

Bundle | 29 April 2026

ENERGY SUSTAINABILITY UNITED STATES

How US trade and industrial policy is rewiring clean energy supply chains

Tariffs and the One Big Beautiful Bill Act have set a major supply chain realignment in motion for the US clean energy industry, with the aim of reducing reliance on China. Short-term strategies to secure alternative supplies are needed – but long-term solutions to advance lasting partnerships and technological innovation are even more crucial

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US solar set to see a significant supply chain reconfiguration

US solar manufacturers are facing significant challenges to reduce reliance on China

By Coco Zhang



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Technological innovation will be key for US battery storage expansion

By Coco Zhang

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US solar set to see a significant supply chain reconfiguration

The reshoring of US solar manufacturing is moving forward, but only gradually. Continued reliance on China, combined with tariffs and FEOC rules, means developers face significant work to map, verify, and potentially reconfigure their sourcing strategies



Solar reshoring across the value chain is still progressing slowly, though momentum is building

Steep tariffs and strict foreign entities of concern (FEOC) rules under the Trump administration are accelerating a reset of the solar supply chain – on a compressed timeline. This poses challenges for developers that have long relied on China’s dominance in global production of cheap solar and battery equipment. Components with minimal Chinese exposure are likely to be in high demand, pushing up prices.

As developers rework their supply chains, short-term fixes may not be enough. More durable solutions will require building and maintaining trade relationships that can withstand future policy shifts.

Over time, a vertically integrated domestic supply chain is achievable, though it will require

incentives and trade protections. The significant volume of solar cell capacity currently under construction in the US suggests progress in the right direction.

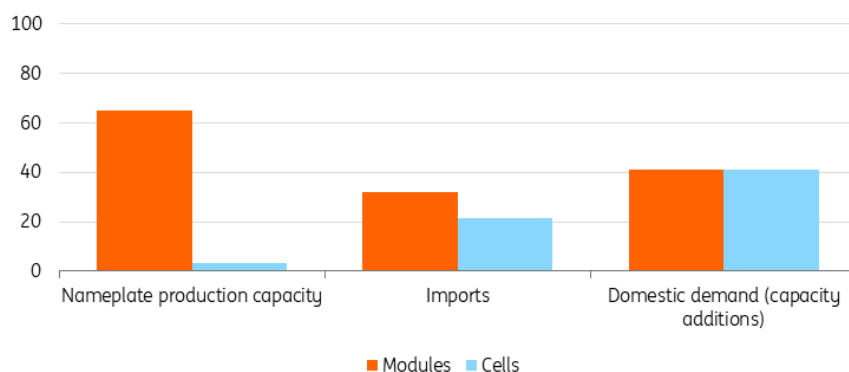
Seemingly high US module capacity does not ensure self-sufficiency

US solar manufacturing capacity has expanded rapidly. The Solar Energy Industries Association (SEIA) estimates that as of early 2026, US solar module manufacturing capacity increased 50% annually to 65GW, much higher than the domestic demand of roughly 40 GW in 2025.

While we think this is a credible and impressive data point, we caution against the interpretation that the US is self-sufficient on solar modules. In fact, the US still imported 32GW of modules last year, despite having 65GW of module capacity targeting mostly domestic customers.

