
From Export Risk to Future Competitiveness

Accelerating ASEAN's Domestic Transition as a Strategic Lever

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Part 1

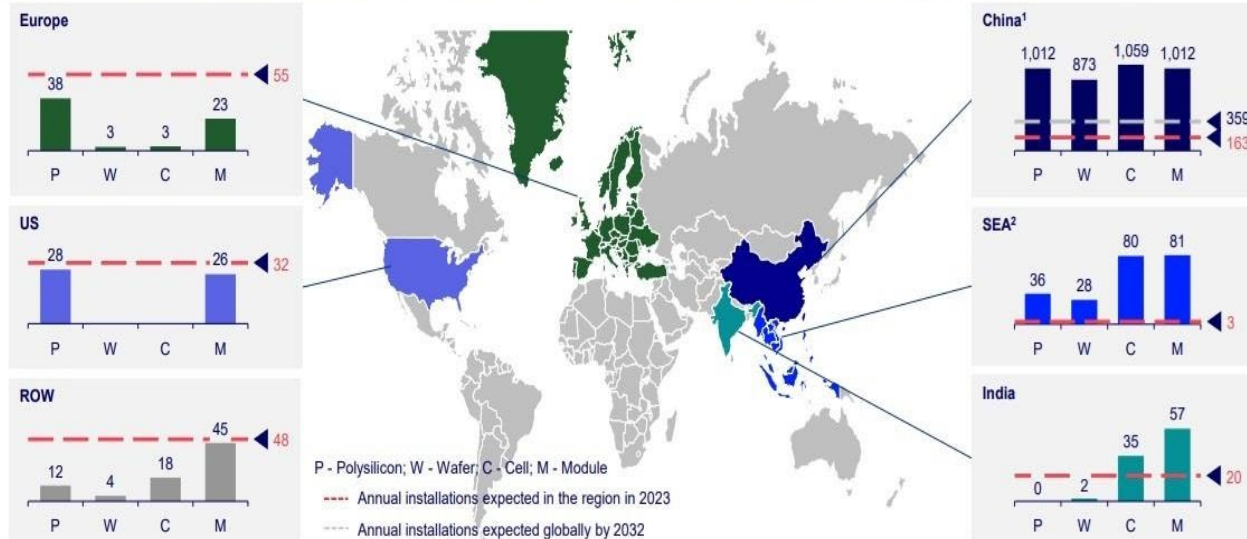
Context

A booming solar industry under stress



The solar boom

Production capacity across module supply chain (polysilicon, wafer, cell and module) by region (GW), 2023



Source: Wood Mackenzie (2023)

- **ASEAN's solar manufacturing is expanding fast**
- **The region now a global player in module assembly and cell production**
- **Yet growth remains highly export-dependent**

Emerging volatility



External headwinds: trade protectionism and tariffs are intensifying amid global overcapacity and price volatilities.



Export markets are being reshaped: demand is becoming harder to reach and increasingly unpredictable.

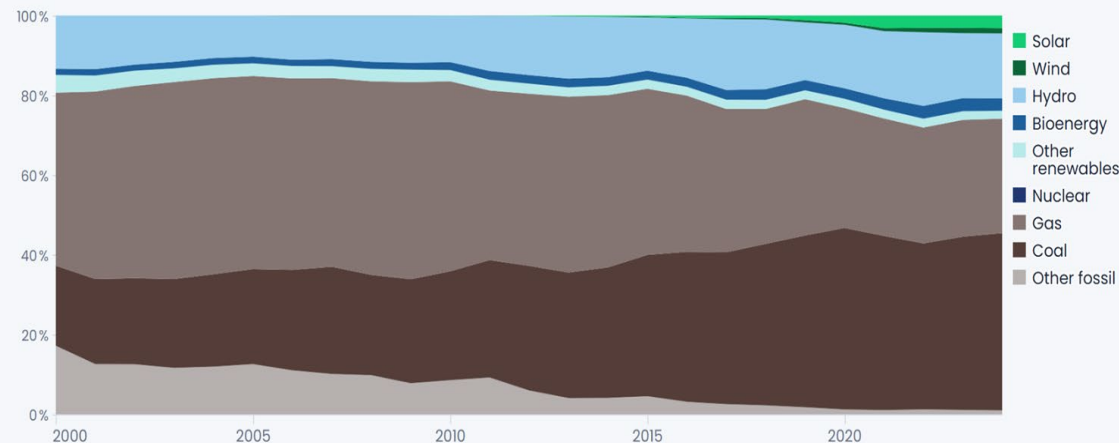


Rising business uncertainty: revenue swings, under-utilised factories, and growing investment hesitation.

