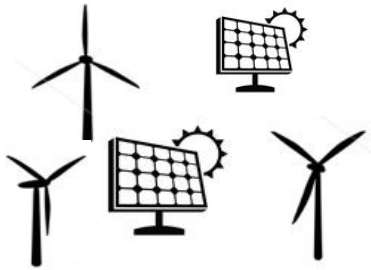
Les enjeux techniques de l'agrégation de flexibilité

26/11/2015

Energy Market Outlook

The energy market is in complete transformation worldwide

State subsidies into renewables
EU 20/20/20 objectives



Profitability

Stability

Supply market deregulation and unbundling

Pure supply margin are decreasing fast

What flexibilities?

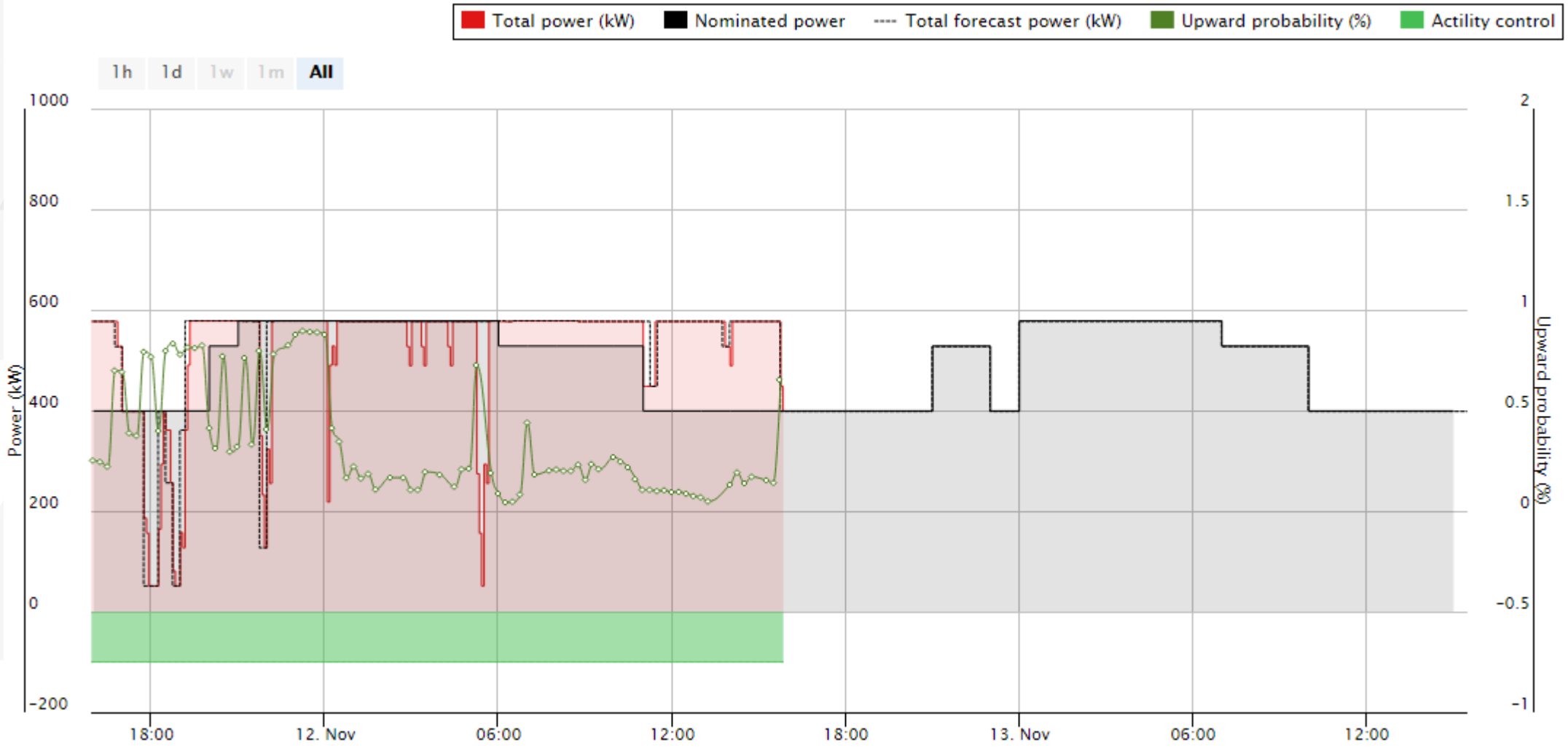
Capacity markets

- Technicality lies in **regulation** and understanding of the tenders
- Technicality also lies in controlling and supervising the sites but it is well known technology with **no real need for innovation**