US solar manufacturing capacity, imports and demand

GW

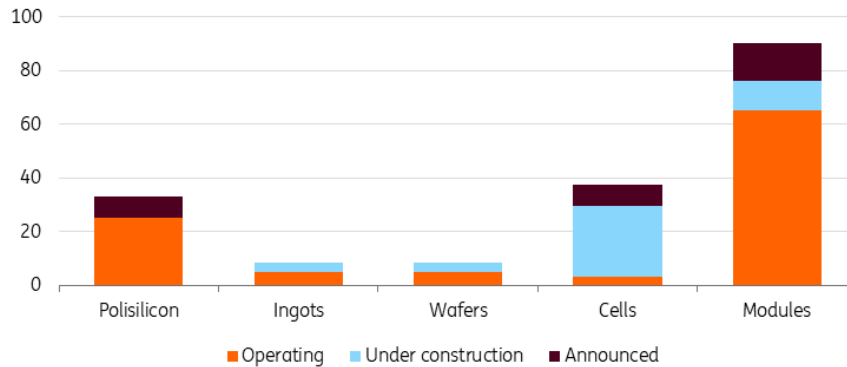


Source: ING Research, Solar Energy Industries Association, BNEF, Wood Mackenzie

One main reason behind this is upstream manufacturing bottlenecks. Further up the supply chain of crystalline-silicon (c-Si) modules, cell capacity is just 3.2GW, while wafer and ingot capacity are each around 5GW. Therefore, US module capacity is not true 'manufacturing capacity', but largely '**assembly capacity**' using imported cells.

US solar manufacturing capacity across the supply chain

GW



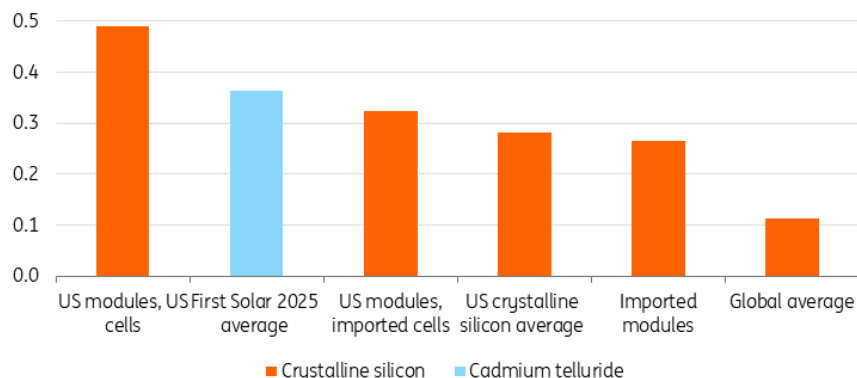
Source: ING Research, Solar Energy Industries Association

This creates additional risks. First, module manufacturers may need to produce way below nameplate capacity if they cannot secure inputs on time and at competitive prices. Second, reliance on imported cells exposes module manufacturers, and by extension solar developers, to tariffs and FEOC restrictions. By contrast, cadmium telluride modules, led by First Solar, benefit from about 14GW of fully integrated domestic capacity.

Another reason the US remains reliant on imports is price competitiveness. Even after accounting for tariffs, imported solar modules, a large share of which has ties to China, remain cheaper than US-made modules. It is also worth noting that even imported solar modules are over twice as expensive as the global average, where tariffs are minimal, suggesting the US manufacturing industry is far from competitive in the global market.

Solar module prices by technology and supply chain

cents/watt



Source: ING Research, Anza Renewables, First Solar, BNEF. Note: The average price of imported modules is inclusive of tariffs, but only as of the publication date of Anza's Q1 2026 market report.

These factors show that the US is far from fully localising its solar supply chain, though the 26GW of cell capacity under construction could improve the situation.

In the near term, however, many US projects will still rely on imports and be exposed to two policy risks: **tariffs** and **FEOC** requirements.

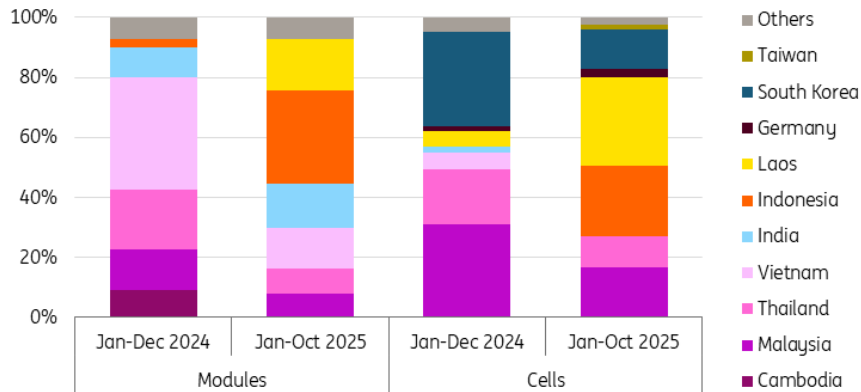
Tariffs continue to push China to find new trade reroutes

