

Partners Group

The future of energy

How would you characterize what is happening in the energy markets right now?

Significant shifts are happening in energy markets right now. Globally, we will see a transition from majority fossil fuels to majority zero-carbon energy over the next several decades, which means a huge migration from coal, gas or nuclear power generation, to renewable power generation. Simultaneously, a decentralization of energy will involve the introduction of an increasing number of small-capacity units, largely renewables, which will all be connected to the main power grid to generate energy from more sources at a local level — including some sources behind the meter.

Where the increasing prevalence of distributed renewable generation, like residential solar, exists, it will challenge the traditional power generation/utility model. This move to the generation of electricity closer to the load is made possible by the development of technologies such as smart grids and gives the grid operator tools to better manage intermittency.

One of the main challenges to arise from increased renewables penetration is intermittency and the challenge of grid stability. To maintain grid stability, a certain amount of flexible generation and consumption will be required. Renewables are, by nature, intermittent. This means that renewable energy is not dispatchable, and power-grid operators cannot reliably use renewable-energy generation facilities to match load, meet peak demands, or fill the gap if another generator suddenly goes offline. As more renewables enter the system, the challenge of intermittency will increase.

As for the potential impact on power systems, energy security — the ensuring of the ability to rapidly cope with short-term energy supply and demand fluctuations — and energy reliability — the ability to balance electricity supply and demand over longer periods — will both demand the management of intermittency by the grid operator. These demands could manifest themselves in terms of additional costs over and above normal generation costs, to mitigate higher loss factors and system augmentation costs. Higher loss factors are brought about as these renewables projects tend to be located in remote areas, away from demand centers, thus more losses occur over the long transmission lines, and system augmentation costs could occur in needing to create more flexible grids, in line with the increase in renewable penetration.

What new solutions do you believe will be required to manage this?

Overall, we believe that a range of technologies will be needed to tackle intermittency, including battery storage, pumped hydroelectric storage, additional flexible gas-fired generation and increased electricity interconnection with devices such as smart meters applied to understand the demand needs of consumers. Additionally, investments in energy efficiency and demand response can address the demand side of the intermittency challenge.

CONTRIBUTOR



Todd Bright
Head of Private Infrastructure
Americas Partners Group

Todd Bright is head of Partners Group's Houston office and head of private infrastructure in the Americas. He is a member of the Private Infrastructure Investment Committee. He is a member of the Board of Directors of the firm's portfolio companies, Nieuport Aviation Infrastructure Partners GP, Seabras Group and Superior Pipeline Co. He has 27 years of industry experience. Prior to joining Partners Group, he worked at Denham Capital, Conectiv Energy, Statoil and Enron.

To touch on a couple of examples in tackling intermittency, battery storage, usually in the form of lithium-ion batteries, is valuable to customers, utilities and independent power producers alike, and as a modular technology, can be located at the transmission or distribution levels, or behind the meter itself. Flexible gas-fired generation is another solution. Gas-fired generation constitutes nearly a quarter of electricity generation worldwide, with continued growth expected as coal generation and nuclear power are phased out.

Electricity interconnectors will also play a part in the solution, where the regulatory and permitting regimes are conducive. Interconnectors play a crucial role in achieving a competitive and integrated energy market, as well as increasing energy security and diversifying electricity supply between respective regions. If excess renewable energy is generated in one region, the surplus energy can efficiently be transmitted through an interconnector to the other region, where the level of demand might be higher. As well as balancing out supply and stabilizing the respective grids, this should also have a beneficial impact on market prices.

If we take one of our most recent investments on behalf of our clients, Greenlink Interconnector, we have invested in a project to build a brand new, 500-megawatt sub-sea interconnector between the Irish energy markets and those in the United Kingdom, which will contribute 33 percent and 11 percent, respectively, to each country's interconnection capacity. Due to its strategic nature, the project benefits from E.U. "Project of Common Interest" status, which is aimed at incentivizing interconnection build-out to reach 15 percent of generation capacity to improve security of supply, better pricing in wholesale markets and efficient integration of renewables. With the build-out of renewable-energy generation in both countries, particularly the growth of offshore wind, infrastructure like

Greenlink is essential to facilitate the low-carbon economy, as it will allow surplus renewable power to be exported between the two countries.

