

Storage: The Final Piece In The Global Energy Transition Puzzle

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Storage: The Final Piece In The Global Energy Transition Puzzle

Recent mergers and acquisitions (M&A) featuring substantial investments in energy storage companies indicate a structural shift in global energy systems. S&P Global Ratings believes this is a sign of things to come, as leading estimates predict that the world will need 150 gigawatts (GW) of battery storage if it is to double the share of renewable power generation by 2030.

Two notable M&A deals this year involve French companies. On May 9, energy giant Total S.A. announced that the board of Saft Groupe, producer of energy storage systems alongside other types of batteries, had approved its takeover bid of €950 million (about \$1.1 billion). This represents the biggest acquisition of an energy storage provider to date. One day later, Engie announced its purchase of an 80% stake in California-based battery storage firm, Green Charge Networks, for an undisclosed figure.

Overview

- Considerable declines in power generation costs and the need for wider renewable options mean significant growth prospects for the rapidly evolving energy storage sector.
- Some governments have started producing policy to encourage the use of energy storage, while in other markets we see the private sector taking the lead in this regard.
- That said, financing of storage projects will likely be more complex than for traditional renewable energy, due to the multitude of revenue streams available and the risks involved.
- Nevertheless, as the technology approaches large-scale commercial viability, we believe storage will become a key tool in global efforts to decarbonize the power sector in the years to come.

A growing number of governments are starting to share the enthusiasm for storage. For example, in the U.K., the National Infrastructure Commission recently published a report in which it concludes that the country could save £8 billion per year through the incorporation of "smart power," which it defines as a mix of interconnection, energy storage, and demand flexibility. We believe the increasing attention to the sector stems partly from the continuously declining price of battery storage technology. As an illustration, the price of lithium ion technology used in battery packs for electric vehicles fell to \$350 per kilowatt hour (kWh) last year from \$1,000 per kWh in 2010.

There are theoretically many financing options for energy storage projects and the market is beginning to explore which ones to use at this stage of the sector's development. A lot can be learnt from financing models for solar, wind, and energy-efficiency projects, which share common barriers like high upfront costs and fairly long payback periods. However, unlike those technologies, energy storage has the potential for multiple-use applications, enabling various revenue streams and potentially shortening payback periods. This increased flexibility serves as both an opportunity for creative project development and a risk to realizing full revenue projections and hence returns.

Storage Technology Still Has A Long Way To Go

Governments' increasing interest in storing energy is a natural progression as renewables gain ground in national energy systems. Storage is crucial to unlocking the full potential of renewable energy. Without it, renewables are unlikely to account for a majority share of a country's power generation mix, due to the unpredictability of sources, such as wind and solar. Managing the variability of supply from renewables increases the stress on energy grids and brings with it associated costs, for both operators and customers. Some nations are fast approaching or have surpassed the typical renewables usage level of 20%-30%, beyond which grids struggle to cope with the variability. They include Denmark, Portugal, and Nicaragua, where 39%, 27%, and 21% of electricity demand respectively was met by wind power in 2014.

The International Renewable Energy Agency (IRENA) estimates that the world needs 150 GW of battery storage to meet its desired target of 45% of power generated from renewable sources by 2030. To put this into perspective, one of the largest battery storage projects is a 40 megawatt (MW) system at the Tohoku Electric Power Company's Nishi-Sendai substation in Japan. 3,750 of these would be required to meet the 150 GW target. But, on a positive note, even larger projects are on the horizon. STEAG Energy Services has started a 90 MW storage program in Germany and Edison is setting up a 100 MW facility in Long Beach, California. Indeed, in the U.S., where carbon reduction efforts are less uniform, lower-cost storage is seen as a possible game changer under the authorities' Clean Power Plan, since it could obviate the need for gas-fired capacity to support intermittent renewable sources.

Today, well over 90% of global energy storage capacity consists of large-scale pumped hydro projects (see table 1), which have been a viable but geographically limited option for decades. New, disruptive technologies, such as battery storage, are emerging, and we see numerous other up-and-coming storage technologies with a lot of potential.

Table 1

Grid Connected Energy Storage Projects As Of May 31, 2016

Technology type	Projects	Projects (% of total)	Power from rated entities (MW)	Power from rated entities (% of total)
Electro-chemical	923	59.4	2,679	1.4
Pumped hydro	350	22.5	179,427	95.3
Thermal energy	203	13.1	3,615	1.9
Electro-mechanical	69	4.4	2,611	1.4
Hydrogen	9	0.6	6	0
Total	1,554		188,338	

MW--Megawatts. Source: U.S. DOE Global Energy Storage Database.

The number of utility-scale energy storage projects has increased dramatically worldwide over the past few years (see chart 1). Much of this growth has been in the U.S., followed by the Asia-Pacific region, Europe, the Middle East, and Africa. Lithium ion battery technology accounted for 79% of the energy storage capacity announced in the first three quarters of 2015, according to the United Nations Environment Programme, showing a considerable lead over other technologies. This complements the growth of global renewable energy capacity (see chart 2) and the renewable energy targets of more than 140 countries (see table 4 in Appendix II).

