

## Charging Ahead: Electrification in Asia

### IN A NUTSHELL



Ivy-sw Ng  
APAC Chief Investment  
Officer

- Global energy systems have long depended on fossil-fuel based energy, but Asia is now accelerating toward energy self-sufficiency through large-scale electrification initiatives.
- Electrification refers to the broad shift towards electricity as the primary energy carrier across transport, industry, and buildings, supported by grid modernization.
- Electrification scorecard: Asia vs peers (DWS Research synthesis based on third-party data)<sup>1</sup>
  - Power (Leading): Asia's renewable deployment is structurally faster. This underpins faster fossil-to-clean substitution
  - Transport (Leading but uneven): Outside China, adoption remains patchy and needs policy tailwinds
  - Buildings & Industry (Lagging): Heat-pump uptake is rising in Japan and South Korea, but Asia's industrial heat is still heavily fossil-fuel reliant and hard-to-electrify
- Grid modernization underpins Asia's electrification, driving long-cycle transformer investment and potentially creating opportunities for power-equipment and materials suppliers, while Korean and Chinese manufacturers diverge in competitiveness and market positioning.



Christy Lam  
Analyst

Energy competition has become a defining theme in global markets. The U.S. continues to prioritize lower oil prices to support domestic consumption and geopolitical leverage, while China has been working aggressively to secure more affordable and stable energy sources. Yet, as a country structurally dependent on imported fossil fuels, China has increasingly turned to electrification as its strategic pathway to greater energy resilience and long-term cost stability.

Against this backdrop, Asia is accelerating energy self-sufficiency through large-scale electrification initiatives. Bloomberg forecasts that annual grid investment in China and India will exceed USD 300 billion by 2030, with a 10-year CAGR (2020–2030) of over 12%, outpacing their domestic GDP growth. In contrast, developed economies continue to show signs of relative underinvestment. (Figure 1 and 2) Europe's grid age is a factor: about 40% of EU distribution networks are over 40 years old, requiring upgrades.<sup>2</sup> In the United States, ~70% of transmission lines exceed 25 years, approaching end-of-life, underscoring systemic renewal needs alongside investment shortfalls.<sup>3</sup>

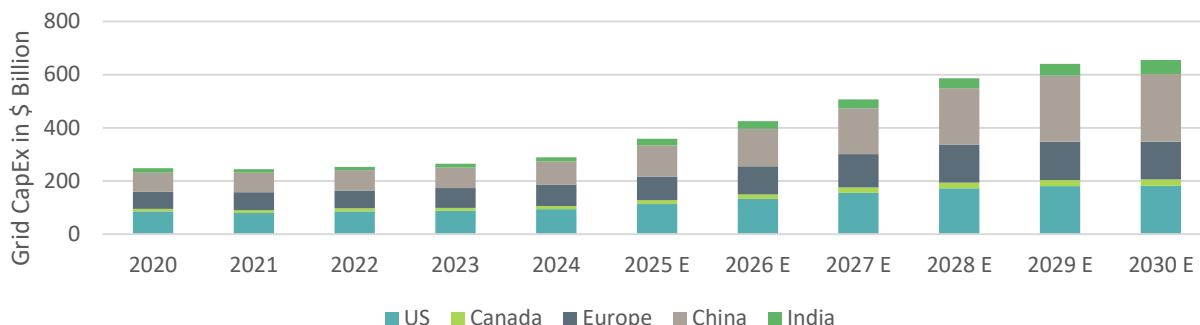
Electrification refers to the shift toward electricity as the primary energy carrier—displacing fossil fuels across transport and industrial processes—and is fundamentally enabled by grid modernization. China is at the forefront of this transition, supported by surging electric vehicle (EV) sales, its role as the world's manufacturing hub, and its dominant position in the global transformer supply chain.

<sup>1</sup> The electrification scorecard represents an indicative, qualitative assessment by DWS Research, synthesizing publicly available data from third-party sources (including international energy agencies and national statistics). Asia is assessed relative to other major regions (including Europe and North America) across power, transport, buildings and industry, based on recent deployment trends, energy mix evolution and electrification indicators. The scorecard does not represent a ranking, forecast or investment recommendation.

