

# Worlds Apart: Contrasting US-China Approaches to Scaling Clean Technology Manufacturing

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Global clean technology manufacturing investment has moderated after a decade of extraordinary growth. China and the US were both the primary drivers of that rise and the subsequent pullback—though the nature of each country's decline differs significantly. China's clean manufacturing boom was built on sustained, multi-pronged government support paired with demand-side policies that created deep domestic markets. In recent years, Beijing has pulled back to address excess capacity and intensifying price wars, and investment has fallen nearly 70% from its 2023 peak. Even so, ongoing policy support, strong domestic demand, and a renewed focus on supply chain security leave China well-positioned to maintain its dominance across clean tech supply chains. The US followed a different trajectory. Investment grew modestly from 2018 to 2022 when the Inflation Reduction Act (IRA) sparked a surge in new clean tech investment, but with the reversal of demand-side policies and the paring back of many IRA support measures, investment has reversed course, falling 17% in 2025 from its 2024 peak. Unlike China's pullback, which came after years of aggressive investment that had already secured supply chain dominance, the US slowdown leaves significant planned investments canceled or in limbo, widening the gap with China. In this note, we leverage [Clean Investment Monitor](#) data tracking quarterly clean technology manufacturing investments to dive deeper into what's driving investment trends in these two major economies.

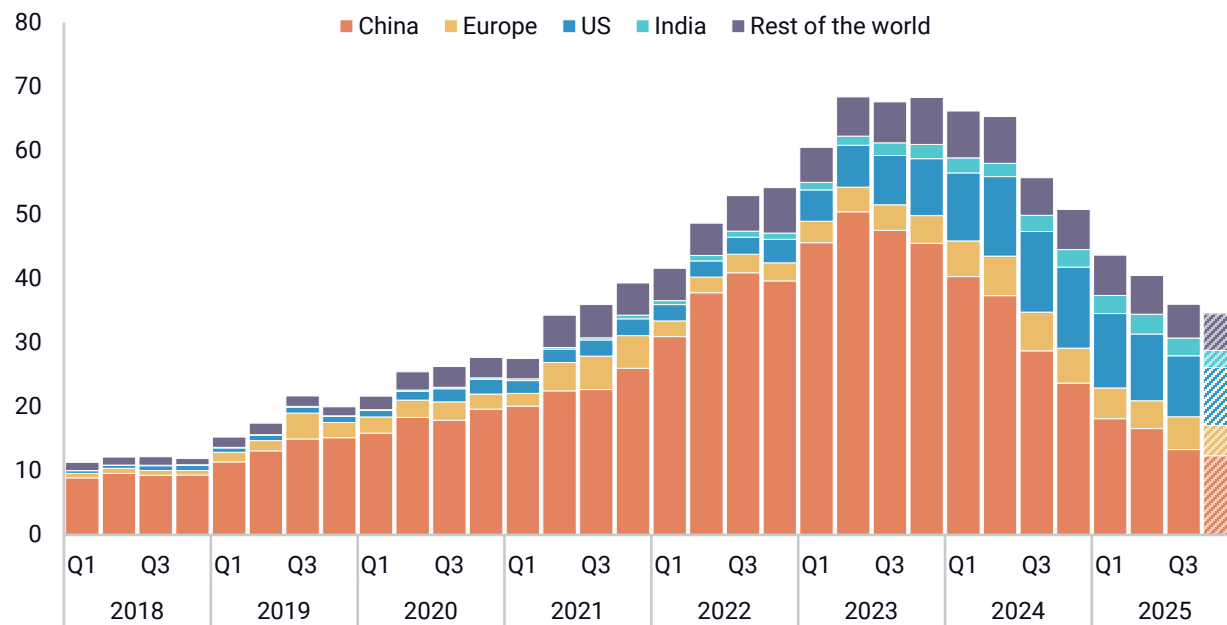
## Clean manufacturing investment is falling in China and the US

Over the past decade, global investment in decarbonization has grown substantially, driving the manufacturing and adoption of clean electricity, transportation, and low-carbon industrial technologies. Clean energy manufacturing has been recast as a strategic priority—no longer just climate policy, but an economic and national security concern—prompting major economies to mobilize substantial public resources to spur both supply and demand. This drove global investment in clean technology manufacturing (including electric vehicles, solar, wind, batteries, and critical minerals important for battery manufacturing) and low-carbon industrial products (including clean iron and steel, cement, and sustainable aviation fuels) to a record \$265 billion in 2023, nearly five times the level in 2018 (Figure 1). However, momentum has slowed and even reversed since, with annual investment falling to \$155 billion in 2025, a 42% decline from its 2023 peak.

The three leading regions for clean manufacturing and industry investment—China, the US, and Europe—all saw investment fall in 2025, led primarily by China and the US. For the US, it was the first recorded year-over-year decline, reflecting a shifting market and policy environment. China, which accounted for the bulk of the global contraction, extended a slide that began in 2024. Europe’s investment has remained more stable, with only a slight year-on-year decline from a peak in 2024. This note takes a closer look at the drivers of clean technology investment in the US and China, building on [joint analysis](#) with Bruegel that also covers Europe.

FIGURE 1  
**China manufacturing rebalancing and waning US markets drive global reduction in clean technology manufacturing and industry investments since 2023**

Actual capital investment in clean manufacturing and industry, billion 2024 USD



Source: Rhodium Group, Clean Investment Monitor

Driven by aggressive, long-term, state-backed industrial policy, China has dominated global clean tech investment and manufacturing capacity. Government support has been multifaceted—combining demand and supply-side tools and building integrated domestic supply chains across the value chain. In recent years, however, Chinese clean tech original equipment manufacturers (OEMs) have faced mounting pressure from domestic overcapacity and price wars, alongside rising wages and foreign tariffs, pushing them to redirect more investments abroad. These forces are now materializing in the form of a massive reduction in domestic investment. Beijing’s anti-involution campaign has fizzled out, and Beijing is now refining and institutionalizing its industrial policy approach as it recenters supply chain security in established growth-driving industries.

The United States kick-started a wave of investment with the passage of the Infrastructure Investment and Jobs Act (IIJA) in 2021 and the Inflation Reduction Act (IRA) in 2022, industrial policy aimed at scaling clean energy technologies through a mix of manufacturing and demand-side subsidies. Those policies generated a massive increase in manufacturing investments, which peaked in 2024 and then declined steadily, as headwinds mounted following the dismantling of major pieces of the IRA, rollback of key demand-side policies, and increased policy uncertainty around trade and tax credit eligibility under the Trump administration.

