DSM from distribution customers: From an increasing reality today in MV to perspectives tomorrow in LV
ORES
Belgian Walloon DSO

- 1.300.000 users
- ORES
  - DGO
  - DSO
    - Meter Operator
    - Market facilitator

DSM at DSO level: from MV today to LV tomorrow
DSM at DSO level
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- Balancing with MV customers
- Low voltage
  - Correct solar production profile
  - Energy transition
    - Challenges for a DSO and their customers
    - Opportunities for an aggregator
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Collaboration with TSO

- Collaboration between TSO and DSO has opened the balancing market to distribution grid users since 2014:
  - Medium voltage
  - Head-meter with 15’ granularity
  - Via an aggregator, sometimes directly
- In addition to the TSO – aggregator specifications and contracts, DSO participates
  - In the pre-contractual phase
  - During the execution of the contract
Balancing & MV customers
Pre-contractual phase

- Provision of relevant information about the connection contract between DSO and grid user, typically:
  - EAN and connection capacity
  - Correct use of emergency generators
- Network Flexibility Study NFS
  - Control of effects of simultaneous behavior's, rebound effect
  - Leads to reservation of grid capacity
  - Evolution from 2014 to 2017:
    - Trimestral study
    - Green light given for undefined period
    - Delay of 12 months in case of congestion risks
    - Independent from aggregator change
Balancing & MV customers
Pre-contractual phase

- Generic aggregator – DSO contract
- Metering data for the TSO certification
- All information available on **http://www.synergrid.be/index.cfm?PageID=16832**

<table>
<thead>
<tr>
<th>C8/01 et Contrat PSP - GRD</th>
<th>08.2015</th>
<th>Network Flexibility Study pour participation aux produits d’Elia SDR 2015-2016 et R3DP 2016 (révision 08.2015)</th>
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<tr>
<td></td>
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<td>Modèle de contrat GRD/PSP (Prestataires de services) dans le cadre des réserves stratégiques 2015-2016 et des réserves tertiaires R3DP 2016 (révision 08.2015)</td>
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<tr>
<td></td>
<td>06.2016</td>
<td>Modèle de contrat entre le GRD et le Prestataire de services de flexibilité dans le cadre de la livraison de RT asymétrique à Elia par l’utilisation du réseau de distribution</td>
</tr>
</tbody>
</table>

| C8/02                     | 08.2015 | Sous-comptage par le GRD: modalités générales dans le cadre du produit R3 DP 2016 |

| C10/11                    | 06.2012 | Prescriptions techniques spécifiques de raccordement d’installations de production délocalisées fonctionnant en parallèle sur le réseau de distribution. |
|                          |        | Voir aussi :
|                          |        | 1/ FAQ concernant l’application du C10/11 (08.2016)
|                          |        | 2/ Que faire si mon installation photovoltaïque se déconnecte régulièrement du réseau ?
|                          |        | 3/ (FR) Déclaration de conformité C10/11 révision 06.2012 - §2.10, §2.13 et annexe 4
|                          |        | (EN) Declaration of compliance C10/11 revision 06.2012 - §2.10, §2.13 and annex 4 |
Balancing & MV customers

During the execution of the contract

• DSO as flexibility data manager in distribution:
  – Is in charge of the access register with the pool of customers
  – Makes the (aggregated) link with the impacted source BRP
  – Calculates the availability of flexibility
  – Calculated the activated volume for the TSO
Balancing & MV customers
It works!

- TSO and DSO processes, timings & procedures are aligned
- Market is functioning for products at DSO-level
  - Prequalification by DSOs in 2015: 679 MW (371 DGUs)
  - Prequalification by DSOs in 2015: 885 MW
  - Prequalification by DSOs for strategic reserves 2015-16: 314 MW (66 DGUs)
- Stepwise improvements in market processes
- Ready to tackle new challenges
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Today and till 2018:
- Because the headcounter turns back during sunny hours and forward during consumption hours, a prosumer is modelled as having consumed approximatively nothing
  - Yearly customer bill 0 €
  - 15’ BRP allocation 0 kWh
- Consequences
  - Non prosumers allocation decreases when it is sunny
  - A Balance Responsible Party BRP receives, from the TSO, a balancing bill … partially based on the portfolio of the other BRP’s
- From 2018, DSO will include the real solar production in the allocation results, in collaboration with the TSO Elia
Low voltage
Correct solar production profile

Typical error on standard load profiles (4 days)

DSM at DSO level: from MV today to LV tomorrow
Low voltage
Correct solar production profile

Error on standard profile and PV production
Low voltage
Correct solar production profile

Residual error
Balancing with MV customers
Low voltage
  - Correct solar production profile
  - **Energy transition**
    - Imagine 2030
    - Challenges for a DSO and their customers
    - Opportunities for an aggregator
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Energy transition
Imagine 2030

• 2016
  – 90,000 prosumers (7%) with 5kVA

• 2030
  – 270,000 prosumers with 10kVA
  – EV between 100,000 and 300,000
  – HP between 80,000 and 160,000

• Evening peak increase

<table>
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<tr>
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<th>Average (kW)</th>
<th>Individual (kW)</th>
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</thead>
<tbody>
<tr>
<td>EV</td>
<td>1,2</td>
<td>3</td>
</tr>
<tr>
<td>HP</td>
<td>1,7</td>
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</table>
Energy transition
Risks for a DSO and their customers

Typical individual load profile without PV, EV and HP
Energy transition
Risks for a DSO and their customers

Typical individual load profile **with** PV, EV and HP
Energy transition
Risks for a DSO and their customers

Impacts for the DSO

Network & system

System

No impact

Network & system

DSM at DSO level: from MV today to LV tomorrow
Because of the peak increase at the interface between TSO and DSO, the grid bill of all the customers could increase by ~ +10%
Energy transition
Opportunities for an aggregator

- We believe it is possible to let the customer free to invest (or not) in EV, HP and PV
- We also believe it is possible to avoid lots of these costs
- We see one way …
• Equip these customers with a **smart meter** with 15’ granularity
• Make **incentivizing tariffs** in order to avoid most of these synchronous peaks
• Good technology can help the customer to avoid these peaks
• Moreover, as a market party, the aggregator or supplier that uses that technology could valorize the flexibility
Energy transition
Opportunities for an aggregator

DSM at DSO level: from MV today to LV tomorrow
Be sure in LV there will be new sources of flexibility & new needs of flexibility

The future will tell us if there is a business model for aggregators and suppliers