



EXECUTIVE SUMMARY

SunTrain resolves massive transmission bottlenecks that are stalling the development and generation of renewable energy. It seamlessly stores gigawatt hours of clean energy from remote solar and wind farms in battery railcars that are transported over existing freight rail networks. This provides an immediate, alternative connection between renewable energy producers, substation nodes, and former fossil-fueled power plants, bypassing the congested transmission system.

The power grid does not have enough capacity to serve the current or projected demand for low-cost electricity from renewable resources. Expanding the grid is not an immediate or sufficient solution due to the twin obstacles of time and money. To build a new transmission line in the U.S. requires an average of 10 years and up to 20 years, at a cost of \$2.3M per mile¹. To meet projected 2050 demand, transmission capacity must triple from 2020 levels at a cost of \$2.4T². The gap between renewable generation and transmission construction is already having a broad economic impact. "Grid interconnection uncertainty" is reported as the primary barrier to financing and constructing projects of any kind, whether they are trying to add additional power to the grid or draw more power from it.³

A 100-car SunTrain, the length of a typical coal train, delivers over 1.9 GWh of energy with a 98% round trip efficiency. This is equivalent to the output of five natural gas power plants. It can be charged with (a) renewable power from SunTrain generation projects or those of third-party developers or (b) existing renewables otherwise curtailed due to grid congestion. At the discharge location, the railcars seamlessly integrate this power into the grid using SunTrain's bi-directional charging system. Once discharged, the train returns to the generation site, while a new, fully charged SunTrain takes its place at the discharge location.

SunTrains allow energy to be shifted in both time and location, providing a new type of energy capacity that avoids transmission congestion and reduces curtailment and emissions. It provides this at a levelized cost of capacity comparable to natural gas generation, while eliminating half a gigaton of carbon emissions per train each year. Unlike stationary storage systems, it does not compound capacity shortages by charging within constrained regions and can be repositioned to adapt to changing grid needs over

¹ <https://ifp.org/how-to-save-americas-transmission-system/>, www.transmission/xcelenergy.com

² <https://www.princeton.edu/news/2020/12/15/big-affordable-effort-needed-america-reach-net-zero-emissions-2050-princeton-study>

³ <https://emp.lbl.gov/publications/survey-utility-scale-wind-and-solar>

time. Importantly, it also supports a just economic transition for workers and communities by replacing lost coal transport business with battery freight cars and repurposing stranded fossil fuel power plants as charge/discharge points.

SunTrain's dynamic business model enables it to meet the needs of different market verticals and customer types, including utilities, renewable project developers, grid operators, and specialty applications such as data centers, electric vehicle charging locations, industrial facilities, and disaster response agencies. It operates using a capital-efficient development company model, building projects using an off-balance sheet project finance structure or direct financing by end-users using their own balance sheets. Projects can produce three types of revenue: up-front development fees, annual operations and maintenance fees, and recurring equity returns based on the ownership percentage retained by SunTrain in each project. As SunTrain's operational and financial capacity increases, it will roll its project portfolio into a subsidiary yield company that can raise additional project capital from investors that value less risk and higher stability of returns.

In 2022, SunTrain raised \$2.5M in Seed funding to build and operate a proof-of-concept scale 750 KWh railcar. This has been charged with solar energy from SunTrain's San Francisco test bed and transported over 6,500 miles on the Union Pacific network for discharge demonstrations around the state of California.

To advance to commercialization, SunTrain is raising a \$2.5M Seed Extension round to complete the design of a \$125M, 20-railcar, 384 MWh pilot-scale project for a major utility. The Pilot will operate between two former coal-fired power plants to capture frequently curtailed renewable wind and solar energy at one site and move it inside a large metropolitan to reduce gas peaker plant emissions. The project will capture critical design and operational data, help develop engineering component and system designs, and define the operational characteristics required by grid planners for the mass deployment and adoption of SunTrains. While the utility plans to directly fund the construction costs of the Pilot project itself, SunTrain will need to raise an additional \$8.5M by 4Q25, or earlier if time-to-market is prioritized. This additional capital will cover costs related to the implementation of the Pilot and for adding financial and human resources needed to create a pipeline of projects. The launch of A round fundraising will begin as soon as the value inflection point of Pilot contracting has been achieved.