Chart 1

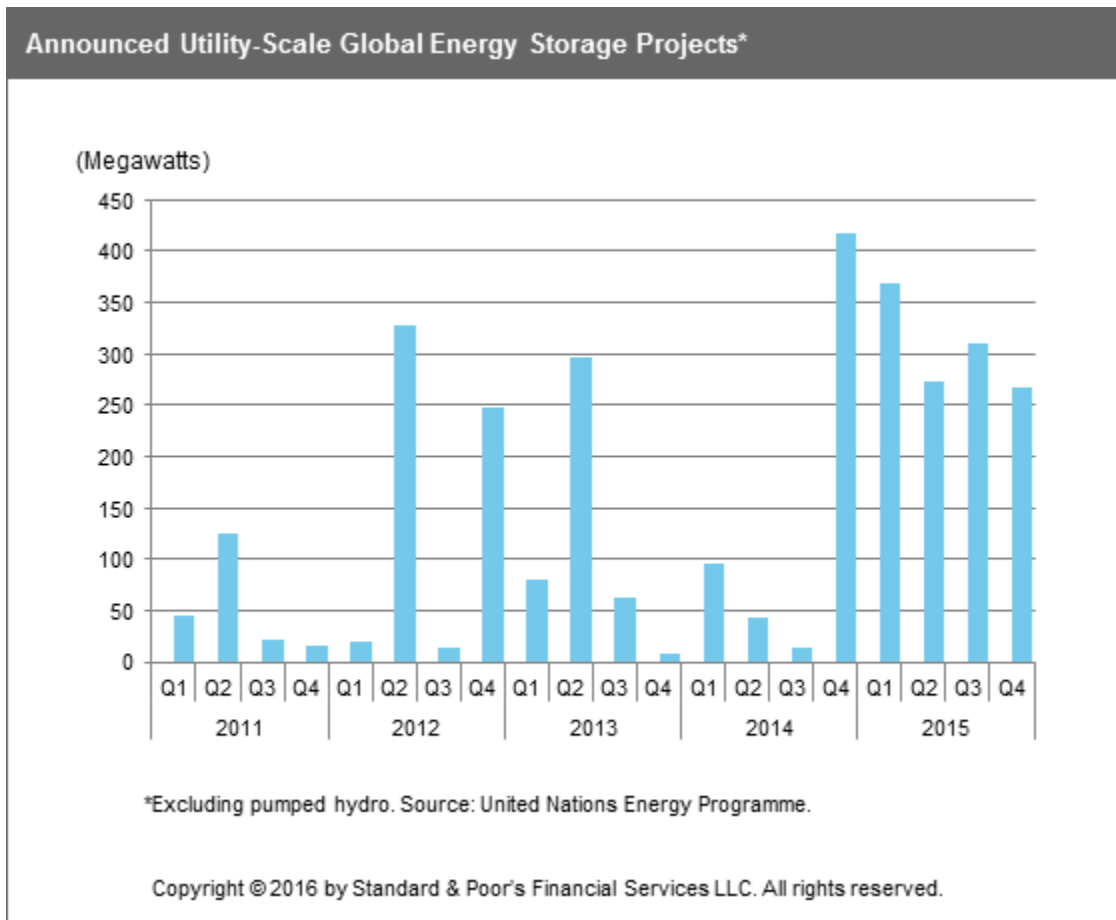
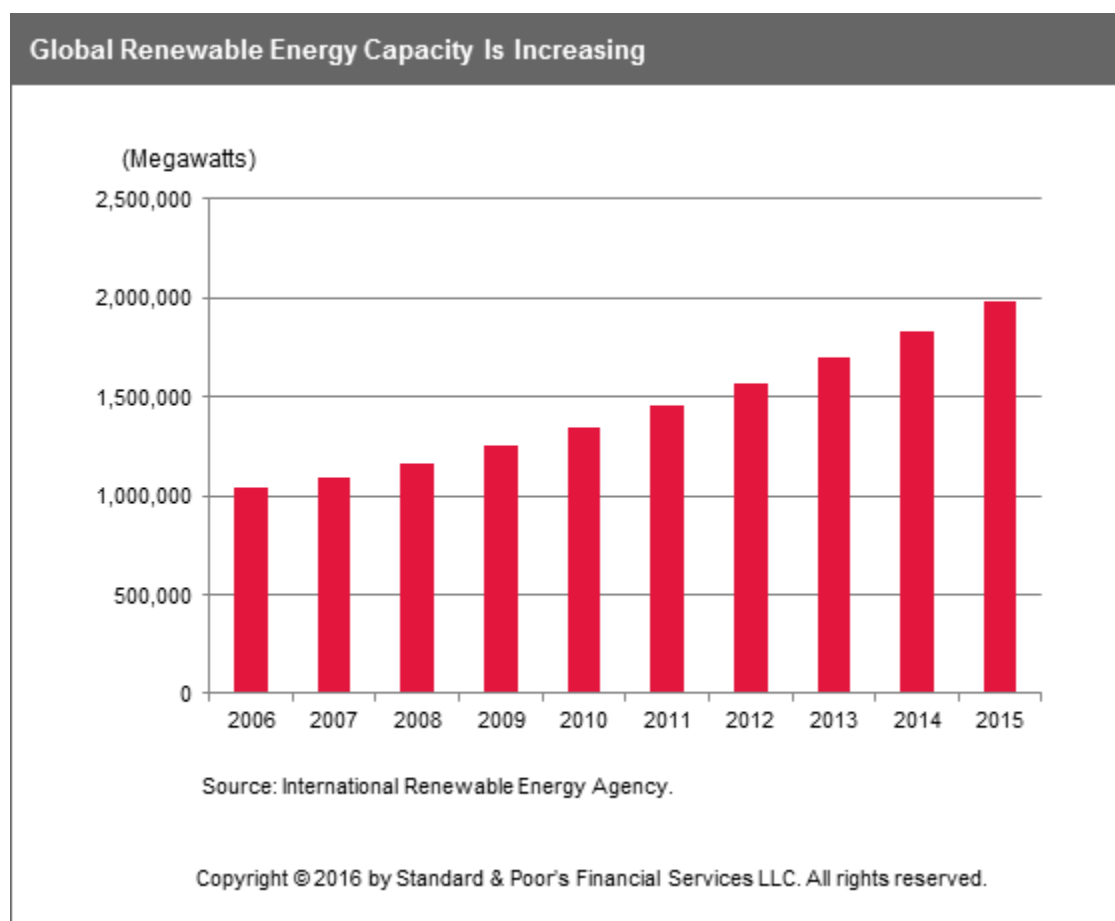