To curb tariff circumvention by China, the US sharply increased countervailing and anti-dumping duties on solar imports from Cambodia, Thailand, Malaysia, and Vietnam in early 2025. This prompted China to react. At the time, we noted in a [research article](#) that alternative trade paths were emerging in Laos and Indonesia. Now, not only has 2025 trade data confirmed this move, but it has shown how fast rerouting happened.

From 2024 to 2025, the combined import share of modules from Laos and Indonesia jumped from 3% to 40%, with the cell import share from these two countries surging from 5% to 53%. In contrast, the combined import share from Cambodia, Malaysia, Thailand and Vietnam collapsed.

US imports of solar modules and cells

% (based on \$)



Source: ING Research, BNEF

This rapid shift triggered a new US investigation. In February 2026, the Department of Commerce announced preliminary countervailing duties of 80.67%-143.3% on solar imports from Indonesia and Laos. It also imposed a 125% tariff on Indian imports, citing evidence of Chinese transshipment.

China's manufacturing overcapacity will incentivise it to continue finding new trade routes. But doing so could become harder, as China's remaining options in Southeast Asia are limited to markets such as the Philippines. And there is potentially Africa. Recent reports suggest solar manufacturing in Africa is expanding, although it is unclear how much is influenced by China.

Looking ahead, there are more trade issues we are watching:

- **Court ruling on previous Southeast Asia tariff exemption:** In August 2025, the US Court of International Trade struck down a Biden-era rule that exempted for two years hefty tariffs on solar imports from Cambodia, Malaysia, Thailand, and Vietnam. The decision is now under appeal. If upheld, it could result in over \$50bn in retroactive duties, dealing a major blow to US solar.
- **First Solar's patent lawsuit:** In March, the US International Trade Commission launched an investigation into whether several solar manufacturers – including Canadian Solar and Jinko Solar – are infringing First Solar's TOPCon (Tunnel Oxide Passivated Contact) patent. The case could take up to 18 months, but a ruling in First Solar's favour could significantly constrain solar equipment supply.
- **Appetite to shift toward non-China-linked suppliers:** There has been little increase in US imports from non-China-linked alternatives, such as South Korea, despite tariffs on Southeast Asian countries. It is worth seeing if that limited appetite can rise this year.

As developers map and rework their supply chains, they should focus not only on short-term fixes but also on durable solutions. For manufacturers, this means building partnerships up and down the supply chain to offer developers a more integrated model. That is the approach taken by Corning, Suniva, and Heliene, which together are establishing US-made polysilicon, wafers, cells, and modules.

FEOC guidance prompts supply chain reevaluation – it's all about proving yourself

Another major policy risk stems from FEOC rules, which are designed to limit Chinese influence. FEOC compliance has two parts: developers cannot be prohibited foreign entities (PFEs), and they cannot rely on material assistance from such entities. Starting in 2026, companies with PFE ties will no longer qualify for clean-energy tax credits.

FEOC compliance criteria

1. A taxpayer cannot be a Prohibited Foreign Entity (PFE)



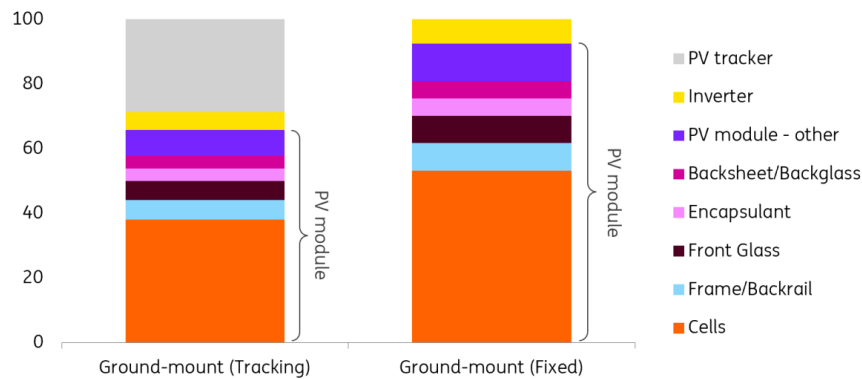
2. A taxpayer cannot receive material assistance from a PFE