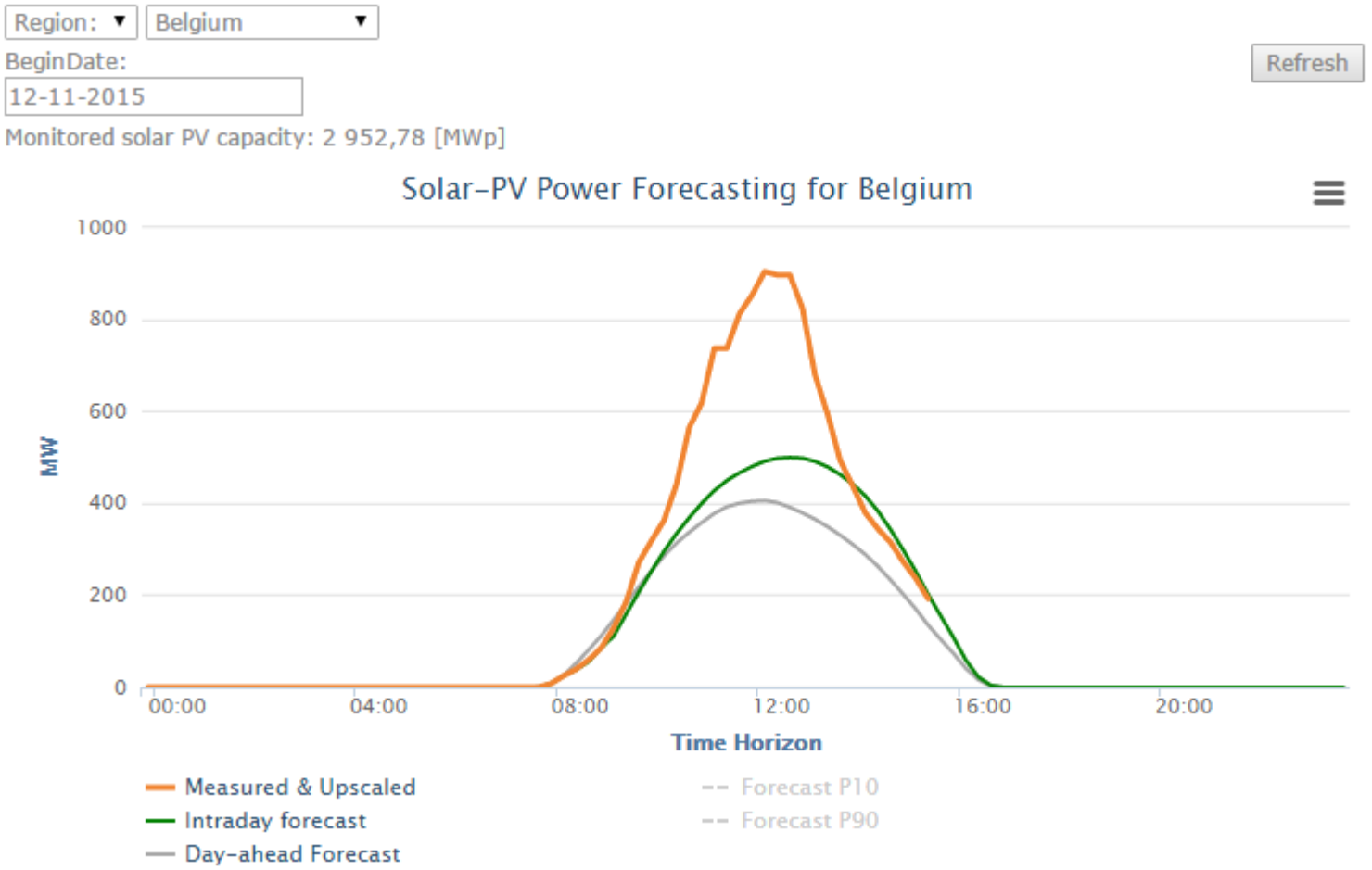
Energy markets

- They are **highly technical, innovation orientated**
- They strongly **depend on regulation** and put the **BRP as a key element of the system**

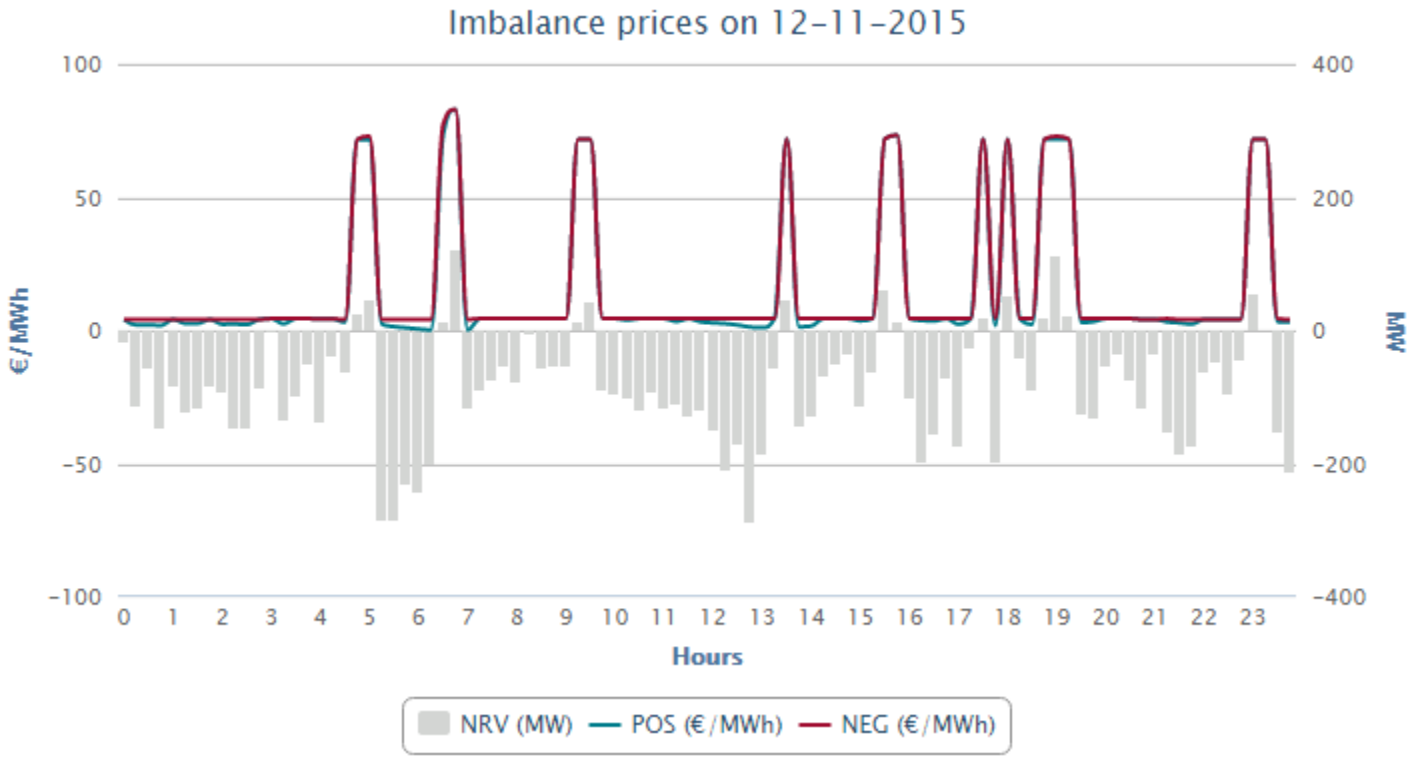
Energy flexibilities in automated distributed processes