Chart 2



Policy And Costs Must Be In Harmony

In our view, three major long-term benefits of energy storage are fueling national interest:

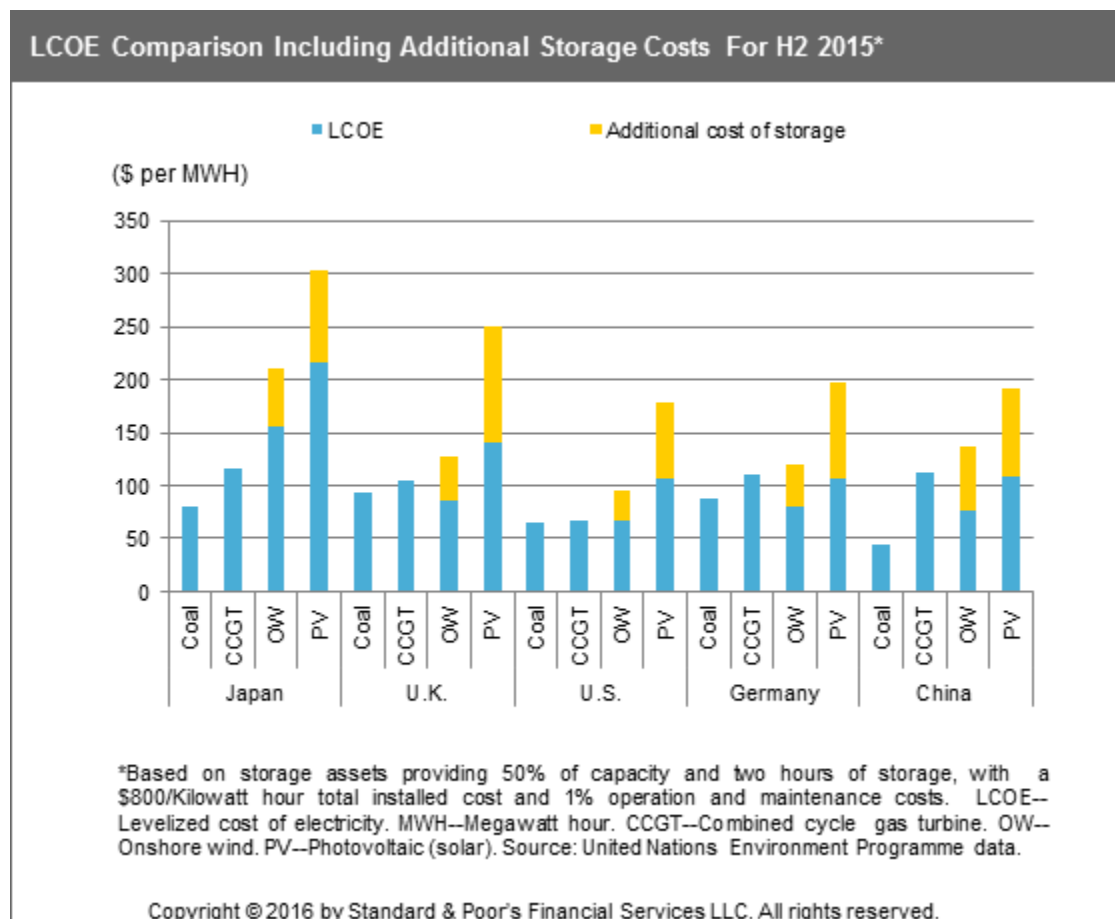
- Lower systemwide costs, thanks to increased use of low-carbon-generation assets;
- Greater energy security, which can help countries reduce reliance on imported fossil fuels; and
- Relief for aging electricity transmission and distribution (T&D) networks, including through reduced need for expensive grid reinforcements.