<sup>2</sup> The European Files, data as of 4<sup>th</sup> Apr 2025

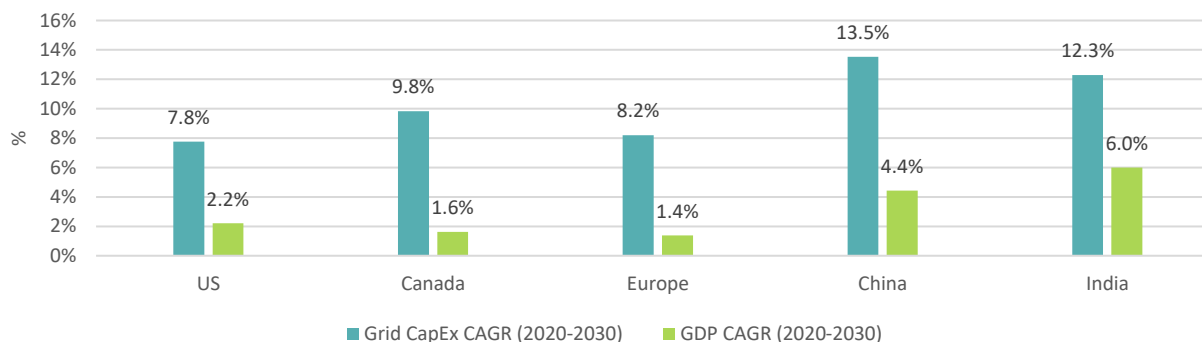
<sup>3</sup> US Department of Energy, data as of 19<sup>th</sup> Oct 2023

**Figure 1: Grid Capital Expenditure Regional Comparison Forecast (2020-2030)**



Source: Bloomberg, data as of 13<sup>th</sup> Jan 2026. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

**Figure 2: Grid Capital Expenditure vs GDP Growth: Regional Compound Annual Growth Rate (CAGR) Comparison (2020-2030)**



Source: Bloomberg, data as of 13<sup>th</sup> Jan 2026. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

**Driving the Change: Transportation’s role in Electrification in Asia**

The most visible and familiar manifestation of electrification in Asia is the continued rise of electric vehicles (EVs). China has been the clearest example of this shift. As of November 2025, battery-electric vehicles and plug-in hybrids accounted for around 60% of retail passenger-vehicle sales, a remarkable jump from about 30% in January 2024. (Figure 3) Beyond China, South Korea has emerged as another major Asian market actively pushing EV adoption. As part of its 2030 Nationally Determined Contribution target to reduce Greenhouse Gases (GHG) emissions by 40% from 2018 levels, Korea aims to deploy 4.2 million cumulative EVs by 2030.<sup>4</sup> National and municipal incentives remain a core part of this strategy. In 2026, Seoul plans to boost EV uptake by complementing central-government subsidies—EV buyers who trade in gasoline or diesel cars can receive South Korean Won (KRW)300,000 (~USD 203) from the city, on top of KRW 1 million (USD 677) from the central government.<sup>5</sup> Despite these efforts, foreign brands have been the largest beneficiaries: Tesla ranked fifth in Korea’s domestic vehicle sales in 2025, as imported EV purchases surged 78% versus 38% for domestic EVs. Nearly KRW 2 trillion (~USD 1.5 billion) in combined subsidies is estimated to have supported purchases of China-manufactured Tesla vehicles.<sup>6</sup>

