, electric mobility and more efficient industrial systems are expanding what is possible. But technology is rarely the binding constraint on its own.

The more consequential innovations may be institutional and social: new models of community ownership; transition contracts for coal-dependent regions; regional sustainability standards for electricity trade; financing instruments that link early fossil retirement to worker protection; participatory spatial planning; portable qualifications for green workers; and tariffs that reward flexibility while protecting basic energy access.

Innovation should therefore be understood as any change that alters the system's capacity to produce better outcomes. A new market rule may unlock more renewable investment than a subsidy. A credible community-benefit agreement may prevent years of conflict. A vocational programme linked to real procurement pipelines may create more lasting value than an imported turnkey project. A building code may avoid the need for a future power station.

The highest-leverage innovations are often those that change information flows, incentives, decision rights and goals.

Choosing the direction of transition is the key

ASEAN's energy future is not predetermined. The region could follow a pathway in which renewable energy grows but fossil use also expands, ecological pressures are displaced into poorer regions and the benefits of new industries remain concentrated. It could achieve substantial decarbonisation while leaving questions of land, labour, affordability and participation unresolved.

Or it could treat the transition as an opportunity to redesign the relationship among energy, development and human wellbeing.

The ASEAN Centre for Energy's own just-transition framework recognises affordability, accessibility, energy security, sustainability, fair distribution, participation, recognition, gender equity and intergenerational fairness as central principles.[11] The challenge is to move these ideas from the language surrounding energy plans into the rules by which projects, markets and investments are actually approved.

Some of the most visible catalysts for change will continue to come from outside the energy sector: geopolitical shocks, economic pressures, climate disruption and changing trade requirements. Yet these forces do not determine the direction of change. They are interpreted and redirected through existing institutions, infrastructure, market rules, financial systems, capabilities and power relationships.

That is where the most important leverage points lie.

The decisive question is not how quickly ASEAN can install renewable technologies. It is whether the region can change the rules and relationships that determine what gets built, where it is located, who owns it, whose knowledge counts, who receives the benefits and who carries the costs.

A just transition will not be achieved by adding social safeguards to an otherwise unchanged energy-development model. It will require transforming the model itself.

Evidence notes

[1] Southeast Asian energy demand is around 40% above 2015 levels; fossil fuels supplied most growth, and coal demand increased about 8% annually. https://www.iea.org/reports/southeast-asia-energy-outlook-2026/energy-in-southeast-asia

[2]–[3] Before the 2026 crisis, about 60% of regional crude imports and one-third of gas imports came from the Middle East. Regional fossil-fuel subsidies were around US$40 billion, while the fossil import bill could reach about US$245 billion by 2035 without structural change. https://www.iea.org/reports/southeast-asia-energy-outlook-2026/executive-summary

[4] The Thailand analysis estimates energy imports at nearly 10% of GDP and argues that reduced fossil import dependence should be treated as a key transition measure. https://www.nationthailand.com/business/economy/40067788

[5] ASEAN electricity consumption has increased ninefold since 1990; grid expansion and modernisation could require more than US$300 billion between 2025 and 2040. https://www.iea.org/reports/financing-the-asean-power-grid/executive-summary

[6] ASEAN's 2030 ambitions include 30% renewable energy in total primary supply, 45% of installed power capacity and a 40% energy-intensity reduction from the 2005 baseline. https://aseanenergy.org/publications/asean-plan-of-action-for-energy-cooperation-apaec-2026-2030

[7] Thailand's current debate emphasises net metering, third-party access, regulatory clarity, local value retention, green skills and implementation continuity. https://www.nationthailand.com/business/economy/40067788

[8] The Lao PDR–Thailand–Malaysia–Singapore project has demonstrated multilateral cross-border electricity trading, while the ASEAN Power Grid could reduce costs,

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renewable curtailment and fossil-import exposure. https://www.iea.org/reports/financing-the-asean-power-grid/executive-summary

[9] The operating Monsoon project has 133 turbines and 600 MW capacity, exporting power from Laos to Viet Nam. The wider wind inventory is an independent compilation and should be described as indicative rather than an official government pipeline. https://www.impactelectrons.com/monsoon-cod-press-release?utm_source=chatgpt.com

[10] IRENA projects approximately 14.3 million ASEAN energy-sector jobs by 2050 under a 1.5°C pathway, including 4.6 million renewable-energy jobs, while stressing the need for reskilling and regional cooperation on training standards. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Oct/IRENA_SOC_Socioeconomics_energy-transition_Southeast_Asia_2025.pdf

[11] ASEAN's just-transition principles include affordability, accessibility, security, sustainability, fair distribution, participation, empowerment, gender equity and intergenerational justice. https://storage.googleapis.com/aceweb-bucket-261225/files/publication/1766846395_A-Guide-to-a-Just-and-Inclusive-Energy-Transition-in-ASEAN.pdf