The number of policy initiatives designed to encourage the uptake of storage options is therefore rising. For instance, California and Ontario have mandated the consideration or installation of energy storage as part of systemwide solutions. In the case of California, legislation stipulates that investor-owned utilities must procure 1.3 GW of energy storage by 2020, which coincides with the state's initial target year for achieving 33% of power from renewables. Elsewhere, Puerto Rico was one of the first jurisdictions to require that renewable energy projects include storage as a means of short-term load balancing. The technical requirements were for wind and solar projects to provide frequency and ramping (output change) control for 30%-45% of nominal generation capacity. We believe this policy requirement for storage alongside renewable energy will slowly become the norm, because it ensures that new renewable energy

projects do not add to the strain on T&D networks through intermittency.

Yet policies like these could significantly increase the levelized cost of electricity (LCOE), which represents the per-kilowatt-hour cost of generation over a plant's lifetime (see chart 3). We believe higher costs could initially deter wider adoption of policies similar to Puerto Rico's until the LCOE of renewables and storage, combined, becomes cheaper than the fossil fuel equivalent; or some of the additional cost can be offset by other revenue streams. The industry is currently focusing on the second option, with a number of revenue stacks being investigated for individual projects. The cost of projects will vary, depending on how long batteries need to store power. A large percentage of energy stored for a longer period will mean higher costs than if a lower proportion is stored for a shorter time. However, storage costs will continue to decrease as the technology evolves.

Chart 3



The role of policy/regulatory frameworks is also important for the economics of storage systems. For example, tax structures, asset depreciation rates, and other subsidies/enablers can create or inhibit market opportunities and influence compensation for project developers. An example of a policy-enabled revenue stream is the capacity-payment type system for frequency regulation that the U.K. is considering. National Grid PLC has issued a tender for additional generating capacity to deliver enhanced frequency response (EFR; which refers to power that can be delivered within one second to stabilize the frequency of grid supply). The need for a short response time makes

battery storage an ideal candidate because large power stations, such as coal-fired plants, are incapable of firing up as quickly. That said, even those plants could benefit from EFR revenue if they invest in storage assets and stock up on energy while they're in operation, specifically for the purpose of EFR. We understand National Grid is seeking 200 MW of EFR capacity under four-year contracts, which could make U.K. storage an attractive investment. However, National Grid also states that any proposed solution must be able to self-fund its development and be fully operational by March 2018. This is a tight deadline for any battery storage projects that are not already well into the planning stage.

Will Greater Storage Depress Prices In U.S. Capacity Markets?

In the U.S., further growth in energy storage technology could have implications for unregulated power markets, such as PJM, ISO New England (ISO-NE), or ERCOT (Electric Reliability Council of Texas). We liken storage technologies to demand-side management resources in that they provide a substitute for conventional generation capacity. Greater storage capacity means weaker net demand for generation capacity. Without a related curtailment of supply (which might come in the form of increasingly uneconomical and environmentally disadvantaged coal plants), we expect that capacity prices will drop. Additionally, to the extent that storage assets are subsidized through some form of tax credit, their owners gain a cost advantage and can put in lower supply bids, potentially dragging down the average capacity price.

However, the nature of a specific market largely determines the extent of storage's role in capacity auctions. For example, largely reliability-driven capacity markets like ISO-NE or PJM may not see a lot of storage participation. Such markets severely penalize suppliers that cannot provide the promised power in critical periods, so those with storage assets that are either technologically untested or subject to considerable variability may want to avoid this risk. By contrast, a market like ERCOT has no capacity construct, and MISO a comparatively weak one, in our view. In these markets, we might expect to see storage complement the seemingly exponential growth in renewable capacity, especially in the U.S. following the recent extension of the investment-tax and production-tax credits.

In less-reliability-focused markets, a greater proportion of energy storage participation can allow for use of various dispatchable renewables (which can transmit energy relatively quickly on request), such as geothermal, hydro, and concentrated solar power. This could trim peak power prices somewhat, to the detriment of base-load generation players that rely on outsized pricing during those periods.

Regulation Could Turn Energy Storage Into A Mixed Blessing For Utilities

In deregulated energy markets, legislation prohibits utility companies from owning generation assets to keep markets fair and competitive. Such legislation is holding back the implementation of storage technologies because storage is widely defined as a generation asset. A key question is whether a utility company should be allowed to own a dispatchable resource that could come into direct competition with independently owned traditional energy assets. However, utility companies are best placed to deploy storage at locations and volumes optimal to the power system (that is, at congested points in the grid); therefore they can make the most efficient use of resources. In regulated

markets, this type of mismatch is less of a problem, due to the vertical alignment of energy systems.