Untapped domestic potential

Share of electricity generation in ASEAN

Percentage share



Data: Ember Electricity Data Explorer, ember-energy.org

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Rapid demand growth

- 2024 growth >7% ($\approx 2 \times$ global average)
- Total demand is set to double by 2050

Vast but underused resource

- ≈ 20 TW of solar and wind potential ($\sim 55 \times$ today's supply capacity)
- Yet deployment lags

So the question is: how can ASEAN unlock its own demand?



Part 2

Unlocking domestic demand

Reforming the system





Why reforms matter

- **Existing power systems built for fossil fuels**
- To scale renewables, ASEAN must **reconfigure its legacy power systems**:
 - Upgrade grids & interconnections
 - Modernise market rules
 - Reform subsidies and tariff structures
 - Electrify transport, industry, and households



Rising headwinds

- **Global complexity:** major-power rivalry, trade protectionism, fading cooperation.
- **Domestic pressures:** elevated debt, cost-of-living strains, and intermittent political distractions crowd out long-horizon planning.
- **Policy bandwidth shrinking:** risk of “transition delayism”; caution becomes default; near-term firefighting overtakes structural reform.
- **Likely outcome:** addition, not transition — renewables pile onto an unchanged fossil system instead of replacing it.

Part 3

ASEAN's energy transition at a crossroads

Immediate growth vs. long-term competitiveness



Two diverging paths ahead



Green Opportunism that leans on domestic advantages (e.g., resources, labour, land) for quick wins, but leaves the structure of the legacy power system and its fossil reliance mostly unchanged



Green Developmentalism that treats the transition as a lever for building future-oriented competitiveness



Signs of a turning point



Carbon neutrality commitments

Nearly all major ASEAN economies have set net-zero targets, anchoring long-term policy direction.



Multi-stakeholder momentum

Think tanks, donors & agencies are building roadmaps, data platforms, and capacity, and convening public-private collaboration.



Industry pilots

Renewable integration & hybrid systems are proving technical and commercial viability



Market signals

Early momentum towards a premium for “green products.”

From momentum to progress



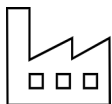
Challenge

Momentum alone is not enough — implementation is not straightforward.



Substantial complexity

RE at scale (weak grids, tough geography); balance near-term economic growth vs. long-term transition goals; entrenched fossil interests; gaps in governing capacity; cross-agency coordination.



Need

Technical solutions and policy recommendations already exist, but what is often missing is the political will to pursue them consistently; only a strong, sustained commitment can translate pilots into progress at scale.

Part 4

Regional mirror

Lessons from China's system pivot



The scale of change



China is moving beyond merely adding wind and solar capacity...

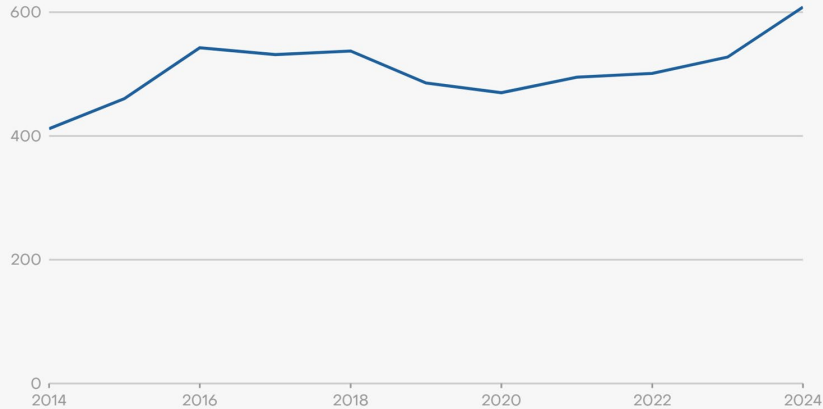


...to building the full system that can integrate, balance, and sustain clean electricity at scale.

