Energy Storage in France, a new revolution?

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Event Summary

Clean Horizon Consulting and I Care Environnement had the pleasure to welcome 85 members of the French and international cleantech and environment communities on May 16th at the round table « Energy Storage in France, a New Revolution? ». Jean-Paul Reich from GDF SUEZ, Daniel Clément from ADEME, Karl Axel Strang from DGEC (linked to the French Government), François Bouchon from Saft et Rajshekar DasGupta from Electrovaya presented and debated their opinions. The exchange focused on the business models of storage and its future in France, as well as US developments. The environmental impact of storage as well as the eco-friendliness of the manufacturing process of storage solutions were then discussed.

Energy storage business models

According to Jean Paul Reich from GDF SUEZ, our world is changing fast which forces us to face new challenges (climate change issues, raise of oil prices…). In this world in constant flux, the energy production mix is also evolving with the increasing momentum of renewable energies. Our mode of energy consumption is also evolving, with a focus on energy savings and, tomorrow, the emergence of electric mobility. These transformations on both ends of the electricity value chains are necessarily creating a new market, the flexibility market. Energy storage, which allows to add a new degree of freedom to the electricity system, is one of the alternatives on the flexibility market.

The economic value of storage can be found by solving a simple economic equation, as far as energy arbitrage is concerned. Bulk storage assets (such as pumped hydro or CAES) can indeed be compared to gas-powered plants. In such power stations, gas (whose price is indexed on oil) is transformed into electricity with a certain efficiency. In storage assets, off peak electricity is transformed into peak electricity, and that process also has a certain efficiency. Thus, assessing the economics of a storage asset can be simply achieved by comparing « gas at a certain price / power station efficiency» to « off-peak electricity / storage asset efficiency».

As Daniel Clément mentioned, the ADEME has developed two roadmaps for storage. The first one aims at integrating renewables into the grid via smart grids. The second deals with storage.

For ADEME, technology is an important aspect of storage but it is not the only key factor for its development. The capacity to develop new competencies is also require and a long-term vision for storage is necessary. Two kinds of roadblocks have been talked about:

- Technological roadblocks: technologies are expensive and materials used to create the systems will stay expensive too.
- Socio-economical roadblocks: politics, industrial choices on energetic questions as well as our consuming culture have a huge influence on the evolution of our storage needs.

According to Axel Strang from DGEC, there are two markets to distinguish: continental France (interconnected with the rest of Europe) and the islands systems (DOM/TOM).

In continental France, pumped hydro storage sites have already been set up, however the main issue remains to know where to invest in the future. This is a difficult question to tackle, as storage must be associated with other systems such as smart grids to deliver all of its potential. Therefore, the French government is relying on the scenarios developed by RTE, the French grid operator, to plan for storage in its multi-year investment plan.

In the French islands, the penetration of renewable energy in the production mix can at times reach 30%, yielding to necessary curtailments: such islands are ideal for tests, as storage assets are likely to have a strong impact there. The panel also agreed on the interest to leverage experiments undertaken in other countries, especially the USA.

According to François Bouchon from Saft, now is the time to act on stationary storage: Saft is very active outside of France, and would like to be conduction more business in France. By pushing local projects and making sure that assets are, as much as possible, built or integrated in by French players, the Nation does have a chance to foster a homegrown storage industry.

Electrovaya, based in Toronto, is developing Li-ion batteries with an innovative and clean process, which requires no solvent in the manufacturing of the electrodes. In North America, there are plenty of lithium-ion projects for stationary storage. Electrovaya is involved with a Canadian energy utility, Hydro One, as well as with Arizona Public Services in the USA.

Rajekar DasGupta addressed the US case to the otherwise very French panel: in the United States, some projects are funding partly by the federal government via the Department of Energy (DoE), although private funding – for instance from utilities - remains important. As a matter of fact, utility funding is a crucial factor in developing storage assets.

As a wrap-up to the discussion, the speakers agreed that, in the context of an increasing demand, battery costs will likely be divided by 2 within 5 to 10 years, thus making the case for storage much easier to pitch.

Environmental parameters of energy storage

In France, the 400 m€ earmarked by the Government as part of the Grenelle de l'Environnement and the 250 m€ of the "Grand Emprunt" will be key enabler to the development of energy storage, for instance through demonstration projects. The initial investment should end up being recouped through CO2 emissions reductions cost reductions induced by energy savings.

According to Axel Strang at DGEC, one has to be pragmatic while laying out potential pathways for the future and not favor a specific technology. Storage will naturally extend in new markets where it is feasible economically and risks are managed at a reasonable cost.

Until that point is reached, whether the customer will or will not accept to pay the price of a clean energy mix remains an open question. The Government must therefore bring economic visibility to utilities by providing incentives for energy storage. These incentives will first enable to build pilot projects, learn from these experiences and share the risk between the Government and the investors. However, it is difficult for the government to design the right mechanism for incentives, as the French PV sector recently experienced. Besides, feed-in-tariffs are more costly in France, where electricity prices are low and the difference to pay is greater then in the rest of Europe.

Currently, energy storage can develop in new niche markets where it is economically favorable and risks can be managed at a reasonable cost. For instance, France has demonstrations projects in the DOM where electricity prices are high.

The panel then addressed the question of the environmental impact of energy storage, and particularly of batteries. Saft and Electrovaya, for instance, are involved in battery recycling. After this process, all the materials are reused for new batteries, with the exception of Lithium whose price point as a raw material still does not justify establishing its recycling. As exposed by François Bouchon, Saft has a pro-active approach, as a 2-3% price mark-up is included in the battery price to cover the recycling cost. . Rajhekar DasGuptad from Electrovaya mentioned that, beyond recycling, ElectroVaya is already involved in “eco designing” its batteries: as most Li-Ion battery manufacturing processes require toxic NMP solvent to be manufacture electrodes, Electrovaya has come up with a solvent-free process: Electrovaya thus resorts to a water-based process for its electrode fabrication, allowing the company to operate its activities from downtown Toronto. This major advantage is not very well known but, as battery demand scales up, our panelist is confident that environmental issues will become more scrutinized and that such an advance as that of Electrovaya will turn out to be a consequent competitive advantage.