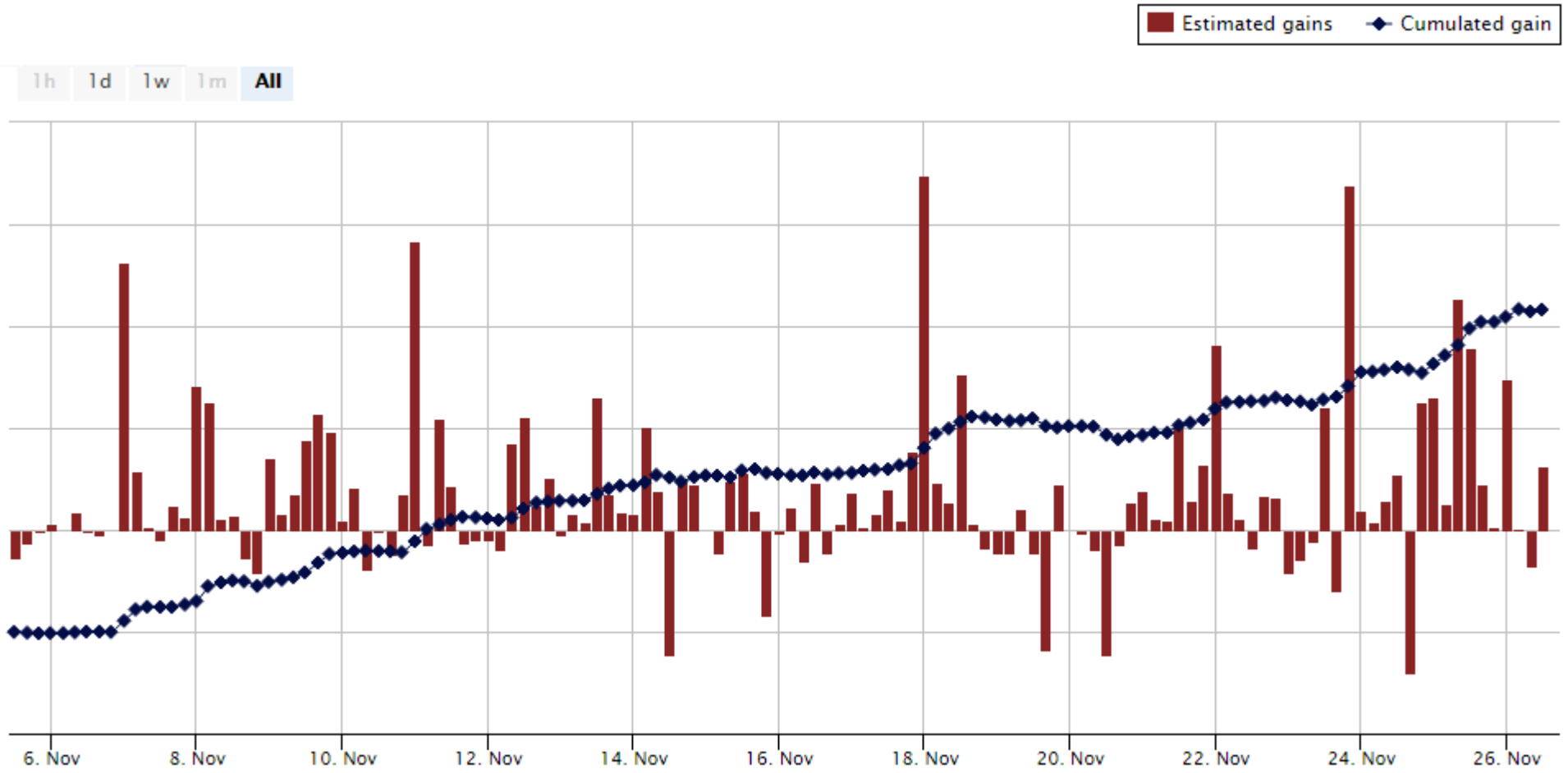
Energy flexibilities in automated distributed processes



