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PRIVATE CAPITAL

Renewable Infrastructure Investments

An Increasing Focus on Energy Storage

The growth of "green" energy is indisputable—renewable energy overtook coal generation in the United States for the first time in 2019, providing 23% of US power generation, exceeding coal's 20% share.[1] Solar and wind energy receive the majority of new investment, with 97% of net new generation capacity additions expected to come from these two resources in 2020.[2]

As the expansion of renewable energy infrastructure continues, we anticipate such investments will be coupled increasingly with the installation of storage capacity, typically in the form of batteries. The evolution of battery technology and a corresponding further decline in costs will be essential to ensure the integrity and resiliency of power supply sources such as solar and wind, particularly with the continued retirement of coal-fired and nuclear baseload plants.

MetLife Investment Management

One of the hallmarks of the US electricity grid is its dependability. With rare exception, we fully expect the light will turn on when we flip the switch. Along with the proliferation of solar and wind projects comes the need to build consistency of supply into the system so that customers can continue to rely on the grid's dependable performance. Due to the inherent intermittent nature of wind and solar resources and the increasing frequency and severity of natural events such as hurricanes, floods and wildfires, utilities and other power providers seek new ways to counter fluctuations in the expanding output of renewable generation. The increased availability and cost-effectiveness of storage solutions should make renewable assets more cost- and performance-competitive with traditional energy sources, further bolstering adoption of renewables.

Furthermore, as the impacts of Covid-19 spread amid substantially reduced economic activity, one outcome is cleaner water in the canals of Venice and reduced smog over large cities like New York. In short, people have noticed this environmental progress and are now eager to maintain these long-term improvements in water and air quality, and the overall environment. Renewables will not only be a key component in responding to those demands, but also can be effective tools to address and mitigate the risks of climate change.

Based on the factors cited above, we believe investment in storage will be a critical step in the evolution of renewable energy infrastructure as an asset class. We see that the availability of storage not only contributes to the viability of renewable infrastructure projects, but is also an investment opportunity in its own right.

The essential role of power production, lightly cyclical demand, and the fact that many market participants are highly regulated or even monopolies, provide good credit characteristics. This credit strength can continue to be the case as power production shifts to renewable power, particularly with energy storage capacity.

Consequently, MetLife Investment Management (MIM) believes investors focused on infrastructure increasingly will seek to allocate capital to financing renewable energy and systems to store such power generation.

Range of Energy Storage Technologies

While energy storage needs can be met by several different technologies, it is fundamentally a means of collecting excess electricity at a point in time for later use. This applies equally to our smart phones or to large scale battery installations. Among the more prevalent types of storage systems, batteries operate by converting electricity into stored chemical energy and then back into electrical energy. Another common, large-scale storage method is pumped hydroelectric storage, which uses electricity to pump water up to an elevated reservoir, from which it later can flow down through a turbine generator. The range of storage technologies also includes compressed air, hydrogen storage, thermal energy storage, regenerative fuel cells, flywheels, capacitors, and other more esoteric systems.

Today, most short-term fluctuations between grid supply and demand are met by "peaking" gas or oil-fired generators. In such cases, the turbines typically run only for a matter of minutes or a few hours. As storage solutions become more cost-effective and more efficient, we expect storage generally, and batteries specifically, to increasingly supplant peaking turbines that are reliant on burning fossil fuels. According to the Energy Storage Association, rapidly declining costs have made battery storage the fastest growing storage technology.[3]