The risk comes from the ability of customers, especially large commercial and industrial companies, to use storage assets to manage their expenses, thereby reducing utility companies' revenues. Such users, which typically pay time-of-use tariffs that include a premium for energy provided during peak demand periods, can use storage for arbitrage purposes. They can store energy during the night, when prices are considerably lower, to use the next day during peak times. Large end users can also be subject to a demand charge, which reflects the maximum power draw; such users could use stored energy to offset usage during peak periods, thereby reducing the demand charge.

Another more serious threat to utilities stems from distributed energy supply, whereby communities, individuals, or businesses source electricity from their own generation and storage assets that don't require connection to the grid. That said, the risk is less imminent because the costs of becoming fully self-sufficient, under most conditions, are still significant and largely uneconomic.

Storage Can Fit In With Various Business Models

Numerous business models and revenue streams are available for financing energy storage projects. The way operators combine revenue streams to maximize the potential value of storage will be essential to the sector's development, especially as projects reach commercial viability.

Take for example large wind projects, which typically generate more energy at night when demand and therefore energy prices are low. Storage can play a role in such load levelling by storing low-cost electricity until demand and, therefore prices, increase during the day. The less obvious value of storage is for T&D systems. Transmission systems are generally underutilized and most efficient at night, so storing wind energy closer to the end users at that time increases the efficiency of T&D infrastructure and frees it up to deliver energy during peak demand times during the day. This means more energy can be transmitted through the same infrastructure.

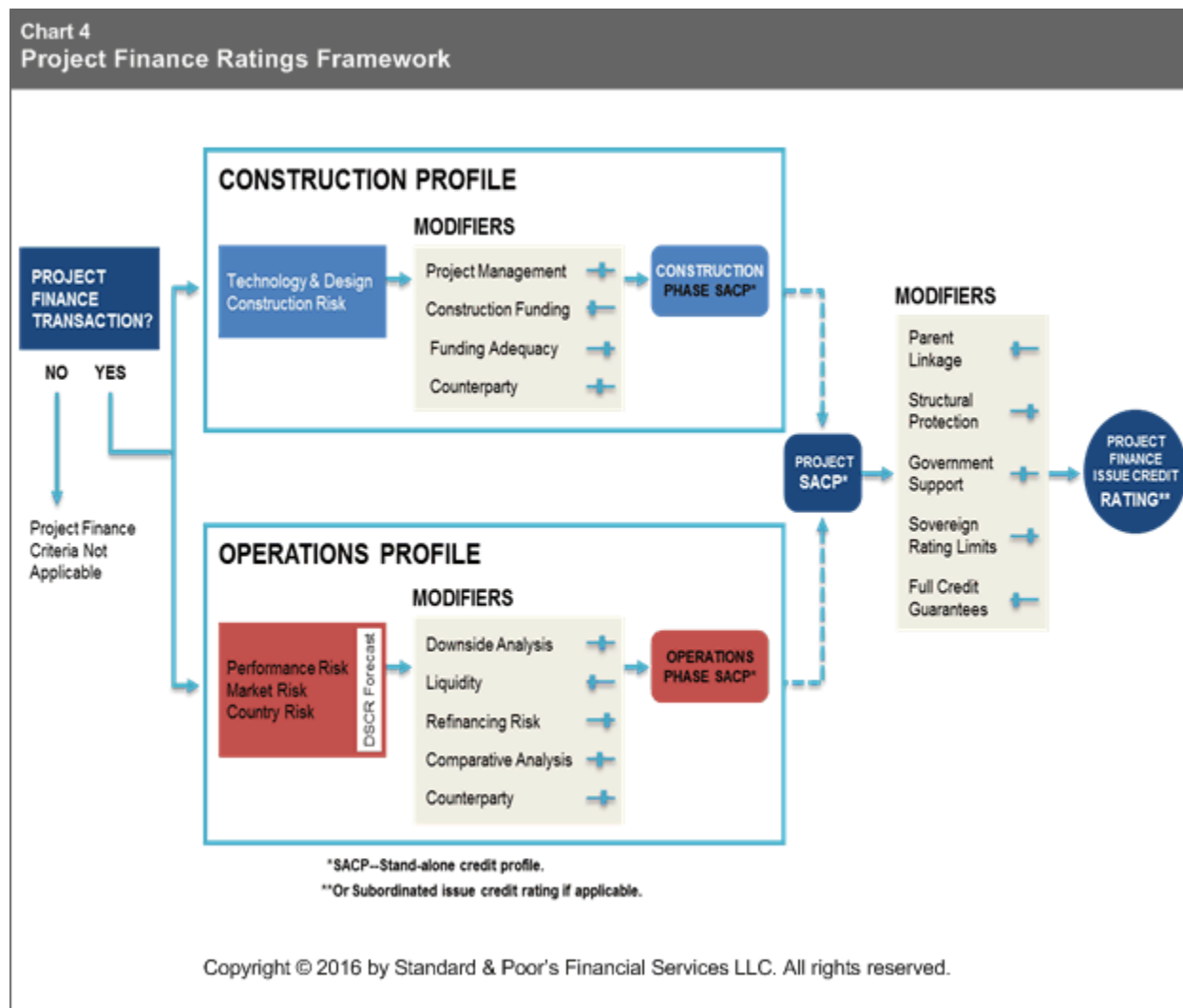
Stored power could be used for several purposes (see table 2 in Appendix II), depending on the requirements of the system and whether lucrative storage options are available. Some options, such as black-start services (restarting a power station without relying on external networks) are unlikely to serve as the primary funding source for an energy storage project. However, they could complement other revenue streams, which otherwise might not be compatible with each other; so careful planning is important. Generally, the more revenue streams that feed into an operator's cash flow, the more attractive storage projects or assets become.

