
PERSPECTIVES

**SOLAR PHOTOVOLTAIC (PV)
CONSTRUCTION PROJECTS:
A FACTUAL REVIEW OF
CONSTRUCTION DISPUTES**



Our perspectives feature the viewpoints of our subject matter experts on current topics and emerging trends.

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Construction professionals involved in solar photovoltaic (PV) construction projects should read this article to learn more about:

- Main drivers of solar PV disputes J.S. Held experts have encountered in Latin America and the Middle East and Africa (MEA) regions.
- Regulatory responses from different countries to mitigate grid connection delays.
- Why the solar PV supply chain is highly reactive to geopolitical instability.
- How aggressive bidding leaves little room to manage disputes more efficiently.

Executive Summary

The global expansion of solar PV is accelerating rapidly, driven by ambitious decarbonization targets and strong demand across major markets, inevitably crystallizing in construction disputes, largely linked to supply chain volatility, grid connection bottlenecks, and evolving regulatory requirements. Highly concentrated manufacturing, particularly in China, heightens geopolitical risks. At the same time, declining costs and aggressive bidding have compressed project margins, reducing resilience to disruptions. Together, these factors create a complex risk environment where proactive planning, contractual certainty, and integrated risk management are critical to successful project delivery.

EXPERT VOICES

David Vallès Vallès



David draws on his expertise as a civil engineer in delay analysis and international arbitration to examine how supply chain volatility, grid connection constraints, and evolving technology are driving disputes in utility scale solar PV projects across global markets. He offers actionable insight into anticipating risk allocation and mitigating disputes from project planning through completion.

Megan Miller



Megan brings nearly a decade of experience in construction disputes and advisory services for owners, developers, contractors, and subcontractors. Drawing on her background managing projects across the Americas, she analyzes how delays, cost pressures, and execution challenges shape disputes in complex capital projects, offering practical knowledge for managing risk and resolving claims across the project lifecycle.

An Unprecedented Growth of Solar Photovoltaic Across the World

With ambitious deadlines set by different countries and supranational organizations, such as the European Union raising the renewable energy target for 2030 to 42.5%,¹ or the United Kingdom Net Zero Strategy setting policies and proposals to decarbonize and meet the net zero target by 2050,² there is an anticipated surge in construction disputes arising from the development of these projects. Perhaps unsurprisingly, the leading cause of energy disputes in recent years has been associated

¹ https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets_en#:~:text=The%20revised%20Renewable%20Energy%20Directive%20EU%2F2023%2F2413%20raises%20the,renewable%20energy%20in%20the%20EU.

² <https://www.gov.uk/government/publications/net-zero-strategy>

with the construction of energy infrastructure and the provision of equipment (including supply chain),³ with which the solar PV industry is familiar, with a volatile supply chain highly concentrated in China.

Nonetheless, after crunching some numbers, we can recognize a relentless growth pattern across different continents in solar photovoltaic (PV) capacity. Recently, in the United Kingdom, the 2026 Allocation Round 7 awarded 4.9 GW of new solar capacity over 157 different projects.⁴ This signifies a tremendous increase over the 20 GW capacity the country had in 2025.⁵ Looking south across the English Channel, in Spain, solar PV capacity surpassed the 50 GW milestone at the beginning of 2026, with some projections anticipating a tripling by 2035.⁶ But such growth does not only occur in the old continent. In fact, when sailing across the Atlantic Ocean, the United States is looming in the sector and planning to add 43.4 GW of utility-scale PV capacity just in 2026,⁷ a significant 60% year-over-year increase over 2025, with Texas accounting for a 40% of this added capacity.⁸ Thus, the 2025 Executive Order to disincentivize wind and solar projects by scrapping subsidies and tax breaks is not causing a short-term slowdown in solar project construction.

In South America, the solar industry's growth does not appear to be slowing any time soon either. For instance, Chile has already installed solar PV capacity of 11 GW⁹ and the country estimated over 2 GW under construction in early 2026.¹⁰ Not even in the oil-rich Gulf States does the industry warn of any sign of slowdown, with Saudi Arabia surpassing the 12.4 GW milestone in solar PV and adding around 7.8 GW only in 2025,¹¹ effectively doubling its capacity.

