

March 18, 2026

Clean Investment Monitor: Tracking Global Clean Technology Investment

Energy & Climate

Authors:

Alfredo Rivera
Shweta Movalia
Hannah Pitt
Mahmoud Mobir
Emma Rutkowski
Harold Tavarez
Eden Chan
Charlotte McClintock
Anne Luo
Yvonne Yu
Xinyu Zheng
Linyi Zheng
Kate Larsen



Key findings

For the past three years, the [Clean Investment Monitor](#) has tracked investment in the manufacture and deployment of clean energy and decarbonization technologies across the United States. This report marks the expansion of the Clean Investment Monitor to every country around the world, tracking investment from 2018 through 2025. We find:

- **Total global clean investment hit record levels in 2025, reaching \$1.96 trillion**—a tripling of investment from only seven years ago. However, investment growth has slowed somewhat in the past two years, rising only 7% in 2025 after a 28% jump in 2023.
- **Total clean investment in China declined 3% from its 2024 peak**, reaching \$849 billion. While investment in Europe and the US rose only modestly in 2025, the most rapid growth occurred in India—which saw a 46% increase to reach \$101 billion—and the rest of the world, which saw an increase of 12% to reach \$352 billion in 2025.
- **The slowdown is primarily due to a decline in global manufacturing investment in 2025**, which totaled \$155 billion, a more than 40% decline from peak levels in 2023. The top three—China, the US, and Europe—all saw a decline in 2025 (with the US declining for the first time since the start of our tracking, and China continuing a decline first seen in 2024), with the lion’s share from China.
- **In China, after years of substantial government support that supercharged new investments, severe domestic overcapacity led to a significant reduction in new manufacturing investments**—falling 70% in 2025 from peak levels in 2023 to \$60 billion, led by a steep decline in solar manufacturing investment.
- **Clean technology manufacturing investment saw some growth outside of China, the US, and Europe.** In India, manufacturing investments have risen rapidly since 2021, reaching \$11.4 billion in 2025, a 17% increase from 2024. If announced projects come to fruition, India will have the largest manufacturing capacity in batteries, solar, and wind outside China and the US by 2030. Turkey, Indonesia, South Korea, Canada, and others represent a widening geographic footprint for clean technology manufacturing.
- **China’s slowing domestic investment does not fundamentally change the geographic distribution of global manufacturing for most clean technologies, however.** At the end of 2025, China was home to 92% of global solar cell manufacturing capacity and 74% of wind nacelle manufacturing capacity, ratios that will persist out to 2030. We do see signs of a gradual shift in batteries and EVs, where China’s share of global manufacturing capacity goes from 84% in 2025 to 71% in 2030 for batteries, and from 69% in 2025 to 56% in 2030 for EVs.
- **Meanwhile, global investment in the deployment of clean electric power and transport continues its consistent rise.** Global electric power investment reached a record-high \$948 billion in 2025, led by growth in solar, and EV purchases have grown six-fold over seven years.
- **Overcapacity (concentrated in China) created a drag on new manufacturing investments.** We find that across solar, wind, batteries, and EVs, global manufacturing capacity exceeded global demand in 2025. If all manufacturing investment announced to date moves forward, we expect this overcapacity dynamic to intensify by 2030, absent an acceleration of demand.

Introduction

Over the past decade, public and private investment in decarbonization has grown significantly—accelerating manufacturing and the adoption of the technologies needed for clean electricity, transportation, and low-emission industrial production. Many major economies see domestic manufacturing of clean energy and decarbonization technologies as a powerful driver of economic growth, important to national security objectives, and necessary to sustain political support for decarbonization policies. In the last decade, many governments—including the US, China, and in Europe—have provided fiscal or other policy support to spur both the manufacturing of those technologies and the demand needed to sustain domestic industries. As a result, global investment in the manufacturing and deployment of clean technologies hit record levels in 2025, reaching \$1.96 trillion—a tripling of investment from only seven years ago.

However, now, after many years of escalating investment, we are starting to see signs of a rebalance for clean technology manufacturing. Spurred by government subsidies and incentives in the late 2010s and early 2020s, companies frontloaded the buildout of manufacturing capacity through a rapid acceleration of investment. Global clean technology manufacturing investment peaked at \$266 billion in 2023. Since then, momentum has slowed down, with investment declining to \$155 billion in 2025, a reduction of roughly 42% from the 2023 peak, marking a period of declining investment that persisted through the end of 2025.

This dynamic is most evident in China, where after years of substantial government support, severe domestic overcapacity has led to a significant reduction in new manufacturing investments—falling 70% in 2025 from peak levels in 2023—forcing companies to search out export opportunities to relieve domestic overcapacity pressures. Growing trade frictions that reduced global market access have only aggravated China's domestic overcapacity challenge. As a result, companies have responded to these signals by curbing new investments. We find the reduction in China's domestic manufacturing investment is the single largest driver of the global reduction in clean technology manufacturing investment in 2024 and again in 2025, dropping from \$189 billion in 2023 to \$60 billion in 2025, suggesting the global rebalance is fundamentally a China story.

Outside of China, we see a range of different regional dynamics emerging. In the US, we find declining manufacturing investments as policy changes dim the outlook for demand, in particular for the EV supply chain. In recent quarters, we've seen cancellations of previously announced manufacturing investments and a slowing of new project announcements. Europe's progress has been uneven as policy uncertainty and shifting trade dynamics have limited growth in manufacturing investments. These dynamics are not playing out in the same way in the rest of the world, however, where growing demand and rising overseas investment drove a steady rise in clean technology manufacturing from 2018 to 2024, with investment levels holding relatively steady through the end of 2025.

Given these regional dynamics, our analysis shows that today's slowdown in manufacturing investment is primarily a market-balancing response to years of accelerated, subsidy-driven capacity expansion—particularly in China—combined with

softer-than-expected demand trajectories and rising trade barriers that limit the size of accessible overseas markets.

In today's landscape of rapidly evolving trade and other geopolitical dynamics, decision-makers are facing challenging decisions about where and how to invest in meeting their growing clean technology demand, whether through increased domestic manufacturing (which supports domestic economies and builds constituencies for the clean energy transition but may raise costs for consumers) or through imports (which may pose economic and security risks but come at much lower cost to consumers). Balancing these priorities will require access to up-to-date information not only on their own manufacturing capacity and demand outlook, but that of their international partners and competitors.

To fill this need, Rhodium Group and MIT's Center for Energy and Environmental Policy Research (CEEPR) have created the [Clean Investment Monitor](#) (CIM) to provide real-time, methodologically consistent tracking of public and private investments in the manufacture and deployment of a wide spectrum of clean energy and decarbonization technologies worldwide. Tracking these investments in real time can help cut through the noise of global trends to understand the regional dynamics at play and inform national strategies.

For the past three years, the Clean Investment Monitor (CIM) has tracked investment in the manufacture and deployment of clean energy technologies across the United States. Today marks the launch of global coverage by the Clean Investment Monitor, providing the same level of detail for clean energy technologies worldwide. In this inaugural report, we provide data tracking quarterly manufacturing and industry investment for each of the CIM technologies from 2018 through 2025, including country-level investment, manufacturing capacity additions, and project status (e.g., announced, under construction, completed, canceled). We couple this with tracking of investment in the deployment of clean technologies in electric power and transport. We will provide data tracking quarterly developments throughout the year. Global and country-level data are freely available at cleaninvestmentmonitor.org and via Rhodium Group's free [ClimateDeck](#) data platform.

In the first chapter of this report, we assess trends in global capital investments in clean technologies across electric power, transportation, and industry, and in the manufacturing base that supports these sectors. In the second chapter, we dig deeper into manufacturing and industrial investments and capacity. In the final chapter, we compare projected manufacturing capacity with projected demand to see how market and policy dynamics affecting demand are impacting the outlook for clean technology manufacturing in the years ahead.

Chapter 1: Global clean technology investment reaches record levels in 2025, despite some moderation in growth

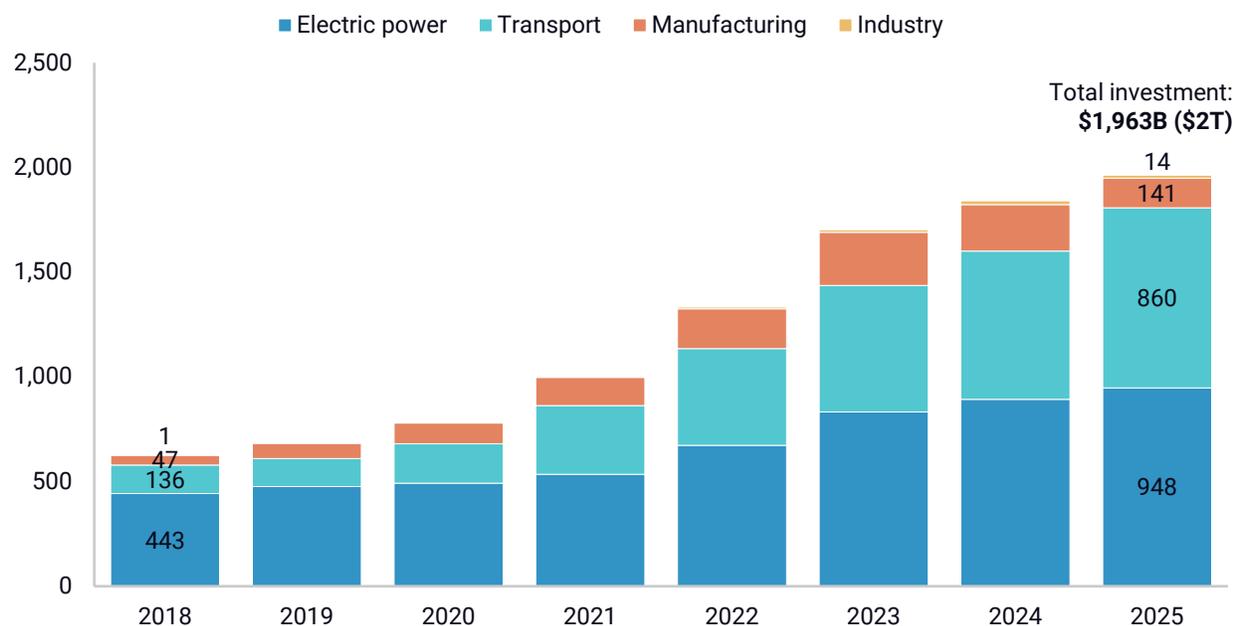
Over the past seven years, the world has seen a significant shift toward the mass commercialization of low-carbon or “clean” technologies. Over that time, sales of electric passenger vehicles jumped from only around 2.5% in 2018 to over a quarter of all passenger vehicles sold today. Seven years ago, solar represented about a third of new global electric generating capacity additions; today that share is closer to 80%. As clean technologies reach commercial scale, total investment in their manufacturing and deployment has risen significantly, making the clean technology economy an increasingly important contributor to global economic activity.