$$\text{Material Assistance Cost Ratio (MACR)} = \frac{\text{Total labor \& material costs of manufactured products} - \text{labor \& material costs of products manufactured by a PFE}}{\text{Total labor \& material costs of manufactured products}}$$

Source: ING Research

In February, the Treasury Department issued draft guidance on material assistance. The key point is that solar and BESS developers only need to review a specific list of upstream components and ensure they are free of FEOC influence. The guidance adds tremendous certainty for developers to manage supply chains and advance projects.

Treasury's material assistance cost ratios to determine FEOC compliance



Source: ING Research, Treasury notices

However, in practice, ensuring FEOC compliance is not easy. Making sure PV module manufacturers are not PFEs could already be challenging. BloombergNEF estimates that over 20% of *US* solar module capacity may have high FEOC exposure through corporate structures or IP partnerships. That could be enough to fail the FEOC test.

Manufacturers that pass ownership and IP tests can still be disqualified if they receive material assistance from PFEs. Here, ensuring cells are compliant is the most critical step, as they account for the largest share of equipment costs used to assess FEOC status. But with limited compliant supply, this step can be challenging for some developers.

And full clarity will not come until the Treasury releases further guidance later this year to define PFEs more precisely and tighten rules against circumvention. A tougher stance means that Chinese firms might not be able to comply simply through restructuring ownership, financing, or contracts.

Now, what developers need to do is not just verify **whether** they are FEOC compliant, but show robust proof of **how** they are compliant. To that end, supplier certifications do provide a certain level of comfort, as they are legally binding documents with penalties of perjury. But lenders are increasingly expecting more intense audits or third-party diligence. Detailed documentation is becoming critical to securing project financing.

Conclusion

Solar reshoring across the value chain is still progressing slowly, though momentum is building. Continued reliance on a China-dominated global market, combined with tariffs and FEOC

rules, means solar developers need significant work to make their supply chains bulletproof.

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US battery storage needs innovation for long-term growth

US battery storage growth in 2026 looks strong, but supply chain risks could limit expansion. Rising demand for non Chinese components would push prices higher, while greater investment in technology and cost reduction is needed for the eventual subsidy phase-out



US BESS growth in 2026 looks strong. Still, efforts to avoid Chinese components could limit expansion, and technological innovation will be key to overcoming hurdles

Battery energy storage systems (BESS) are set to gain strong momentum in the US, as outlined in our [Renewables Outlook for 2026](#). However, growth projections for 2026 vary widely, ranging from 48GWh (BloombergNEF) to 70GWh (Solar Energy Industries Association, or SEIA). Our view is closer to that of Wood Mackenzie, which expects installations to grow from 54GWh to 56GWh.

Where actual growth lands will depend largely on how well the industry manages supply chain risks – more specifically, shaking off its heavy reliance on China.

In the long term, however, structural cost reduction will be critical as tax credits phase out. We

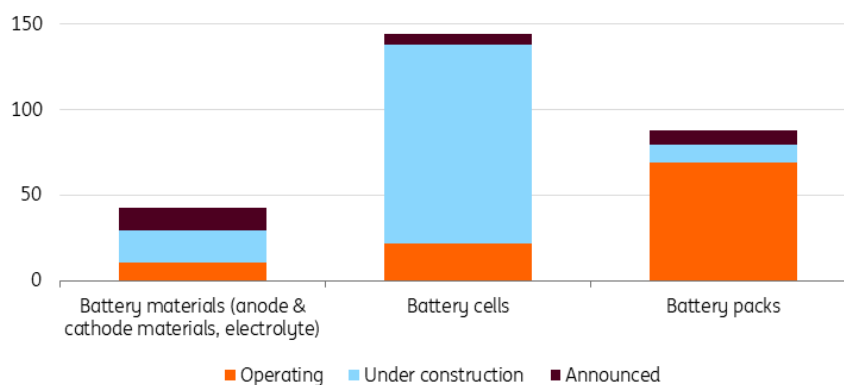
believe that is best achieved through technological innovation.