However, the acceleration toward solar PV is unquestionably riddled with construction disputes throughout its project lifespan. In this paper, we summarize patterns we have identified from our personal involvement in solar PV construction disputes, revisiting the main takeaways and common drivers.

Solar PV Disputes in Latin America

Drawing on our experience as construction experts, we have identified quasi-systematic patterns in Latin America. First, in this region, common delays impacting project completion are, as previously identified by the Queen Mary University study, often rooted in the late delivery of equipment. More specifically, our review has identified substantial procurement delays on PV modules, trackers, and inverters. Stated differently, supply chain bottlenecks and disruptions are cascading down the chain also in Latin America, impacting the construction phase of solar PV projects. We anticipate that these disputes will only escalate in the coming years, particularly due to the knock-on effects of tariffs, uncertain regional economic growth, and the financial effects of ongoing armed conflicts, especially in the Middle East.

Additionally, we identified a discernible pattern of disputes arising in Latin America resulting from delayed access to sites. Unlike infrastructure projects in urban areas, where planning permits usually delay the start of construction, in solar projects in the region, there is an actual risk of regulatory authorities imposing additional requirements after contract award, as well

³ Future of International Energy Arbitration Survey Report – Published 20 January 2023

⁴ <https://www.gov.uk/government/news/new-auction-delivers-unprecedented-clean-homegrown-power>

⁵ <https://www.atlanticrenewables.co.uk/contact-us/news-blog/uk-solar-capacity-hits-20-gw.html#:~:text=UK%20Solar%20Capacity%20Hits%202020.systems%20both%20surging%20in%20popularity>

⁶ <https://www.pv-magazine.es/2025/10/02/espana-alcanzara-1528-gw-fotovoltaicos-en-2035-y-cumplira-el-pniec-segun-globaldata/>

⁷ <https://www.pv-tech.org/eia-us-add-record-43-4gw-new-utility-scale-solar-pv-capacity-2026/>

⁸ <https://www.eia.gov/todayinenergy/detail.php?id=67205>

⁹ <https://infotecnica.coordinador.cl/instalaciones/centrales>

¹⁰ https://energia.gob.cl/sites/default/files/documentos/reporte_de_proyectos_-_enero_2026.pdf

¹¹ <https://www.pv-magazine.com/2026/03/25/saudi-arabia-adds-around-7-8-gw-of-solar-in-2025/>

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as delays in the construction of transmission infrastructure. These supplementary requirements often delay the project's critical path significantly. Furthermore, environmental, land-use, or archaeological permits, notably by national heritage authorities, have imposed further restrictions on full-scale mobilization in specific developments. Therefore, a robust understanding of the stakeholders is paramount in most countries of the region, as it precludes the ability to proceed without delay or disruption. It follows that providing timely identification of when and which areas of work are required for the contractor to proceed can systematically reduce the project's risks.

Moreover, our analysis reveals grounds for disputes arising from scope changes, some of which are specific to solar PV projects. For instance, we have encountered disputes arising from technical modifications of layouts, additional studies required by the Owner, or revised installation, testing, and commissioning procedures.

The key driver of delays, however, is often related to grid connection and system operators; not only in the Latin American bloc, but a common threat faced all over the world. This is because interconnection delays often impact the actual critical path, especially when construction is complete, but the project's commercial operation is prevented because the system remains off-grid after commissioning. We later analyze the problems with grid connections and their potential solutions.

Solar PV Construction Disputes in the Middle East and Africa

With many parallels to Latin America, in the Middle East and Africa (MEA) region, we have first identified a pattern of construction disputes in solar PV arising from delays that

prevent the project connection date from being achieved as planned. This is often the knock-on effect of delaying energization and subsequent hot commissioning. For instance, it is common to suffer access delays to electrical special facilities and interfaces, with disputes emerging between the parties as to whether it was a delayed access, which usually falls under the Owner's risk, or the critical delay was a lack of construction and design coordination, which usually falls under the contractor's control. This is often a contentious dispute in which effective management of contemporaneous records tilts the balance one way or another, and expert evidence becomes the pinnacle for untangling the dispute.