Stronger grids, bigger batteries

Grid investment in China has rebounded in recent years

Annual network investment (billion RMB)

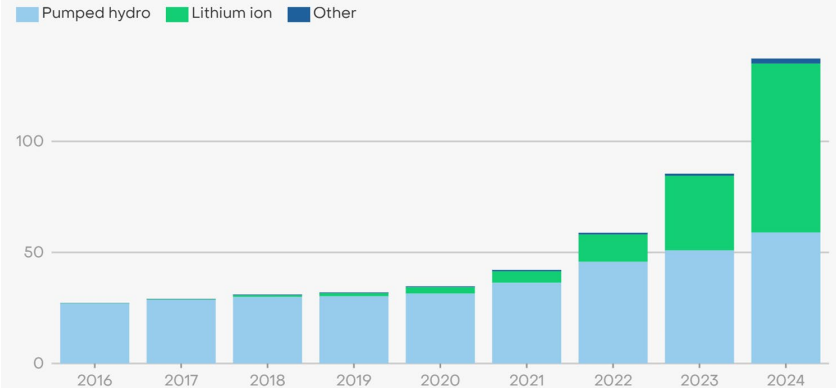


Source: National Energy Administration's national power industry statistics

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Supercharged by lithium-ion: China's energy storage capacity has tripled in just three years

Cumulative installed capacity (GW)

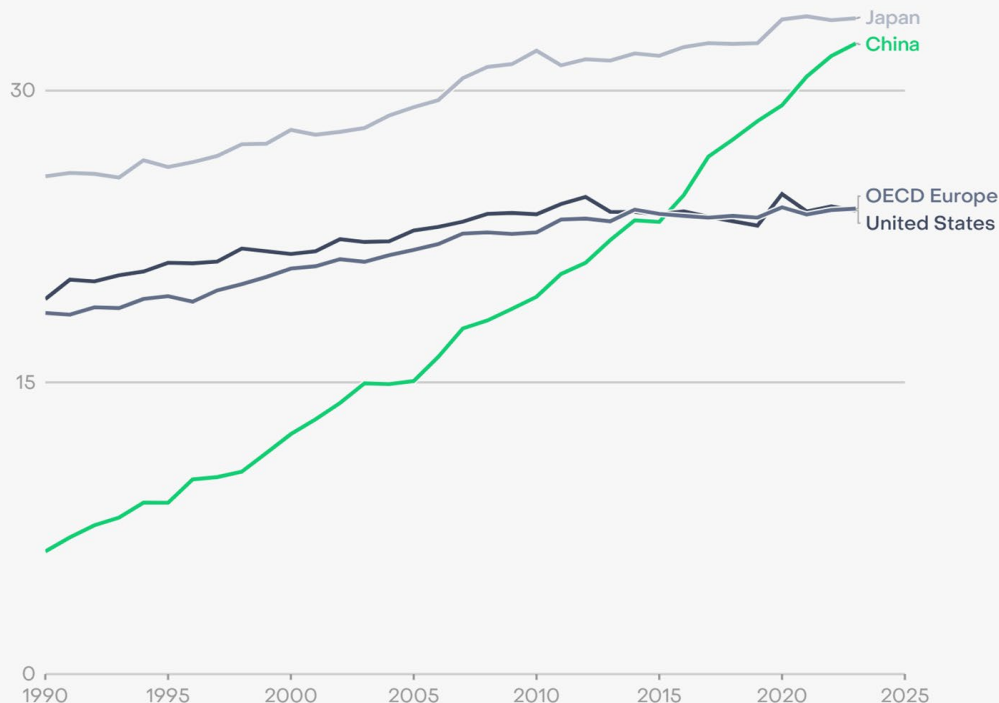


Source: China Energy Storage Association
Other includes lead acid batteries, flow batteries, super capacitors, compressed air storage, flywheel energy storage and sodium sulphur batteries

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China charges into the electrification era

Share of electricity in final energy consumption (%)



