Assessing Data Center Power Options with the Transition Acceleration Framework

July 9, 2026
Charlotte McClintock (cmcclintock@rhg.com), Shashank Mohan (smohan@rhg.com), Eden Chan (echan@rhg.com), Michael Delgado (mdelgado@rhg.com), Trevor Houser (tghouser@rhg.com)

Following decades of incremental change, electricity supply in the US is once again a growth industry, and data centers sit at the center of debates over affordability, reliability, and climate impact. Rhodium has previously quantified what surging data center demand means for US energy and emissions. Here we analyze options for powering data centers, and assess which choices genuinely accelerate the energy transition, which undermine progress, and which merely participate in trends that are taking place anyway. The question is important for investors, asset managers, and procurement teams with real climate ambition: how can you maximize impact with the capital you control while solving for the binding constraints of speed to power and limited interconnections and supply? To differentiate options, we employ the Transition Acceleration Framework (TAF), a new analytical approach from Rhodium Group, developed in partnership with CalSTRs and Generate Capital, that scores how much an investment speeds up or slows down the energy transition, applied here to data center power.

The developer's dilemma

Powering a data center today means building at scale against hard constraints. Interconnection queues are long, gas turbines are on back order, and clean firm technologies are still early and costly. Most importantly, every month of delay defers the return on the facility's far more valuable asset—its chips—so speed to power is non-negotiable. Procurement teams are under pressure to eliminate scope 2 emissions now, while also striving to advance the novel clean firm solutions they (and the wider grid) will ultimately need to fully decarbonize.

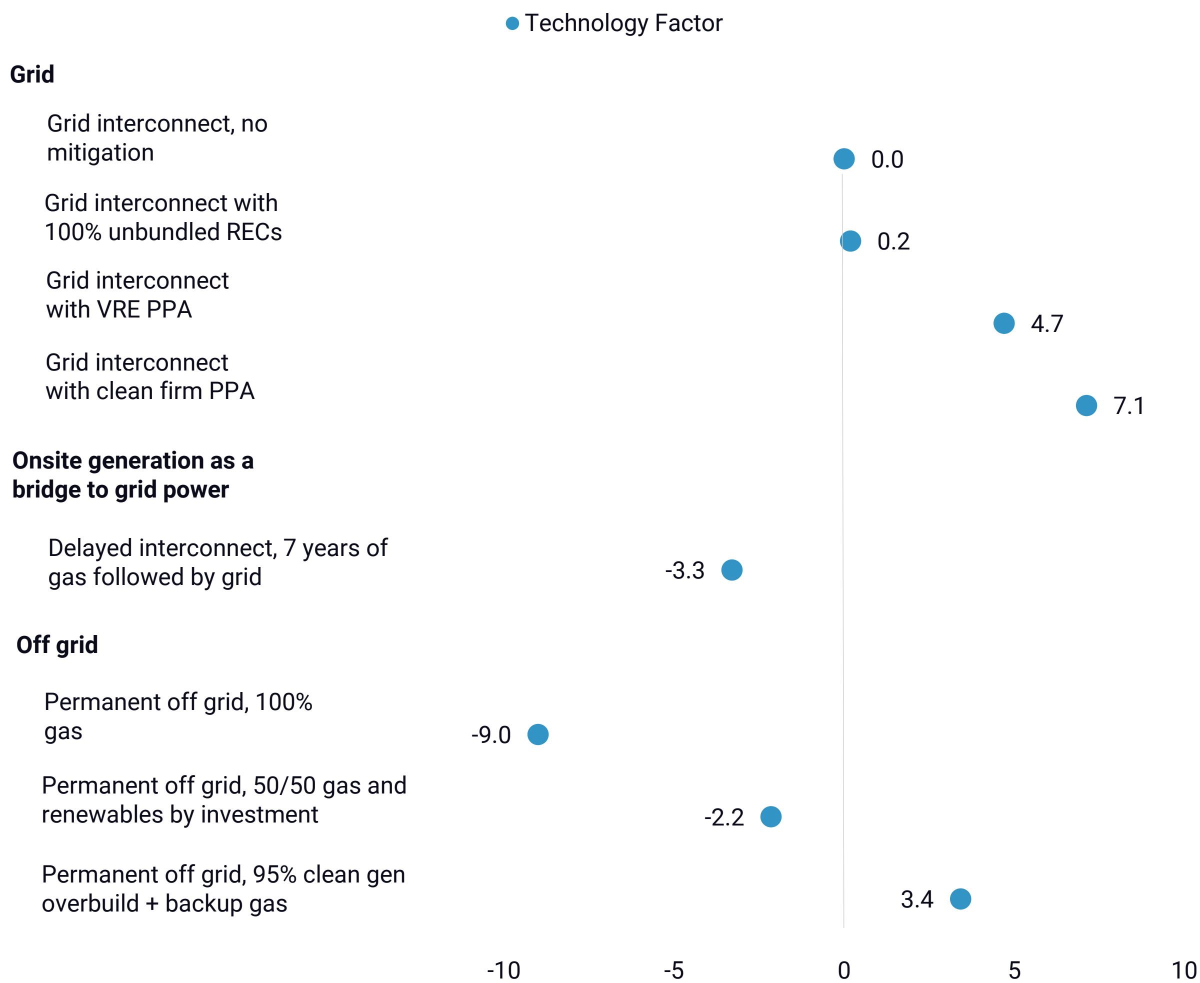
Conventional emissions accounting offers limited help in sorting out these competing tensions. It largely asks whether a buyer has matched the facility's load with enough clean megawatt-hours, not whether a given choice has actually changed what gets built and emitted. Configurations with very different real-world impacts can look equivalent on paper. And teams putting immense and vitally important effort into proving out new markets, fostering emerging technologies, and building supply chains are treated in sustainability reports as expensive side quests on the road to homogenous power procurement goals.