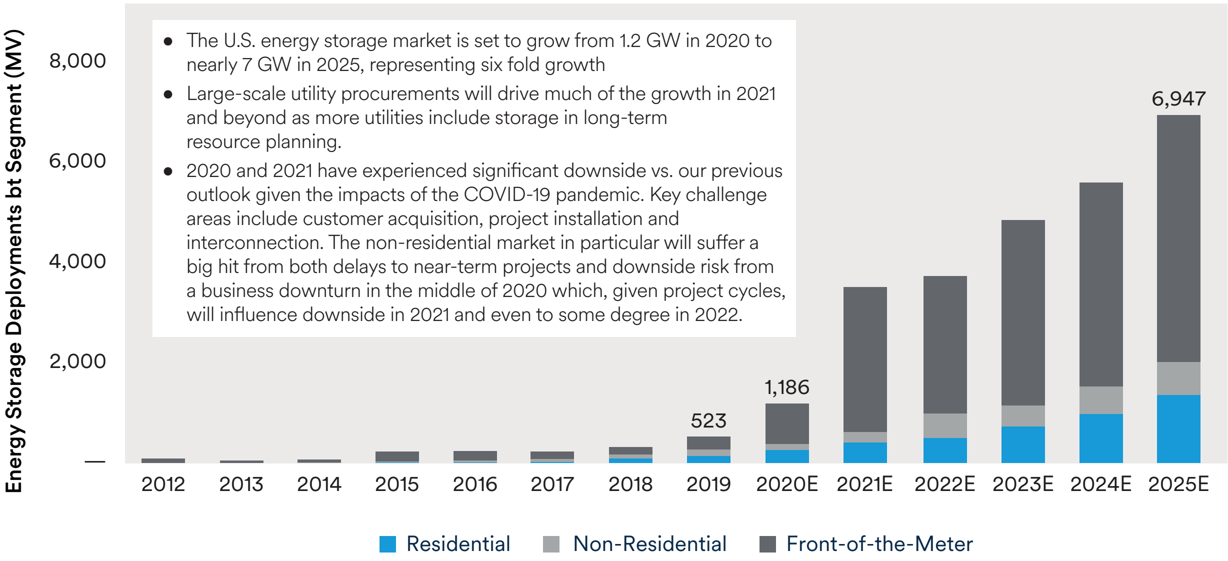
Energy Storage Demand: A Growing Market

To understand the market for energy storage, it is first helpful to examine the growth in demand. Between 2013 and 2018, energy storage deployments in the US alone grew at a compound annual growth rate of 74%.[4] The pace of growth is projected to increase exponentially in the next five years, driven by continued technological innovation, decreasing costs and rising demand for cleaner power generation.

U.S. Energy Storage Deployments will Reach Nearly 7 GW Annually in 2025

COVID -19 creates near-term downside due to customer-acquisition issues, installation/interconnection delays

U.S. Energy Storage Annual Deployment Forecast, 2012-2025E (MW)



Source: Wood Mackenzie Energy Storage Monitor, June 2020.

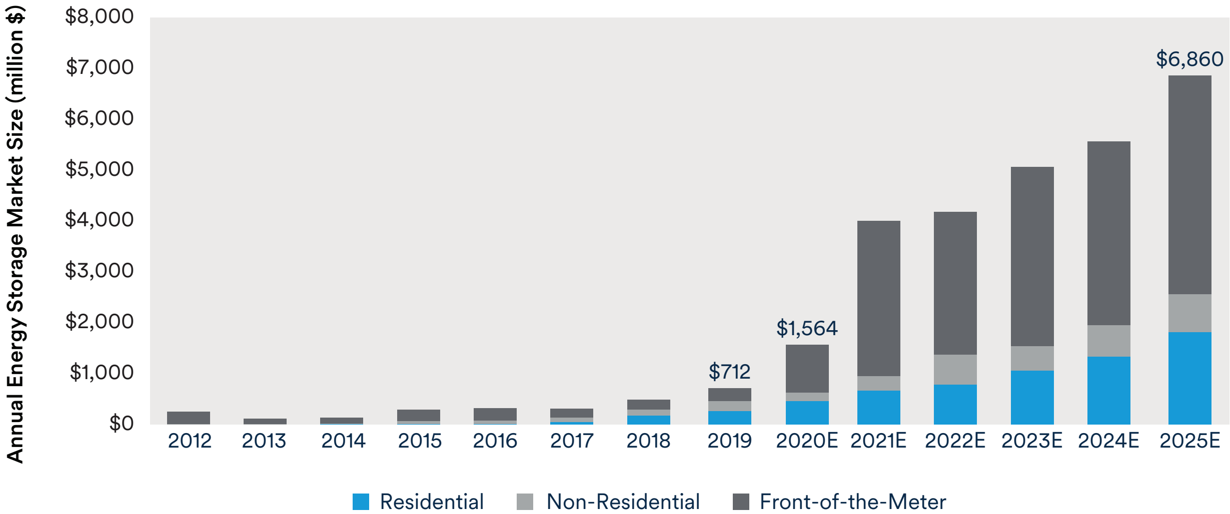
A major driver of the demand for storage has been the declining cost of renewable infrastructure generally. Particularly with respect to wind and solar assets, there has been a significant drop in the cost of the physical infrastructure and construction costs. As wind and solar installations become more cost-competitive with traditional fossil fueled plants, the concept of "grid parity" has become a reality in many regions domestically and internationally. Grid parity is a shorthand way of describing when clean energy is generated and delivered at the same or lower cost as the regional utility and is typically closely correlated to the cost of fossil-fuel generation. Yet, "cost" for comparison purposes should include common expenses (revenue) such as transmission, tax and other government incentives and, increasingly, environmental emissions and societal impacts. At the same time, storage costs also are falling, with predicted cost reductions of 48% to 64% by 2030.[5] As technology increases the efficiency of batteries, and declining costs enhance the economics of both renewable projects and storage, investors' interest in financing storage is likely to grow.