We believe energy storage will become one of the most essential contributors to efforts to decarbonize the power sector. It is a rapidly evolving area that shows encouraging rates of price decline, which is bringing it toward large-scale commercial viability. Right now, the risks are abundant as the industry goes through the early stages of transition. But we expect these risks will reduce over the next few years as the technology becomes a mainstream participant in the power sector.

Acknowledgements: Many thanks to Asif Rafique of SUSI Partners for his contribution to this article.

Appendix I: Assessing Credit Risk In Storage Projects

Six main factors contribute to our view of a project's credit risk profile (see "Project Finance Framework Methodology," published Sept. 16, 2014) planning, construction, operations, resources, counterparties, and the market (see chart 4).



Planning risk

This is relatively low compared with that in low-carbon-generation assets because storage modules are typically smaller than wind turbines or solar farms, often able to fit into standard shipping containers, and will therefore not face similar opposition to their aesthetics. However, concerns over fires and safety might trigger some level of resistance. Storage projects are also generally based in industrial areas, which means they do not usually face major planning approval hurdles, unlike projects slated for densely populated areas.

Construction risk

In general, we would expect to classify storage projects as simple building tasks. Construction risk is relatively low compared with that for other new technologies because batteries are modular units that require minimal construction on site. Risk emerges when interfacing such assets with other projects, such as solar or wind, because there is currently limited practical experience of this in the market.

One key credit factor that contributes to construction risk is technology. More specifically, we scrutinize the previous performance of the system, equipment, and material, as well as how the solution and its design address site-specific challenges. In most cases, when looking at a project's technology track record, we would expect to assess it as commercially proven because we would expect most projects to use off-the-shelf technology.

However, that type of technology might not yet be the norm for energy storage projects, given that it is relatively new and evolving rapidly. It's possible that supplier warranties could mitigate additional risk from the technology side, however. The type of long-term warranty packages required may well be offered by some of the large, well-established companies entering the battery storage space, such as Panasonic, Samsung NEC, and LG Chem.

Operations risk

When we assess a project's operations phase stand-alone credit profile (SACP), we first determine its business risk profile, which we call the operations-phase business assessment (OPBA; see "Project Finance Operations Methodology," published Sept. 16, 2014). The OPBA can be thought of as a measure of how risky a project's operations are. It ranges from '1' to '12', with '12' representing the highest risk. To arrive at the OPBA value, we assess market and performance risks, both key factors. Two other important aspects of performance risk, from the energy storage perspective, are asset class operations stability and technology performance.

Asset class operations stability

Our assessment of this factor indicates the risk that a project's cash flow will differ from expectations as a result of it being unable to provide services or products based on the type of activities it engages in. Energy storage is a sophisticated technology that requires complex electrical components and interlinkages between these components and sometimes other infrastructure outside the project. This means that we are initially likely to assign asset class operations stability a high score (indicating higher risk) until a track record of operational stability is established.

Technology performance

Our assessment in this area focuses on the extent to which a project may face operating challenges, based on the technology deployed. Unless the technology has a proven track record, with large amounts of industry data demonstrating good operating performance at a similar scale and under similar operating conditions, we would likely assess technological performance as negative until more data are available to support a neutral view.

We then evaluate financial risk and other factors such as counterparty risk. In our financial analysis of the operations phase, the key assumptions for energy storage analysis are those regarding degradation rates and operations and maintenance (O&M) expenses, including reserves for equipment replacement or refurbishment. As large battery storage projects increase in number and mature, more data will be available to build our key assumptions in these areas. Until then, data from demonstration projects and independent engineer reports can contribute to our opinion on performance factors and life-cycle costs. Key factors for energy storage projects include: round-trip efficiency, energy

density, and capacity fade. An increase in data availability will also contribute to our assessment of other important aspects of the operations phase, such as performance risk. We will also factor contractual terms and project-specific risk attributes into our analysis, allowing us to gauge whether projects will maintain a high level of operating performance.

Utility companies will often be a natural off-taker of an energy storage project, either for ancillary services or load levelling, or in the future potentially as a simple power generation asset. Utilities will want a high degree of flexibility from storage projects to match the varying requirements of the energy system. This flexibility could cause issues because the benefits of revenue-generating services may need to offset degradation of the assets. With current technology, battery systems can run for a limited number of cycles. The number of cycles is maximized when capacity remains within set limits (such as 20%-80% of total capacity) instead of when the battery unit is fully charged or discharged. A balance will need to be found between flexibility for the off-taker and reduction of O&M costs for the owner.