Whereas China’s pullback follows years of overinvestment that have already secured its dominance across major clean tech manufacturing supply chains, the slowdown in the US is occurring before significant planned investments have been realized—investments that could have helped narrow the gap between the two nations.

## China

The arc of clean technology supply chain investments in China over the past few decades closely follows an industry policy rulebook the country has used to foster innovation and dominate high-tech sectors—including subsidies, state-led investment, and a focus on whole-of-supply chain support—facilitated by central government guidance and local implementation. Investment in China’s domestic clean tech manufacturing rose steadily from \$37 billion in 2018 to a peak of \$189 billion in 2023, a more than five-fold increase, driven by a concerted state-led focus on building out the solar and EV supply chains. In recent years, a contraction in new investments for these same industries has driven a precipitous decline in total manufacturing and industry investments in 2024 and 2025 as the country seeks to rebalance its approach in the face of overcapacity (Figure 2).

Over the past decade, China’s solar and EV supply chain has benefited from generous producer subsidies, plus a dense web of policy tools that drive demand creation and manufacturing scale-up. China has gained global dominance in these industries by developing vertical depth, spanning from overseas and domestic resource extraction and processing, through midstream processing, to downstream manufacturing, which ensures demand at each stage of the supply chain.

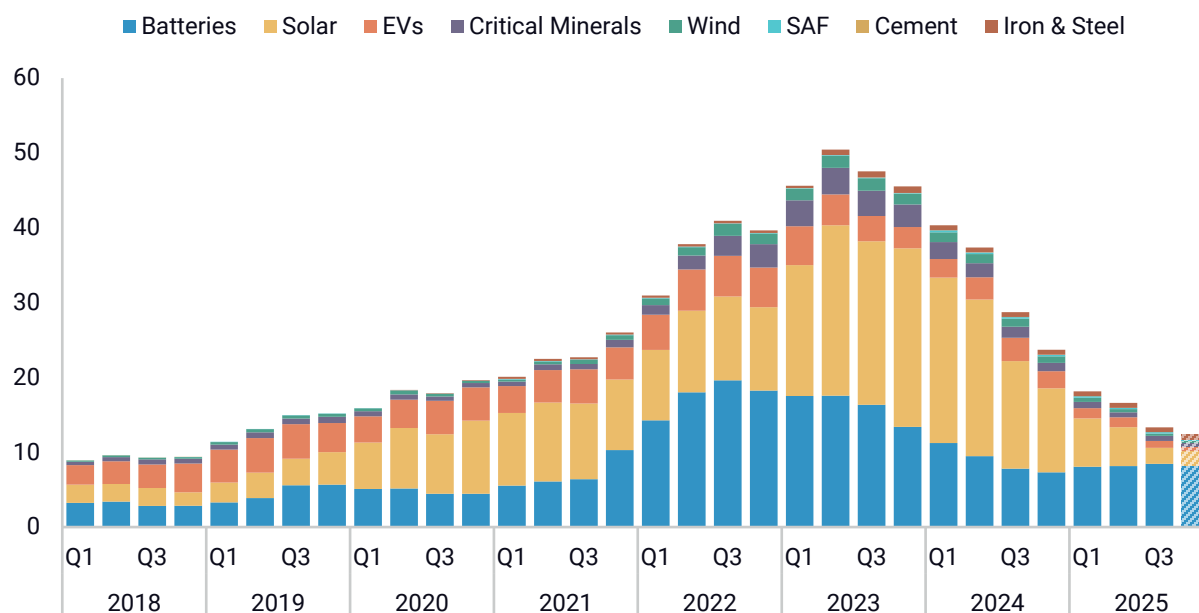
This approach set China apart from economies like the US and Europe, which have pursued more market-driven and targeted supply chain development. In recent years, however, Beijing has made efforts to rationalize excess overcapacity and curb intensifying price wars, putting emphasis on disciplining industrial policy spending. In addition, China

is struggling to spur demand at home, putting pressure on company margins and leading many companies to seek higher-margin markets overseas. Some of China's largest export markets for clean technologies (including Europe and the US) have targeted low-priced Chinese imports through import restrictions and tariffs. As a result, many Chinese firms are moving away from a purely export-led model and have begun moving some lower value-added manufacturing abroad.

FIGURE 2

### Declining solar and battery investments in China drive an overall reduction in domestic investments in clean technology manufacturing and industry

Actual capital investment in clean manufacturing and industry in China, billion 2024 USD



Source: Rhodium Group, Clean Investment Monitor

Below we dig in on the specific dynamics driving these trends for two sectors that have each drawn more than a third of China's investment in clean technology manufacturing and industry since 2018: solar and the EV/battery supply chain.