Total global clean investment across key sectors reached record levels at over \$1.96 trillion in 2025, tripling levels seen only seven years ago (Figure 1). After a few years of modest growth, total clean technology investment began to ramp up between 2021 and 2023, with a jump of 33% in 2022 and 28% in 2023. Investment has slowed somewhat in the past two years, however, rising 8% in 2024 and 7% in 2025, year-on-year.

FIGURE 1

Global capital investments in clean technology continue to rise, but growth has been showing signs of moderation since 2023

Actual capital investment in manufacture and deployment, billion 2024 USD



Source: Clean Investment Monitor, Rhodium Group, IRENA, Ember, EV Volumes

Note: Electric power includes all deployment investments in solar, wind, BESS, nuclear, and geothermal. Transport includes all deployment investments in electric passenger vehicles, medium-duty, and heavy-duty vehicles. Manufacturing includes facilities that produce: solar polysilicon, wafers, cells, and modules; wind blades and nacelles; battery cells and modules; electric LDVs, MDVs, and HDVs; and critical mineral mining, processing, and beneficiation for cobalt, graphite, lithium, and nickel. Industry includes the production of low-carbon iron and steel, cement, and sustainable aviation fuels (SAF).

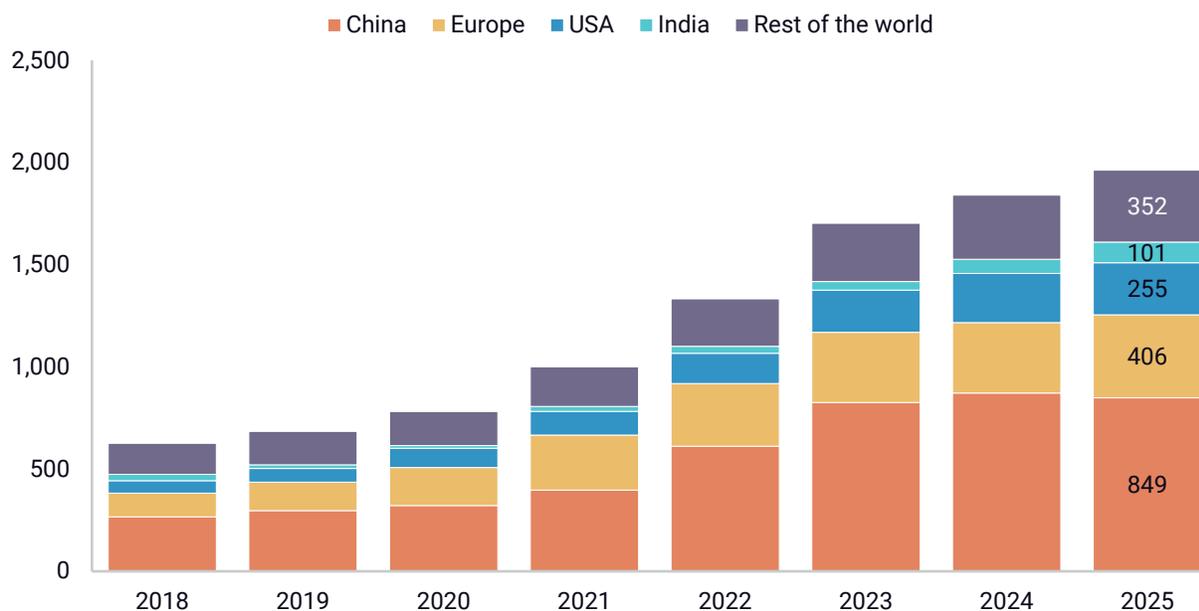
In the early years of that period, investment was concentrated primarily in the electric power sector, as countries expanded renewable and other clean generation capacity. Since 2021, rapid growth in EV purchases has driven a surge in transport-sector investment. In the past few years, investment has broadened to include a significant ramp-up in manufacturing of clean technologies, supporting growing demand for clean power and electric vehicles. Meanwhile, investment in industrial decarbonization technologies—including clean steel, cement, and sustainable aviation fuel—has increased meaningfully, albeit from a relatively small base.

China has been the predominant home for the majority of clean technology investment to date, maintaining between 40-50% of the global total every year since 2018 (Figure 2). In 2025, investment in China's domestic manufacture and deployment of clean electric power, transportation, and industry reached \$849 billion, a slight decrease of 3% from the 2024 peak. Investment in Europe and the US rose only modestly in 2025. The most rapid growth in clean technology capital investment in 2025 occurred in India—which saw a 46% increase to reach \$101 billion—and the rest of the world, which saw an increase of 12% to reach \$352 billion in 2025.

FIGURE 2

China continues to dominate global clean technology investment

Actual investment, billion 2024 USD



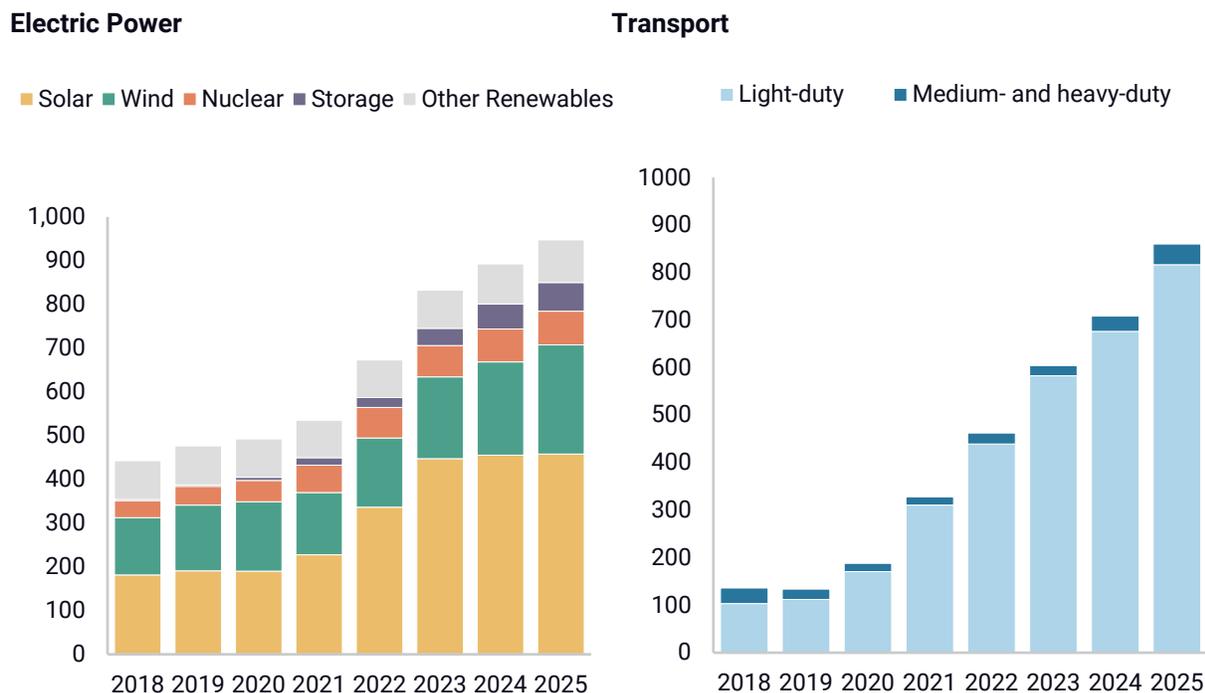
Source: Clean Investment Monitor, Rhodium Group, IRENA, Ember, EV Volumes

Investment in the construction and installation of new clean electricity generation facilities and clean vehicle purchases—what we call "deployment"—has continued to rise. Growth in the deployment of clean technologies is particularly visible in the electric power sector, where capital flowing into the construction and installation of new generation and storage capacity has continued to expand. According to our CIM database, global electric power deployment investment rose from approximately \$443 billion in 2018 to roughly \$948 billion in 2025, more than doubling over that period (Figure 4).

Solar photovoltaics has been the principal driver of this growth. Investment in solar deployment—including utility-scale and distributed systems—increased from about \$181 billion in 2018 to roughly \$458 billion in 2025, accounting for nearly half of total electric power investment by the end of the period. Wind energy remains the second-largest contributor, rising from roughly \$131 billion in 2018 to about \$250 billion in 2025. Growth in wind has been more uneven, reflecting permitting constraints, supply-chain pressures, and policy uncertainty, but it still represents roughly a quarter of global electric power deployment spending.

Other technologies are playing an increasingly important supporting role. Investment in the deployment of stationary battery storage expanded from just \$3 billion in 2018 to approximately \$66 billion in 2025, highlighting the growing importance of grid flexibility as solar and wind penetration rise. Nuclear deployment spending also increased, with conventional nuclear investment rising from about \$37 billion in 2018 to nearly \$74 billion in 2025, while advanced nuclear technologies—including sodium and lead-cooled fast reactors—grew gradually from a small base. By contrast, investment in hydropower and other renewable technologies remained comparatively flat over the period.

