Increasing the value of renewable energy through Storage

25th of September 2019, Berlin
The need for renewables

Powering French non interconnected territories

Today:

- 70% Fossil fuel
- 233 €/MWh Average “ZNI*” electricity price in 2016

Source: Commission de Régulation de l’Énergie

*ZNI: Zones Non Interconnectées
A threat for grid stability

Impact of renewables

Cleaner and cheaper energy

Lack of *predictability* and *stability* of generation

- Risk of demand / supply mismatch in real time
- Threat on grid frequency
- Risk of global black-out

Need for more dispatchable power
A well-adapted solution: Li-ion batteries

Already >95% of new energy storage projects

And price keeps going down

Note: prices are for EVs and stationary storage, and include both cell and pack costs. Historical prices are nominal, future prices are in real 2017 U.S. dollars.

Sources: OECD/IEA (2017), BloombergNEF (2017)
Design of ESS solutions

Example of *Le Lamentin* project: CRE ZNI tender for Renewable energy integration

- **4 MWp**
- **3 MW | 5 MWh**

1 container Delivery station
- Supervision system (SCADA)
- Energy Management System (EMS)
- High voltage cells

2 containers PCS & batteries
- Conversion system
- Storage system
- HV/LV transformers
Adding predictability to renewables

Weather forecast
wind speed / solar irradiation

Generation schedule
+ energy supply during peak periods

Energy management
to stick to schedule in real time
Adding predictability to renewables

Avoid penalties
Respect the program sent to the DSO in D-1

Get bonus
Provide max energy during the evening peak period
Committing on performances

As operator of the ESS, Omexom:

takes a *contractual engagement* on the *efficiency* of the project

= financial outcome compared to solar irradiation.

over the *first 13 years* of the ESS.

After *full battery replacement*, the project is entirely *handover* to the client.
### Adding value to renewable energy

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<thead>
<tr>
<th>More <strong>predictability</strong> means...</th>
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<tbody>
<tr>
<td>... less needs for <strong>back-up generation</strong> (fuel, gas...)</td>
<td>... <strong>better valuation</strong> on the market</td>
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<td><strong>No downside for the electrical system</strong></td>
<td><strong>More revenue on the wholesale electricity market</strong></td>
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<th><strong>Storage capacity</strong> means...</th>
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<tr>
<td>... ability to <strong>correct deviations</strong> in real-time</td>
<td>... ability to provide <strong>additional services</strong></td>
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<td><strong>No balancing penalties</strong></td>
<td><strong>Revenue stacking from FCR, voltage regulation</strong></td>
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The advantages of an independent integrator

Global EPC contractor FOR Energy Storage Systems

**ENGINEERING**
- Sizing study & Design
- Grid stability
- Hybridation (PV, wind)
- Procurement

**INTEGRATION**
- PCS
- EMS
- Fire detection
- HVAC

**CIVIL WORK**
- Access road
- Trenches
- Grading
- Building / Walls

**ELECTRICAL WORK**
- Lines / Cables
- Substations
- HV/LV connections

**OPERATION & VALUATION**
- Operational assistance
- Maintenance
- Valuation on markets
Thank you!

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