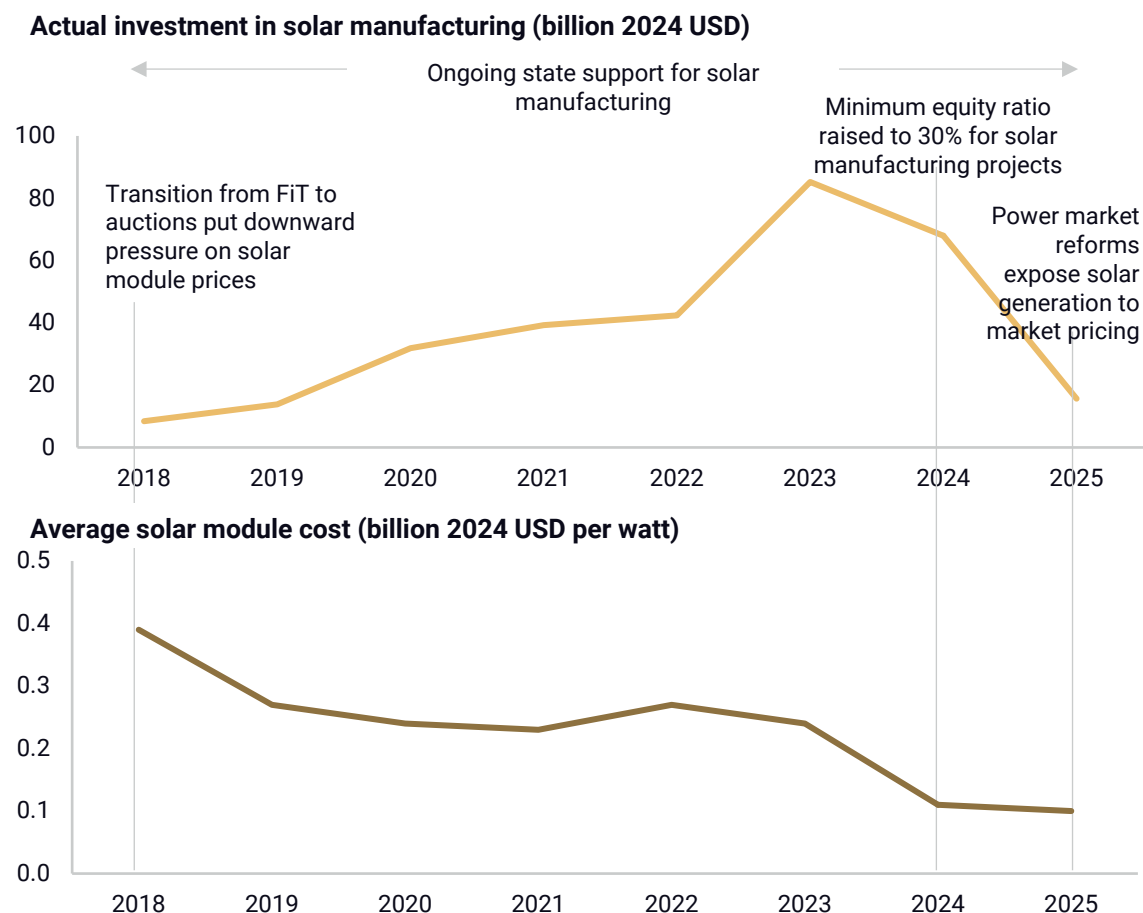
## Solar

China's rise to dominance in solar manufacturing is one of the most striking industrial policy stories of the past two decades. In the early 2000s, the Chinese government identified solar energy as a strategic sector and began channeling support through a combination of subsidized land, cheap loans from state-owned banks, and low-cost financing from development banks. To spur demand, state subsidies for solar installations began in 2009, transitioning to feed-in tariffs in 2011, which ensured generators received a fixed, above-market price for electricity fed into the grid, making solar projects financially viable and predictable for investors. Mandatory quotas and national targets embedded in China's Five-Year Plans solidified solar's rise, signaling a long-term commitment by the Chinese government that encouraged investment in solar installations and manufacturing.

As companies like JA Solar, Tongwei, Yingli, Suntech, and later LONGi, Jinko, and Trina ramped up in response to policy signals, the massive scale of production drove down unit costs through learning-curve effects and economies of scale. China also invested heavily in the entire supply chain—from polysilicon refining to wafer cutting to panel assembly—which further reduced costs and gave domestic manufacturers a structural advantage. When global demand surged (partly fueled by European feed-in tariff programs and US tax credits), Chinese firms were positioned to capture the bulk of that market.

In more recent years, China has calibrated its state support in response to the very market dynamics it helped orchestrate. As solar costs fell, China began transitioning away from feed-in tariffs toward a competitive auction system in 2018, which maintained demand while reducing fiscal cost and pushing the industry toward grid parity. This helped rationalize demand-side policy, but manufacturing investment continued to rise dramatically. Investment in solar manufacturing reached its peak in 2023, while capacity from an earlier wave of announcements in 2020–2022 simultaneously began to come online. This dual expansion—ongoing investment plus prior commitments materializing—triggered severe overcapacity, putting downward pressure on prices. As a result, the price of Chinese modules fell by 60% between 2022 and 2024 (Figure 3).

**FIGURE 3**  
**China’s solar manufacturers have been swamped by the overcapacity problem**



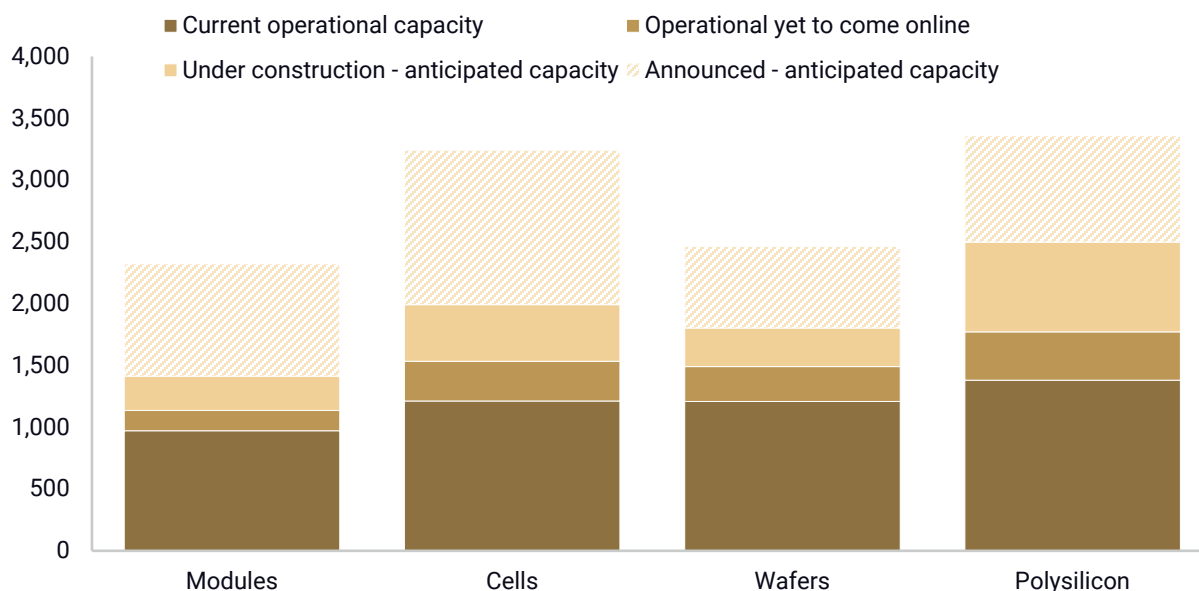
To rein in overcapacity and resulting price wars and attempt to bring more discipline to the sector, in 2024, the Ministry of Industry and Information Technology raised the minimum equity ratio to 30% for new and expanded solar manufacturing projects, and introduced revised guidelines for the industry that increased efficiency thresholds that effectively forced a transition to more advanced cell technologies. This coincided with updated power market reforms in 2025 that exposed solar even further to market-based pricing, coupled with heightened trade uncertainty, leading to an overall correction in solar manufacturing. In 2025, investments in domestic solar manufacturing in China dropped to an estimated \$16 billion, an 80% fall from peak levels reached in 2023.

Despite current overcapacity, China has even more solar manufacturing capacity in the planning stages, including modules, cells, wafers, and polysilicon (Figure 4). China has 458 GW of solar cell manufacturing capacity under construction and 1.3 TW of announced capacity yet to commence construction. This additional planned capacity would more than double current solar cell manufacturing capacity (1.5 TW) if it comes online as planned.