FIGURE 3
Solar and electric vehicles dominate deployment investment, with storage and heavy-duty vehicles beginning to scale
 Actual capex investment, billion 2024 USD



Source: Clean Investment Monitor, Rhodium Group, IRENA, Ember, EV Volumes

A similar acceleration is evident in the transport sector, where deployment investment reflects the rapid uptake of electric vehicles. According to our CIM database, global investment in electric vehicle purchases rose from approximately \$136 billion in 2018 to roughly \$860 billion in 2025, more than six-fold growth over seven years. Most of this

investment has been concentrated in light-duty vehicles, which increased from about \$103 billion in 2018 to over \$816 billion in 2025, accounting for nearly all EV-related deployment spending. This surge reflects a combination of declining battery costs, expanding model availability, and supportive policy incentives in major markets such as China, Europe, and the US.

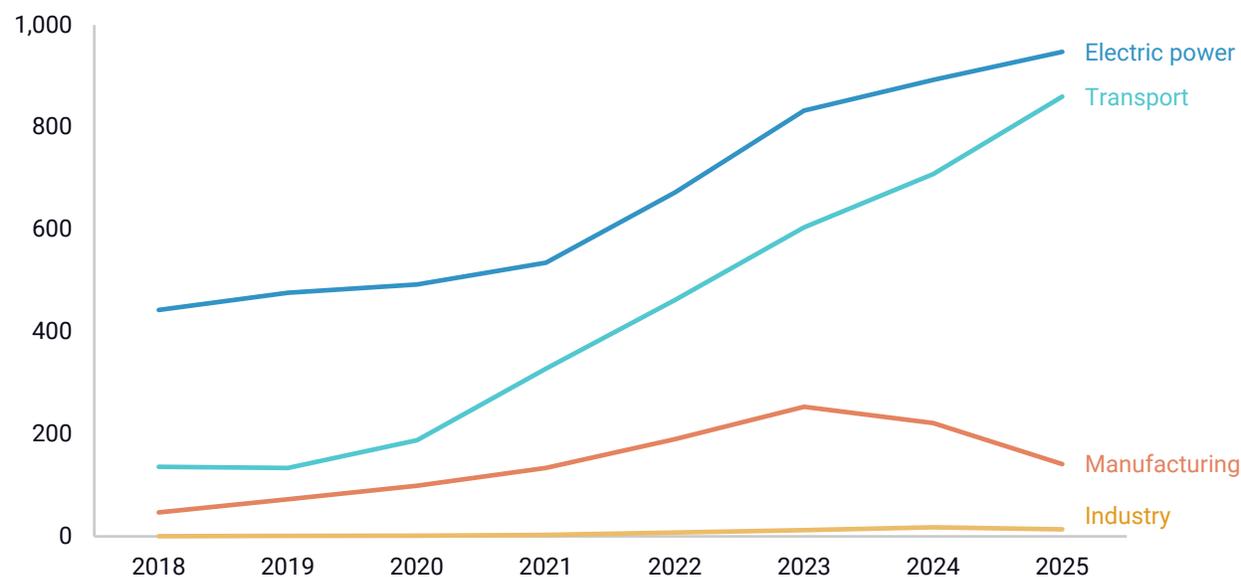
Investment in medium- and heavy-duty electric vehicles remains comparatively small but is beginning to scale. Spending in this segment rose from roughly \$33 billion in 2018 to about \$44 billion in 2025, with particularly strong growth in the most recent years as electric buses and commercial fleets gain traction. Although investment still represents a modest share of total EV deployment, its steady expansion signals the early stages of electrification beyond passenger vehicles.

While investment in clean energy and transport deployment continues to rise worldwide, not all segments are experiencing the same growth. Capital investment in new clean technology manufacturing facilities has declined since its peak in late 2023 (Figure 4). Investment in industrial decarbonization technologies—like clean iron and steel, cement, and sustainable aviation fuel—has seen modest investment growth from a relatively small base as these sectors remain in early stages of development and have limited market potential to date beyond the voluntary market.

FIGURE 4

Global investment in the deployment of clean power and electric transport sees continued growth, while clean technology manufacturing sees moderate decline

Actual capex investment, billion 2024 USD



Source: Clean Investment Monitor, Rhodium Group, IRENA, Ember, EV Volumes

This poses several important questions for the future of the global clean technology supply chain. In the next chapter, we dive into the regional and technology-specific dynamics we're seeing in clean technology manufacturing and industry.

Chapter 2: Investment trends in clean technology manufacturing and industry

Before clean power and transportation technologies can be deployed, they first need to be manufactured, including mining and processing the materials that go into those products. The Clean Investment Monitor tracks all capital investments in the manufacture of: electric vehicles (including passenger vehicles and trucks), solar (including polysilicon, wafers, cells and modules); wind (including nacelles and blades), batteries (cells, modules, anodes and cathodes) and the mining, processing, and beneficiation of critical minerals that are important for battery production (including cobalt, graphite, lithium and nickel). CIM also tracks the production of low-carbon industrial products, including clean iron and steel, cement, and sustainable aviation fuels (SAF).

To understand the real-time trends in these capital investments, CIM tracks individual projects at the facility level, collecting information on when and where factories are announced, built, and brought online, as well as their expected capacity and capital investment. Other available estimates that continue to show rising investment rely on official government estimates that can often be inflated, or where those are not available, data gaps are filled by assuming a rolling overage of trends from past years. In contrast, our data reflects facility-level project announcements and investment in construction and equipment installation of those facilities as reported by company announcements, regulatory filings, press releases, investor disclosures, and reporting by industry and trade publications.

Actual investments in manufacturing and industry

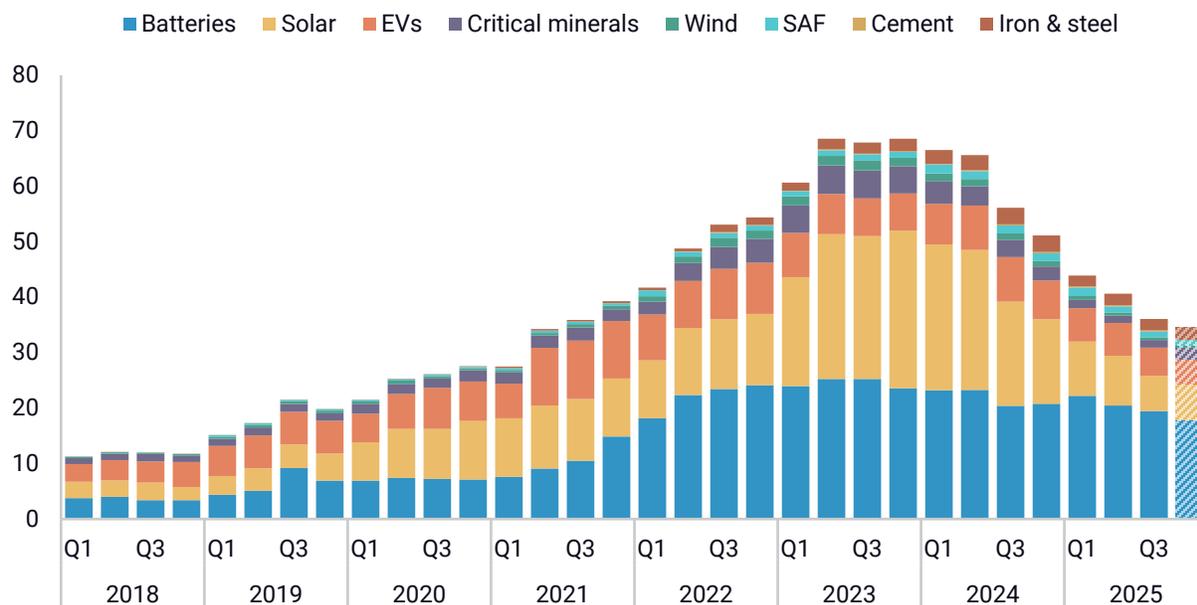
Going back to 2018, we find that global capital investments in manufacturing and industry rose steadily through mid-2023, with annual investment rising from \$48 billion in 2018 to a peak of \$266 billion in 2023 (Figure 5). Since then, we have seen a steady quarter-on-quarter decline in actual investments. In 2025, actual investment in manufacturing and industry totaled \$155 billion, a 35% decline from 2024 levels and an over 40% reduction from the peak in 2023.

Solar, EVs, and batteries led the early growth in manufacturing investment, driven by rising global demand and supportive industrial policy in China, the US, and Europe. Annual investment in solar manufacturing reached a peak of \$100 billion in 2023 before falling 69% to \$31 billion in 2025, largely the result of China's domestic rebalancing as overcapacity sent prices plunging. Capital investments in battery manufacturing saw a rapid rise in 2021 and the first half of 2022, with annual investment reaching a peak of \$98 billion in 2023. EV manufacturing saw its highest annual investment in 2021 at \$38 billion. Investments have leveled off and even started to decline over the past few quarters, with EVs and batteries falling 18% and 43% from their peaks, respectively. This is driven largely by a saturation over many years of investment in China and the US reversal of IRA-led investment and demand-side policy.

FIGURE 5

Declining global solar, EV, and battery investments drive an overall reduction in clean technology manufacturing and industry

Actual capital investment in manufacturing and industry by technology, billion 2024 USD (Q4 2025 estimated)



Source: Clean Investment Monitor, Rhodium Group

Note: Actual investment is actual capital investments made in that quarter (excluding announcements that have not translated into actual investments).