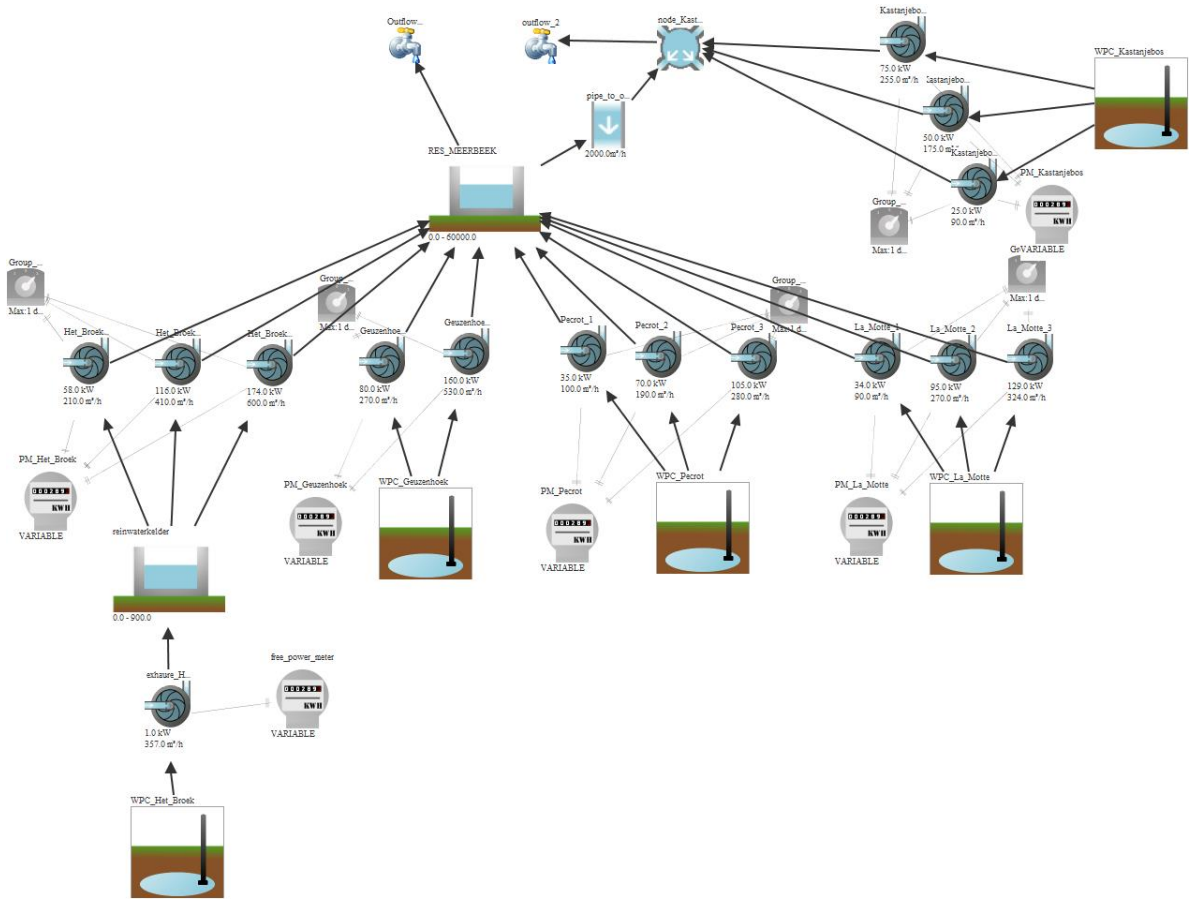
Energy flexibilities in automated distributed processes



Energy flexibilities in automated distributed processes



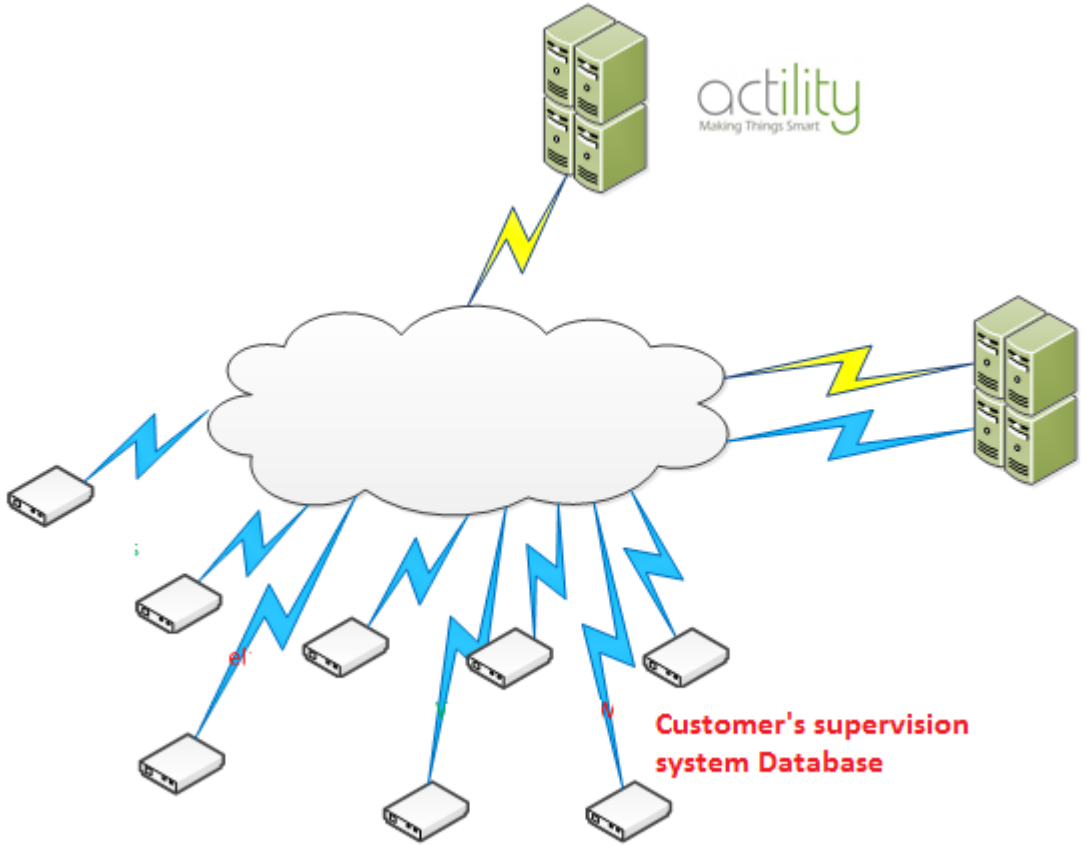
✓ **Process modeling in key to understand the different dynamics**



In the case of smart water management, the modeling is done after having collected the following information :

typology of the network, pump electrical power and outflow, historical tank outflows, electricity tariffs at offtake points, reservoir size and geometry.