Given the technical complexities of solar PV systems, we have identified a recurring pattern of disputes arising from failures to meet compliance requirements and operational restrictions following energization. However, depending on the project design, delays impacting the energization may not fully prevent the whole electricity dispatchment but only a fraction of it. Therefore, [thoughtful planning of the systems and construction works](#), such as staggered energization, may shift the risk profile of the parties in one direction or another, reducing exposure to compliance and operational delays. Nonetheless, the same dispute may subsequently crystallize in whether the Initial Commercial Operation Date (ICOD) could have been deemed achieved despite incomplete grid tests. In these instances, it is not surprising for owners to claim partial concurrency to reduce ICOD periods and energy payments, and we have seen it firsthand in the MEA region.

Finally, we have also identified disputes in the region arising from non-compliant PV modules and severe supply chain disruptions, leading to material delays that are critical to energization and project completion. We have already pinpointed their occurrence elsewhere in the world, and we further detail our view in the subsequent section.

Understanding Supply Chain in Solar PV: A Market-Wide Analysis

Based on our findings in Latin America and the MEA markets, we briefly examine supply chain constraints and realities in the solar PV market, with the inevitable implications for supply risk and dispute exposure.

An operational strategy to mitigate supply chain disputes is to develop vertical integration of the same and consider geographic rebalancing. However, this is not always possible, especially for technologies that require rare-earth elements (REE) to become competitive. In practice, these REEs are critical components in solar panels, with China leading extraction with almost 70% of production, followed by the United States with 13.1% as of 2025.¹² In solar PV, one application of REEs is to convert light to electricity using semiconductor minerals such as indium, gallium, cadmium, germanium, selenium, and tellurium.¹³ Furthermore, China is not only the leader in REE mining but also overwhelmingly dominates the global solar PV supply chain. China accounts for almost 95% of global polysilicon, ingot, and wafer manufacturing capacity.¹⁴ This relative metric is even more impressive when compared with the total trade of the global photovoltaic supply chain, which, in absolute terms, increased from \$14.75 billion to \$79.57 billion from 2000 to 2020.¹⁵ Therefore, a shift in global manufacturing of PV components is not only highly unlikely in the short to mid-term but

also technically implausible. This overwhelming market domination poses a threat to national energy security in many countries, and the unavailability of specific components affects not only the construction phase but also the operational period.¹⁶

Interestingly, the demand for rooftop solar panels has surged since the start of the Iran war,¹⁷ probably attributable to strengthening energy security and reducing dependency on oil, boosted by the volatile situation in the Middle East and the Strait of Hormuz. Research suggests that, since the onset of the Middle East conflict, Europe's existing solar fleet has generated savings of around €110 million per day.¹⁸ Nonetheless, this surge in demand is not going to alleviate the already strained supply chain but rather raise shipping prices and insurance premiums.

To further complicate matters, it is necessary to examine the regional dynamics of each region. For instance, in addition to China's global dominance on REEs and manufacturing power of solar PV elements, the US steel supply is reportedly squeezed by tariffs on imported steel, whose direct impact on solar PV is essential to mounting structures, racking, and single-axis trackers¹⁹, and such tension is materially relevant to the country, which sits at the top of the world's steel net import rankings with 18.6 Mt in 2025.²⁰ The European Union, on the other hand, has recently blocked public funding on solar PV inverters, citing that Chinese energy infrastructure represented a major threat.²¹

¹² <https://www.statista.com/statistics/270277/mining-of-rare-earths-by-country/>

¹³ Chadly, A., Moawad, K., Salah, K., Omar, M. and Mayyas, A. (2024). State of global solar energy market: Overview, China's role, Challenges, and Opportunities. Sustainable horizons, [online] 11, pp.100108-100108. doi:<https://doi.org/10.1016/j.horiz.2024.100108>.

¹⁴ <https://www.iea.org/reports/solar-pv-global-supply-chains/executive-summary>

¹⁵ Li, W., Zhang, M. and Han, M. (2025). Geographical linkage and trade disruption within global photovoltaic supply chains. Geography and Sustainability, p.100323. doi:<https://doi.org/10.1016/j.geosus.2025.100323>.

¹⁶ Evans, M.-A., Grand, P.-P. and Dupuis, J. (2025). Diversifying the solar photovoltaic supply chain to secure Europe's energy and climate roadmap and sovereignty. iScience, 28(6), p.112751. doi:<https://doi.org/10.1016/j.isci.2025.112751>.