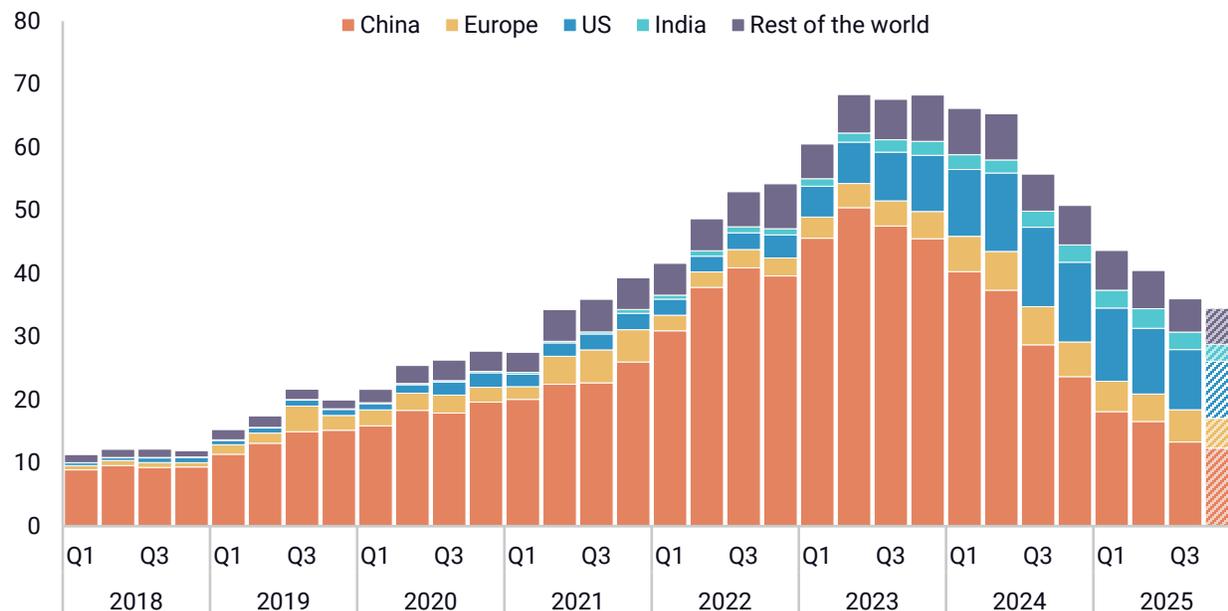
Novel industrial decarbonization technologies also saw investment growth starting in 2021. SAF and clean iron & steel both saw investment peak in 2024 at \$6 billion and \$11 billion, respectively, before seeing investments begin to fall. Low-carbon cement investments have continued to rise, albeit from a very small base, reaching a little under \$1 billion of annual investment in 2025.

The underlying regional dynamics also help explain the recent rebalancing in global clean technology manufacturing investments. The top three regional investors to date—China, the US, and Europe—all saw a reduction in investment in 2025, though China was responsible for the lion's share of the recent decline. China was the home of the vast majority of global investment in clean technology manufacturing, driving more than 70% of global growth through its peak in the first half of 2023 (Figure 6). Since then, China's actual investment in both solar and battery manufacturing has seen a steep decline, as China seeks to rein in overcapacity resulting from over-investment in earlier years and rampant competition among domestic producers. While China's battery manufacturing investment leveled off and remained relatively flat in 2025, new solar manufacturing investments continued to plummet last year. And although China is the global leader on industrial decarbonization investment, it still represents a small share of overall investment. As a result, China's clean manufacturing and industry investment in 2025 fell to \$60 billion, roughly 70% below its peak in 2023.

FIGURE 6

China manufacturing rebalancing and US market shifts drive global reduction in clean technology manufacturing investments

Actual capital investment in clean technology manufacturing, billion 2024 USD (Q4 2025 estimated)



Source: Clean Investment Monitor, Rhodium Group

Note: Actual investments include only actual investments made in that quarter. This does not include announced investments. Europe includes the EU-27, UK, Switzerland, Iceland, and Norway.

In the US, actual investment in clean technology manufacturing and industry fell for a fifth consecutive quarter, ending 2025 at \$41 billion of annual investment, [17% below 2024 levels](#). Q4 2025 also set a record for the highest quarterly level of canceled manufacturing investment in the US—with roughly \$8 billion in investment canceled—as policy changes contributed to a pullback in wind, battery, and EV manufacturing, as well as investment in key critical mineral inputs.

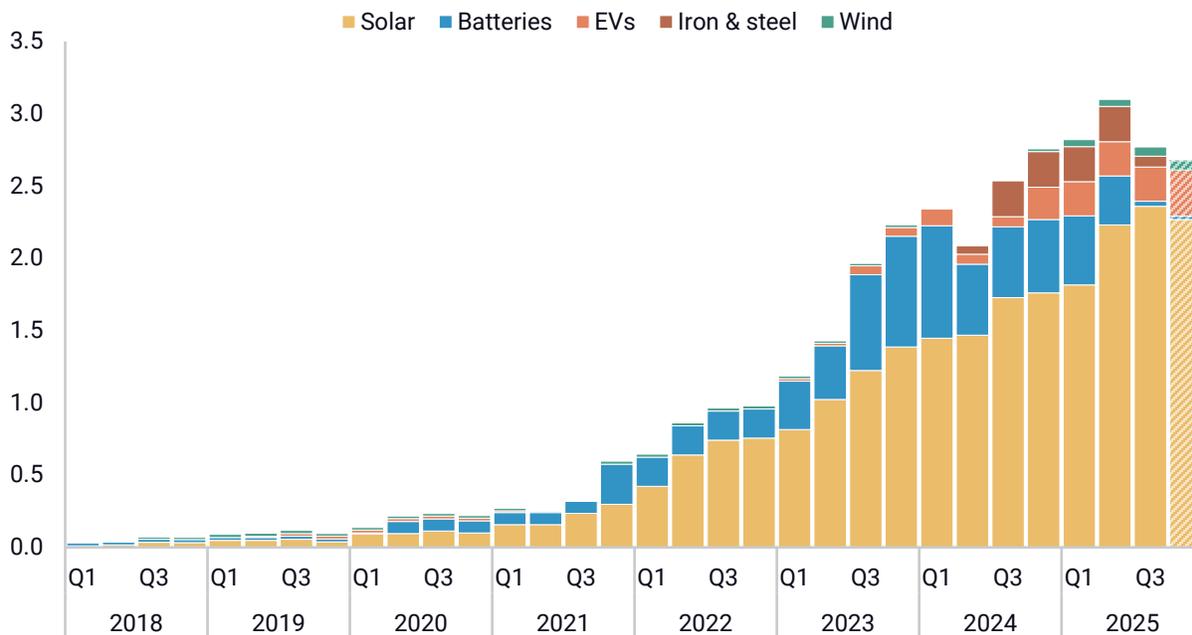
Europe has had a mixed record on clean technology manufacturing and industry over the past few years, with investments slowly ramping up through 2021, only to decline over 60% year-on-year in 2022. Investments picked up steam again in 2023 and 2024, achieving 50% growth year-on-year, but 2025 ended in an estimated decline of nearly 20% at \$19 billion of annual investment. Results of implementing the European Union's Green Deal have been mixed, leading to the introduction of the new Clean Industrial Deal plan in early 2025, aimed at leveraging economic competitiveness to achieve the region's decarbonization goals.

Despite declines in quarterly outlays in China, the US, and Europe, manufacturing and industry investment in the rest of the world continues to grow. India is an emerging force in clean technology manufacturing across the board. Manufacturing and industry investments—led by solar—have risen rapidly since Made in India 2.0 was launched in 2021, coupled with rapidly growing domestic energy needs and an easing of FDI rules (Figure 7). Investments in manufacturing and industry reached \$11.4 billion in 2025, a 17%

increase from 2024. The vast majority of investments are outstanding projects that have not reached fully operational status, but if all announced projects come to fruition, India will have the largest manufacturing capacity in batteries, solar, and wind outside China and the US by 2030.

FIGURE 7
“Made in India 2.0” clean industrial strategy drives rapid manufacturing and industry investment growth

Actual capital investments in clean technology manufacturing and industry in India, billion 2024 USD (Q4 2025 estimated)



Source: Clean Investment Monitor, Rhodium Group

Note: Actual investments include only investments made in that quarter. This does not include announced investments.

Beyond the US, China, Europe, and India, a growing group of countries is steadily building out clean technology manufacturing capacity, with investment increasingly concentrated in a handful of emerging hubs, as shown in Figure 8. Turkey and Indonesia account for the largest cumulative totals among this group, but their industrial profiles differ. Turkey has leveraged its established automotive manufacturing base and, in response to Europe’s accelerating push for electric vehicle adoption, expanded into electric vehicle assembly and battery production, positioning itself as a regional clean manufacturing hub bridging Europe and the Middle East. Indonesia, by contrast, is building an integrated battery supply chain anchored in its nickel reserves, pairing upstream mineral extraction and refining with downstream cathode, cell, and EV production through partnerships with Chinese and Korean firms.