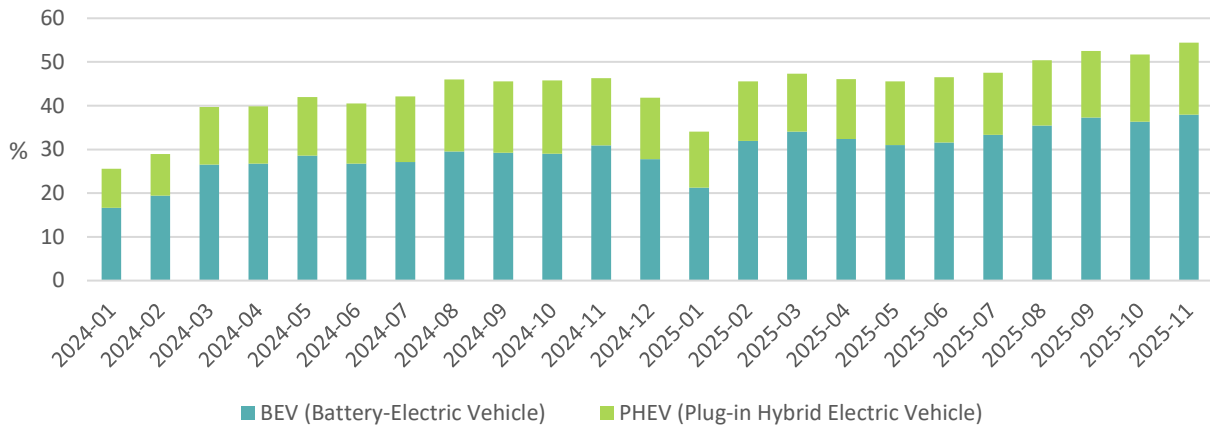
Apart from China and Korea, other Asian markets are also catching up—albeit from a smaller base. In India, Toyota’s joint venture Toyota Kirloskar Motor entered the fully electric segment in January 2026 with the launch of the Urban Cruiser *Ebella*, its first

<sup>4</sup> The Chosun Biz, data as of 25<sup>th</sup> Nov 2025  
<sup>5</sup> The Korea Times, data as of 18<sup>th</sup> Jan 2026  
<sup>6</sup> The Chosun Daily, data as of 22<sup>nd</sup> Jan 2026

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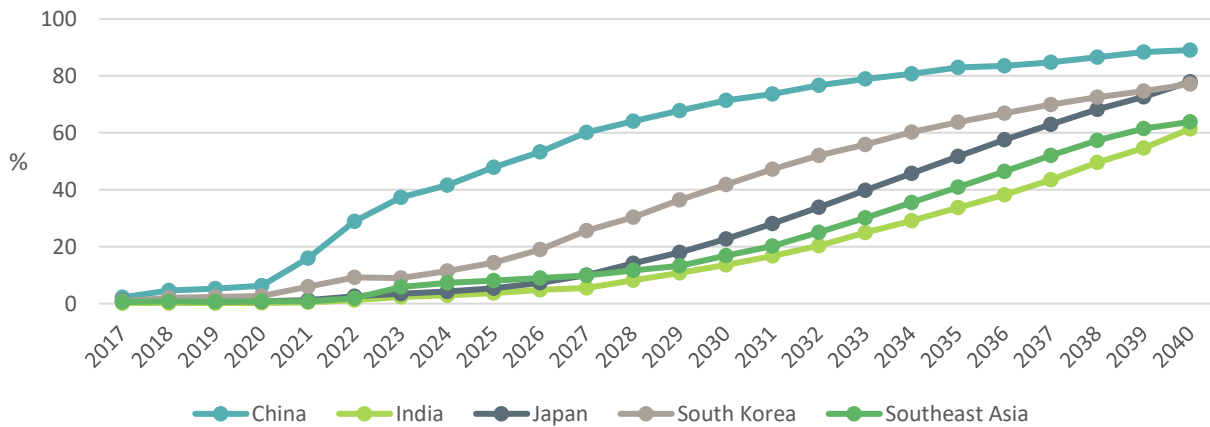
battery-electric SUV for the local market.<sup>7</sup> Bloomberg forecasts that by the early 2030s, EV sales as a percentage of total vehicle sales in India, Japan, South Korea, and Southeast Asia will exceed 60%. (Figure 4) However, EV penetration as a share of the total vehicle fleet remains modest across most of Asia. By 2040, Bloomberg expects EVs to represent less than half of all vehicles in India, Japan, and Southeast Asia, while China and South Korea are projected to reach 66% and 62%, respectively. (Figure 5)

Figure 3: China retail passenger-vehicle sales by vehicle type (January 2024-November 2025)



Source: Bloomberg, as of 28<sup>th</sup> Nov 2025

Figure 4: EV sales as a % of total vehicle sales forecast: Asia country comparison