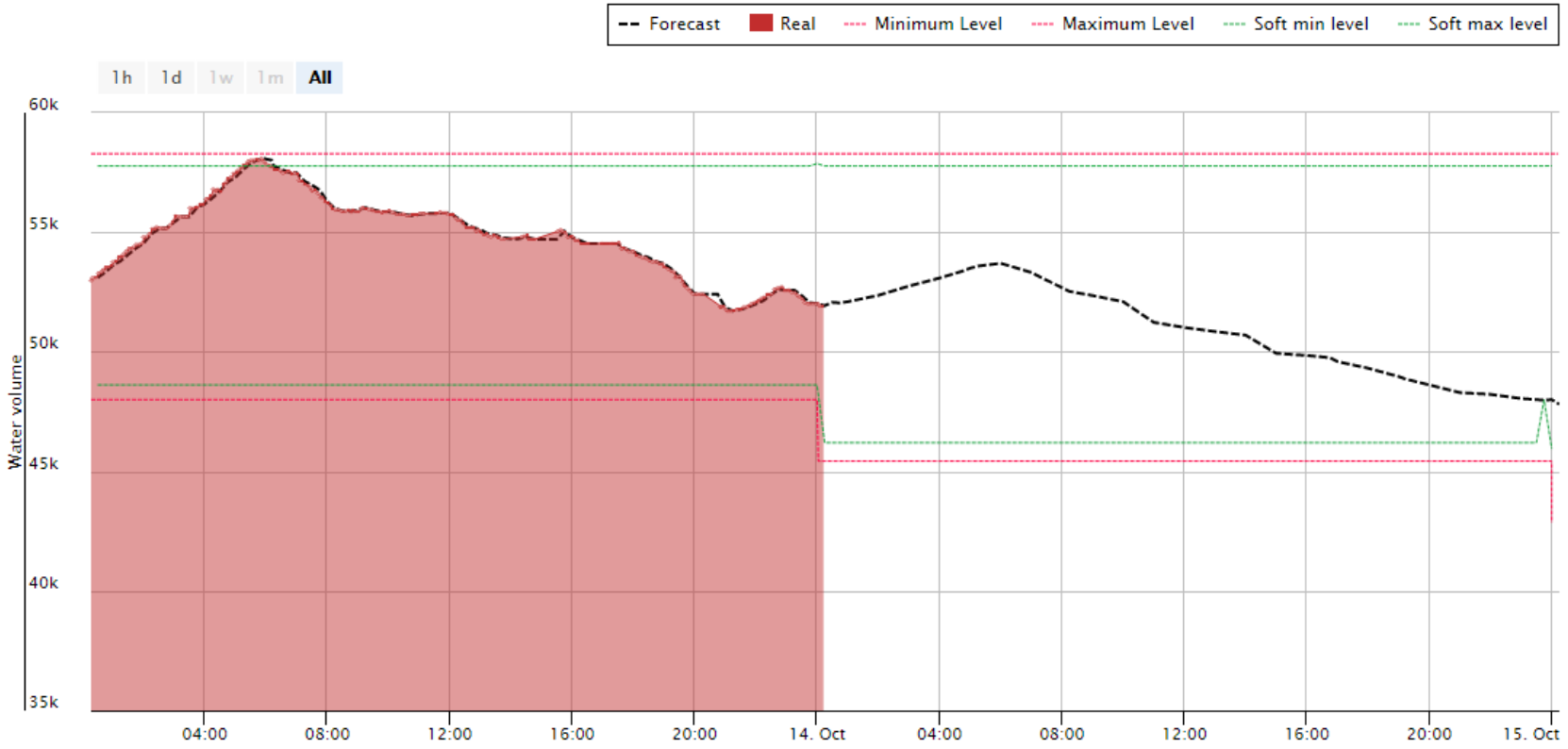
✓ **Simple API to send commands to pumps and get data from the site**



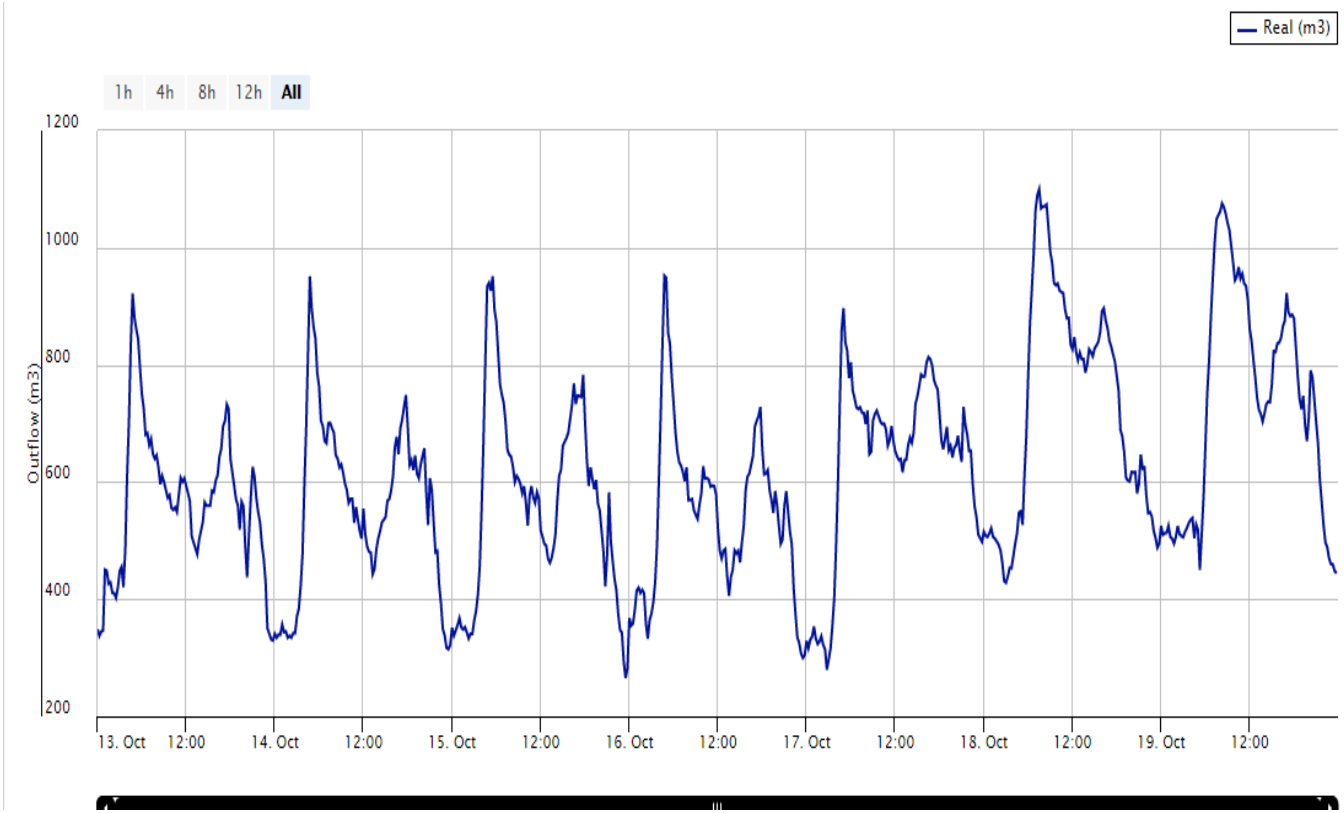
In the case of smart water management, the data retrieved are usually the following :