For investors, an important implication of this trend is that the market for energy storage is expected to reach nearly $7 billion in the US within five years.[6] This is borne out by the fact that MIM is seeing a slow but steady increase in the number of renewable projects that incorporate storage. For example, our recent investments include a project in Southern California consisting of a 1,284 MW combined-cycle gas plant with 110 MWs of battery storage. MIM also financed a pumped storage project in Massachusetts with a total capacity of 1,168 MW. Residential solar portfolios also contain increasing percentages of storage mated with solar panels.

U.S. Energy Storage will be a $6.9 Billion Annual Market in 2025

Market crosses $1 billion annual threshold in 2020 even taking into account COVID-19 impacts

U.S. Annual Energy Storage Market Size, 2012-2025E (million $)



Source: Wood Mackenzie Energy Storage Monitor, June 2020.

Battery Storage and Project Financing

The rising demand for battery storage reflects expanding demand for solar and wind generation, including off-shore wind. Concerns about resiliency and grid stability impact the conventional power supply system, spurred by the effect on the grid of increased severe weather, wildfires and other climate-related phenomena. We believe balancing the grid and the continued expansion of renewable infrastructure will fuel investors' interest in and appetite for project financings that incorporate or rely on storage.

The inclusion of battery storage as a project infrastructure component was noted by Moody's Investors Service's 2018 report, which stated that battery storage technology was, "...emerging as a tool to boost electric grid reliability, which is credit positive for owners of intermittent renewable energy generation and grid operators."[7] The US Congress also recognized investors' interest in storage financing. The *Energy Storage Tax Incentive and Deployment Act of 2019* (H.R.2096) was introduced last year to expand the tax credit for investments in energy property to include storage equipment including, but not limited to, batteries.[8]

Revenue Models and Financing Considerations

It should be noted that one of the more significant factors for project and infrastructure investors is the pro forma financial model which forecasts project financial performance to support a given financing transaction. In a *contracted model*, revenues are subject to a long-term contractual arrangement between the project and power off-taker, usually a utility or corporation. Alternatively, in a *merchant model* there is no set contract, and revenues are dependent on supply and demand conditions in the market over time. A hybrid approach, combining aspects of both the contracted and merchant models, is becoming more common.

Thus, investors in all renewable projects need to understand the contractual nature of each transaction. Until a few years ago, most renewable energy transactions had long-term contracts with utilities. More recently, contracts have been signed directly with corporations that are large energy users. The market also has seen *hedge agreements* replace long-term contracts, where instead of having a definitive counterparty, a project owner might enter into a contract with an investment bank that agrees to a minimum price for power. And then, as noted above, there are partially or even entirely merchant projects.

Since financings for projects involving renewable infrastructure often have terms of 10 to 20 years, investors need to understand the predictability of the long-term revenue and expense stream over the debt term. The long-term contract model clearly provides the most revenue visibility. However, more capital providers have grown comfortable with hedged and/or merchant deals. As more sponsors invest in merchant structures, we expect to see a broader mix of revenue models. This should encourage debt investors to look more closely at merchant transactions and whether they can gain comfort with the risk-reward profile.

