



Workshop -Flow batteries, bringing the technology to the market

Vitoria-Gasteiz

The Relevance of the RFB on Hybrid Projects

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Introduction

1. Overview about the future of the renewable power plants
2. New challenges of the renewable power plants
3. Integration of the redox flow batteries on the hybrid projects
4. RFB in hybrid facilities like La Plana

Overview About The Future Of The Renewable Power Plants

- **STAGE 1: BEGINNINGS OF RENEWABLE**

Some years ago, the only one requirement for the wind farms was to generate energy on a profitable way → Asynchronous generator + Fixed Pitch

- **STAGE 2: TECHNOLOGICAL MATURITY**

Later on the aim was to improve the AEP → DFIM, Full Converter, Variable Pitch

- **STAGE 3: CONTINUOUS IMPROVEMENT**

The WTG set, the windfarm, should behave like a power plant, not like several isolated WTGs → Power Plant Controllers

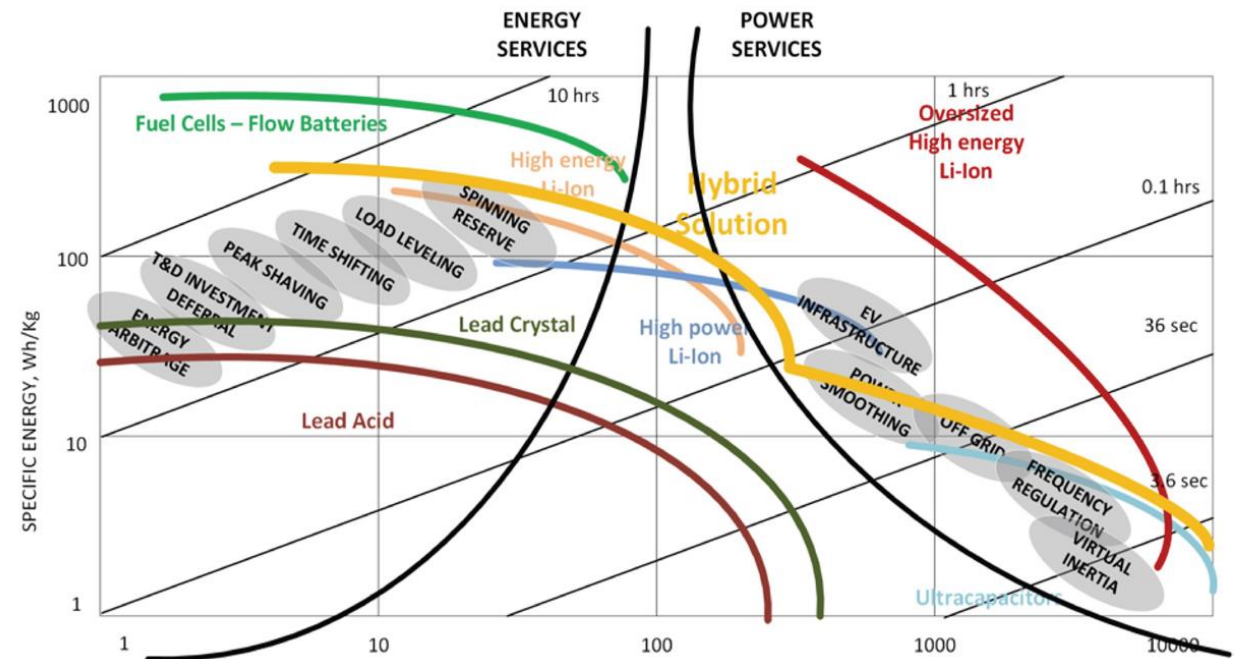
- **STAGE 4: NEW CHALLENGES**

A wind farm should behave as much as possible like an usual power plant, and providing new electrical services and products → Batteries + Hydrogen

New Challenges of the Renewable Power Plants

Nowadays the energy market is at the beginning of the stage 4, and it entails to provide new services from the renewable power plants, and these services have to be supplied largely from the batteries, so the present, and of course the future of the renewable power plants is hybrid.

1. Energy Services
2. Power Services



Integration of the Redox Flow Batteries on the Hybrid Projects

As the future renewable projects will have to supply new energy and power services, the new assets to commission there should provide both services, and this is the real challenge of any battery technology, and of course the RFB. This, together the profitability of any new investment are the two main targets.