Must-run mode, level of water in reservoirs, status of pumps, planned maintenance, outflow from tanks…

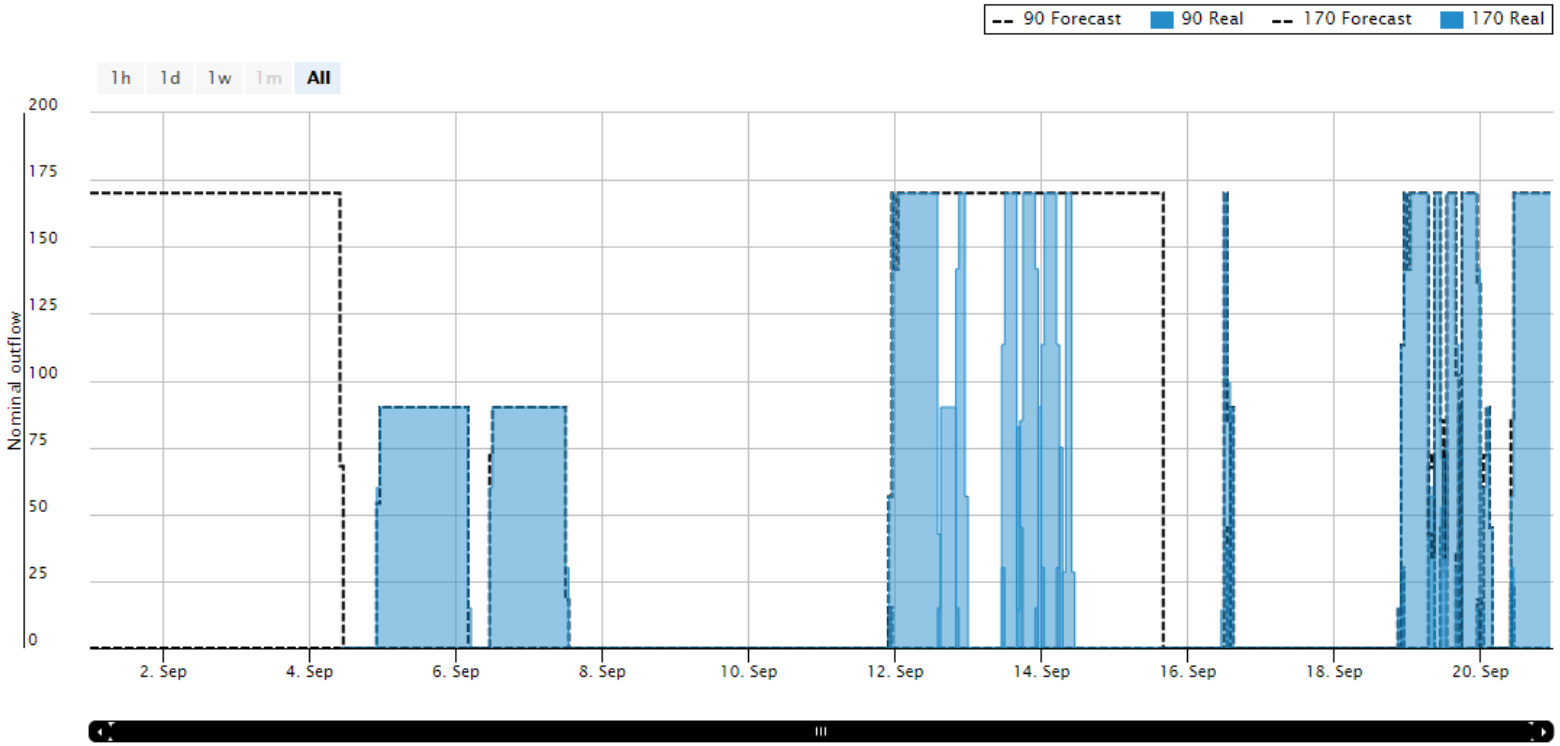
✓ **Water level measurement and forecast helps human monitoring of the activity**



- ✓ **Measuring tank outflow helps in detecting leakages or change in consumption patterns**



- ✓ **Pump state monitoring enables human operator to detect problems in the controllability of the system**



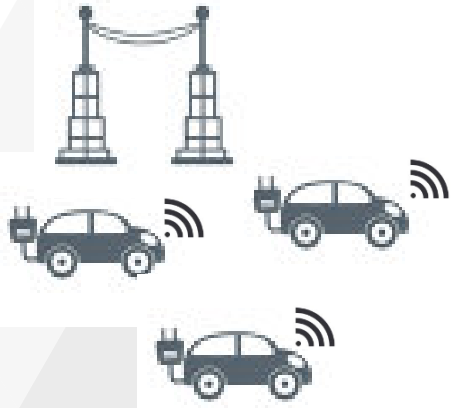
Going for the mass market flexibilities

Clear need for a mutualized infrastructure for a valid business model

Connected thermostat for energy efficiency and flexibility management

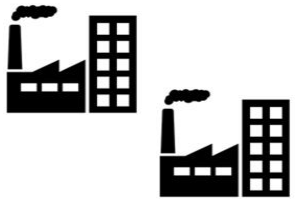
Real time utility metering (gas, electricity, water…)

