

Foresight

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It's time to get excited about energy storage

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Long viewed as the 'slow-moving experiment' of energy wonks and physicists, energy storage has recently exploded into the mainstream. Costs are falling, technology is improving and investment is pouring into the sector. And all signs suggest that the implications could be massive for governments, for investors, for utilities, for private companies and — more importantly — for the world's people and places.

A sleeping giant awakens

Until recently, infrastructure players and governments have paid scant attention to energy storage technology. Innovation seemed to be moving slowly (particularly when compared to hyped areas such as renewable energy) and costs largely remained prohibitive for large scale commercial deployment. Most energy storage projects focused more on scientific achievement than commercial viability.

Over the past few years, however, this once-overlooked sector has been 'discovered' with a vengeance. Some areas have been driven by advancements in adjacent sectors. Battery storage, for example, has been driven forward by bullish entrepreneurs such as Elon Musk, whose planned Gigafactory will pump out an estimated 50 GW hours of battery power per year by 2020,¹ largely to fuel his growing fleet of electric vehicle models.

Pumped storage has also been moving forward quickly as developers identify new opportunities to leverage existing landscapes and assets for projects, and as others retrofit aging pumped storage facilities. By the end of 2014, global pumped storage capacity sat at 142 GW. Almost 9,000 more MWs of capacity are currently in the planning stages in Europe alone.²

Investment and competition rises

More recently, however, governments and utilities have started to invest heavily into energy storage solutions. In part, these investments are focused on helping existing grids to meet peak demand and ensure reliability. But they are also increasingly focused on helping jurisdictions (or companies) integrate ever increasing amounts of intermittent renewable generation such as solar and wind power.

San Diego Gas and Electric, for example, recently announced the purchase of 37.5 MW of battery storage from AES Corporation, reportedly to "help improve regional reliability and integrate greater amounts of renewable energy" into the grid.³ South Korea's national power company (KEPCO) expects to deploy 500 MW of energy storage solutions by 2017.⁴

Private companies are also starting to invest, both for financial and environmental reasons. From retail stores seeking to reduce their environmental footprint (Walmart has more than 30 fuel cell servers installed at stores and distribution centers in the US) through to companies on the leading edge of innovation (Google has 400 kW of fuel cells installed at their main campus

¹ <http://www.zdnet.com/article/panasonic-to-pour-billions-of-yen-in-teslas-gigafactory-as-initial-investment/>

² <http://www.hydroworld.com/articles/print/volume-23/issue-6/features/pumped-storage-hydropower-round-up.html>

³ <http://www.power-eng.com/articles/2016/08/aes-to-deploy-37-5-mw-of-energy-storage-arrays-for-sdg-e.html>

⁴ <http://www.renewableenergyworld.com/articles/2016/03/south-korean-grid-will-soon-boast-world-s-largest-energy-storage-system.html>

in the US),⁵ it is clear that the business case for private investment into energy storage 'at scale' is starting to solidify.

Increased interest and investment has, not surprisingly, spurred competition within the sector. A recent auction process conducted by the UK's National Grid (developed to procure 201 MW of 'enhanced frequency response' capacity) attracted 61 'prequalified' tenders from battery storage technology providers. Bid prices averaged around GBP20.20/MW/hr with the lowest bid (by EDF ER) coming in at just GBP7/MW/hr.⁶ However, many believe that the low auction prices are indicative of strategic bidding rather than a significant cost reduction in the technology.

Much to be excited about

While the growing interest and investment into energy storage solutions is certainly exciting — particularly for early-stage investors and technology innovators — this growing market represents much more than simply another investment opportunity. Indeed, we believe that current energy storage trends have the potential to radically change the way energy is produced, distributed and consumed.

The most obvious benefit of energy storage relates to renewable energy. Utilities have long struggled to integrate intermittent power generation sources (such as solar and wind) into a grid that depends on security of supply. Energy storage offers a promise of a viable and cost-effective solution to flattening out the peaks and troughs, thereby allowing utilities and governments to incorporate greater amounts of renewable power into their mix.

On the flip side, however, energy storage also threatens to fundamentally alter the current 'grid' based infrastructure estate so common in developed markets. Given current trends, it won't be long before storage, small scale distributed generation (e.g. fuel cells, domestic solar PV + battery combinations) are reliable enough and affordable enough to build into new homes, thereby taking entire developments 'off the grid'. As generation becomes more distributed, investments into legacy power assets become riskier, placing long-term investment plans in question.

However, we believe that it is the emerging economies of the world that might potentially feel the greatest impact of energy

storage — in such countries, the more abundant availability of sources of renewable energy (e.g. sunny skies 300 days of the year!) combined with the lack of legacy transmission infrastructure will create a compelling business case for the large scale deployment of renewable energy with storage to create micro-grids serving individual communities. Analogous to how the developing world has leapfrogged the fixed land-line telephone model with high and fast growing levels of mobile phone penetration, energy storage could allow governments around the world to finally achieve the dream of delivering cost-effective and renewable power to every citizen in every part of the world. And that is certainly something to be really excited about!

Keep the energy going

The trajectory of the energy storage sector over the past few years has been somewhat reminiscent of the early days of the internet. Businesses are exploring the value, entrepreneurs are innovating the technology and governments are quickly starting to catch on. It won't be long before consumers start to participate in the market.

So what can governments, policy makers and infrastructure planners do to help maintain this trajectory? First, governments will need to think carefully about their current regulatory environment and how it encourages (or discourages) energy storage solutions. Regulators will also likely need to work with their utility providers to ensure that legacy grid infrastructure remains intact, even while consumers move to more distributed generation.

Investors (strategic and institutional) and utility providers will also need to play a key role in encouraging the energy storage solution market. Savvy investors, particularly those focused on emerging technologies or renewable energy, should view energy storage as a smart long-term bet. Similarly, utilities will need to recognize the trends at play and start thinking more strategically about how they invest into and integrate energy storage solutions.

No matter who you are or what role you play in the energy value chain (generator, investor, distributor or consumer), it is clear that the energy storage solution sector is worth watching. Indeed, we believe that energy storage has become something that everyone should be very excited about.

⁵ www.bloomenergy.com

⁶ Market Briefing: EFR tender results, KPMG LLP., September 2016

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