

WHEN THE BOTTLENECK BECOMES THE ASSET

Why the scarcity of executable power may be changing where value is created in energy infrastructure

By Gustavo Vera, CFA, FRM

More than 2 TW of generation and storage is seeking U.S. grid interconnection. Yet the scale of the queue is a poor proxy for executable supply. Among capacity that requested interconnection between 2000 and 2020, only 13% had reached commercial operation by the end of 2025; 75% had withdrawn and 10% remained active.

That gap matters for valuation. The constraint facing investors may be shifting from the availability of projects to the availability of projects that can actually reach operation on an investable timetable. Put differently: perhaps the emerging scarcity in power infrastructure is not simply generation. It is executable generation.

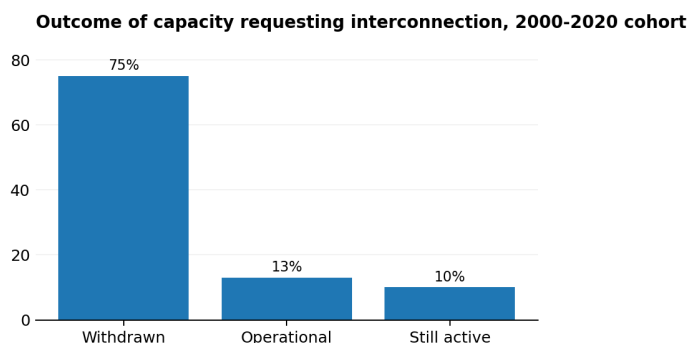
The distinction is increasingly visible in U.S. interconnection data. Berkeley Lab reports approximately 8,200 active projects at year-end 2025, representing 1,312 GW of generation and 749 GW of storage. Solar alone accounted for 773 GW, storage for 749 GW, natural gas for 253 GW and wind for 220 GW.

The queue therefore contains enormous nominal supply. But nominal megawatts and financeable megawatts are not equivalent. A project still needs an interconnection pathway, permits, equipment, land, contracting and a credible route through construction. Each can consume time; several can become binding simultaneously.

This suggests a different way to frame scarcity. If capital is abundant relative to projects that can be executed promptly, value may migrate toward the attributes that compress the path from development to cash flow: interconnection, permitting maturity, equipment access, firm deliverability and time-to-power.

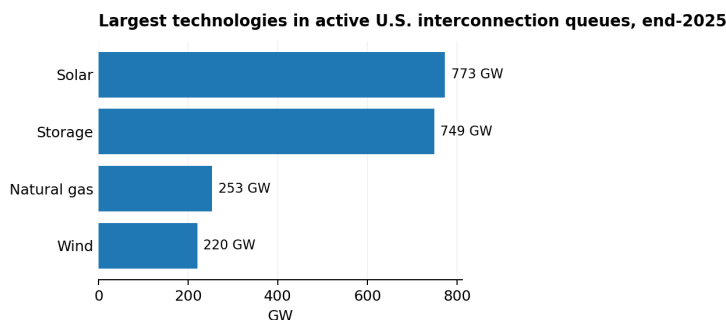
The hypothesis is not that every bottleneck deserves a premium. It is that execution rights can acquire economic value when they are scarce, durable and controllable.

Exhibit 1. Most queued capacity never reaches operation



Source: Lawrence Berkeley National Laboratory, *Queued Up: 2026 Edition*. Capacity requesting interconnection in 2000-2020; residual reflects other statuses/rounding.

Exhibit 2. More than 2 TW is seeking U.S. grid interconnection



Source: Lawrence Berkeley National Laboratory, *Queued Up: 2026 Edition*. Active capacity at year-end 2025.