Resource risk

Battery storage projects, if used for generation purposes and supplied by a single wind or solar plant, will face resource risk, which is one of the biggest risks for renewable energy power operations, in our opinion. This is because, with rare exceptions, renewable power purchase or feed-in tariff agreements stipulate that suppliers are paid only for volumes they deliver. Our assessment of resource and raw-material risk in renewable projects aims to determine whether the resource or raw material will be available in the quantity and quality needed to meet production and performance expectations. Our resource and raw-material risk assessments range from minimal to high.

Counterparty risk

Reliance on third parties to make payments or perform under a wide range of agreements--such as revenues, construction, equipment supply, and O&M--is a common feature in project finance. That's why it's important to assess counterparty risk. Where a material amount of risk is transferred to a counterparty, we provide an estimate of the exposure to the project should the counterparty become insolvent, and we assess whether the counterparty is replaceable. If that is the case, subject to the amount of available liquidity, a project can achieve a higher rating than the creditworthiness of the construction and equipment suppliers (see "Project Finance Construction And Operations Counterparty Methodology," published Dec. 20, 2011).

For energy storage projects, equipment counterparties in particular, and interconnection will be key issues. We have seen several bankruptcies by small battery manufacturers such as Extreme Power and A123 Systems, which highlight this risk. In our view, relatively few players in the battery storage industry are not easily interchangeable. Some larger players have entered the market, but many of the advancements seem to be coming from smaller players, which may expose projects to their credit risk.

Market risk

This only applies when a project's cash flow available for debt service (CFADS) has the potential to decline by more than 5%, to our downside case from our base case. In such instances, we determine the project's market exposure by assessing its CFADS volatility due to market forces, as well as its competitive position, which for renewable projects comprises our analysis of regulation support and predictability, barriers to entry, delivery cost relative to peers', fuel

supply, and transmission access. Our view of market risk reflects the extent to which a project is exposed to market changes, for example, if the price of power generated is linked to commodity market prices.

If a project has a period of no market risk, followed by a period of market risk, we would typically assess these two periods independently and determine an SACP level for each. We would then use the lower of the two SACP assessments to determine the rating on the project's debt. In periods of contracted revenue, the SACP category is usually higher than when there is uncontracted revenue, but not always.

Appendix II: Additional Data

Table 2

Business Models And Revenue Streams Compatible With Storage Projects		
Business models category	Revenue stream	Relevant counterparties
Load levelling		
Definition: Adjusting supply to demand at source or distribution points.	Power fleet optimization--This enables the most efficient use of power plants with the lowest operating costs.	Independent power producers (IPPs) and utilities
	Renewables integration--Reduces time to mobilize renewables to meet demand.	IPPs and utilities
	Peak shaving--Reduces overall energy bill through storing energy when cheap and using it when expensive.	IPPs and utilities
	Peak power plant replacement--Replacing expensive "peaker" plants with stored energy.	IPPs and utilities
	T&D deferral--Ability to delay maintenance/upgrade costs to the grid infrastructure, which can also help alleviate grid congestion. From our observations, this revenue stream is rarely used, so we treat these as potential benefits.	Transmission grid operators, distribution grid operators, and utilities
Isolated area supply		
	Remote generation--This combines energy storage and renewable energy to provide access to off-grid consumers in remote locations or to improve reliability of an isolated grid system.	Grid operators, commercial, industrial, or residential customers, governments/municipalities
Ancillary services		
Definition: Providers of ancillary services ensure the consistent quality of electricity supply, usually in the open market or through bilateral agreements with the grid operator.	Regulation of frequency/power quality--To avoid damaging equipment and to prevent grid instability, it is important to maintain a constant voltage and frequency. Frequency regulation usually involves ramping generation assets up or down, which has a time lag of minutes or seconds. Battery storage has the capacity to reduce the time lag to milliseconds. Frequency regulation has the highest value among ancillary services.	Grid operators and end customers
	Operating reserve--To allow for a quick response to unpredictable consumer demand or a generator failure. Traditional power systems typically have an operating reserve that is equal to the largest generator plus a fraction of the peak load. The operating reserve provided by battery storage provides additional capacity that can be brought online as required and does not increase the strain on generation assets. This brings the additional benefit of making more efficient use of generation assets.	Grid operators and utilities

Table 2

Business Models And Revenue Streams Compatible With Storage Projects (cont.)		
Business models category	Revenue stream	Relevant counterparties
	Black-start services--These provide non-grid energy to power stations and certain industrial equipment to restart after they are switched off. Storage suits this purpose well, but because the frequency of black starts is low, it would need to be in conjunction with other revenue streams.	Grid operators and commercial and industrial customers such as IPPs

T&D--Transmission and distribution.