Congestion management through real time load flow calculations

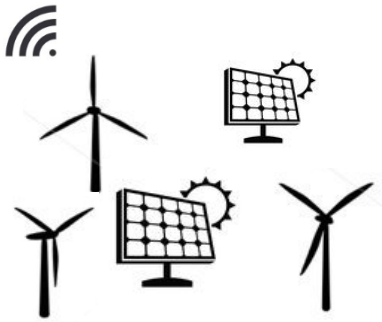


Mobility and load management of electric vehicles

LPWA network



Industrial and tertiary load management



Admission control, production monitoring and forecasting

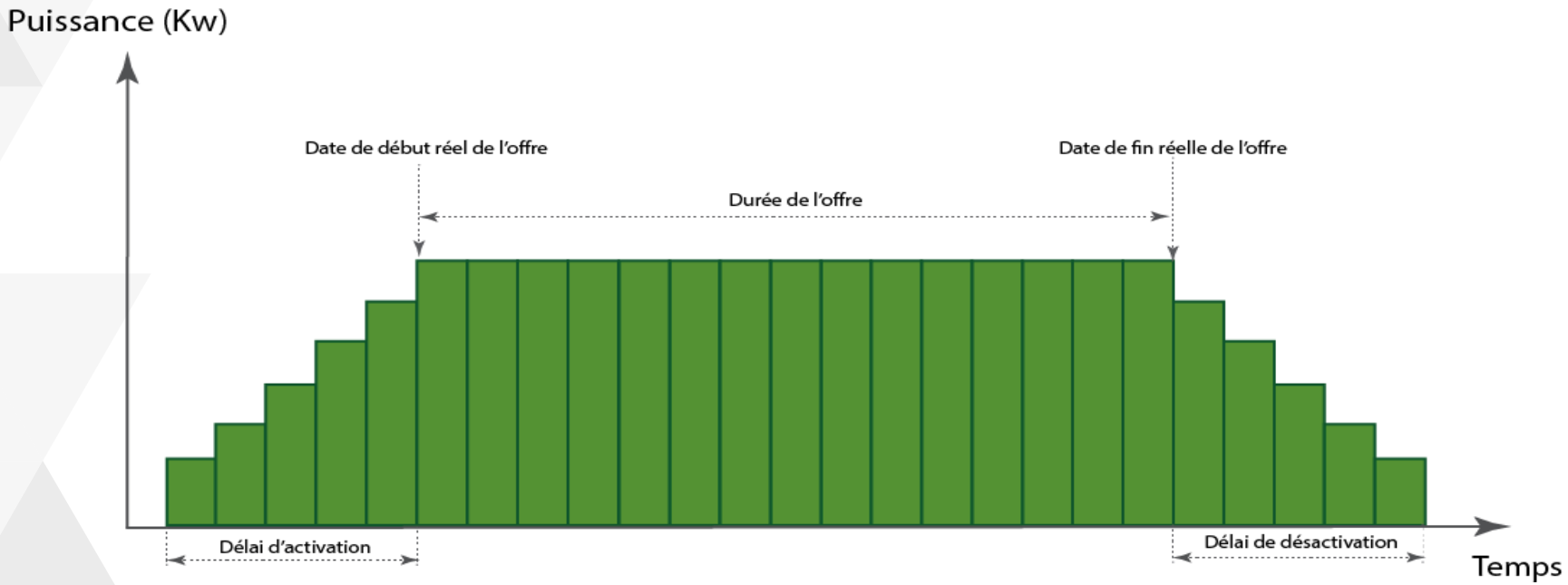
Going for the mass market flexibilities

Need for reactive algorithm to deaggregate small load flexibilities

N° UA	Type	Puissance (kW)	Coût	Type de ramp down	Rebond/Report	Durée rebond/report (min)
UA1	Froid+/-	50	18,36	Linéaire	Oui	30
UA2	Froid+/-	200	32,36	Linéaire	Oui	30
UA3	Froid+/-	100	26,36	Linéaire	Oui	30
UA4	Froid+/-	80	15,2	Linéaire	Oui	30
UA5	Froid+/-	40	25,36	Linéaire	Oui	30
UA6	CVC	80	2,36	Linéaire	Non	0
UA7	CVC	120	3,012	Linéaire	Non	0
UA8	CVC	40	5,36	Linéaire	Non	0
UA9	CVC	100	2,45	Linéaire	Non	0
UA10	CVC	250	5,55	Linéaire	Non	0