South Korea and Canada also stand out, primarily in battery cell and EV manufacturing. South Korea’s investments reflect the global expansion of its leading battery firms and a coordinated industrial strategy to secure next-generation technologies and critical mineral supply chains. Canada’s clean manufacturing push is centered on large-scale EV

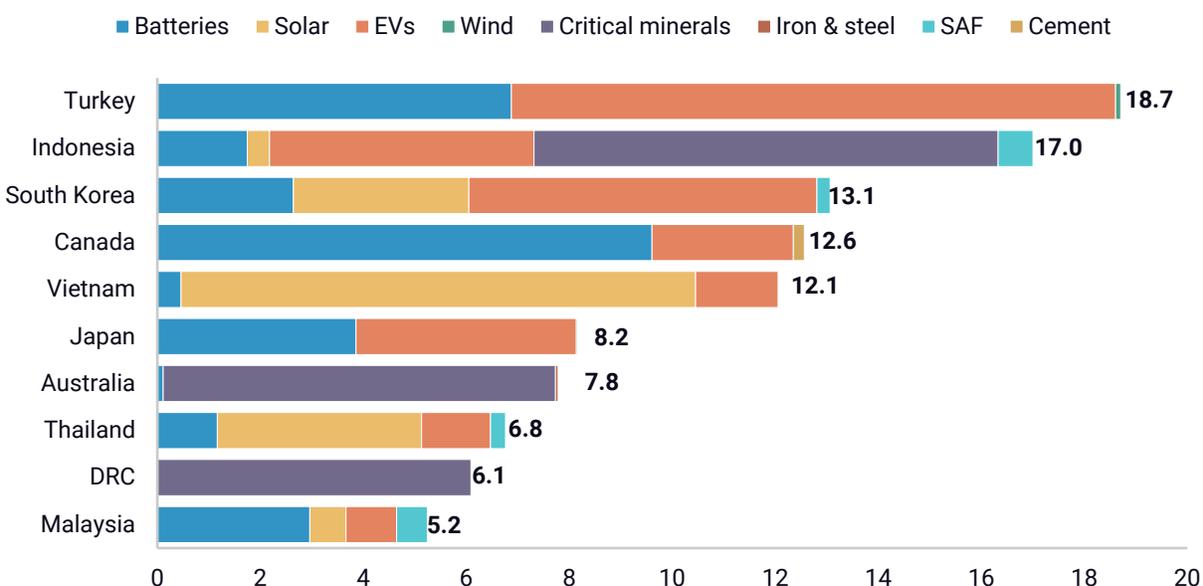
and battery plants in Ontario and Quebec, supported by federal and provincial incentives designed to anchor North American supply chains.

A middle tier that includes Vietnam, Japan, Australia, Thailand, and Malaysia shows more specialized investment patterns. Vietnam has made major investments in solar manufacturing, EV assembly and battery capacity, often in partnership with Chinese firms. Japan's activity is also concentrated in EV and battery manufacturing. Australia's role remains closely tied to critical minerals processing, particularly lithium, nickel, and cobalt, which are essential inputs for lithium-ion battery chemistries. Thailand is positioning itself as a Southeast Asian EV assembly hub, attracting Chinese automakers and battery manufacturers, while Malaysia combines battery cell manufacturing and EV assembly with broader ambitions to serve regional supply chains.

FIGURE 8

Expanding geographic footprint for clean technology manufacturing and industry investments

Cumulative actual capital investments in clean technology manufacturing and industry from 2018 to 2025, billion 2024 USD



Source: Clean Investment Monitor, Rhodium Group

Meanwhile, resource-rich economies such as the Democratic Republic of the Congo (DRC) remain heavily weighted toward upstream production of critical minerals, particularly cobalt, which are essential inputs to global battery manufacturing. Recent policy measures aimed at export controls and domestic processing reflect efforts to capture greater value within the country rather than exporting raw materials alone. The government in DRC is now trying to capture more value locally and not only export raw materials.

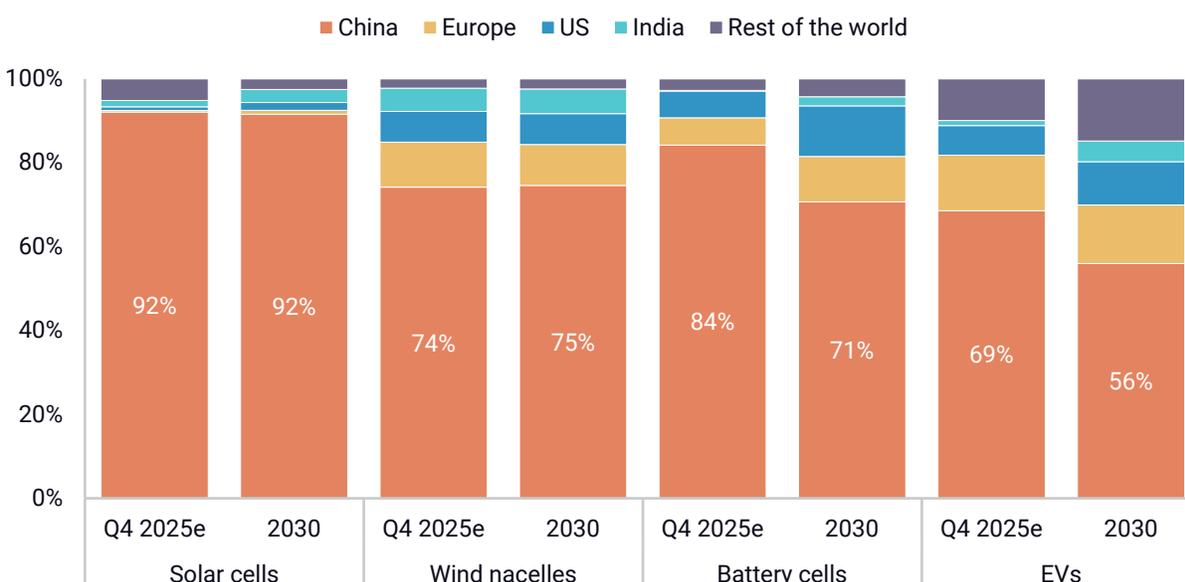
Together, these countries illustrate a widening geographic footprint for clean technology manufacturing. While still smaller than the dominant markets, they are forming a network of regional nodes across the battery, EV, solar, and critical minerals value chains, reinforcing the gradual diversification of global supply chains.

What has the increased diversification of investment across the world meant for the distribution of clean technology manufacturing capacity? We find that on the whole, China's slowing domestic investment does not fundamentally change the geographic distribution of global manufacturing for most clean technologies. At the end of 2025, China was home to 92% of global solar cell manufacturing capacity and 74% of wind nacelle manufacturing capacity (Figure 9). Even with a sharp decline in China's domestic investment in recent years, China is set to retain its share of global manufacturing capacity for solar and wind through 2030. We do see signs of a gradual shift in batteries and EVs, where China's share of global manufacturing capacity goes from 84% in 2025 to 71% in 2030 for batteries, and from 69% today to 56% in 2030 for EVs.

FIGURE 9

China's slowing domestic investments don't fundamentally change the geographic distribution of global manufacturing for solar and wind, but suggest gradual shift for batteries and EVs

Share of operating manufacturing capacity as of Q4 2025 and outlook to 2030



Source: Clean Investment Monitor, Rhodium Group

The Clean Investment Monitor tracks investment as a leading indicator of where new activity in manufacturing is getting traction, with the end goal of delivering sufficient manufacturing capacity to meet growing regional and global demand for these technologies as the energy transition unfolds. In the next chapter, we assess the relative balance of supply and demand for these technologies—at the global and regional level—to assess where near-term production capacity surplus or shortfall may play a role in shaping the investment and manufacturing landscape even further in the years ahead.

Chapter 3: Global and regional overcapacity contributes to a rebalancing of manufacturing investments

One of the inherent challenges facing a rapidly evolving sector like clean technology is the need to strike a balance of manufacturing capacity and demand that keeps prices competitive, while ensuring industry is able to make sufficient profits to sustain production over time. While there is relative clarity on what the end-state of the clean energy transition should look like, there is significantly less clarity about how that transition is likely to proceed in the intervening years.

In the very early stages of the clean energy transition, a rapid ramp-up in new clean investment helped build out the nascent clean technology manufacturing base that was ultimately critical to bringing clean technology prices down sufficiently to compete with incumbent fossil counterparts and achieve market growth. Today—after over a decade of significant global investment—the market for solar, wind, EVs, and batteries is significantly more mature, served by a large existing stock of manufacturing capacity. At this stage of the clean technology transition, near-term overcapacity has emerged as an increasingly important consideration.

One factor contributing to overcapacity is uncertain or declining demand in some regions. Investors evaluating new projects look for clear signals that sufficient market demand will materialize to warrant moving projects forward and increasing capacity. When the demand outlook weakens or becomes uncertain (either at home through changes in domestic policy or consumer preferences, or abroad through similar policy shifts or trade restrictions), developers may delay, scale back, or cancel planned investments.

For several years now, overcapacity has plagued China's domestic industries, especially in the EV supply chain. In 2024, for example, China's EV battery manufacturing capacity was double domestic demand and 20% greater than global demand, triggering a collapse in new domestic investment compared to the policy-fueled investment boom in 2021 and 2022. Domestic overcapacity and the resulting price wars pushed many firms to look abroad for profit amid slowing demand and tight margins. In 2024, investment by Chinese companies across the EV supply chain was greater overseas than domestically for the first time, a historic reorientation of capital. With the recent increase in protectionism and tariffs on Chinese imports, Chinese firms are facing increasing uncertainty that global markets will remain open to their exports. This rise in geoeconomic fragmentation, paired with domestic overcapacity, has contributed to an increasing shift in new Chinese investment directed [overseas](#).

The impact of shifts in market demand on manufacturing investment has been particularly evident in the US, where project cancellations have followed recent changes in domestic policy and the dimming market outlook for EVs. In 2025, 19 US EV supply chain manufacturing projects representing \$22 billion in planned investment were canceled amid announced changes to federal vehicle standards and consumer EV tax credits—exceeding the \$21 billion in new announced manufacturing investment that year. In Europe, similar challenges to demand-side policies for EVs may put its nascent EV and battery manufacturing industry at similar risk.

To get a sense of how these dynamics play out in the recent rebalancing in manufacturing investment across all regions, it is helpful to assess the relative demand for clean technologies with manufacturing capacity in 2025 to gauge whether overcapacity may have contributed to a rebalancing of investment. And by looking ahead to 2030, we can get a sense of whether these forces may continue to play a role in future manufacturing investments in the coming years.