Table 3

Energy Storage M&A Over The Past Six Months				
Announced date	Closed date	Target	Buyer/Investor	Size (mil. \$)
May 10, 2016	May 10, 2016	Green Charge Networks, LLC	Engie SA	N.A.
May 9, 2016	--	Saft Groupe S.A.	Total S.A.	1,372.4
April 18, 2016	--	e-Wolf GmbH	SOLARWATT GmbH	N.A.
March 23, 2016	--	Golden Power Group Holdings Limited (SEHK:8038)		1.9
March 7, 2016	--	Zhuhai Yinlong New Energy Ltd.	Gree Electric Appliances, Inc. of Zhuhai	N.A.
Feb. 26, 2016	--	Zhuhai Yinlong New Energy Ltd.	Jingning Shezu Autonomous County Fangde New Energy Investment Partnership	7.7
Jan. 27, 2016	--	Changsha Economic and Technological Development Zone Investment Holding Co., Ltd.		2.5
Jan. 20, 2016	--	Chongqing Wanli New Energy Co., Ltd., Non-Cash Assets and Liabilities	Shenzhen Nanfang Tongzheng Investment Co., Ltd.	106.4
Jan. 18, 2016	Jan. 18, 2016	MCM Energy Lab S.r.l.	Electro Power Systems S.A.	0.3
Jan. 8, 2016	--	Lithium Technology Corp., Substantially All Assets	Alveni Holdings B.V., Mas Arbos Invest B.V., VFR Holding B.V., Virium BV	2.5
Dec. 25, 2015	Dec. 25, 2015	Guangzhou Great Power Energy & Technology Co. Ltd.		N.A.
Dec. 23, 2015	--	Zhuhai Yinlong New Energy Ltd.	Beijing Bashi Media Co., Ltd.	30.9
Dec. 14, 2015	Dec. 29, 2015	Elvi Energy	Electro Power Systems S.A.	2.7
Dec. 14, 2015	Dec. 29, 2015	MCM Energy Lab S.r.l.	Electro Power Systems S.A.	N.A.
Dec. 11, 2015	--	Xiangyang Tuolong New Energy Co., Ltd.	Camel Group New Energy Battery Co., Ltd.	30.7

M&A--Mergers and acquisitions. N.A.--Not available.

Table 4

Examples Of Country Targets For Final Energy From Renewables		
Country/region	Target share of generation (%)*	Target year
EU	20	2020
Albania	38	2020
Algeria	40	2030
Austria§	45	2020
Belarus	32	2020

Table 4

Examples Of Country Targets For Final Energy From Renewables (cont.)		
Country/region	Target share of generation (%)*	Target year
Belgium	13	2020
Bosnia and Herzegovina	40	2020
Botswana	1	2016
Bulgaria	16	2020
Burundi	2	2020
China	13	2017
Croatia	20	2020
Cyprus	13	2020
Czech Republic§	14	2020
Denmark	35	2020
Estonia	25	2020
Fiji	23	2020
Finland	25	2020
France	23	2020
Gabon	80	2020
Germany	60	2050
Greece	20	2020
Guatemala	80	2026
Hungary§	15	2020
Ireland	16	2020
Israel	50	2020
Italy	17	2020
Jamaica	15	2020
Kosovo	25	2020
Laos	30	2025
Latvia	40	2020
Lebanon	12	2020
Lithuania	23	2020
Luxembourg	11	2020
Macedonia	28	2020
Madagascar	54	2020
Malta	10	2020
Moldova	17	2020
Montenegro	33	2020
Nauru	50	2015
Netherlands§	16	2020
Norway	68	2020
Palestinian Territories	25	2020
Poland	16	2020
Portugal	31	2020
Romania	24	2020

Table 4

Examples Of Country Targets For Final Energy From Renewables (cont.)		
Country/region	Target share of generation (%)*	Target year
Serbia	27	2020
Slovakia	14	2020
Slovenia	25	2020
Spain§	21	2020
Sweden§	50	2020
Thailand	25	2021
Ukraine	11	2020
U.K.	15	2020

Note: Final energy is the useful, secondary energy available to the end user, for example heat (hot water) for a radiator or electricity from the socket at home. This table shows one type of renewable energy target. Other types such as: share of renewable electricity production, share of heating and cooling from modern renewable technologies, total capacity targets, and share of primary energy from renewable targets are also used at the national level (see Ren21, Renewables 2015 Global Status Report). *Rounded to the nearest whole decimal for numbers over 10%, except where associated targets are expressed differently. §Some countries shown have other types of targets. Final energy targets for all EU-28 countries are set under EU Directive 2009/28/EC. The governments of Austria, the Czech Republic, Germany, Greece, Hungary, Spain, and Sweden have set higher targets, which are shown here. The government of the Netherlands has reduced its more ambitious target to the level set in the EU Directive. Source: Renewable Energy Policy Network for the 21st Century (Ren21 2015).

Related Criteria And Research

Related Criteria

- Project Finance Framework Methodology, Sept. 16, 2014
- Project Finance Operations Methodology, Sept. 16, 2014
- Key Credit Factors For Power Project Financings, Sept. 16, 2014
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