Supply chain gaps leave BESS projects vulnerable

Similar to solar, US BESS manufacturing is heavily concentrated in downstream assembly, with limited coverage of upstream components. SEIA estimates that while the US has 79GWh of nameplate battery pack manufacturing capacity as of early 2026, battery cell capacity stood at just 22GWh, highlighting a significant upstream gap.

US BESS manufacturing capacity across the supply chain

GWh



Source: ING Research, SEIA

Moreover, these figures include producers that make both stationary BESS and EV batteries, so the nameplate capacity dedicated to BESS alone is smaller. Plus, production can run well below nameplate capacity due to upstream bottlenecks. These two factors suggest that US BESS manufacturing has low self-sufficiency. Wood Mackenzie estimates that US battery cell manufacturing capacity could only meet 6% of domestic demand in 2025, though that share could increase to 40% by 2030. The scale of the projected ramp-up is evident: 116GWh of battery cell capacity is currently under construction in the country.

Tax credits are the lifeline for US BESS to trump cheap Chinese imports

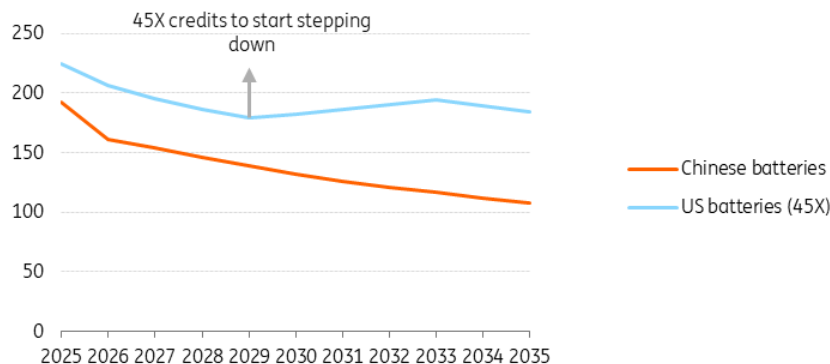
Manufacturing and clean electricity tax credits are crucial to the growth of domestic BESS manufacturing. Without *either*, US producers would struggle to compete with low-cost Chinese imports.

Even under the current tariff regime, US four-hour turnkey battery systems using batteries that benefit from the 45X tax credits are still 31% more expensive than systems using

imported Chinese batteries. The gap will further widen when the tax credits start to phase out.

Cost of US 4-hour turnkey battery storage systems

\$/kWh, usable (real 2025)

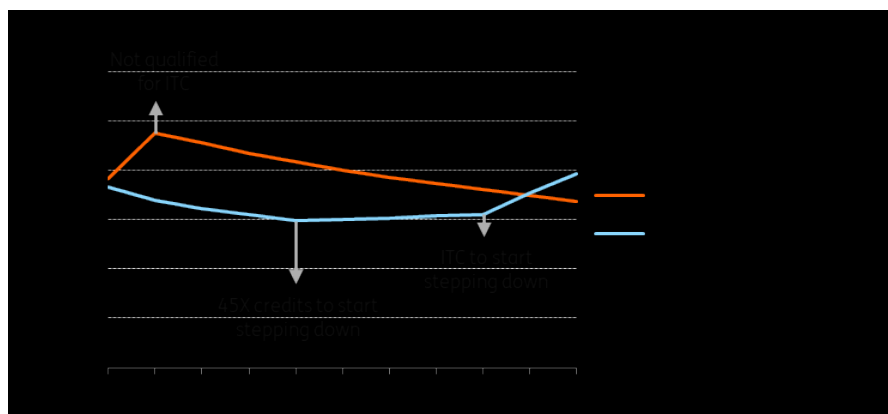


Source: BNEF, ING Research

It is only when the 45X tax credits are combined with 48E/48Y clean electricity tax credits in four-hour energy storage projects that US projects using US-made batteries can enjoy a cost advantage.