In Figure 10, we compare the stock of manufacturing capacity based on investments in the pipeline today—including capacity that is fully operational, operational but not yet fully online, under construction, and announced—with global demand in 2025 and projected demand in 2030 under current policy. Given the uncertainty in how policies and technology and fuel costs are likely to evolve in the next five years, our demand projections span a range of potential outcomes from the 2025 [Rhodium Climate Outlook](#) and from the 2025 [Taking Stock](#) modeling for the US. We find that across all four commercial clean technologies (solar, wind, batteries, and EVs), global manufacturing capacity comfortably exceeded demand in 2025. And if all manufacturing investment announced to date moves forward, we expect this dynamic to intensify by 2030, absent an acceleration of demand-side policies.

Looking across all global manufacturing announcements in the pipeline as of Q4 2025, we find that wind and EVs have the most mature pipelines, with the majority of investments in operational or nearly operational stages (Figure 10). If all announced projects come online and projects in the construction phase materialize as planned, manufacturing capacity for batteries and solar is expected to increase significantly. Across our four manufacturing sectors, solar has the largest share of announced investments that are yet to commence construction.

As a result, projected overcapacity is most stark for solar and batteries—driven in large part by China, where planned manufacturing capacity for 2030 far exceeds projected demand. For batteries, manufacturing capacity anticipated to come online by 2030 would almost triple current operation cell capacity and more than double modules capacity. If built, this would far exceed projected demand, despite substantial growth. Solar also has a robust project pipeline of planned manufacturing projects, even though the world already has enough production capacity to meet 2030 demand.

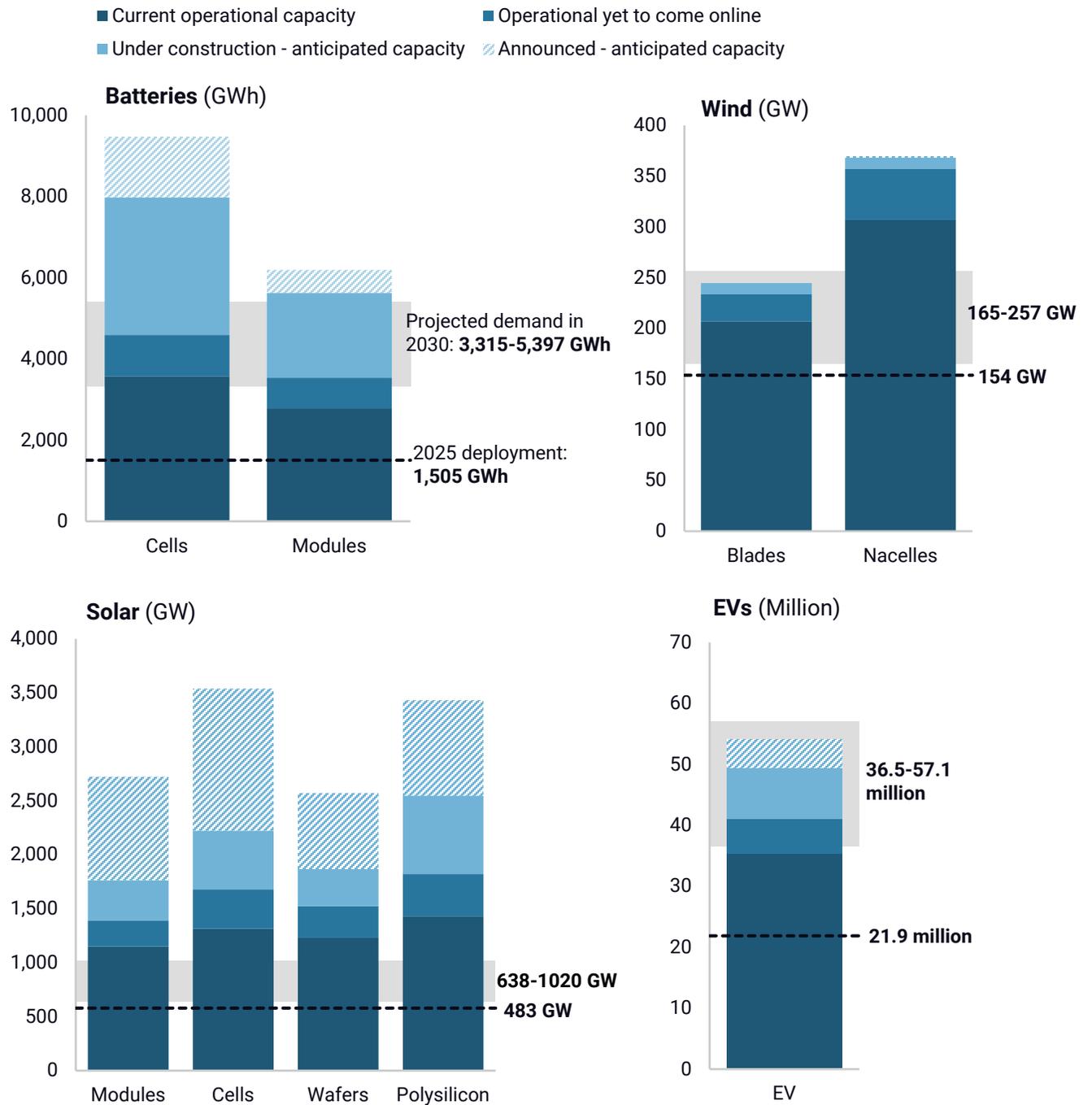
With wind power demand highly uncertain in the coming years, the picture for matching manufacturing capacity to demand is similarly challenging. We see a projected overcapacity in nacelles—even if no new investments move past the construction phase—but for blades, there is a more mixed picture. Currently operational blade manufacturing capacity would be sufficient to meet demand if it falls in the middle of our demand projections for 2030. If all planned projects come online, blade production capacity would approach but not quite reach the high end of projected demand in 2030.

The capacity-demand balance for EVs is also mixed. Both manufacturing capacity and sales of EVs—including for passenger vehicles, medium- and heavy-duty trucks—are expected to grow substantially by 2030. EV manufacturing capacity is expected to meet the low end of our demand projections if only today's operational facilities come fully online by 2030. If all announced and under-construction projects come online, capacity is expected to approach, but not meet, the most optimistic demand projections for 2030.

FIGURE 10

Solar and batteries face the largest projected overcapacity as pipeline builds out

Projected annual manufacturing capacity and demand in 2030 by project status as of Q4 2025

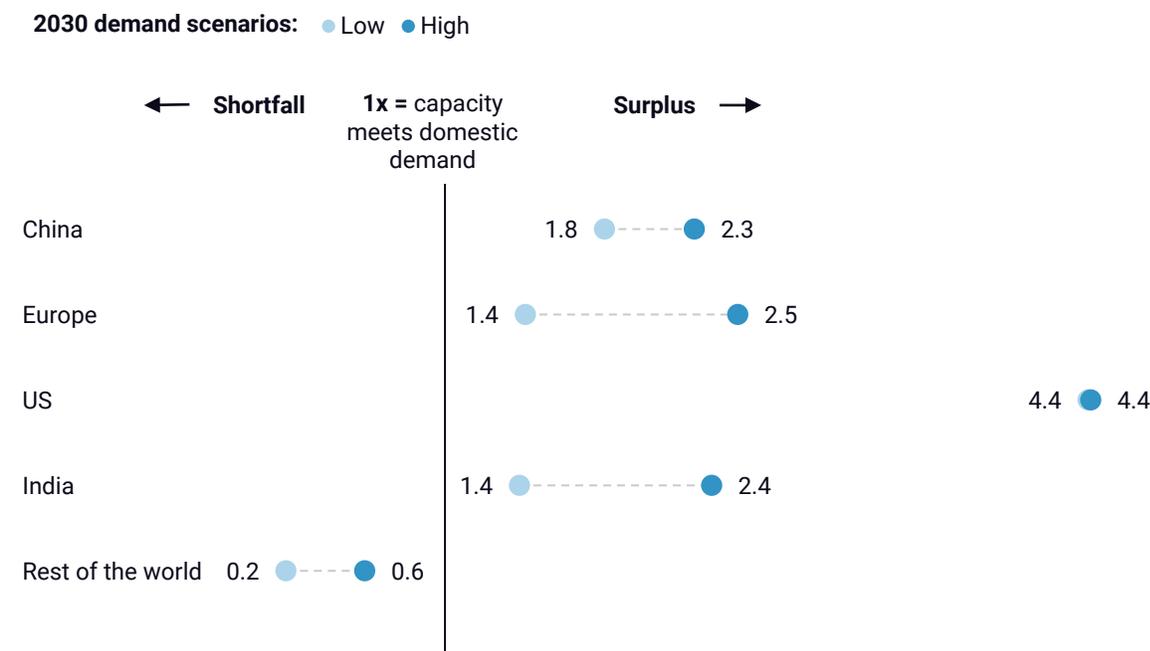


Source: Clean Investment Monitor, Rhodium Climate Outlook 2025, Taking Stock 2025

While the overall global market outlook helps understand the balance of manufacturing capacity and demand broadly, for most regions manufacturing investments are largely targeted toward domestic markets first. Digging into the regional balance of capacity and demand puts a finer point on where overcapacity (or undercapacity) in clean technology manufacturing is concentrated. Those with significant overcapacity are forced to find export markets to avoid price wars at home, while those with significant shortfalls must rely either on imports or find ways to scale up domestic production over time.

With their sheer size, wind turbines are the least traded clean technology, which means they tend to be produced close to where they will be installed, keeping overcapacity relatively low as excess can spill over less easily into export markets. In 2030, we find overcapacity in wind manufacturing compared to domestic demand across China, the US, Europe, and India (Figure 11). The US has the biggest discrepancy with manufacturing capacity at 4x demand in 2030. China, Europe, and India have similar levels of projected overcapacity at around 2x domestic demand. Outside of those regions, there is insufficient manufacturing capacity currently in the pipeline to meet projected demand.