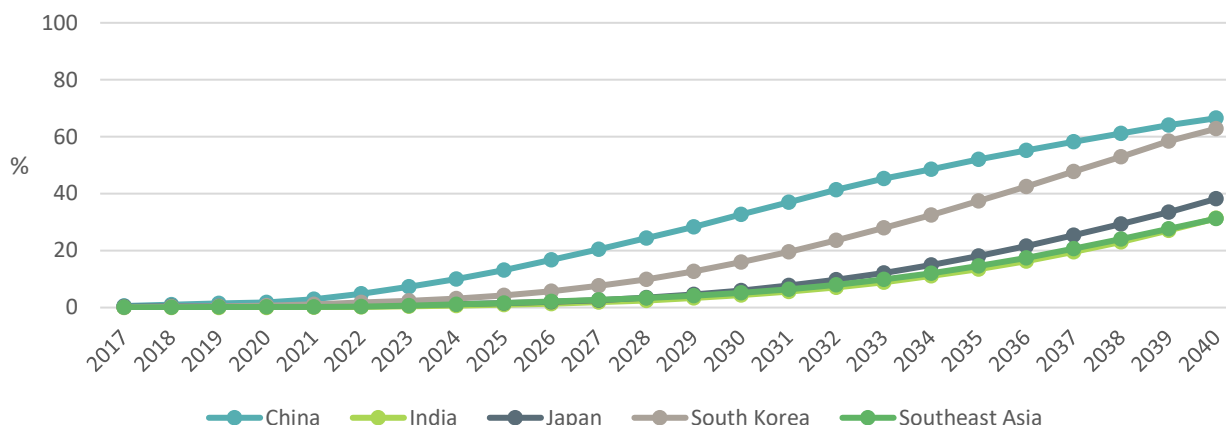
Source: Bloomberg, as of 6<sup>th</sup> Jan 2026. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

<sup>7</sup> Fortune India, data as of 20<sup>th</sup> Jan 2026

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Figure 5: EV as a % of total vehicle fleet forecast: Asia country comparison



Source: Bloomberg, as of 6<sup>th</sup> Jan 2026. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

### Heat it up: Electrification in Asia

While transportation has been the most visible driver of electrification, EV adoption is not the end point of Asia's energy transition. The next major frontier likely lies in industrial and building electrification, particularly in heating—an area that remains heavily reliant on fossil fuels across much of the region. Power, industry and transport account for roughly 85% of global GHG emissions, with industry and power dominating in Asia. (Figure 6) Electrification targets these sectors most directly, displacing coal- and fossil-fuel-intensive processes and delivering the largest structural reductions in fossil-fuel demand.

Electrification in manufacturing, heavy industry, and buildings refers to replacing direct fossil-fuel use with electric technologies, especially for thermal processes. Although Asia serves as the world's manufacturing hub, countries such as China, Indonesia, and Vietnam continue to exhibit deep dependence on fossil-fuel-based industrial energy. According to the *World Bank's "Industrial Decarbonization in East Asia" (2025)*, less than 30% of industrial energy consumption in these markets is powered by electricity.<sup>8</sup> As a result, thermal energy has become the central focus of the next wave of electrification.

Heat pumps are emerging as a pivotal technology in this transition.

- In China, air-to-air heat pumps dominate due to their cost-effectiveness and ease of deployment.
- In Japan, a more mature heating market has enabled steady growth in reverse-cycle systems and heat-pump water heaters, supported by national subsidies. By 2035, heat pumps are expected to meet around 40% of Japan's space-heating demand, while their market share in China is projected to double over the same period.<sup>9</sup>The International Energy Agency (IEA) emphasizes that consistent policy frameworks will be essential to maintain this adoption momentum.

Japan and South Korea—both with sizable industrial sectors—face a distinct set of opportunities and challenges. Their machinery sub-sectors already exhibit over 70% electrification, reflecting early adoption and strong government backing. Much of their industrial equipment is already compatible with electric or hybrid systems. In Japan, the *Investment Promotion for Energy Conservation* program offers companies up to JPY 10 million (~USD 65,000) per facility to install industrial heat pumps.<sup>10</sup> Meanwhile, South Korea's Ministry of Climate, Energy and Environment aims to deploy 3.5 million heat pumps by 2035 to curb fossil-fuel-based heating demand.<sup>11</sup>

Supportive policies provide long-term demand visibility for industrial electrification, but structural challenges remain. Grid upgrades will be necessary to manage higher loads in industrial clusters, and several heavy industries—such as chemicals, steel, and materials—

<sup>8</sup> World Bank, data as of 26<sup>th</sup> Aug 2025

<sup>9</sup> The International Energy Agency, data as of 12<sup>th</sup> Nov 2025