Expansion of Financing Vehicles

As the market for renewable infrastructure and storage evolves, we expect investors to accept a wider range of financing vehicles. In addition to infrastructure project financing using conventional long-term debt, there is room in the marketplace for asset-based lending such as private ABS transactions and other structures such as Energy Savings Performance Contracts. MIM is increasingly willing to explore different points in the capital structure, such as financing a holding company versus traditional project financing done at the asset level. There is also the potential to add leverage or even back-leverage to tax equity transactions, which historically were financed with sponsor cash equity and tax equity alone.

Regardless of the appeal of renewable infrastructure and storage and the emergence of different financing vehicles, what has not changed is the defining characteristic that all underlying transactions must be sound and must show potential to generate appropriate risk-adjusted returns. In that regard, it is worth noting that larger investors, with investment track records in renewable infrastructure, often advocate for tighter transaction terms and conditions and better pricing. We believe the best practices for measuring infrastructure portfolio performance often favor privately placed debt versus public debt: better covenants, collateral and/or higher yield potential.

Conclusion: Providing Capital for Our Energy Future

As our society continues its march toward an energy future with both resiliency and lower carbon emissions, the availability of wind and solar generation, increasingly coupled with storage, will be critical to pursuing and achieving these goals. The growth of projects utilizing intermittent resources poses a particular challenge for grid stability. We believe advances in technology and declining cost curves point to a strengthening case for storage investments and the willingness to finance them.

With this challenge comes an opportunity to invest in projects that utilize a wider range of financing models across the capital structure. Investing in renewable power will continue to evolve—from financing stand-alone plants, to providing capital to larger portfolios of projects. Integration of renewable power into the overall power system will be a recurring theme. We believe that the continued evolution of these investment solutions will be essential for the future growth and evolution of the power industry. Wind, solar and battery storage will be no exception.

Endnotes

[1] Deloitte "2020 Renewable Energy Industry Outlook," page 2.
[2] Deloitte "2020 Renewable Energy Industry Outlook," page 2.
[3] Energy Storage Association, "Energy Storage 101," page 1.
[4] Wood Mackenzie, "Global Energy Storage Market Takes Off," April 2019, page 1
[5] International Renewable Energy Agency, "Battery Storage," April 2017, page 16.
[6] Wood Mackenzie Energy Storage Monitor, June 2020.
[7] American Public Power Assn., "Battery Storage Emerging as a Project Finance Opportunity," March 2018, page 1.
[8] U.S. Congress, Bill H.R. 2096.

JOHN TANYERI

Head of Infrastructure and Project Finance
MetLife Investment Management

John Tanyeri is Head of Infrastructure and Project Finance for MetLife Investment Management (MIM). In this capacity, he oversees a team of 20 credit analysts in the US and UK.

Mr. Tanyeri spent three years in the UK from December 2013 to 2016 in an effort to build out the infrastructure origination platform. In 2016, Mr Tanyeri repatriated back to the U.S. and under his leadership, MIM is recognised as a leading lender.

Prior to joining MetLife in 1996, Mr. Tanyeri worked in a variety of investing and finance functions at Salomon, Incorporated.

Tanyeri holds a BS degree in Finance from the College of New Jersey and an MBA in Finance from the University of Tennessee.

STUART ASHTON

Director
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Stuart Ashton is a Director responsible for the origination and execution of new transactions, as well as the ongoing management of existing fixed income, lease equity and tax equity investments. His nearly 17 years with MetLife have focused on Project Finance, Renewables and Tax-Oriented Equity Investments in the wind and solar power arenas.

Ashton has 30 years of experience investing in corporate, power-related and infrastructure debt.

Prior to joining MetLife, Ashton was at New York Life Investment Management where he led their tax equity and utility lending teams. Prior to this, he spent seven years in investment and commercial banking at Smith Barney, Swiss Bank and Sumitomo Bank.

Ashton earned a BA degree in Engineering from Lafayette College and an MBA in Finance and Accounting from Cornell University's Graduate School of Business.

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For more information, visit: **investments.metlife.com**

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