What opportunities do you see for investors in the energy space?

At Partners Group, we constantly ask ourselves whether the ongoing disruption in the energy market is a risk or an opportunity, and what it will mean for the future of the assets that we invest in, on behalf of our clients, particularly considering that infrastructure is about underwriting long-term (20- to 30-year) cash flows. As different patterns of energy demands materialize, along with distributed and localized generation, the legacy systems currently used to generate and transmit energy (e.g., conventional power plants and electrical grids) will come under strain, as they weren't built for that type of demand profile. It will also negatively impact generation assets, which aren't able to flexibly scale up and down. As such, we see good opportunities in assets that can either store electricity or allow for flexible generation.

The market for energy storage is gaining significant momentum globally, but the technology is still somewhat expensive and not yet widely deployed in large-scale projects. The cost of lithium-ion battery storage in the United States is about three times the cost of new combined-cycle natural gas resources; however, batteries are becoming increasingly competitive with new-build gas peakers, as battery costs continue to fall (although competitiveness relative to gas-fired generation varies materially by geography). Additionally, a key commercial challenge for battery storage is developing contract structures and regulatory frameworks that allow for battery-storage projects to monetize the multiple sources of value it can provide in a financeable manner.

However, the costs have been falling rapidly in recent years, similar to the cost declines previously seen in utility scale renewables. As such, we expect that further decreases in costs for batteries should unlock opportunities in the future. Battery

storage is also expected to increasingly be co-located with other forms of generation, particularly renewables, and so the continued rise in renewable energy additionally allows for opportunities.

Another area for opportunity includes smart meters and energy efficiency. Smart meters work to balance the energy system — that is, ensuring that demand is met by supply, by amassing data on customer energy consumption and feeding that information back to distribution network operators so they are able to better match energy supply and demand. Techem, a portfolio asset we invested in in 2018, is a great example of how this technology works. The company is a leading submetering service provider, serving approximately 410,000 customers in 11 million dwellings across 21 countries. As a well-established smart-meter company, its services allow consumption-based measuring and billing of heat and water consumption at the individual customer level, meaning that customers only pay for what they consume. Not only does this potentially lead to lower costs, it also allows customers to make choices on the levels of energy they consume to reduce energy waste and ultimately contribute toward the issue of intermittency. Techem creates clear value and presents a highly predictable cash-flow model due to the fact that its underpinning contracts are long-term and fixed-payment based. Energy-efficiency investments provide similar benefits by reducing overall demand, which we see as a growing space for investment, as large energy consumers, including both governments and C&I, increasingly look to energy efficiency to both generate cost savings and achieve sustainability goals.

Finally, we continue to believe that the transition to clean energy is one of the biggest investment opportunities in infrastructure, moving forward. We have been an active investor in the clean-energy space, including investments in wind (both onshore and offshore) and solar platforms, and we see extensive opportunities going forward, particularly in building and expanding renewables assets and platforms, where a new build premium can still be captured in most markets and for most technologies.

CORPORATE OVERVIEW

Partners Group is a global private markets investment management firm with \$91 billion in investment programs under management in private equity, private real estate, private infrastructure and private debt. The firm manages a broad range of customized portfolios for an international clientele of institutional investors. Partners Group is headquartered in Zug, Switzerland, and has offices in Denver, Houston, New York, São Paulo, London, Guernsey, Paris, Luxembourg, Milan, Munich, Dubai, Mumbai, Singapore, Manila, Shanghai, Seoul, Tokyo and Sydney. The firm employs more than 1,300 people and is listed on the SIX Swiss Exchange (symbol: PGHN), with a major ownership by its partners and employees.

For more information, contact:

Vittorio Lacagnina
Client Solutions, Partners Group
vittorio.lacagnina@partnersgroup.com

This article presents the author's present opinions reflecting current market conditions. It has been written for informational and educational purposes only and should not be considered as investment advice or as a recommendation of any particular security, strategy or investment product.