Cost of US 4-hour BESS projects

\$/kWh, usable (real 2025)



Source: BNEF, ING Research. Note: Costs included in BESS projects but not turnkey storage systems include Engineering, Procurement, and Construction (EPC), grid connection, project overhead, and developer margin.

This means US battery manufacturers will need to double down on technological

advancement and innovation. Based on current technology projections, tax credit phase-outs in the next decade will more than offset the cost advantage among US producers.

But before manufacturing capacity increases meaningfully across all supply chain components, the US BESS industry will remain exposed to tariffs and foreign entity of concern (FEOC) restrictions that target China. Below, we analyse these risks and how they can be managed.

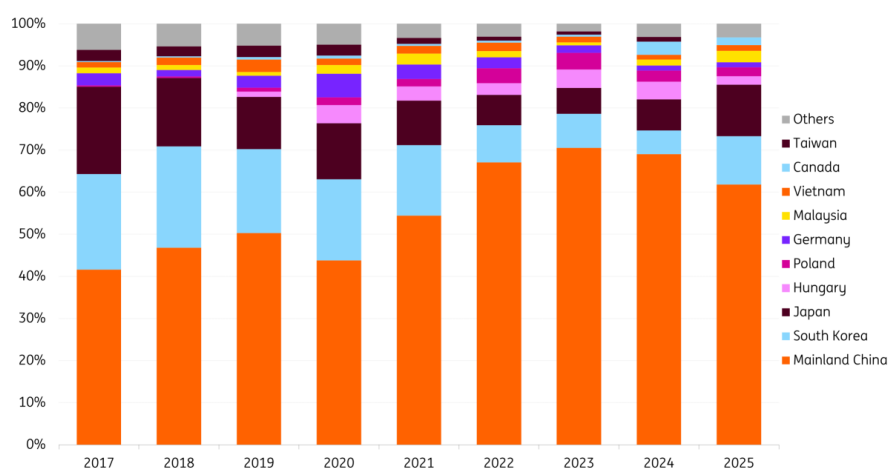
China is still king in US solar imports, but with a weakening role

It is difficult to quickly dismantle China's dominance, which accounts for nearly 90% of global lithium-ion battery manufacturing capacity. It will take time for the US to ramp up domestic manufacturing, and in turn, it will still need to rely on imports in the near term.

China accounted for the lion's share of US lithium-ion battery (both EVs and non-EVs) imports in 2025, at around 60%. Although import tariffs on Chinese batteries are higher than elsewhere, the difference has not been as material as seen in solar equipment. And because of safety control, batteries are harder to be transhipped via a third country. Rising tariffs have therefore led to a decreasing share of Chinese imports without much transshipment from proxy countries.

US import of lithium-ion batteries by origin

% (based on \$)



Source: BNEF, ING Research

Here's what we'll be watching in terms of tariffs and trade looking ahead:

- **Further tariff hike on batteries:** It is worth watching whether tariffs on Chinese lithium-ion batteries, currently at 25% under Section 301 (to prevent unfair practices), will be raised further. This year, the US initiated an investigation under Section 301 after the Supreme Court struck down reciprocal tariffs imposed, citing the International Emergency Economic Powers Act (IEEPA).
- **Further tariff hike on graphite:** Graphite is a key metal in lithium-ion battery production. Natural graphite imports from China currently face a 25% tariff; any further hikes under Section 301 would mean higher supply chain costs for battery developers.

Because of limited battery transshipment from China and decent battery pack capacity in countries like South Korea and Japan, US BESS developers have some ability to shift away from Chinese imports. In fact, battery pack imports from South Korea and Japan rose in 2025 and could increase further this year.