FIGURE 4

**Nearly half of China’s solar manufacturing capacity is yet to come online**

Projected annual manufacturing capacity in 2030 by project status as of Q4 2025 (GW)



Source: Rhodium Group, Clean Investment Monitor

**Batteries**

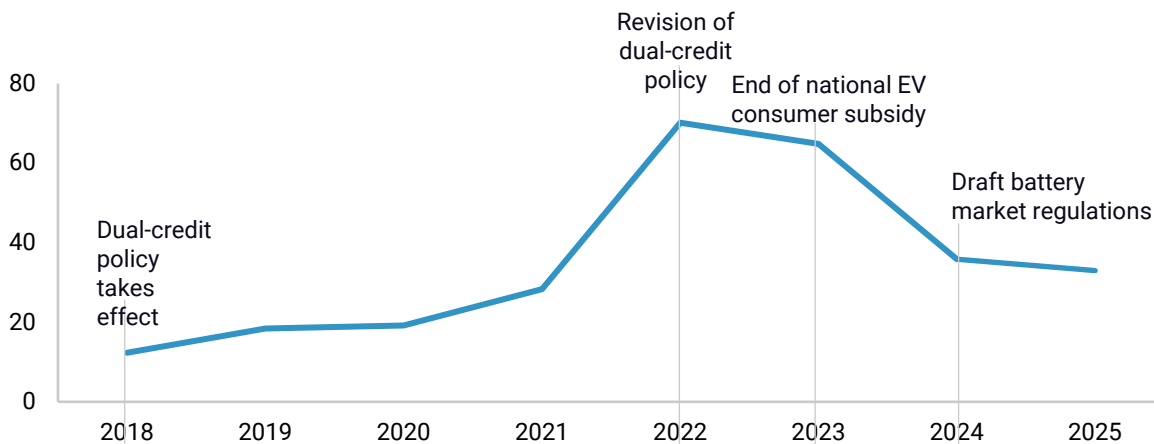
Like solar, China's battery industry has been shaped by ongoing widespread support measures that centered the electric vehicle and battery industry as a core focus of economic development. National purchase subsidies in 2013 seeded domestic demand and gave rise to manufacturers like CATL and BYD. The Dual-Credit Policy, which took effect in 2018, mandated a certain proportion of production to be EVs, giving EV makers an advantage in the market over ICE-dominant makers as pure-play EV manufacturers (like BYD and Tesla) were able to generate surplus credits, generating billions in revenue.

Although South Korean and Japanese battery makers were invested in China, China excluded foreign firms from standards catalogues required to get subsidies during this critical growth period, shifting EV makers’ preferences towards Chinese batteries. The value of trading EV credits, earned by producing EVs in excess of mandated targets, peaked in 2021, further boosting investment activity. Beyond national policy, battery manufacturing has benefited from provincial government support: grants, tax incentives, below-market lending, government guidance funds, and dedicated industrial parks.

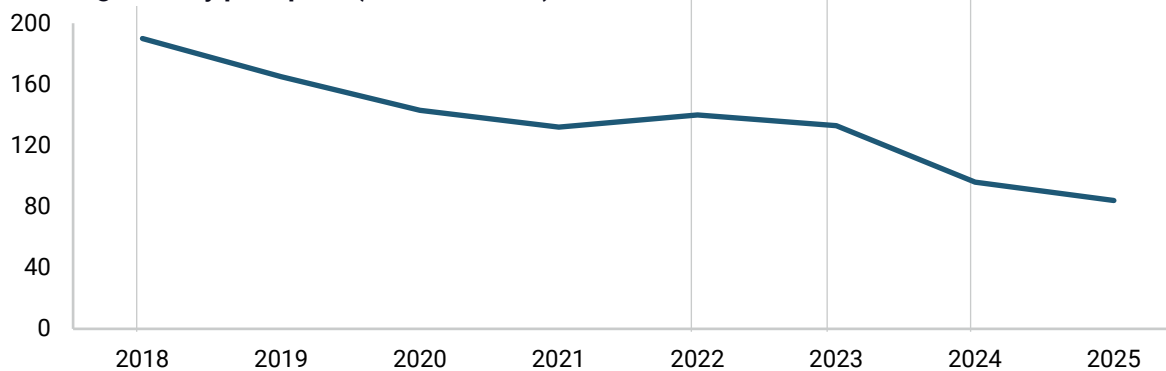
Like solar, rapid expansion in the sector hit industry profits and sparked concerns about overcapacity in international markets. Investments in EVs and batteries began their decline in 2023 as profits shrunk, compounded by the suspension of national EV purchase subsidies. Agencies took additional steps signaling the government’s intent to rationalize investment, including revisions to the Dual-Credit Policy and more stringent lithium battery regulations.

**FIGURE 5**  
**Investment in EV supply chain slows as overcapacity reduces margins and government rationalizes policy support**