From queue depth to execution scarcity

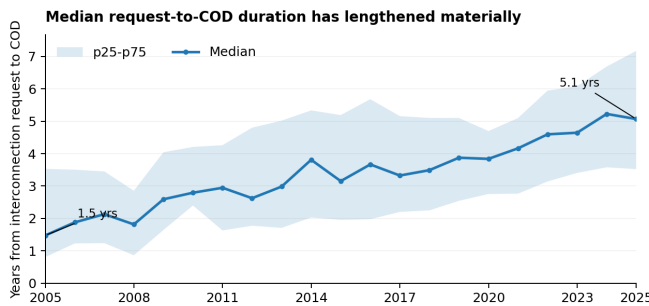
The first implication is analytical. Interconnection queues should not be read as a conventional supply pipeline. Berkeley Lab notes that most requests are ultimately withdrawn and that even projects with signed interconnection agreements can fail to reach operation. At year-end 2025, 549 GW had a draft or executed

interconnection agreement but had not yet achieved commercial operation.

That does not make the queue irrelevant. It changes what the queue measures. Rather than representing future supply one-for-one, it is better viewed as a large option set competing for a smaller stock of executable pathways.

The second implication is temporal. For projects reaching commercial operation in 2025, median request-to-COD duration exceeded five years in regions with complete data. In the mid-2000s the comparable median was roughly 1.5 years. The economic issue is therefore not only whether a project eventually operates, but when its cash flows become available.

Exhibit 3. Interconnection timelines have lengthened materially



Source: Lawrence Berkeley National Laboratory, Queued Up: 2026 Edition, annual IR-to-COD duration series. Shaded range in the underlying series reflects p25-p75.

Time-to-power as a valuation variable

Consider two assets with identical technology, operating performance and annual cash flow. The only difference is timing. Asset A can begin producing cash flow today; Asset B must wait five years.

	Today	Year 5
Annual perpetual cash flow	\$100	\$100
Value at 10% discount rate	\$1,000	\$1,000
Present value today	\$1,000	\$621
Timing discount	-	38%

Illustrative only. A perpetual \$100 annual cash flow discounted at 10% is worth \$1,000 when available immediately; if the same cash-flow stream starts five years later, its present value is approximately \$621.

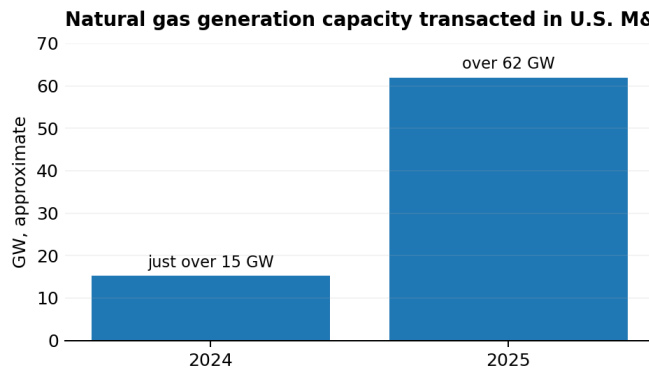
Nothing about the physical asset changed. The 38% difference is entirely the value of time. In an actual

project, the effect would interact with construction spend, development risk, inflation, financing carry, contract expiry and terminal assumptions. But the simplified example isolates a point that conventional technology comparisons can obscure: execution timing is itself an economic variable.

This matters most when delay is not diversifiable at the asset level. A developer can improve engineering or renegotiate an EPC contract, but it cannot unilaterally create transmission capacity, accelerate a utility study process or manufacture a constrained transformer. Where the critical path sits outside the project, a nominally attractive return may be less valuable than a lower-return opportunity that can be executed now.

Market evidence is consistent with this repricing mechanism. Deloitte estimates that more than 62 GW of U.S. gas generation changed hands in 2025, versus just over 15 GW in 2024. Gas generation transaction value reached nearly \$89 billion across 23 deals, while M&A valuations approximately doubled year over year.

Exhibit 4. U.S. gas generation M&A accelerated sharply



Source: Deloitte, Power and Utilities M&A, 2026. Capacity figures are approximate.

The interpretation is more important than the headline volume. Deloitte links the repricing to scarcity of firm, deliverable capacity, elevated turbine pricing and manufacturing backlogs, and the value of operating assets with established interconnections and transmission infrastructure. In other words, buyers appear to be paying not only for megawatts, but for deliverable megawatts with time already removed from the development path.

The same constraint is visible from the demand side. JLL reports that average grid-connection waits in

primary data-center markets exceed four years and identifies speed-to-power as the primary site-selection criterion. Reuters reported in July 2026 that lead times for some transformers exceeded 160 weeks. These observations are not necessary to make the valuation argument, but they reinforce the breadth of the execution constraint.