¹⁷ <https://www.reuters.com/sustainability/climate-energy/iran-war-revives-european-rooftop-solar-demand-cut-energy-bills-2026-04-23/>

¹⁸ <https://www.solarpowereurope.org/press-releases/new-research-solar-power-saving-europe-more-than-110-million-a-day-since-middle-east-conflict-began>

¹⁹ <https://pv-magazine-usa.com/2025/09/19/the-steel-supply-crunch-threatening-u-s-solar-ambitions/>

²⁰ <https://worldsteel.org/data/world-steel-in-figures/world-steel-in-figures-2025/>

²¹ <https://www.ft.com/content/341d3ee4-bae1-4819-8db2-b91767a2752d?syn-25a6b1a6=1>

In practical terms, the solar PV supply chain remains concentrated and exposed to world disruptions and geopolitical instability, with near-term diversification implausible. Stakeholders in the market should therefore plan for continued supply volatility and factor supply-chain risk into both project delivery strategies and long-term operations.

Grid Connection Reform and Queue Management: Emerging Regulatory Responses

Following our initial findings, this section examines grid connection and the regulatory responses reshaping project risk allocation. To put some background and numbers in perspective, in the United Kingdom, solar sites can wait up to 15 years to be connected due to lack of capacity on the grid.²² Similar claims have been made in Europe, where grid connectivity can take up to 9 years.²³ In the United States, the delay is not that significant, but it increased from 3 years in 2015 to 5 years in 2022.²⁴

Some countries have started tackling this problem, as it will not fade away without intervention. For instance, in the United Kingdom, major players need to enter into a grid connection agreement with the National Grid Electricity System Operator (NGESO). Due to a large number of projects requiring grid connection, NGESO issued the reform CMP376 to address this issue.²⁵ Among other requirements, the reform imposes eight milestones (seven

for transmission) to be achieved. Otherwise, NGESO can terminate the contract if any of these milestones are not achieved. In this situation, disputes arising from the connection to the national grid must be managed under the Electricity Arbitration Association rules. From statutory consents and planning permissions to finalizing project construction, the milestones aim to ensure delays are avoided throughout the project, covering securing land rights, design, and constructability. The reason for undertaking this approach is to kick any lagging or unachievable projects from the queue management process to connect to the grid. This is an attempt to benefit the performing projects by streamlining the queue management system and reducing the backlog time. Similarly, in Australia, the Distributed Energy Resources Grid Connection Guidelines require the Network Services Provider to outline “time limits on the proponents at various stages of the connection process, such that any proponent who exceeds these timeframes foregoes its place in the queue, and any reasonable grounds upon which time limits may be extended.”²⁶

Grid connection reform and queue management mechanisms are emerging as necessary regulatory responses resulting from fatidic past experiences. While measures such as CMP376 in the United Kingdom and equivalent frameworks in Australia and elsewhere aim to prioritize effective project delivery and reduce congestion, they function as a triage mechanism, benefiting successful projects and penalizing laggards. Therefore, these regulatory requirements must be successfully integrated into the contractual framework and the project’s schedule to enhance stakeholder awareness and reduce risk uncertainty.

²² <https://www.bbc.co.uk/news/science-environment-65500339>

²³ <https://windeurope.org/newsroom/press-releases/immediate-actions-needed-to-unblock-grid-capacity-for-more-wind-energy/>

²⁴ <https://www.utilitydive.com/news/grid-interconnection-queue-berkeley-lab-lbnl-watt-coalition-wind-solar-renewables/647287/>

²⁵ <https://www.neso.energy/industry-information/codes/cusc/modifications/cmp376-inclusion-queue-management-process-within-cusc>

²⁶ https://www.energynetworks.com.au/assets/uploads/distributed_energy_resources_grid_connection_guidelines_framework_and_principles.pdf

A Relentless Technological Evolution: The Engineering Improvements Drying Up Financial Margins

