

Session I: Hosting Country Situation

Energy Storage Installation Potential The case of France

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Involved parties

➤ Steering Committee



➤ Industrial funders and contributors



➤ Technical contributors



➤ Consortium





Aims of the study

- Assess the **energy storage potential** in Metropolitan France and its overseas territories by 2030
 - Evaluation of the economic interest for the community as a whole (**social welfare**)
 - Without taking into account incentive mechanisms

- Identify the **most economically relevant technologies**
 - Among **30 storage technologies** (batteries, PHS, CAES, power to gas, heat and cold...)

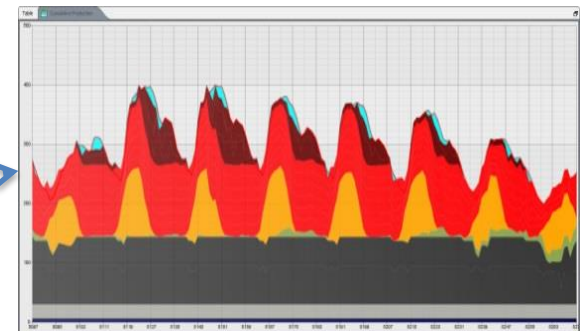
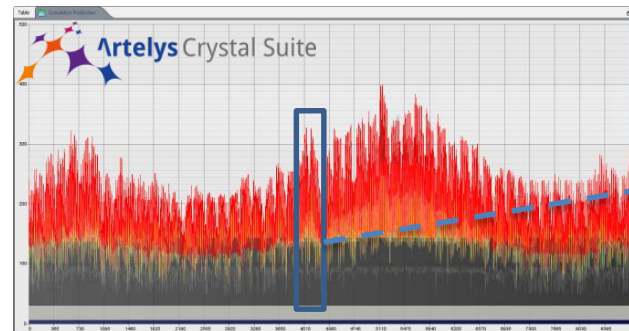
- Point out possible actions (regulatory, economic) to make these technologies develop



Methodology

- Study based on **3 possible 2030 power mixes**
 - Scenarios published by RTE and ADEME
 - **20 to 40% intermittent renewable** energies in the power mix
- The computed storage value comes from savings in
 - **Generation costs** (arbitrage)
 - **Investments in peak plants** (capacity value)
 - **Network investments** (reduction of congestions)
 - **Ancillary services** (spinning reserve and voltage stability)

Storage potential was evaluated using detailed simulations (hourly)





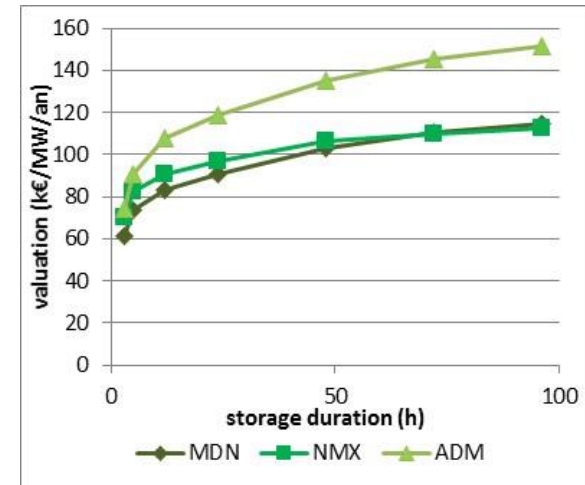
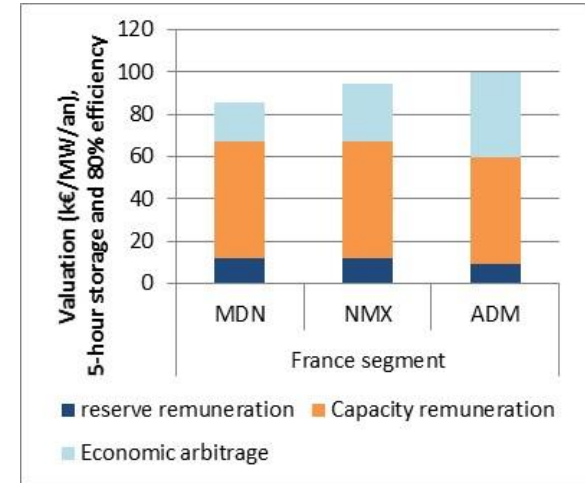
Main results: Metropolitan France