Economic scarcity is not investable scarcity

A bottleneck can be economically important without creating an investable return. This is the key distinction.

For scarcity to matter to an investor, the investor must be able to own, contract or otherwise control the scarce attribute. The scarcity must also persist for long enough to matter relative to the asset's holding period, and the acquisition price must not already capitalize the full benefit.

Scarce Attribute	Control mechanism	Potential value channel
Interconnection	Queue position / Interconnection Agreement / asset ownership	Development premium; earlier cash flow
Permitting	Project-specific approvals	Lower completion risk; shorter duration
Firm deliverability	Existing connected asset / contract	Capacity or contracting premium
Equipment access	Reserved slot / supply contract	Avoided delay; replacement-cost advantage

This framework changes the underwriting question. The relevant issue is not simply whether a bottleneck exists, but whether it is durable, controllable and mispriced.

An interconnection agreement attached to an operating plant is different from a general expectation that transmission will remain constrained. A reserved turbine slot is different from observing that turbines are scarce. Permitting maturity can shorten duration, but only if the remaining approvals are not themselves binary. Scarcity becomes investable when it is embedded in a right, contract, asset or position that can be transferred into cash flow.

What could invalidate the thesis?

There are at least four counterarguments. First, queue reform may work. FERC (Federal Energy Regulatory Commission) Order 2023 and regional reforms are designed to reduce speculative requests and accelerate processing; Berkeley Lab explicitly notes that it is too early to assess their full effect. The decline in active queue volume from its 2023 peak near 2,600

GW to 2,061 GW in 2025 may be an early sign of normalization rather than permanent scarcity.

Second, supply can respond. Transformer and turbine manufacturing capacity can expand, alternative suppliers can qualify, and procurement strategies can move earlier in the development cycle. A current backlog should not automatically be capitalized as a perpetual rent.

Third, the scarce attribute can be overpaid for. If an acquisition premium fully reflects five years of avoided delay, the buyer has not created value; it has purchased time at fair value. The investment case depends on the market underestimating either the duration, probability or economic cost of the alternative path.

Fourth, execution advantages can decay. Interconnection rights can be conditional, permits can lapse, contracts can expire and network upgrades can alter congestion patterns. The value of executability is therefore path-dependent rather than permanent.

Implications for infrastructure underwriting

The practical implication is not to abandon conventional asset valuation. It is to disaggregate it. Investors can think of project value as comprising at least two layers: the value of the operating asset under normalized assumptions and the value of the execution position that determines how quickly and confidently that operating state can be reached.

This execution value is rarely identified separately in traditional project valuation. Instead, it is typically embedded in assumptions around expected COD, development risk and the discount rate. As execution constraints become more material, investors may need to assess these factors more explicitly — including the probability and timing of reaching COD, the certainty of interconnection, and the time required to replace critical equipment.

This also changes comparables. Two projects with similar capex, technology and contracted revenues may not be economically comparable if one has an executed interconnection agreement, secured equipment and mature permits while the other is exposed to a multi-year critical path. The appropriate premium is not a generic 'scarcity premium'; it is the present value of avoided delay and avoided failure risk, net of the price paid to secure those advantages.

The broader conclusion is deliberately narrower than the headline. There is no evidence that bottlenecks universally become assets. But where a scarce execution attribute is durable, transferable and controllable, it can become economically separable from the physical plant itself.

As development timelines lengthen, part of the economic value of infrastructure may migrate from the asset toward the attributes that make the asset executable. For institutional investors, the opportunity is not merely to identify scarcity. It is to determine which forms of scarcity can actually be owned, and whether the market is pricing the value of time correctly.

References

Lawrence Berkeley National Laboratory. Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection, 2026 Edition. Data through year-end 2025.

Deloitte. Power and Utilities M&A, 2026. Analysis based on S&P Global Capital IQ Pro and Deloitte research.

JLL. 2026 Global Data Center Outlook, January 2026.

Reuters. "US power companies scramble to secure equipment as surging data center demand strains supplies," July 9, 2026.