The [Transition Acceleration Framework (TAF)] is built to directly address these challenges. It prioritizes investments that go beyond the baseline, with forward-looking analytics that reward capital-efficient strategies that close the gap between what the world is currently on track for and what is possible with increased attention and ambition.

FIGURE 1

Transition impact of US data center power configurations

Technology Factor scores from the Transition Acceleration Framework



Source: Rhodium Group Transition Acceleration Framework. Scores here are for the United States. Clean firm includes enhanced geothermal systems and nuclear, which averages small modular reactors and conventional light water reactors. Where a data center draws power from an onsite source prior to grid connection, the score is adjusted based on the duration of onsite use relative to the assumed asset lifetime (20 years for gas turbines and fuel cells). Permanent off-grid gas assumes an NGCC; other configurations using gas assume an aeroderivative/modular peaker combustion turbine.

The good, the bad, and the break-even

In looking at the different options for powering data centers, the first takeaway is encouraging: there are many good ones. Within our illustrative set of profiles (Figure 1), a grid interconnect with a 100% PPA or direct investment in a clean firm source such as enhanced geothermal or new nuclear scores highest (+7.1) because it adds firm, low-carbon capacity that would otherwise not get built. A 100% PPA for variable renewables is not far behind (+4.7). An islanded off-grid facility can score well (+3.4) when it relies on overbuilt clean generation and battery storage, using gas for low-frequency (<5%) backup. Each of these represents a very different kind of win. The renewable PPA and the clean overbuild are reliable base-hits. They are real, repeatable, near-term gains available with today's technology. Clean firm procurement is the transformative play, and the gap in score between them captures the value of catalyzing future deployment and the fully realized value of additional sources.

The second finding is that the downside is just as meaningful. Permanent off-grid gas scores a -9.0 on the 10-point scale; a delayed interconnection bridged by 7 years of gas (-3.3) and an equal dollar-value investment in an aero gas combustion turbine and variable renewables (-2.2) also hinder progress relative to a default grid connection in the US (which scores a 0).

For developers and investors looking to maximize impact while racing to hit procurement needs on time, base-hit options deliver progress. The highest-impact configurations can be worth developing and paying down the cost curve, as today's choices catalyze future options, with benefits to investors, offtakers, and the public. TAF offers a pragmatic framework for weighing these positive outcomes against negatives, giving clarity to the question of just how much a fossil investment weighs down progress elsewhere in a portfolio.

The Transition Acceleration Framework

Rhodium Group has partnered with CalSTRS and Generate Capital to develop the Transition Acceleration Framework (TAF) to help allocate capital to where it is needed most. TAF provides quantitative answers to specific questions about where a marginal dollar, a marginal policy, or a marginal procurement decision will deliver the most decarbonization beyond the trajectory the world is already on. TAF analytics are available globally for more than 100 technologies spanning all sectors in the economy.

TAF is built on two core metrics: Transition Potential, measuring the size of the acceleration opportunity available for a technology, and Transition Efficiency, measuring the capital efficiency of additional emissions reductions. Transition Potential and Transition Efficiency are combined here into a Technology Factor (normalized to 10) to create clear, decision-relevant signals of transition acceleration impact.

Negative scores, assigned to unabated fossil technologies, mean investment in such technologies will lead to transition *deceleration*. Low scores indicate capital drives minimal additional emissions reductions beyond the baseline. High scores indicate investment catalyzes large emissions reductions relative to capital required.

FOR MORE INFORMATION

For more details on the Transition Acceleration Framework, including a deeper dive into our method and illustrative findings, visit us at taf.rhg.com or reach out at taf@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

Initial development of the Transition Acceleration Framework was conducted with support from CalSTRs and Generate Capital. This report was supported by a grant from the Blue Horizons Foundation. Rhodium designed and maintains the TAF methodology, scoring rules, and analytical outputs independently. Supporting organizations provided input on use cases, coverage priorities, and validation, but did not direct methodological choices, and the views presented here are those of the authors and not necessarily those of any supporting organization. The same methodology, scoring rules, and analytical outputs apply equally to all TAF users, regardless of commercial relationship with Rhodium.

Rhodium's full editorial and methodological independence is governed by our Principles of Independence.

DISCLOSURES

New York | California | Washington, DC | Paris

Website: **www.rhg.com**

Rhodium Group