

March 31, 2024

Dear Client:

In our current quarterly letter, we focus on the myriad roadblocks along the green energy highway. One obstruction above all else will need to be addressed before our reliance on fossil fuels declines in a meaningful way: the electric grid. U.S. utilities are warning of an impending imbalance between available supply and the explosive growth in demand driven by, among other things, data centers, electric vehicles, bitcoin mining, and advanced manufacturing. We emphasized distribution transformers -- a key device used to manage the flow of electricity along the power grid by changing high-voltage electricity from interstate transmission lines into low-voltage electricity before it reaches our homes -- as a weak point.

We should have identified the transmission lines themselves, because our national focus on the transition towards clean energy feedstocks ignores the critical state of our primary infrastructure. Perhaps the biggest obstacle to the rapid expansion of demand -- even before the inclusion of feedstock sources -- is a lack of modern power lines. Flat for decades, electricity demand has surged, causing utilities to double their forecasts of how much additional power will be required in just five years. As it is, power companies were already struggling to keep the lights on (especially during extreme weather), and the strain on grids will only increase.

But building transmission lines is a brutal undertaking, and it can take a decade for developers to site new lines through multiple counties and states, receive permission from a patchwork of different agencies, and address lawsuits about spoiled views or ecological damage. The U.S. added just 251 miles of high-voltage transmission lines in 2023, a shockingly low number for such a vast landmass and far flung manufacturing. This reflects the fragmented nature of America's electricity system: it's essentially just three grids but run by 3,200 different utilities with layers of regional planners and regulators at every level of local and state government.

The difficulty of adding new lines has stimulated ways to squeeze more out of the existing grid. This includes replacing existing power lines with cables made from state-of-the-art materials. Today's power lines consist of steel cores surrounded by strands of aluminum, a design that's been around for more than a century. Several companies have developed cables that use smaller, lighter carbon fiber cores that hold more aluminum, allowing twice as much current to be carried. Simply replacing the old lines can be done relatively quickly and would allow the cables to carry the solar and wind power from thousands of projects that have been proposed but can't move forward because local grids are too clogged to accommodate them.

The U.S. Department of Energy (DOE) estimates that upgrading power lines with AI-driven sensors that allow for more power to be sent through existing lines, in concert with new wires, could double the capacity of existing transmission corridors at less than half the cost of adding new lines. Power companies will need to build new capacity to reach more remote windy and sunny areas -- and utilities in Georgia, North Carolina, South Carolina, Tennessee, and Virginia are indeed proposing to build dozens of power plants over the next 15 years -- but if utilities began deploying advanced conductors on a nationwide scale, it is estimated they could add four times as much transmission capacity by 2035 as they are currently on pace to do.

Experts broadly agree that the sluggish build-out of the electric grid is the Achilles' heel of the transition to cleaner energy. The biggest barrier is that the industry and regulators are still caught in a short-term, reactive mind-set. But now we're in an era where we need the grid to grow very quickly, and our existing processes haven't caught up with that reality.

Regards,



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