**Announced capital investment in EV and batteries (billion 2024 USD)**



**Average battery pack price (2024 USD kWh)**



Source: Rhodium Group, Clean Investment Monitor, BNEF

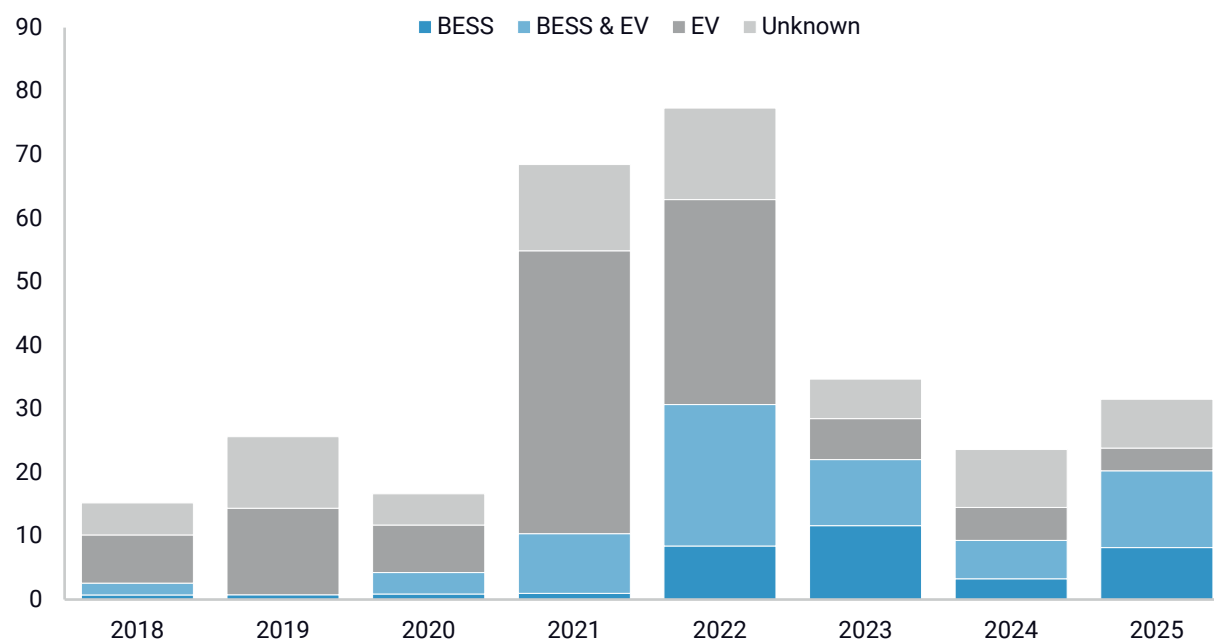
While actual capital investment in the construction of new or expanded battery manufacturing facilities remained modest in 2025, announcements for new planned investments rebounded to nearly match 2023 levels (Figure 6). This recovery is being driven by a shift toward grid-scale storage, as producers move away from an oversaturated EV battery market and China adjusts policies toward driving demand for energy storage. A 2022 mandate that storage be paired with new renewable installations coincided with a peak of \$86 billion in announced battery manufacturing investments in China. The mandate was scrapped in February 2025—as it resulted in low-quality storage installations and low utilization rates—and was replaced with a new three-year 180GW Action Plan that aims to leverage market-based revenue mechanisms to scale up storage, accelerate technology innovation in “new-type” batteries, and improve quality and standardization. By the end of 2025, 20 provinces had set rules for ancillary service subsidies that are expected to provide larger and more stable sources of income for energy storage in the years ahead.

On the back of those policy shifts, new battery cell manufacturing announcements in China bounced back in 2025, rising 33% year-on-year, though announced investment reached less than half of peak levels seen in 2022. Nearly two-thirds of the announced battery investments in 2025 are earmarked for energy storage (including dual-purpose facilities), compared to about 15% in 2021.

FIGURE 6

### Energy storage drives a rebound in China’s battery manufacturing announcements

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



Source: Rhodium Group, Clean Investment Monitor

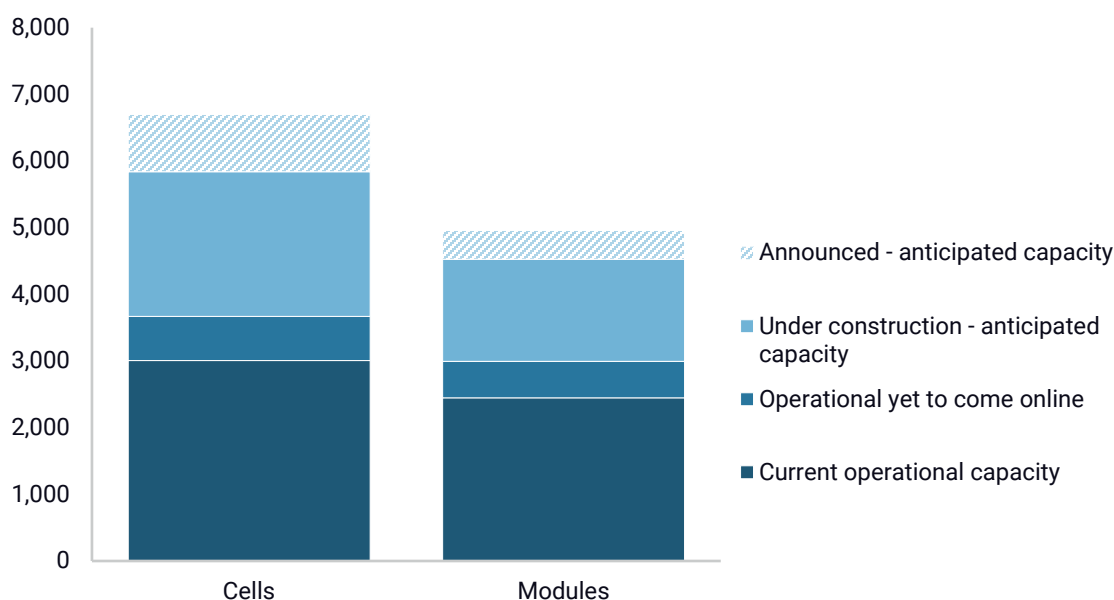
China’s battery manufacturing pipeline—like solar—still has significant new capacity slated to come online if all announced projects proceed as planned. Cell capacity is set to nearly double, and module capacity would increase 65% by 2030 if all under

construction and announced projects come online. We will be tracking this pipeline, along with any new announcements in 2026 to assess the impact of China’s deliberate pivot from quantity-driven, mandate-fueled growth toward quality and market viability in the battery space.

FIGURE 7

**Nearly half of China’s battery manufacturing capacity is yet to come online**

Battery manufacturing capacity (gigawatt-hours): current (2025) and planned (by 2030)



Source: Rhodium Group, Clean Investment Monitor

China’s recent focus on “anti-involution” aimed at ending the price competition plaguing Chinese clean technology manufacturing by shifting the industrial model from quantity to quality, restoring pricing power, and building long-term resilience. But national industrial planning under the recently announced 15th Five-Year Plan (FYP) recenters the economic and strategic importance of traditional industries like solar, EVs, and batteries. Under this new plan, anti-involution measures have cooled, and capacity replacement and closure policies are disappearing. Instead, this next iteration of industrial policy aims to maintain and upgrade traditional industries, as Beijing’s framing shifts to elevating them as a strategic buffer for supply chain resilience and promoting key labor-intensive industries—priorities that conflict with the legacy of ‘anti-involution’ and industry rationalization. The new policy focus on solar manufacturing and the EV supply chain is likely to emphasize maintaining China’s leading position and closing remaining technological gaps and overseas dependencies, as well as dominating in horizontal industries.

**United States**

The US has been slower than China to support domestic investment in clean technology manufacturing and has followed a less linear policy path for driving consistent demand for clean technologies, including wind, solar, and EVs. From 2018 to late 2022, investments in clean manufacturing and industry in the US grew gradually. Renewables and EVs were

supported primarily from demand-side policies at the federal and state levels, including vehicle emissions standards, EV consumer tax credits, state renewable portfolio standards, and federal tax credits for wind and solar installation and generation. During this period, there was little to no support for the domestic manufacture of these technologies, as the primary vehicle for this support—the Department of Energy’s Advanced Technology Vehicles Manufacturing (ATVM) Loan Program—was largely dormant during the first Trump administration.