FIGURE 11
Wind turbine manufacturing overcapacity projected across most major economies
 Domestic manufacturing capacity relative to projected domestic demand in 2030



Source: Clean Investment Monitor, Rhodium Climate Outlook 2025, Taking Stock 2025, Rhodium Group

Solar and its components, on the other hand, are highly tradable. As a result, domestic demand does not act as the same potential brake on manufacturing investments that we see in wind. We’ve seen that play out over a decade of significant investment by China, which has fed a growing domestic market as well as significant exports. We expect that to continue in the coming year—even as solar installations are expected to slow from 2025’s record levels—with projected Chinese solar manufacturing capacity reaching about 5-8x domestic demand in 2030 (Figure 12). We also see modest domestic overcapacity on the horizon for the US and India (at around 2x domestic demand, absent

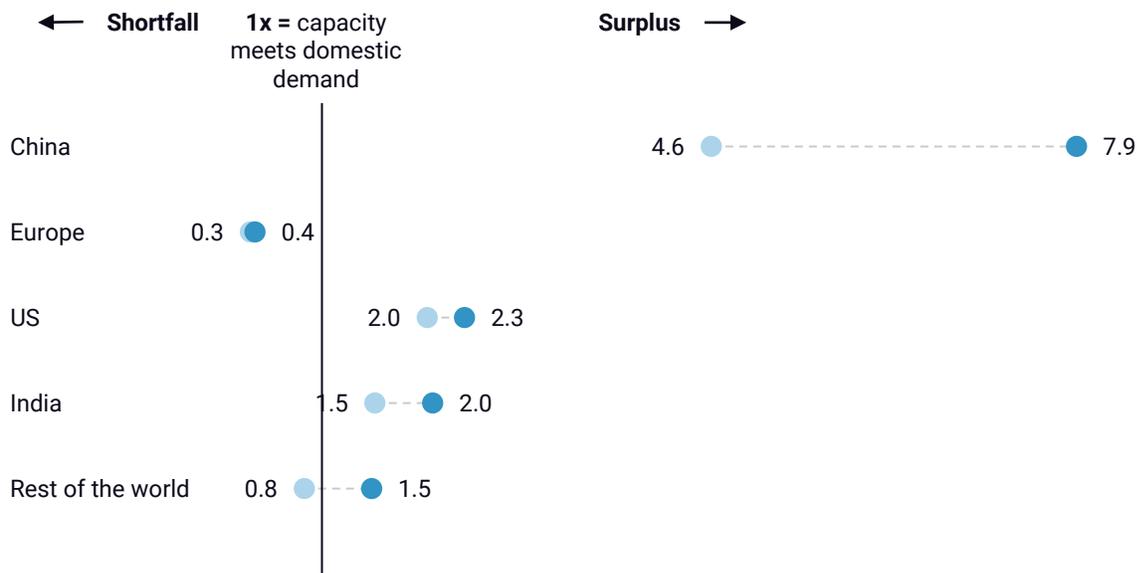
a shift in domestic policy driving additional demand). Europe’s solar manufacturing capacity falls short of meeting regional demand, requiring continued imports. And in the rest of the world, we see overall manufacturing capacity on par with projected demand.

FIGURE 12

China’s solar cell manufacturing overcapacity dwarfs other regions

Domestic manufacturing capacity relative to projected domestic demand in 2030

2030 demand scenarios: ● Low ● High



Source: Clean Investment Monitor, Rhodium Climate Outlook 2025, Taking Stock 2025, Rhodium Group

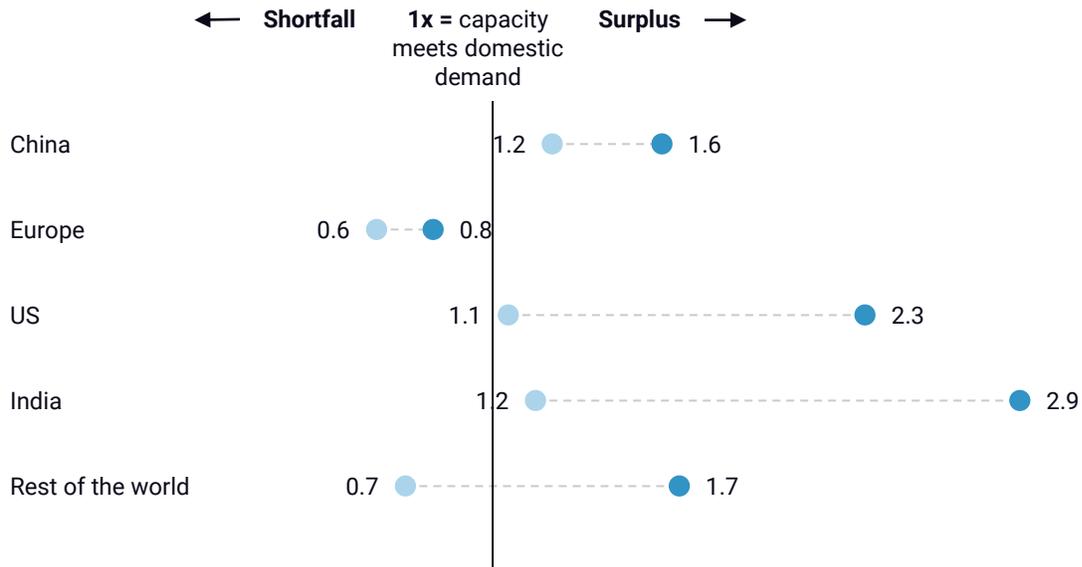
We see a somewhat similar story when it comes to EVs, with China, the US, and India facing projected domestic overcapacity in 2030 (Figure 13). China’s EV overcapacity has long been an issue, resulting in the removal of subsidies and significant restructuring in an effort to rein in price wars. As a result, new domestic EV manufacturing investments in China have slowed to a trickle, leaving projected overcapacity at about 1.2-1.6x demand in 2030. We see a much wider range in both the US and India as policy and market uncertainty leave expected manufacturing capacity at about 1-3x demand in 2030. In contrast, although European EV manufacturing capacity far exceeded demand in 2025, due to expected demand growth by 2030, the region is expected to come just short of projected demand.

FIGURE 13

Uncertainty in EV demand raises potential for overcapacity in most regions

Domestic manufacturing capacity relative to projected domestic demand in 2030

2030 demand scenarios: ● Low ● High



Source: Clean Investment Monitor, Rhodium Climate Outlook 2025, Taking Stock 2025, Rhodium Group

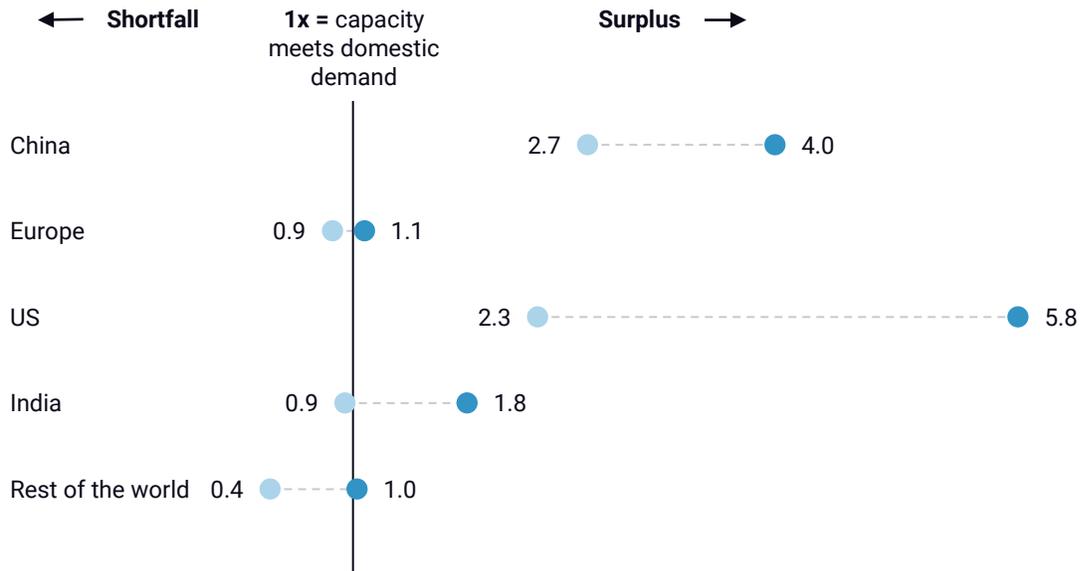
Finally, looking at the balance of 2030 demand and manufacturing capacity for batteries across both mobile and stationary applications, we find that overcapacity is primarily an issue in China (at 2.7-4x demand) and the US (2.3-5.8x demand) (Figure 14). In the US, policy shifts have dimmed the demand outlook for EVs and renewables balanced by storage, threatening to strand new battery manufacturing investments. In China, the Ministry of Industry and Information Technology has begun to take action to mitigate the impact of severe overcapacity in the battery industry, including enhancing supervision to curb low-quality capacity expansion. It is not clear what impact, if any, this has had on the industry, however, as announced investments in battery manufacturing ticked up in 2025—driven by novel battery chemistries and a shift toward energy storage applications (see section below). Many of the announced investments lack concrete construction plans and face uncertainty around potential cancellation given persistent overcapacity challenges.

FIGURE 14

Battery cell manufacturing overcapacity most acute in China and US

Domestic manufacturing capacity relative to projected domestic demand in 2030

2030 demand scenarios: ● Low ● High



Source: Clean Investment Monitor, Rhodium Climate Outlook 2025, Taking Stock 2025, Rhodium Group
 Note: Battery demand includes BESS and EVs (LDV, MDV, and HDV).

