The Distribution Battery (Distribat)

The Distribat as a Network Asset

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ENEXIS

DSOs: Target, Responsibility & Challenges

- **The core of the DSO's target and responsibility:**
- Prevent network problems at minimal societal costs;
- While maintaining Security of Supply (SoS) and Quality of Service (QoS).

- **The DSO's challenge today: integrate distributed (local) energy resources**
- Prevent - also in this new reality - security, quality and voltage stability problems, which could be caused by e.g. high peak loads (in both directions) or even congestion;
- Solutions can be found in flexibility services, e.g. demand response;
  → DSOs, as neutral market facilitators, should facilitate the development and the operation of flexibility services and DSOs should even be able to procure these services on the market;
- Avoid that the distribution system becomes a bottleneck in the trading markets, nor in the flexibility services markets.

Batteries Can Help

- **Customers and market parties could employ batteries to save money or make profit:**
  - With e.g. Tesla's Power Wall customers can store and use their self-generated kWhs;
  - EV's batteries can be charged when prices are low, or can be deployed by aggregators to offer flexibility;
  - Market parties can employ the flexibility to support their trading activities;
  - Commercial parties can offer flexibility to DSOs or other customers.

- **DSOs can use batteries to prevent network issues such as:**
  - Bidirectional flows and unnecessary distribution losses by charging when the sun shines & demand is low;
  - Classical network reinforcements can be deferred or even prevented by discharging at peak load hours, reducing peak load;
  - This can also prevent congestion and instability and help integrate distributed renewables.

O&O: DSOs to Own and Operate Batteries?

- DSOs should be able to buy storage services on the market:
  - The service has to be available on the market, at a fair price;
  - and the offering should fully meet all DSO's conditions, in particular those concerning quantity, quality, capacity, priority, moments of supply, etc..
- In the end, the DSO is responsible for SoS and QoS. Therefore these conditions are hard requirements that have to be enforceable. So the DSO needs leverage.
- Therefore the DSO should not be only depending on the market. The DSO should also be able to employ storage itself and to own and operate it, as a regular network asset.
- Then, it's a distribution battery, only for network management purposes. To prevent network problems, at minimal societal costs. **And accountable to the regulator**.
- If market offerings are okay (quality, price, etc.), buying the service is prefered.

Boundary Conditions for the Distribat

- Only for network management. To prevent network problems.
- With Distribat, DSOs ***do not*** intend to offer services to customers. We leave that to the market.
- DSOs choices must be based on lowest societal costs. Particularly when the following Distribat options are considered:
  - Distribat versus alternative solutions;
  - Own&Operate versus purchasing storage capacity.

DSOs are accountable to regulators, markets and society. Also with respect to the employment of Distribats.

Some Q&A (1/3)

- **Q**: But, with such a battery you simply exchange kWhs with the market. That's trading!
  A: No, we do not exchange kWhs with anyone. It isn't even necessary to measure the kWh-flows into and out of the battery. Charging and discharging only have some effects on our distribution losses. They are just slightly shifted in time, from discharging hours to charging hours. Charging increases these losses, but discharging has the opposite effect, it decreases them.

- **Q:** By shifting network losses you are making money. Buying more at cheap night hours or when sun and wind are producing and less at expensive peak hours.
  A: That's right, the difference is 1 à 2 ct/kWh. So our expenses for network losses will decrease. That's fine but the effect is small. For our pilot battery less than 5 euro/day.

Some Q&A (2/3)

- **Q**: When peaks are shaved and valleys are filled, price levelling is to be expected. So you are disturbing the market.
  A: Yes, some price levelling may be expected. This is the result of a solution that is good for society. A solution for the problem of integrating distributed renewables. We don't create a problem. And yes, some traders who are using price differences to make money maybe don't like the idea. But this money making is based on a problem, that we reduce. You can't blame us for reducing our problems. So, it is not an argument against the idea. Besides that, the effect is the same for all traders and even trading itself will normally lead to price levelling.

- **Q**: Okay, a distribat. But then only (or at least first) with storage capacity provided by the market.
  A: That would not be logical. If we would go for the classical solution, i.e. reinforcing the grid, this restriction would not be applied, even if the classical solution is less positive for society.
  Grid management is a regulated activity, not subject to market forces, and that is a conscious choice. Dutch legislation even states that all strategic network management activities should be performed by the DSO itself (and all network assets should be owned by the DSO). And the new Dutch legislation will be technology agnostic with respect to network management.

Some Q&A (3/3)

- **Q**: But, if a DSO as a regulated entity is allowed to O&O batteries, we (the market) will never take it up. No level playing field! And we all know that competition is the best way to fulfil customer's needs.
  A: Yes, but with a distribat we don't fulfill customer needs, we don't offer any services to anyone. We don't operate within the competitive demand side services market. A distribat doesn't play any role in the commercial trading of flexibility.

- **Q**: Okay, but what if a Local Sustainable Energy Collective (LSEC) were to ask the DSO to install and operate a battery and to offer it's storage capacity to the LSEC?
  A: Even then: not a task for the DSO.

- **Q**: Even if the distribat already exists and the LSCE would have a similar request?
  A: No, this is not a DSO task.

- Distribats don't generate, nor use electricity. They don't produce a real product. They just increase the distribution capacity, and that is not a commercial product. The purpose of distribution capacity is just to facilitate production, trade, supply and consumption of electricity.