Source: IEA World Energy Balances
Excludes consumption for non-energy use

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Nationwide growth

Electricity 32% of final energy in 2023, up from 25% in 2015

Global standing

Overtaking US and major European countries

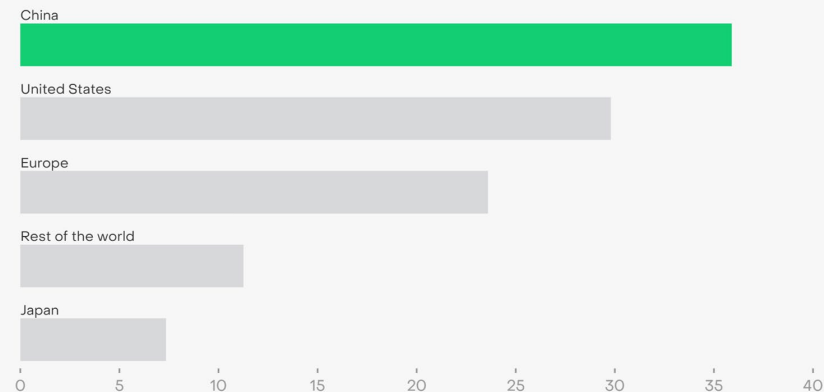
Main drivers

Industrial sparks, EV boom, clean heating

Beyond the low-hanging fruit: Tackling more complex end uses

China is powering efficiency by leading the global rollout of heat pumps

Heat pump sales in 2024 (GW)

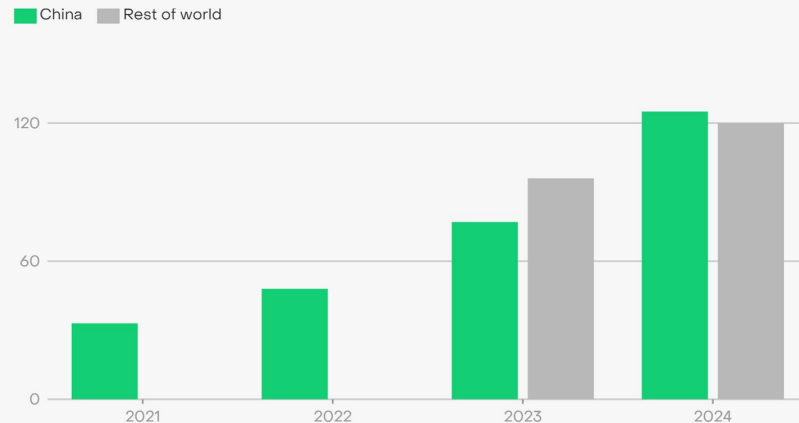


Source: Estimated by the authors based on information obtained from IEA's Future of Heat Pumps in China report and IEA's Global Energy Review report (2025)

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China is now home to half the world's green hydrogen capacity

Green hydrogen production capacity (thousand tonnes/year)



Source: Estimated by the authors based on information obtained from China Hydrogen Development Report (2025). - Notes: Data on renewable hydrogen production capacity for the rest of the world in 2021 and 2022 are not available.

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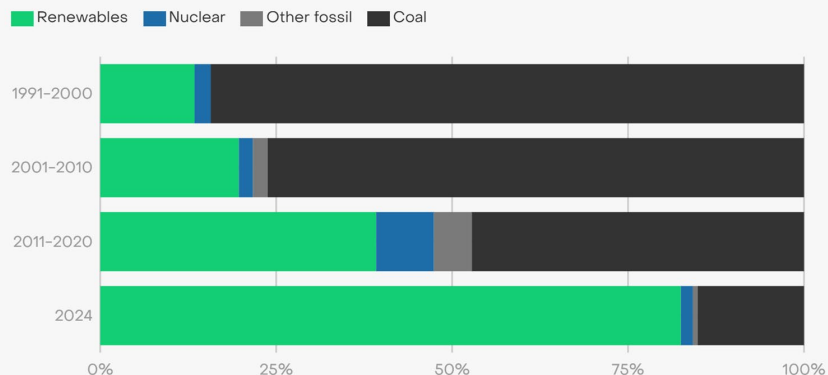
Faster transition

Multiple trends point to an **accelerating transition** - from routinely overachieving targets to clean power taking an ever-larger share of new demand.