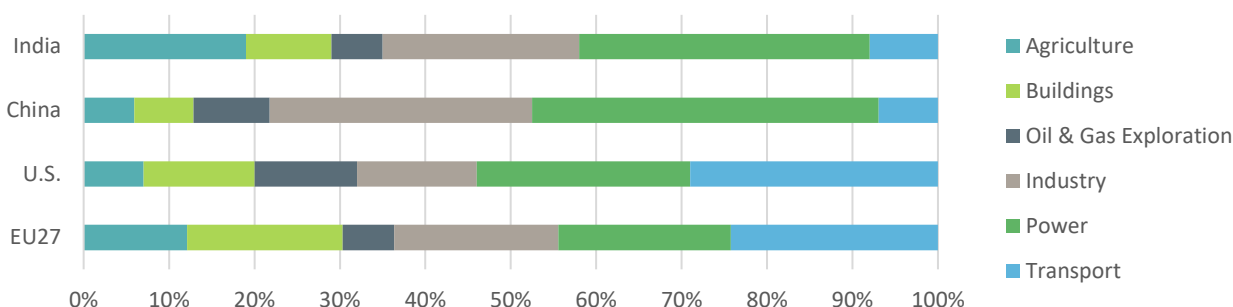
<sup>10</sup> The Ministry of Economy, Trade and Industry, data as of 15 Apr 2022

<sup>11</sup> The Chosun Daily, data as of 16<sup>th</sup> Dec 2025

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still rely on ultra-high-temperature processes that are difficult to electrify. These sectors may therefore see a slower or more uneven transition.

**Figure 6: The sector share of greenhouse gas emissions by region or country**



Source: DWS Research Institute (September 2025), EDGAR - Emissions Database for Global Atmospheric Research, data corresponds to 2023 GHG emissions. Buildings include solid waste disposed on land, solid waste composted and hazardous solid waste processing/storage, wastewater handling, waste incineration, Industrial combustion and processes includes combustion for industrial manufacturing and industrial process emissions (e.g. nonmetallic minerals, non-ferrous metals, solvents and other product use, chemicals, etc.). Oil & Gas Exploration is labelled "Fuel exploitation" by EDGAR and includes fuel extraction, transformation and refineries activities, including venting and flaring.

### Rewiring Asia: Grid Modernization Powers the Shift

As electrification accelerates across transportation, industry, and buildings, the pressure on Asia's existing power infrastructure intensifies. The grid itself becomes the next critical bottleneck. Higher thermal-load electrification, rising EV penetration, and the growing deployment of heat pumps all require significant grid upgrades—not only to increase capacity but also to fundamentally redesign how electricity is delivered and managed. This underscores grid modernization as a central enabler of Asia's broader energy transition.

Modern grids must be smarter, stronger, and far more flexible than the traditional systems built around centralized fossil-fuel plants. Instead of one-way, predictable power flows, they now need to accommodate intermittent renewable supply, two-way energy movement, and sharp demand spikes from electrified transport and industry. At the heart of this transformation are transformers, which enable voltage conversion across transmission and distribution networks and ultimately determine how much electrified load the system can support.

Electrification in Asia therefore requires a substantial expansion and upgrading of transformer capacity. This has historically been a long-cycle, capex-intensive segment with high entry barriers and multi-year visibility, contributing to its durability as a structural theme in the region. Global transformer prices have risen more than 60% between 2022 and 2025, supported by renewable-project commitments, data-centre growth, and post-pandemic supply constraints. Producers with higher overseas exposure generally capture stronger pricing and margin profiles, reflecting tighter supply-demand balances in markets such as the U.S. and Europe.<sup>12</sup>

Geopolitics and lead-time dynamics are also shaping competitive positioning within Asia. Some manufacturers have strengthened their foothold in Western utility markets through long-standing export relationships and local capacity expansion, while others are gaining share in emerging markets through shorter delivery times and competitive pricing. This divergence creates differentiated risk-reward profiles across the power-equipment value chain.