➤ Context

- An already large storage capacity (13 GW hydro, 4.3 GW PHS, 13–20 TWh of electrical hot water heaters in homes)
- Around 10 GW of interconnections with neighboring countries

➤ Foreseen needs in Metropolitan France

- 1 GW to 2 GW of PHS
- 600 MW of storage dedicated to the spinning reserve (flywheels or Li-Ion batteries)





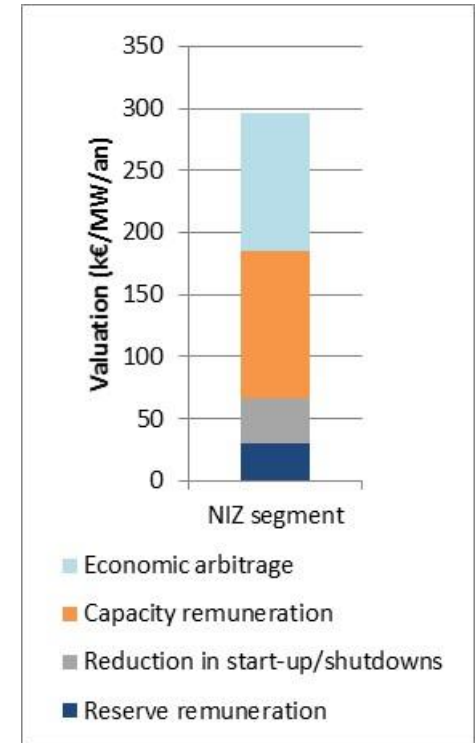
Main results: French islands

➤ Context

- High generation costs
- High demand variation and renewable energy intermittency
- High start-up/shutdown costs

➤ Foreseen needs in French islands

- **200-400MW**
- Surface CAES, Li-ion, Na-S, marine PHS





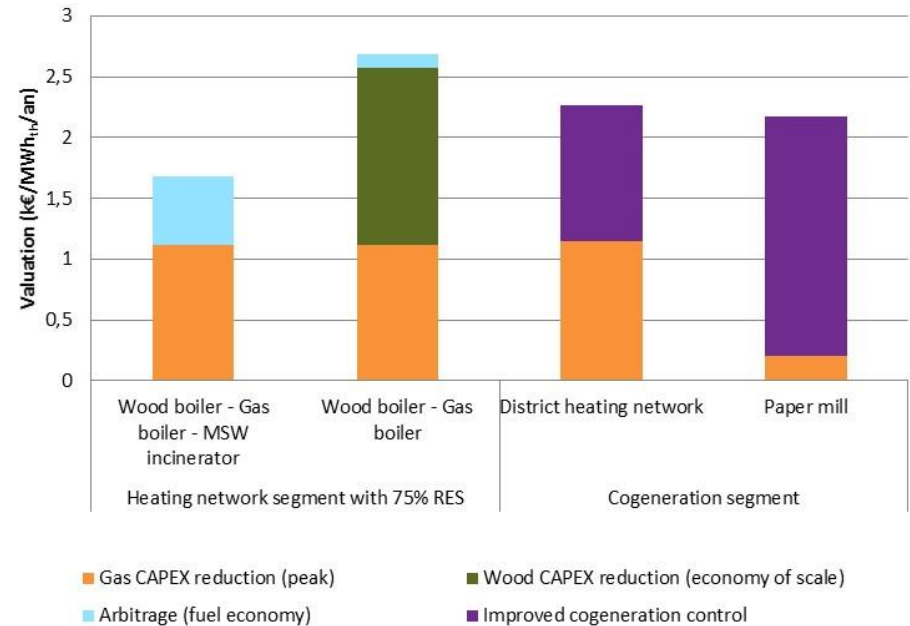
Main results: Heat storage

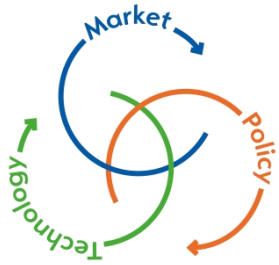
➤ Context

- **Low CAPEX** (compared to electricity storage)
- **Similar services** (combined with CHP or power to heat)

➤ Foreseen needs in France

- **5-10 GWh_{th}** for new district heating networks or extensions





Thank you for your attention

For more details: artelys.com/media/peps/executive-summary.pdf