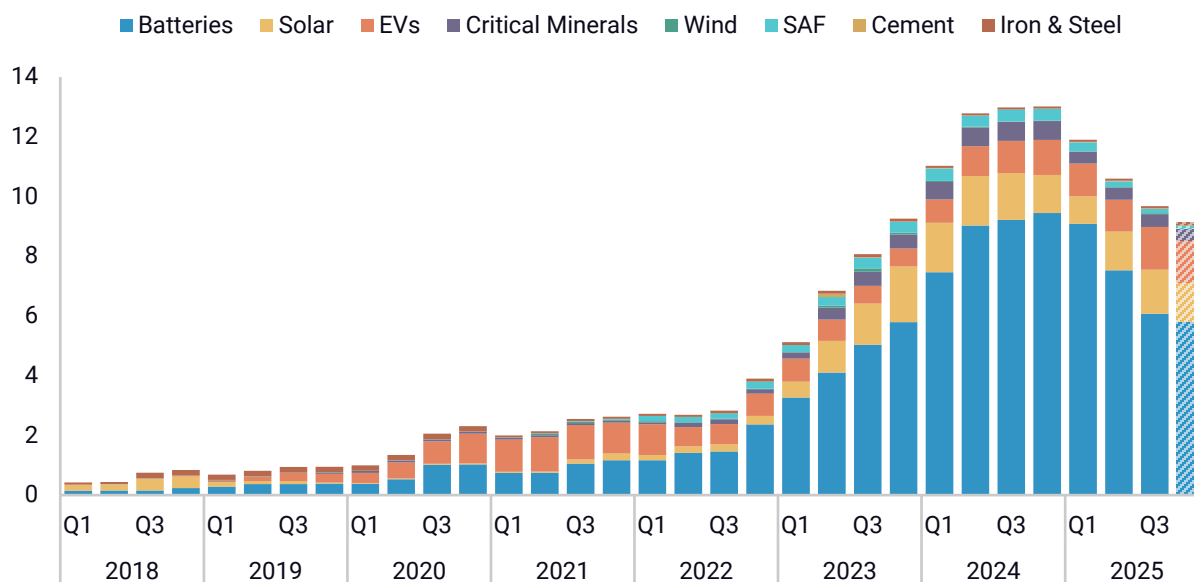
This changed dramatically with the passage of the Inflation Reduction Act in Q3 2022, which kick-started a surge of clean technology manufacturing activity. Notably, the IRA strengthened clean technology demand through extending and revising consumer EV tax credits, and by providing long-term clean electricity tax credits that made wind and solar installation and generation significantly more cost-competitive with fossil sources, as well as a suite of loans and other clean energy deployment mechanisms. It paired these demand-side supports with advanced manufacturing production tax credits for clean technology components.

Implementation of the IRA ran in parallel to additional federal demand-side policies established under the Biden administration, including more stringent federal vehicle standards and clean energy regulations. This gave producers the market confidence needed for long-term investment—particularly important for industries like batteries and solar that had yet to reach scale in the US.

With strong demand signals in place and new support for clean technology manufacturing, investment rose more than five-fold from \$9 billion in 2021 to its peak of \$50 billion in 2024 (Figure 8). Battery manufacturing—including cells, modules, and battery materials—accounted for roughly three-quarters of the growth in that period.

**FIGURE 8**  
**US capital investments in clean technology manufacturing and industry have fallen since their peak in 2024**

Actual capital investment in manufacture and deployment, billion 2024 USD



Source: Rhodium Group, Clean Investment Monitor

The resulting investment surge proved short-lived, however. Policy changes have since contributed to a 17% fall in annual 2025 investment relative to 2024 and increasing project cancellations. A key inflection point was the July 2025 passage of the One Big Beautiful Bill Act (OBBBA), a budget reconciliation package that modified several of the provisions supporting clean technology manufacturing. Although OBBBA largely preserved Section 45X manufacturing tax credits for solar, batteries (with modifications to eligibility for modules), and critical minerals, it terminated support for wind components produced and sold after 2027 and introduced a new phase-out timeline for critical mineral tax credits by 2033. The most consequential change, however, was an amendment to 45X that removed eligibility for components produced with “material assistance from any prohibited foreign entity” (PFE) with disqualifying foreign content thresholds ratcheting up over time. For qualifying battery components, for example, the required ratio of non-PFE sourcing starts at 60% in 2026, rising to 85% by 2030. Compliance with these provisions requires extensive supplier documentation and due diligence. For manufacturers reliant on Chinese-sourced inputs—very common in US solar and battery supply chains—meeting these thresholds may entail costly restructuring or losing tax credit eligibility entirely, and delays in Treasury Department guidance added additional uncertainty for would-be investors.

In addition, OBBBA eliminated the ATVM Loan program, removing the primary financing mechanism for large clean manufacturing projects that were too capital-intensive for equity alone. This program enabled many US OEMs, including Ford, GM, and Rivian, to finance the construction of large-scale EV and battery facilities at favorable interest rates. Without cheap debt financing, many projects that would likely have survived the elimination of the 45X tax credits couldn’t access sufficient funding.