The bigger constraint, however, is battery cells, where alternatives to China remain far more limited. We discuss this in more detail below.

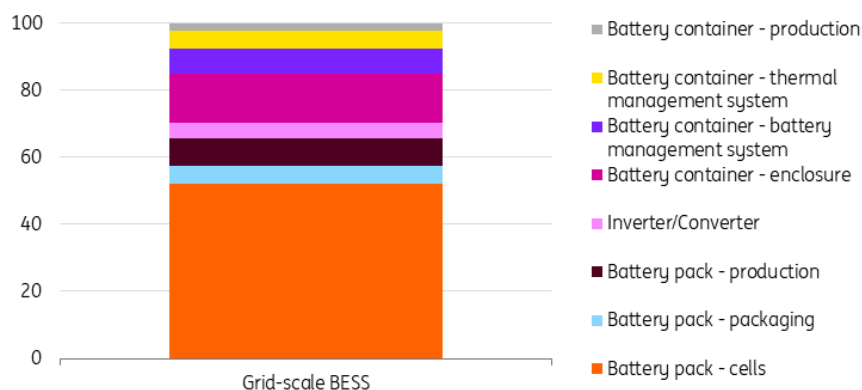
FEOC rules to have far-reaching impact on BESS supply chain

BESS developers will be subject to FEOC rules for longer, as BESS tax credits extend into the next decade, while solar and wind face near-term eligibility deadlines. This means BESS developers will need to more structurally transition away from reliance on China.

In February, the Treasury Department released draft guidance clarifying how FEOC requirements can be met from a supply chain perspective. The Treasury is expected to issue further guidance on definitions of foreign prohibited entities (PFEs). Below is a summary of the BESS material assistance cost structure, while our detailed FEOC analysis can be found [here](#).

Treasury's material assistance cost ratios to determine FEOC compliance

%



Source: ING Research, Treasury notices

If a developer now uses imported Chinese battery packs, it will need to replace them with US-made or non-Chinese imports. However, using US-produced battery packs does not eliminate FEOC risk. Developers must still verify that suppliers are free of Chinese influence across ownership, IP licensing, supply chain material assistance, etc.

Among these, battery cells are the most critical component, as they represent about half of the total cost used in the FEOC material assistance test for grid-scale BESS.

This poses a significant challenge. China controls more than 80% of global battery cell production, while US cell capacity remains limited. On top of that, BloombergNEF estimates that roughly half of the current US operating BESS cell capacity may have high FEOC exposure risk due to corporate structure and IP partnership. That could further constrain near-term compliant supply.

Nevertheless, conditions can improve. Only 17% of planned US cell capacity is expected to face high FEOC exposure (excluding supply chain considerations), suggesting a meaningful expansion of compliant supply over time.

In the near term, rising demand for FEOC-compliant components is likely to push prices higher. Many developers may prioritise FEOC compliance over domestic content eligibility. Longer term, progress will hinge on the pace of vertically integrated battery manufacturing growth in the US and among non-Chinese partners.

Car manufacturers' repurposing EV batteries can boost BESS capacity

As EV tax credits are phased out under the One Big Beautiful Bill Act (OBBBA) and demand for battery storage from data centres accelerates, manufacturers are shifting their focus from EV batteries to BESS.

Ford, for example, has ended its EV battery joint venture with SK On and is repurposing its Kentucky plant to produce stationary LFP batteries, positioning the site as a BESS hub and exploring licensed CATL technology. GM is redirecting excess and used EV batteries to partners such as Redwood Materials and SunPower, supplying BESS for customers, including AI data centres. Stellantis's joint venture with Samsung SDI has made a similar shift in production priorities.

These strategic moves have reshaped industry expectations, prompting SEIA to double its forecast for US BESS capacity by 2030.

Conclusion

US BESS growth in 2026 looks strong, but efforts to avoid Chinese components could limit expansion. This underscores the need to scale domestic manufacturing across the value chain and, more importantly, to accelerate technology-driven cost reductions to improve US competitiveness.

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