Microgrids

Emerging Microgrid Technologies - challenges

Bucharest, 4 September 2018
Agenda

• Technical Challenges – SENSIBLE Project

• Network Planning Challenges

• Conclusion
Under SENSIBLE project, EDPD developed a demonstrator in Evora (Valverde), installing a storage unit that enables a secondary substation to act as microgrid.

SENSIBLE was developed with LABELEC and EDP NEW R&D

Allows the islanding and synchronization of the LV network associated with a secondary substation, on the premises of a Evora University’s campus

Furthermore, allows for load management (peak-shaving, consumption deferral)

Addressed the challenges

✓ Optimizing storage dispatch in extended islanding
✓ Optimizing LV storage dispatch in normal operation
✓ Islanding transition and main grid synchronization
✓ Residential flexibility management in markets
Agenda

• Technical Challenges – SENSIBLE Project

• Network Planning Challenges

• Conclusion
Network Planning Challenges

- Networks have several end-user categories, with different usage patterns:
  - Loads
  - Renewable DG
  - Storage
  - Flexible loads/generation
- As a result, load flows are more complex and unpredictable → need to enhance network planning tools
- EDPD developed and implemented a new probabilistic methodology, accruing from AMI data, building synthetic load and generation diagrams
- This new probabilistic methodology support risk controlled network planning
Network Planning Challenges

- Simulation is performed by running a full AC power-flow analysis for each 15min period of the sampled load profiles of each year.

- Branch current and nodal voltage results are computed and synthesized to be compared to technical limitations.

- This simulations allow to quantify the probability of having a load flow above a certain value, for each network component.

- EDPD is also using probabilistic assessment to evaluate network investment projects – calculating the NPV and CB for probabilistic demand scenarios.
Agenda

• SENSIBLE Project

• Network Planning Challenges

• Conclusion
CONCLUSION

• DSO are cornerstones in enabling the implementation of policies addressing climate change. These policies foster the connection of renewable DG, and the emergence of new loads (EV, flexible loads).

• **EDPD is a neutral market facilitator, empowering consumers and ensuring security of supply**

• **EDPD is promoting the transition to smartgrids, enabling it to address the new challenges of the electrical energy sector**
  
  ✓ +1.6 million smart meters deployed (6 million consumers)
  
  ✓ Development of probabilistic network planning methodologies, suited for scenarios with large penetration of renewable generation and with flexible DER available

• **EDPD is developing technical expertise that allows it to be prepared for the emergence of microgrids**
  
  ✓ Participation in SENSIBLE project, which developed a microgrid
  
  ✓ Participation in other FP7 projects – including the coordination of InteGrid, testing a flexibility provided by storage and through a market hub.
Thank you!