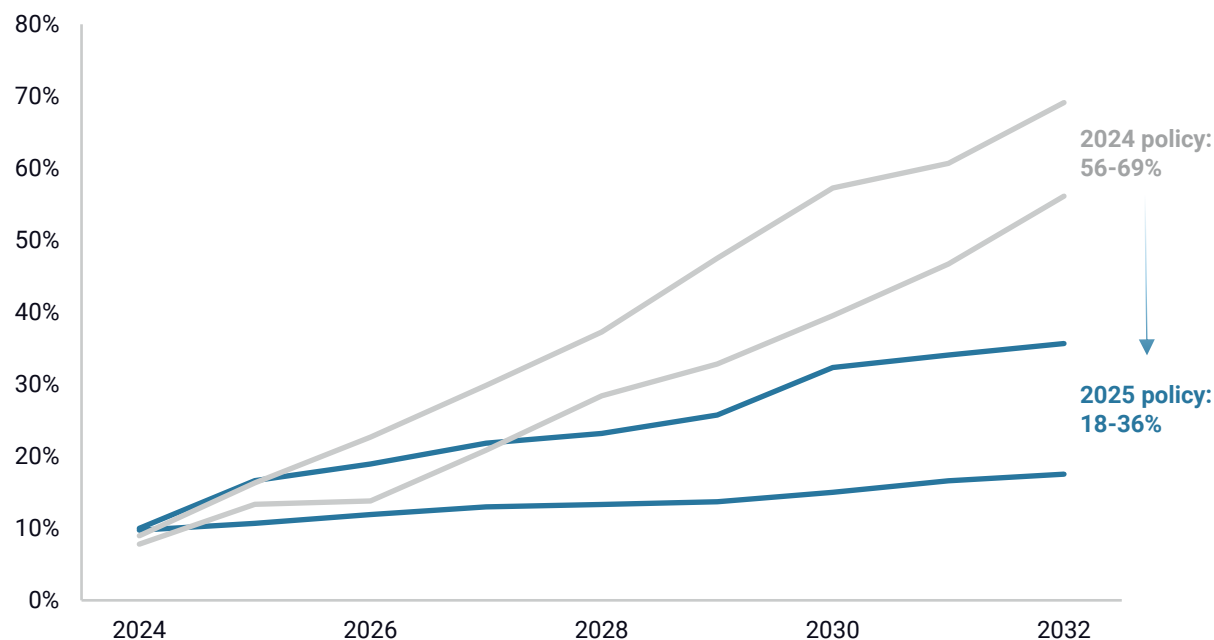
These supply-side headwinds coincided with a dimming outlook for US demand for clean technologies in general and EVs in particular. OBBBA shortened the eligibility timelines and placed new restrictions on IRA tax credits for wind and solar generation and phased out consumer tax credits for EVs. The early sunset of the \$7,500 EV consumer subsidy had the most immediate effect, causing a surge of purchases through September 2025, when the credit expired, and then a sharp fall. The elimination of the subsidies has since had a chilling effect on US EV purchases, with consumer spending falling 43% in Q4 after the previous quarter’s record high and down 31% relative to Q4 2024. As a result, EV inventory ballooned by January 2026 to 168 days supply (compared to less than 100 days for combustion vehicles), nearly quadrupling from September’s near record low of 46 days.

Long-term EV demand prospects also weakened, as the Trump administration rolled back federal vehicle emission standards and eliminated civil penalties for noncompliance with federal fuel economy standards. The Trump administration also revoked California’s authority to set more stringent state emission standards and EV mandates, which were also in effect in 17 other states (covering 40% of the US auto market). As a result, Rhodium Group projects that, in 2032, passenger EV sales shares will likely drop to 18-36%, compared to 56-69% before those policy changes (Figure 9).

FIGURE 9

**US policy changes resulted in substantial reduction in vehicle electrification expectations**

Electric share of US light-duty vehicle sales, low/high projected range based on policy in place as of 2024 and 2025



Source: Rhodium Group, Taking Stock 2024 and 2025. Note: demand projections are based on Taking Stock low and high scenarios.

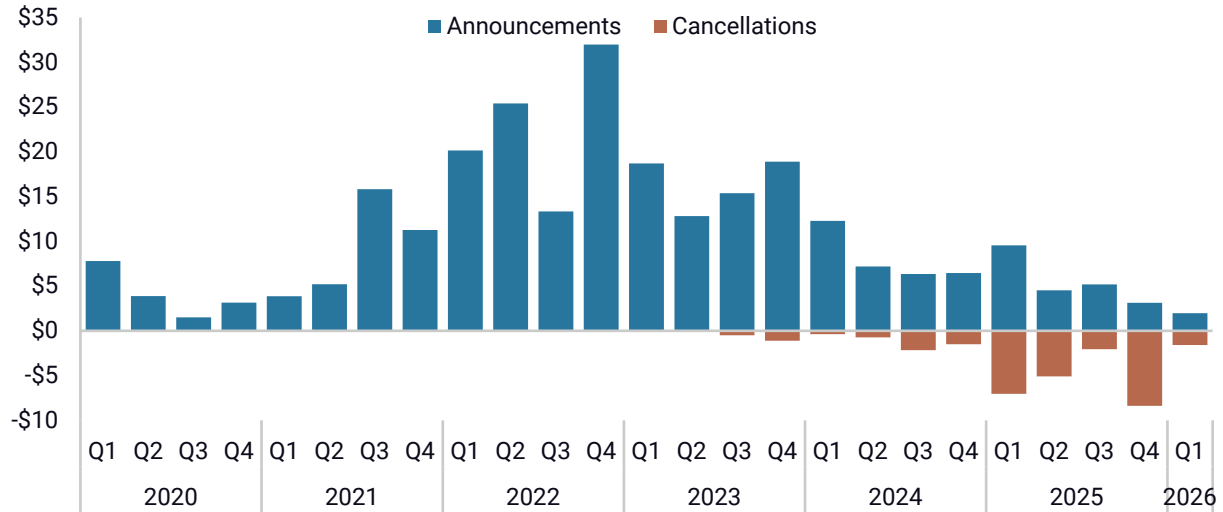
The sudden reversals of supply-side incentives and demand-side policy—in particular for the EV supply chain—have had a significant chilling effect on clean technology manufacturing investments across the US. In 2025, 24 manufacturing projects tied to \$22.5 billion of investment were canceled. If earlier-stage cancellations, including facilities halted before site selection and facilities retired, are included, that total rises to \$46 billion, consisting of 95 distinct projects. The pace of new announcements also slowed amid growing headwinds and demand uncertainty, with canceled investment surpassing new announced investment in Q2 2025 and in Q4 2025 (Figure 10). Canceled investments in Q1 2026 were lower at less than \$2 billion after a record-high \$8 billion of cancellations in Q4 2025.

The vast majority (97%) of the canceled investments in 2025 occurred in the EV supply chain. Battery manufacturing accounted for \$11 billion in canceled investment in 2025, more than 10 times the level observed in 2024. Announced battery investment totaled \$8 billion in 2025, leaving a \$3 billion deficit between announced and canceled projects. Just over 40% of project cancellations in 2025 hit EV assembly, with announced investment (\$10 billion) slightly surpassing cancellations (\$9 billion). Critical minerals fared better, however, with announced investment (\$3 billion) exceeding cancellations (\$1 billion) in 2025.