And it is known that the RFB, compared with another battery technologies, will allow us to design the BESS of the projects thinking on an isolated way how we should manage the energy and the power, because power is linked to stack design, and energy with the tank size, **and this is one of its more important features of this technology.**

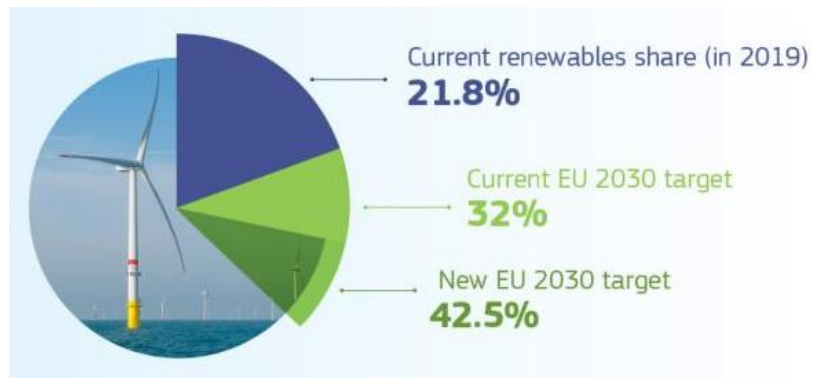
In summary, if reliability is taken for granted of this technology, these would be the two main targets:

- 1. Provide power services:** Could these batteries have shorter response times? Currently this response time is over the 100 milliseconds, so the new designs might to think on it.
- 2. Profitability:** To continue the researching to find new products and materials to reduce the final price, and the auxiliary services consumption as well. **Aim of this HIGREEW EU Project.**

RFB in Hybrid Facilities Like La Plana

Leaving behind the two commented areas of improvement of the RFB (Power Services and Profitability), nowadays there are some reasons for the RFB technology has a nice opportunity to be commissioned on hybrid projects like La Plana hybrid facility.

- **High daily volatility in price of energy:** New business opportunities.
- **Free space to install big tanks:** No restrictions due to space.
- **Bigger EU renewable targets:** Which it involves, more curtailment.



Source: European Commission

https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets_en#:~:text=On%2030%20March%202023%2C%20the,at%20least%2042.5%25%20by%202030.



La Plana Hybrid Facility

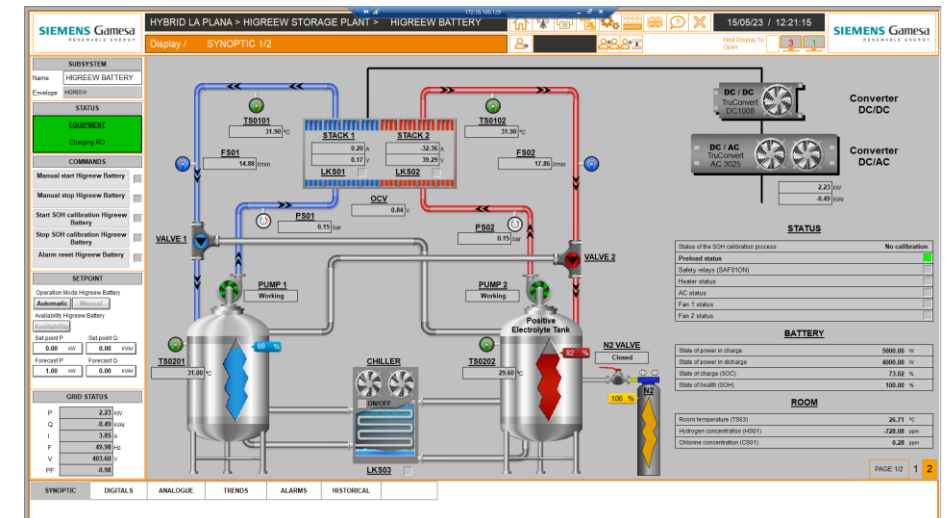
RFB in Hybrid Facilities Like La Plana

But there are still some challenges to achieve:

- Increase trust in technology: Testing products in real environments for many more hours.



HIGREEW RFB in La Plana Hybrid Facility



HIGREEW RFB SCADA

- Ensuring business cases: The whole legislation has to promote it.

Thank you!



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