Clean electricity rising, faster each decade

In 2024, clean electricity met more than 80% of new demand in China

Share of electricity demand growth met by different sources (%) by decade and in 2024

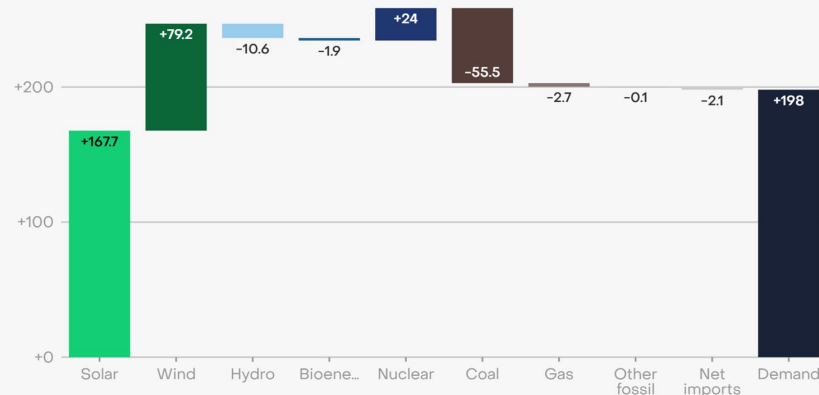


Source: Yearly electricity data, Ember

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China's strong solar and wind growth outpaced rising demand in H1 2025 — cutting fossil generation

Year-to-date change, H1 2025 (TWh)



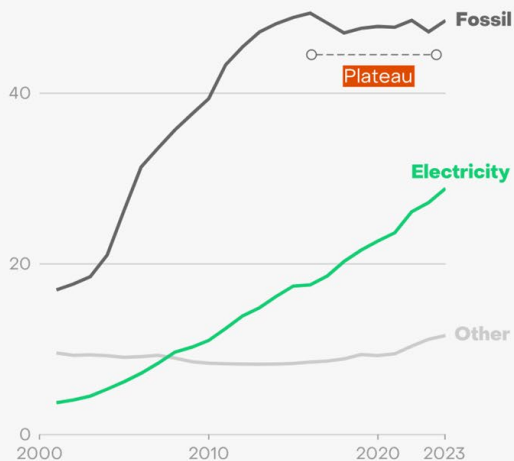
2024 Demand: 10,073 TWh
Source: Monthly electricity data, Ember

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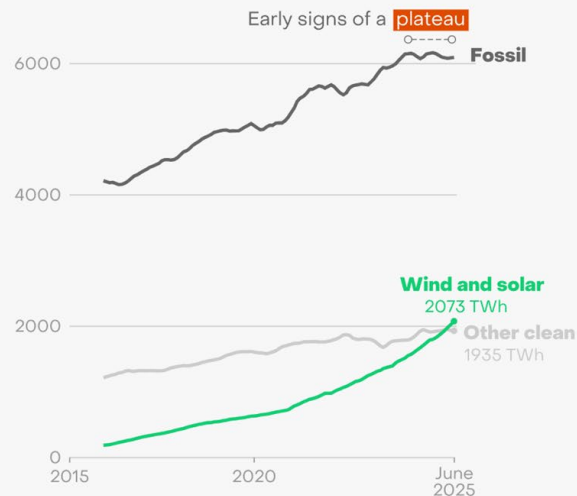
Beyond addition: Fossil peaking is in sight

China's rapid electrification and rising solar and wind power will soon drive down its fossil fuel use

Final energy consumption (EJ)



Electricity generation (TWh), 12-month rolling sum



Source: IEA World Energy Balances, Monthly electricity data, Ember
Final energy consumption: 'Other' includes biofuels, heat, geothermal and solar thermal.
Final energy consumption from fossil refers to the on-site burning of fossil fuels or other energy sources for heating, transportation, or other purposes. Non-energy use of fossil fuels is excluded in the figure.
Electricity generation: 'Other clean' includes bioenergy, nuclear and hydro.

Powering prosperity: China's transition logic



Strategic rethink: Fossil-fuelled growth, once powering China's rise, is becoming increasingly unsustainable; perceived clean opportunities; decarbonisation was reframed not as a constraint, but as a driver of competitiveness, innovation, and resilience.



Implications for ASEAN: The fossil-based growth model has run its course; and the “polluting first, clean up later” pathway is not inevitable.

- Fossil path = volatility, subsidy burdens, rising debt & climate losses
- Clean path = home-grown energy, new industries, stronger resilience

The transition is demanding — but the cost of delay will hit Southeast Asia's economy hardest.



Thank you!

谢谢聆听!

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