<sup>12</sup> J.P. Morgan, data as of 27<sup>th</sup> Jan 2026

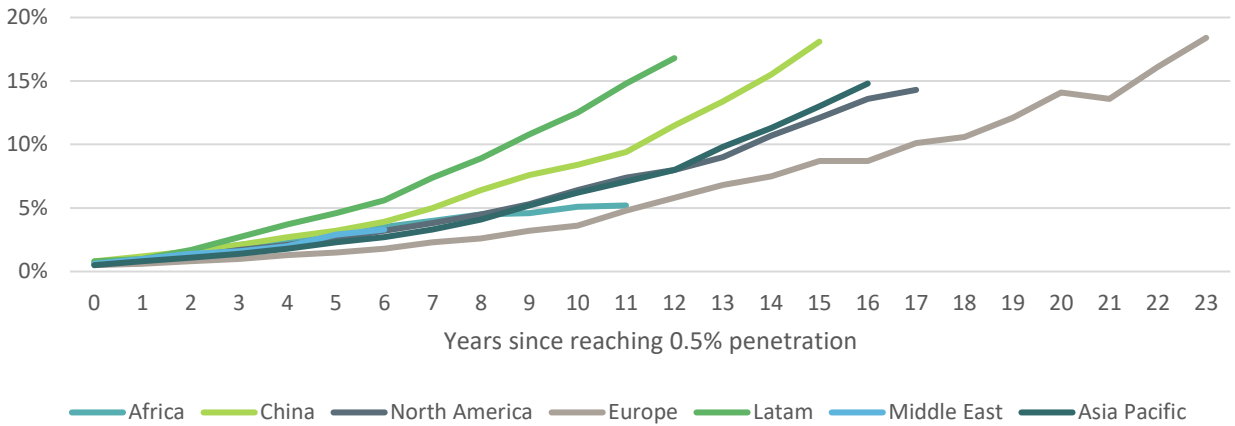
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Beyond core equipment makers, upstream materials—including copper, aluminium, and grain-oriented electrical steel (GOES)—stand to potentially benefit directly. Copper alone represents 10–20% of transformer production costs, closely tying raw-material demand to the accelerating grid-expansion cycle.

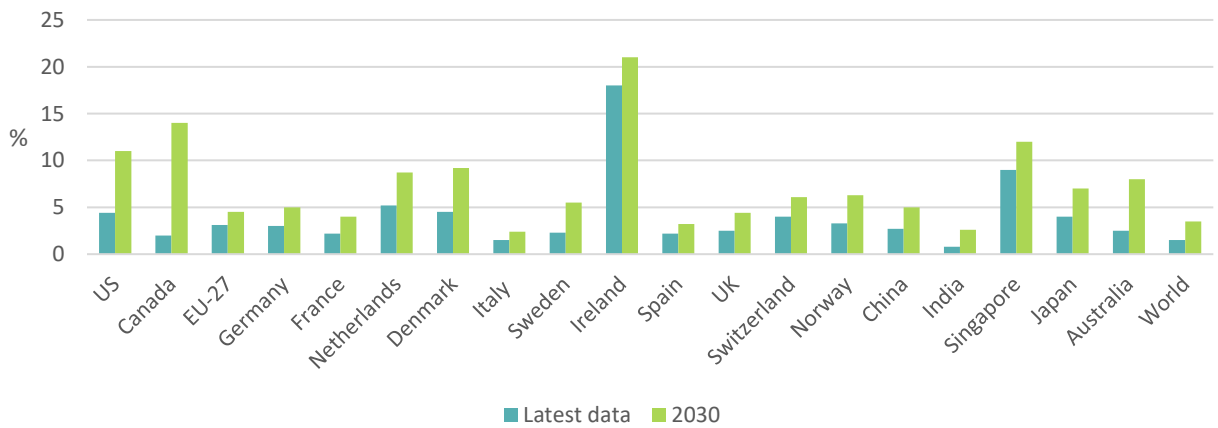
Asia's data-centre boom is intensifying electricity demand, especially across major hubs, where facilities already consume up to 9% of national power. (Figure 8) With data-centre electricity needs rising rapidly, AI-driven load growth is set to deepen grid strain and accelerate the urgency of large-scale network upgrades. Asia is also deploying renewables at a significantly faster pace than Western economies. China and other Asian markets reached a 12% wind-and-solar generation share five to eight years earlier than Europe or North America (Figure 7), and China hit its 2030 wind-and-solar capacity target six years ahead of schedule—underscoring the region's accelerating clean-power momentum. Compared with the US and Europe, Asia's grid modernization is advancing faster in scale but from a younger baseline. While Western grids struggle with aging infrastructure and slower permitting, Asia's accelerated investment, manufacturing depth, and policy momentum may have it positioned to outpace both regions in enabling large-scale electrification and long-term energy resilience. Ultimately, grid modernization is not just an operational necessity—it represents a long-term structural theme that is expected to support multiple stages of Asia's electrification journey. As electrified demand grows, the grid is increasingly emerging as a key system constraint and an important area of focus for long-term, policy-aligned infrastructure investment.