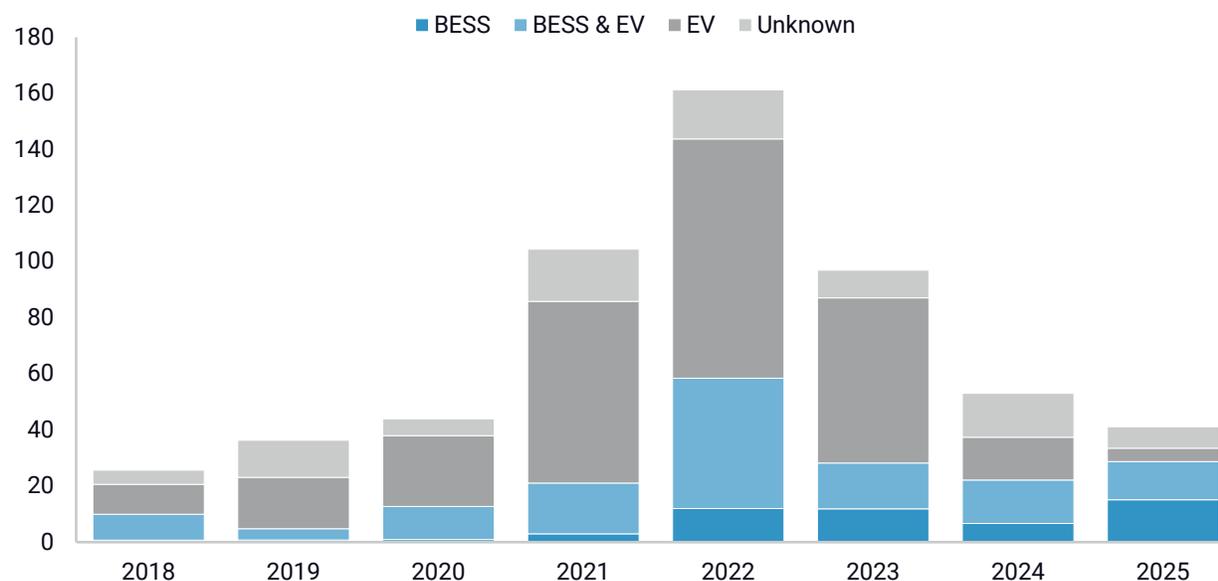
Investment in battery manufacturing for stationary energy storage ticks up in 2025

One industry that saw a noticeable increase in manufacturing investment is battery energy storage systems (BESS), used to balance intermittent renewable sources on the grid. Although overall announcements of new battery cell manufacturing investments in 2025 were only a quarter of the 2022 peak, BESS-specific investments in 2025 reached a new record at over \$15 billion globally. When combined with dual-purpose facilities that produce batteries both for BESS and EV applications, the share of investment planned for facilities that produce BESS rose to nearly 70% (vs. only 11% for EVs, with 19% of investments lacking sufficient details on their ultimate end-use).

FIGURE 15

Although announced battery cell manufacturing investments declined slightly in 2025, investments in batteries for stationary energy storage rose

Announced global battery manufacturing investments by end-use, billion 2024 USD



Source: Clean Investment Monitor, Rhodium Group

Of the approximately \$41 billion of new battery cell manufacturing investments announced in 2025, three-quarters (\$31.5 billion) came from China. Overall, new battery cell manufacturing announcements in China ticked up in 2025 following a dip in 2024, rising 33% year-on-year, though levels reached less than half of peak levels seen in 2022. Investment in EV manufacturing declined 50% between 2024 and 2025 as China's automotive market experienced a round of consolidation to crack down on involution competition, leading to a shift in investment toward batteries used for stationary energy storage, which have seen increased government subsidies, local government support, and other favorable policies over the past few years. In 2025, 64% of announced battery cell manufacturing investments in China were earmarked for BESS (including dual-purpose facilities), compared to about 15% in 2021.

We also see this trend playing out in the US, where several companies have announced plans to shift at least some battery production lines from EVs to BESS. Nine battery manufacturing projects have adjusted plants in this direction, collectively accounting for nearly one-fourth of current (2025) operational capacity. This shift reflects both softer near-term expectations for EV demand and rising interest in grid-scale storage, including from data center and renewable integration needs. While BESS-exclusive manufacturing is expected to represent a growing share of US battery manufacturing capacity in the years to come, the majority of projected battery demand through 2030 remains tied to EV deployment. Of all new announced US battery manufacturing investment during 2025, 97% was geared toward BESS applications, which rose from \$218 million in 2023 to over \$3.8 billion in 2025.

In India, the third largest home of new announced battery manufacturing investments, all of the \$3 billion announced in 2025 is planned for BESS applications, which can serve an important balancing role as the country installs record amounts of renewable power generation to meet rapidly growing electricity demand.

Across geographies, the growing pipeline of battery storage manufacturing investment speaks to the benefit of being able to shift investments as the market evolves. With batteries' two distinct markets—for vehicles and stationary energy storage—the battery industry has more flexibility to adapt to changing policy and market conditions. Whether this pivot offsets weaker EV-linked investment in the years ahead will depend on the durability of storage demand growth relative to transportation electrification needs.

Conclusion

After a decade of rapidly rising investment in clean technology, the global picture has become significantly more complicated. While overall clean technology investment reached record levels in 2025, investment growth has moderated somewhat in recent years. Investment in clean technology manufacturing has seen a consistent quarter-on-quarter decline since its peak in Q4 2023, as global and regional markets balance manufacturing capacity with shifting demand.

The challenges for decision-makers are becoming increasingly complex as well. How do economies navigate this current phase of clean technology manufacturing consolidation? How do policymakers balance manufacturing costs with domestic welfare concerns? And how do they incorporate national and economic security concerns into domestic industrial policies and trade measures to achieve those ends? Finally, how do policymakers design the next generation of policies to boost demand for clean technologies to achieve the clean energy transition to ensure large, stable and growing markets for these industries?

Access to objective, real-time global data will be critical to inform decision-makers as they attempt to answer these questions and navigate this new era of clean technology expansion across the world. The Clean Investment Monitor will continue to track these developments and provide all stakeholders with the objective data necessary to inform good policymaking in the years ahead. Additional Clean Investment Monitor data and visualizations, including country-level data, government subsidy estimates, and more detailed sector breakdowns are available on Rhodium Group's free [ClimateDeck](#) platform.

Methodology

The Clean Investment Monitor (CIM) created by Rhodium Group and MIT's Center for Energy and Environmental Policy Research, tracks investments in the manufacture and deployment of clean energy and decarbonization technologies across all countries around the world. Leveraging detailed, facility- and project-level data and in-depth analysis (including data from Bruegel's [European Clean Tech Tracker](#)), CIM provides insights into investment trends, the pace and scale of new clean technology manufacturing capacity and deployment, and the role of policy and market dynamics in shaping the evolving global clean energy landscape. All analyses are publicly available on cleaninvestmentmonitor.org.

To establish a historical baseline against which to assess recent developments, CIM's global database includes all covered investments since 2018 and reports periodic investment totals for the manufacture and deployment of covered technologies, enabling consistent analysis of trends within countries and across regions. In total, the database captures investment and capacity data for over 6,340 projects at over 2,440 manufacturing and industrial facilities, worldwide.

Investment amounts are temporally allocated and presented in real terms to ensure comparability over time, and the database includes facility-level project tracking alongside aggregated investment totals by country and region (and sub-national geographies where available). The database is updated periodically as new information becomes available; the next release extends coverage through Q2 2026 in summer 2026.

In addition to tracking project-level capital investment, capacity additions, and project status for the manufacture and deployment of covered technologies, we complement these data with demand projections for clean electricity and clean transportation technologies to help assess the pace of the global clean-technology buildout. Demand projections are developed using Rhodium's Global Energy Model ([RHG-GEM](#)) and Rhodium's National Energy Systems Model ([RHG-NEMS](#)) for the US. Methods, sectoral coverage, and key assumptions are documented in our [Rhodium Climate Outlook 2025](#) methodology and [Taking Stock 2025](#) Technical Appendix.

ClimateDeck Data Platform

ClimateDeck, Rhodium Group's free interactive data platform, provides global and US 50-state greenhouse gas emissions inventory data and projections, energy market outlooks, clean investment tracking, and analysis of energy and climate policy developments. ClimateDeck equips users with comprehensive datasets, unique and responsive insights, and a robust set of tools for tracking pathways to climate targets and understanding the emissions and economic implications of major developments at the international, national, and state levels. All of this data is available to explore and download for free from the platform at climatedeck.rhg.com.

About Rhodium Group

Rhodium Group is an independent research provider with deep expertise in policy and economic analysis. We help decision-makers in both the public and private sectors navigate global challenges through objective, original, and data-driven research and insights. Our key areas of expertise are China's economy and policy dynamics, and global climate change and energy systems. More information is available at www.rhg.com.

Acknowledgments

This nonpartisan, independent research was conducted with support from the New Energy Industrial Strategy Center and the Hewlett Foundation. The authors would like to thank Rhodium Group colleagues Moni Adeyemo, Thilo Hanemann, Hannah Hess, and Charlotte McClintock for their support and Jaspreet Sohal and Maggie Young for their review and contributions.

Disclosures

This material was produced by Rhodium Group LLC for use by the recipient only. No part of the content may be copied, photocopied, or duplicated in any form by any means or redistributed without the prior written consent of Rhodium Group. Our publications are intended to provide clients with general background research on important global developments and a framework for making informed decisions. Our research is based on current public information that we consider reliable, but we do not represent it as accurate or complete. The information in this publication is not intended as investment advice and it should not be relied on as such.

© 2026 Rhodium Group LLC, 5 Columbus Circle, New York, NY 10019. All rights reserved.

New York | California | Washington, DC | Paris

Website: www.rhg.com

