FRENCH DEMONSTRATION

Blockchain-based improved monitoring of flexibility for congestion management. Partners: RTE and Enedis

Problem Statement

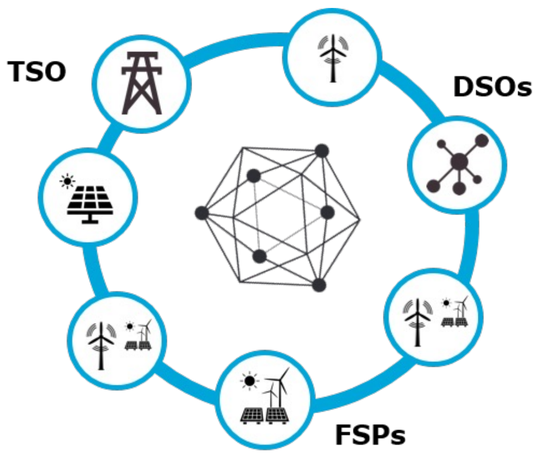
The expected increasing penetration of RES in the European network along with the growing number of actors, diversification of consumption patterns and complexity of grid operations lead to anticipate greater future needs for flexibilities and TSO/DSO coordination.

In particular, congestion management on both the French transmission and distribution networks will be challenged with more intermittent production and curtailments activations.

In this context, a new tool should be developed to **ensure a shared transparent monitoring of flexibilities activations, efficient TSO/DSO coordination and ease the producers' compensation process**, facilitating a better integration of FSPs into the French electricity grid.

Demo's Innovation

Building an open source platform (STAR) to simplify and optimize the management of renewable production curtailments for solving congestions by covering t**he entire life cycle of a flexibility activation order, from its formulation to the monitoring of the invoicing process from its activation.**

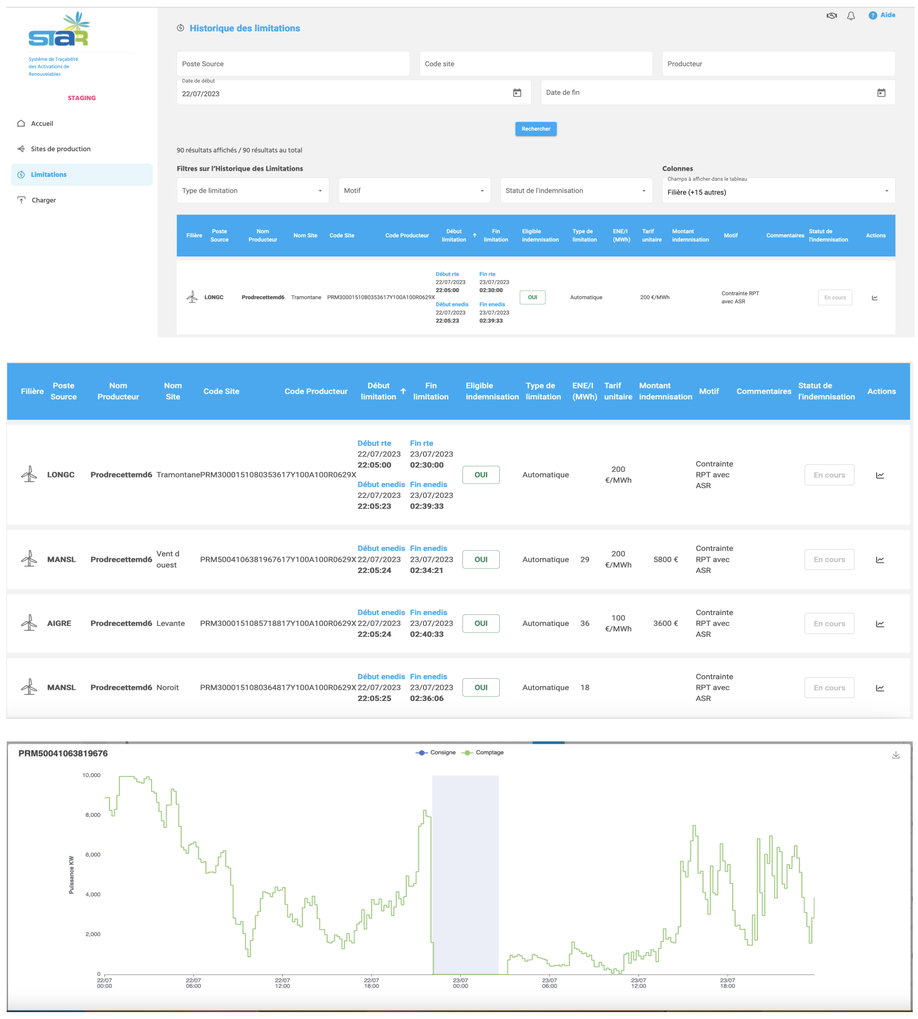


STAR relies on Hyperledger Fabric, a permissioned blockchain technology creating a consensus on data with the technical conditions for decentralized trust, thus enabling **transparency, traceability while guaranteeing confidentiality of commercial data.**

The demo also includes a reflection on post OneNet future TSO/DSO coordination means that would enhance and optimize flexibility usages, in a technically and economically efficient way.

Results and Lessons Learned

- The STAR platform ran successfully for TSO, DSO and producers, fulfilled functional requirements (tracking of orders, metering data, energy not served) and proved to handle both SUCs while improving data exchanges, transparency and traceability.
- Definition of a data model meeting requirements of standardization and compatibility with types of flexibility activations considered in the experiment, will be reused in following projects.
- Mobilized producers through successful workshops, and allowed to proceed to functional scoping with them, as well as feedback collection in order to take into account their needs and user experience. Such learnings will be also used.
- The shared governance between RTE and Enedis has led to a welcome alignment on the definition of common processes in the management of post-real time RES curtailments, as well as reflections on possible future coordination on flexibility activation rules.
- OneNet connector deployed and tested for data reception within the Regional Business Usecase
- Throughout the experimentation, distributed ledger technology has proved to be more complex to master than conventional technology, requiring specific expertise and leading to change the architecture throughout the duration of the experimentation. Eventually the platform meets the confidentiality requirements at the cost of a reduced performance (latencies) and a complex architecture that seems hard to scale.



Main Challenges

- **Delays** during the development phase due to unexpected temporary unavailabilities of some members of the developing team.
- **Technical challenge faced with the implementation of the HyperLedger Fabric blockchain**: redefinition of the architecture during the project to ensure data privacy.
- **Missing metering data** prevented some flexibility activations to be taken in account.
- The targeted number of 2 involved producers was just met, for a total number of 216 activations. A higher number could have helped better test the platform robustness.

Recommendations

- The next steps for RTE and Enedis in addressing the management of curtailment flexibility will rely on a more traditional centralized database approach.
- Reuse of the work done on the standardized data model and TSO/DSO coordination

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