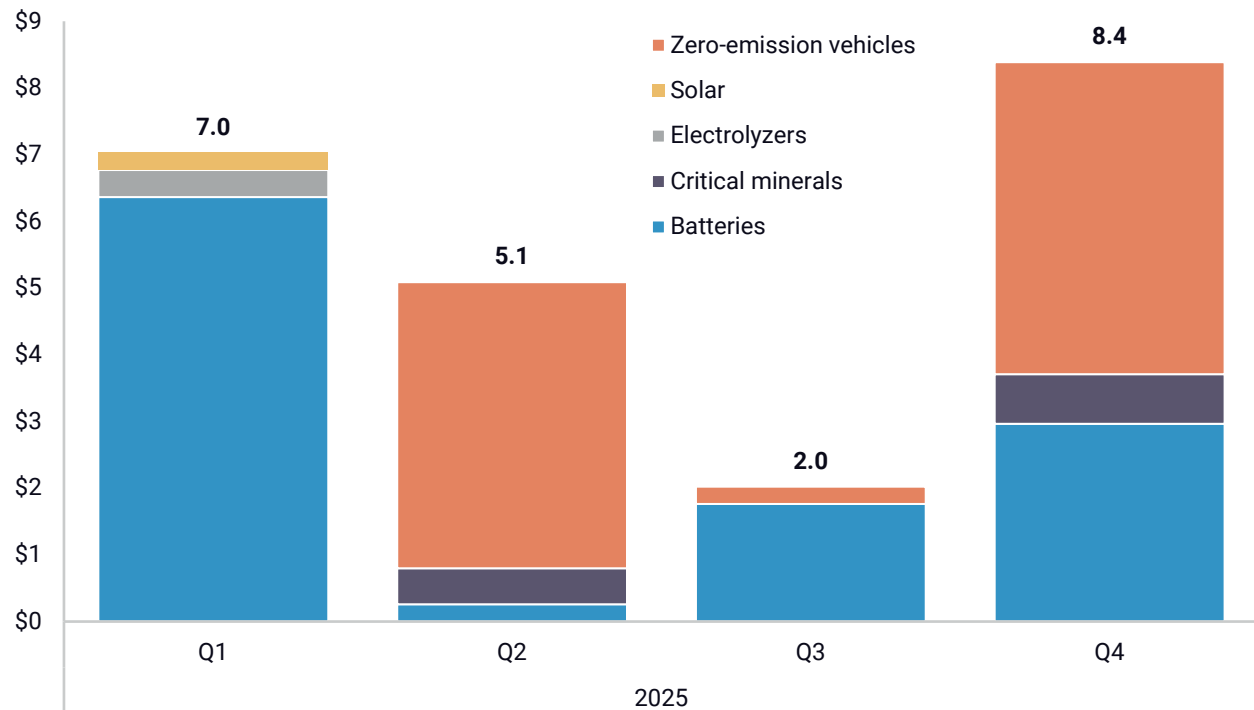
FIGURE 10

**Shifting markets drive up manufacturing cancellations, slow announcements**

a) Manufacturing announcements vs cancellations, billion 2024 USD



b) Manufacturing cancellations by technology, billion 2024 USD



Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

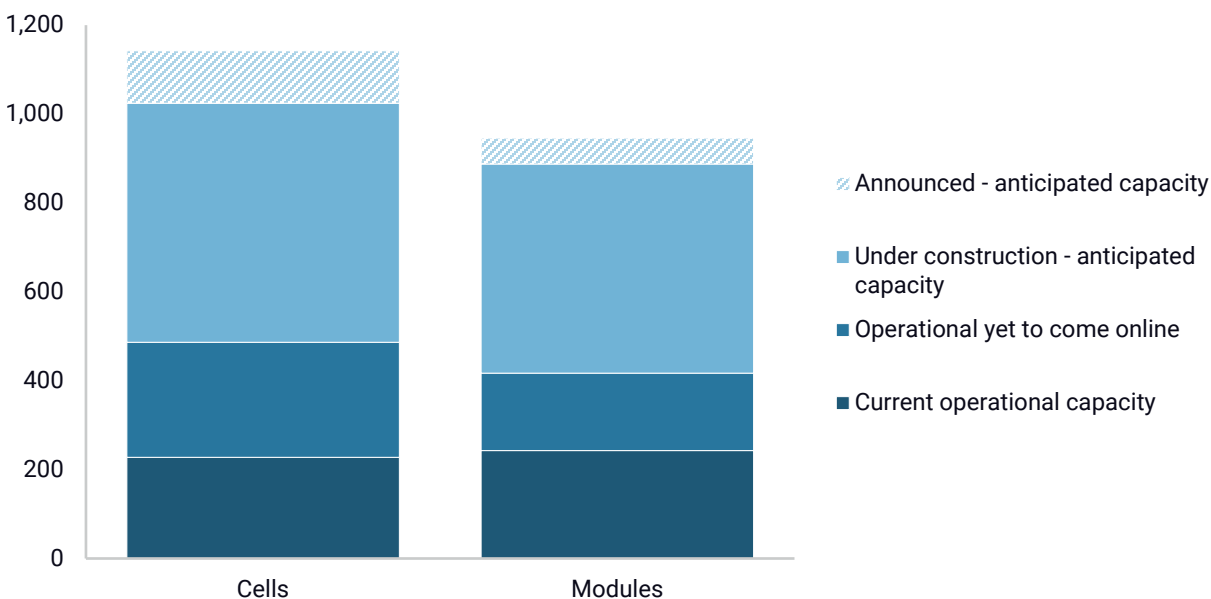
Even accounting for recent cancellations, the US still has substantial planned battery manufacturing projects in the pipeline. Both cell and module capacity are set to more than double by 2030, assuming projects currently under construction and in planning reach

completion. Like in China, some facilities have shifted focus from EV batteries to grid-scale storage, reflecting softening EV demand and growing appetite for reliable power.

FIGURE 11

### Over half of US battery manufacturing capacity is yet to come online

Battery manufacturing capacity (gigawatt-hours): current (2025) and planned (by 2030)



Source: Clean Investment Monitor, Rhodium Group

How far these market shifts can buffer the broader battery industry remains to be seen, and we're likely to see additional cancellations going forward as companies deal with the challenging outlook. Unlike China, the concerted boost from the IRA lasted only a few years and began to unwind before sufficient industrial build-out or a robust domestic market could be established. Across all clean manufacturing industries, about \$98 billion of outstanding investment tied to projects that haven't broken ground or completed construction remains vulnerable to delays or cancellations.

## A new phase of global competition

For US companies, China's slowdown isn't likely to provide any openings. If China's market consolidates—driven either by shrinking profits or Beijing's recent rationalization focus—the shedding may serve to strengthen China's top global players. As weaker Chinese firms exit, the survivors—including giants like BYD and CATL—benefit from subsidy mechanisms that automatically scale with revenues, further entrenching their market position. Competing with these firms without long-term, bankable government support and policies that spur reliable domestic demand will only become harder. If Beijing scraps its rationalization push and doubles down on its support for growth industries like batteries and solar, China's dominance in those sectors will only deepen.

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