Figure 7: Share of solar and wind power in electricity generation by region



Source: DWS Research Institute (September 2025). Data for 2015 to 2023 sourced from IEA. Data for 2024 sourced from BNEF.

Figure 8: Current and projected data centre power demand as a share of national power demand by country



Source: ICIS (May 2025). Data centres: Hungry for power. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

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Figure 9: Assessing the speed of the clean energy transition: Asia vs Global

	Latest		2030 target <sup>1</sup>		Average annual rate of historical change (Last five years)		Average annual rate of change required to meet 2030 target (from latest data)		Acceleration factor required to meet 2030 target		Transition status vs 2030 target (DWS assessment)	
	Asia	Global	Asia	Global	Asia	Global	Asia	Global	Asia	Global	Asia	Global
<b>Power</b>												
<b>Share of zero-carbon sources in electricity generation (%)</b>	29.88 (2024)	40.9 (2024)	50	70	0.75	0.90	3.35	4.85	4.5x	5x	Off track	Off track
<b>Share of coal in electricity generation (%)</b>	51.11 (2024)	34.3 (2024)	30	12	-0.32	-0.45	-3.52	-3.72	11x	8x	Way off track	Off track
<b>Carbon intensity of electricity generation (gCO<sub>2</sub>/ kWh)</b>	570 (2024)	473 (2024)	350	100	-10	-6.49	-36.7	-62.17	3.7x	10x	Off track	Way off track

Source: DWS Research Institute (September 2025), Climate Action Tracker (November 2023), State of climate action 2023, Our World in Data (February 2026). Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. <sup>1</sup>Targets are based on third-party pathways and publicly stated benchmarks, not DWS targets.

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## Glossary

**Heat pump** refers to a device that transfers heat from the air, ground, or water to provide efficient heating or cooling using electricity.

**Grid** refers to the interconnected network of power lines, substations, and equipment that delivers electricity from generation sources to end-users.

**Compound Annual Growth Rate (CAGR)** measures the average yearly growth of a value over a specified period, assuming it increases at a steady, compounded rate.

**Gross Domestic Product (GDP)** measures the total monetary value of all goods and services produced within a country's borders over a specific period, reflecting the size of its economy.

**Battery-electric vehicle (BEV)** is a vehicle powered solely by electricity stored in a rechargeable battery, using no gasoline or diesel engine.

**Plug-in hybrid (PHEV)** is a vehicle that combines an electric motor and a gasoline engine, with a battery that can be recharged by plugging into an external power source.

**Capital Expenditure (CapEx)** refers to money spent by a business to acquire, upgrade, or maintain long-term, physical assets such as property, plants, equipment, or infrastructure, expected to generate benefits over multiple years.

**Greenhouse Gas (GHG)** refers to gases (such as carbon dioxide and methane) that trap heat in the atmosphere by absorbing infrared radiation.

**Nationally Determined Contribution (NDC)** is a country's formal climate pledge under the Paris Agreement, outlining targets and policies to reduce greenhouse gas emissions and adapt to climate impacts over defined timeframes.

**Electric vehicles (EV)** refer to vehicles powered partially or fully by electricity, using batteries or electric motors instead of internal combustion engines.

**Grain-Oriented Electrical Steel (GOES)** is a specialized silicon steel used in transformers, optimized for magnetic efficiency, reducing core losses, improving energy efficiency, and supporting reliable electricity transmission and distribution networks globally.

**Carbon intensity** measures the amount of carbon dioxide emitted per unit of energy produced, typically electricity, indicating how carbon-efficient an energy system or technology is over time and across regions.

**Zero-carbon sources** are energy sources that produce little to no carbon dioxide (CO<sub>2</sub>) emissions at the point of electricity generation.

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