Going for the mass market flexibilities

Need for reactive algorithm to deaggregate small load flexibilities



Going for the mass market flexibilities

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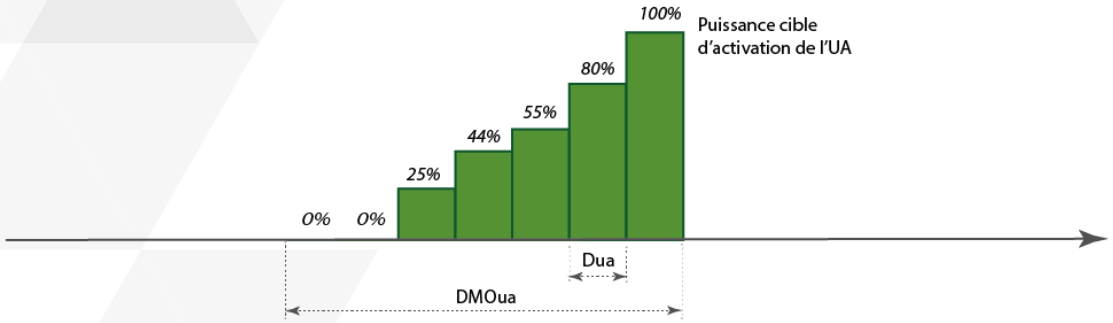
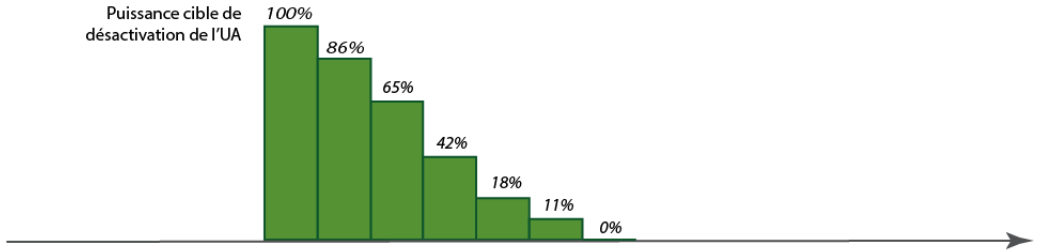
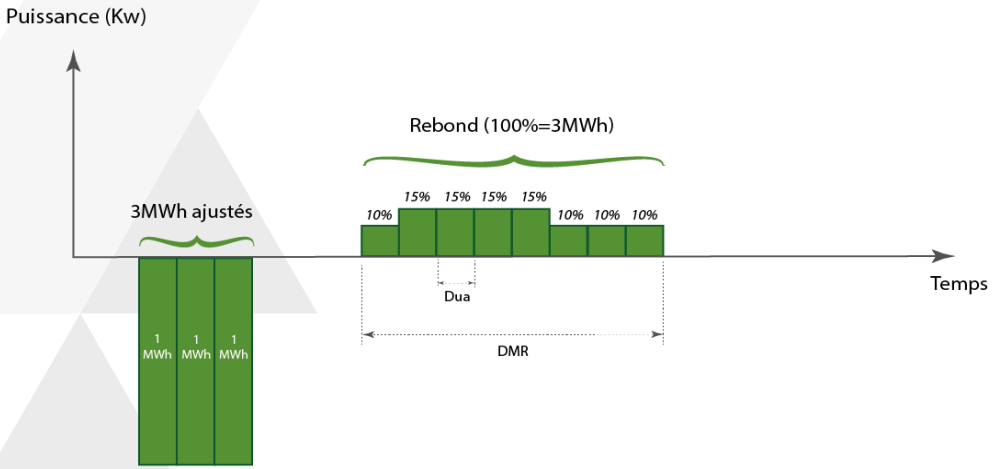


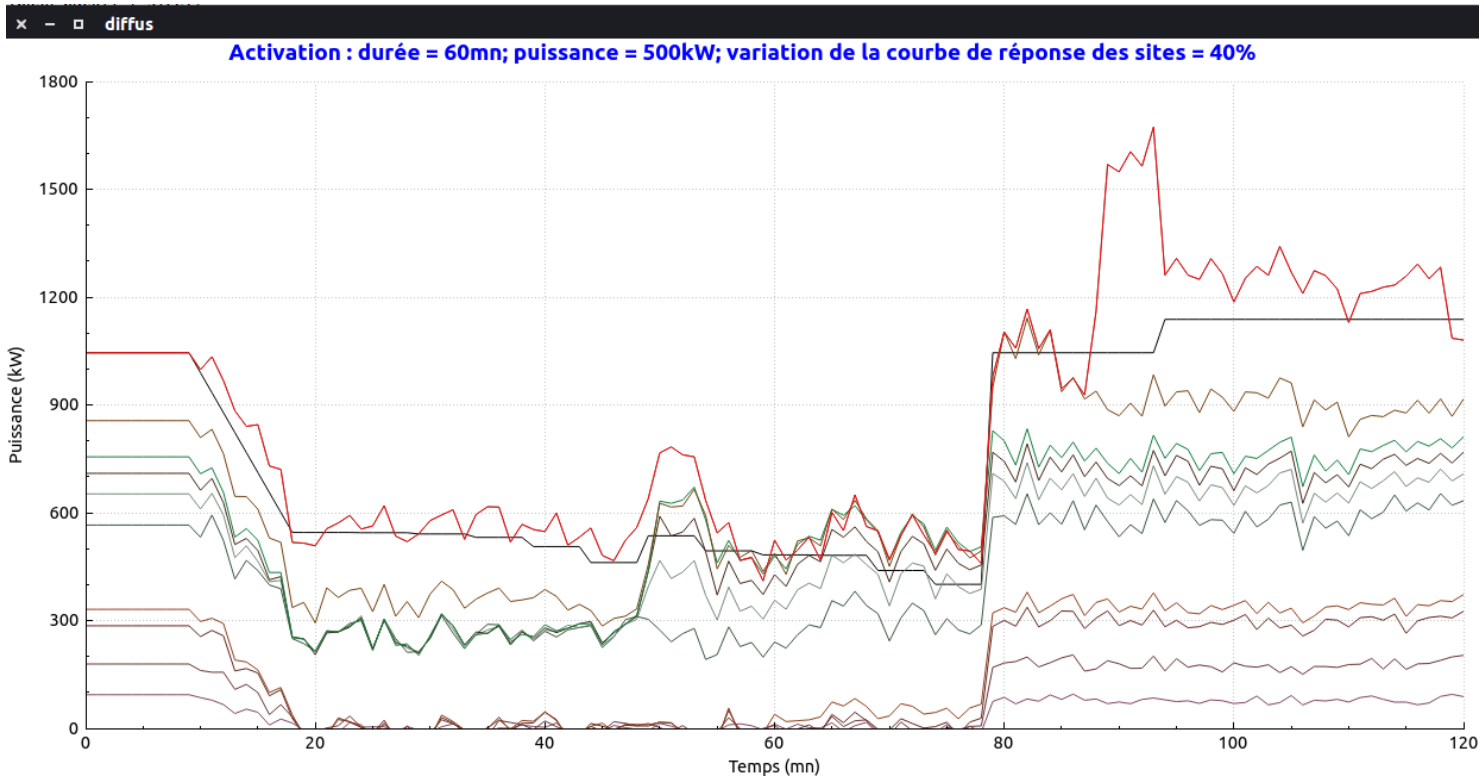




+ static constraints

Going for the mass market flexibilities

Need for reactive algorithm to deaggregate small load flexibilities



Wrap up

- Innovation needs to be supported by intelligent regulation
- Real time data availability at both site and system level are critical
- Energy price signals need to be strong to support innovation and avoid capacity biases
- Newly conceived systems need to give up on the silo approach

Q&A

Thank you

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