In this final section, we delve into the shadowed impact of the rapid technological evolution and cost compression on financial margins in solar PV projects. Undoubtedly, the downward pressure on costs of solar PV projects is also increasingly shaping the disputes market. Between 2010 and 2024, the global weighted average installed cost reduced dramatically, from 5,283 USD/kW to 691 USD/kW.²⁷ This massive cost reduction has been driven by several factors, including the cost of the modules (50% reduction), an improvement in installation (15% reduction), the cost of the inverters (10% reduction), and the cost of racking and mounting (7% reduction), just to name a few.²⁸ However, a decline in costs does not translate into higher profitability. In most cases, the financial viability of solar PV offers tight margins, and even in stable jurisdictions with strong policy support, it benefits from a low Weighted Average Cost of Capital (WACC).²⁹ Such a cost of capital does not translate into high margins but rather into aggressive pricing strategies and bidding. Therefore, it inherently shapes a distressed project from inception. And when short margins dry up, and the profitable project turns into a loss-making one, disputes are quickly crystallized, sometimes not even genuinely, but as a matter of financial last resort.

Therefore, while solar PV technology is rapidly evolving, it is probably a sign of a healthy and prominent industry. But likewise, when the

financial margins shrink, there are inherent commercial risks and tensions to manage while successfully delivering within positive margins. From a construction perspective, changes from the initial project design may have an impact on the approval of the final design by owners and grid operators alike. Additionally, initial designs may also be influenced by statutory requirements. But these requirements are constantly evolving, introducing project changes that impact the intended design of solar PV projects. For instance, the US introduced changes to the National Electrical Code 2026, which have different impacts on utility-scale projects.³⁰ When new requirements are not recognized and incorporated into design and commissioning procedures by all relevant stakeholders, the project's risk of permitting problems with the grid operator in many jurisdictions increases significantly.

In short, cost reductions and technology evolution in solar PV have compressed margins rather than strengthened delivery. In practice, aggressive bidding pricing leaves little tolerance for design and regulatory adaptation. Therefore, when unexpected complexities emerge, the already limited financial margins give the perfect cocktail for disputes to trigger.

Conclusion

The rapid global expansion of solar PV infrastructure marks one of the most significant transformations in modern energy systems. The sector is no longer constrained by demand or policy ambition, but by its capacity to deliver projects reliably in a complex, increasingly strained delivery environment. The unprecedented scale of deployment has amplified pressures across projects,

²⁷ https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Jul/IRENA_TEC_RPGC_in_2024_2025.pdf

²⁸ https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Jul/IRENA_TEC_RPGC_in_2024_2025.pdf

²⁹ https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/May/IRENA_The_cost_of_financing_renewable_power_2023.pdf

³⁰ <https://www.surgepv.com/blog/nec-2026-solar-changes>

from manufacturing and logistics, through permitting and engineering, to grid connection and commercial operation. These challenges are further exacerbated by the structure of the global solar PV supply chain, which remains highly concentrated in China and geopolitically exposed to conflicts and regulatory policies in the west. As explored in this article, near-term diversification is neither commercially nor technically feasible, meaning that supply chain volatility may be treated as a baseline rather than an exceptional risk.

Compounding the complexities, grid connection has emerged as a global bottleneck often sitting outside the direct control of the contractual parties. Some countries, such as the United Kingdom and Australia, have recognized the problem and, indeed, legislated to address the backlog. However, problems arising from delayed grid connections are not expected to be resolved anytime soon. Overlaying these operational realities onto a financial landscape defined by increasing competition and aggressive bidding puts the market on fragile ground. Sustained cost reductions and low financing costs have enabled rapid deployment, but they have also compressed margins and reduced tolerance for avoiding disruption. As a result, when permitting, engineering, or grid-related issues emerge, the rapid erosion of financial margins frequently acts as a catalyst for disputes, as a mechanism attempting to reallocate risks.

From our experience across different jurisdictions, we identified that disputes in solar PV are not driven by isolated technical shortcomings, but by the cumulative effect of stressed delivery conditions. Where concentrated supply chains, evolving technology, constrained grid access, and compressed financial margins coexist, even minor disruptions can destabilize projects, and disputes quickly crystallize. As construction in most regions accelerates, parties that recognize these dynamics early and incorporate them realistically in the financing assumptions,

contractual frameworks, and project governance will be best positioned to navigate disputes proactively and preserve value in an increasingly complex delivery environment.

Acknowledgments

J.S. Held would like to thank David Vallès Vallès and Megan Miller for providing insights and expertise that greatly assisted this research.

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