



Smart TSO-DSO interaction schemes, market architectures and ICT Solutions for the integration of ancillary services from demand side management and distributed generation

**Brussels – EDSO workshop on flexibility: Rethinking distribution grids: future DSOs' roles in active system management through flexibility | 9<sup>th</sup> November 2017**

## TSO-DSO Coordination Schemes for Accommodating Ancillary Services from Distribution Networks

Daan Six, EnergyVille



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# Agenda

- TSO-DSO coordination schemes: scope and definitions
- Characteristics of 5 TSO-DSO coordination schemes for flexibility-based services
- Conclusions

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## TSO-DSO coordination schemes: scope and definitions

- Objective: analyze TSO-DSO coordination schemes (CSs) for the provision of flexibility-based system services by distributed resources (DG, DSM, ...)
- Analyse each CS, focusing on:
  - envisioned set of roles and responsibilities,
  - potential market architectures, and
  - relevant information exchanges
- Impact on TSO grid operation, DSO grid operation, the role of other market participants and the related market design ↔ national regulatory frameworks and EU context



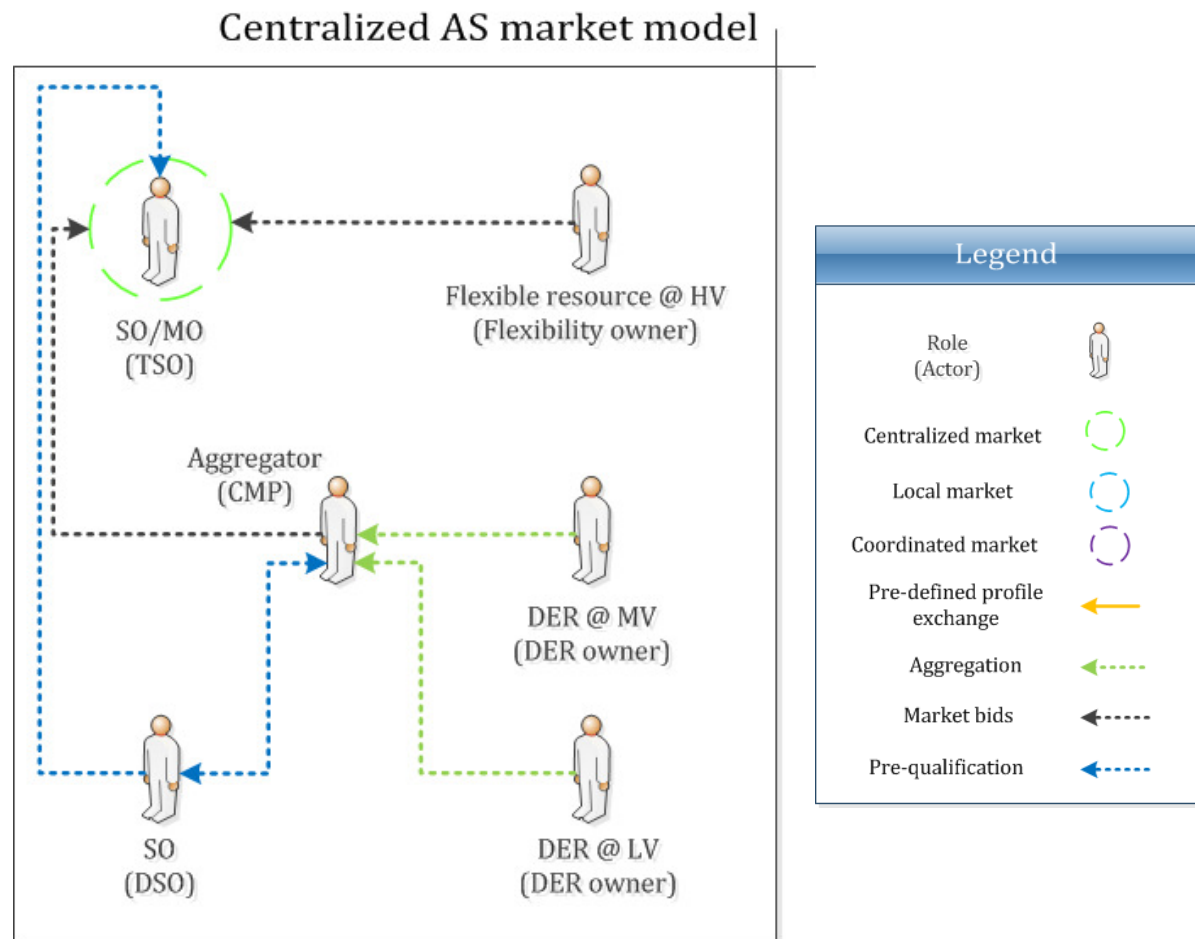
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# Five possible TSO-DSO coordination schemes:

## 1) Centralized AS market model

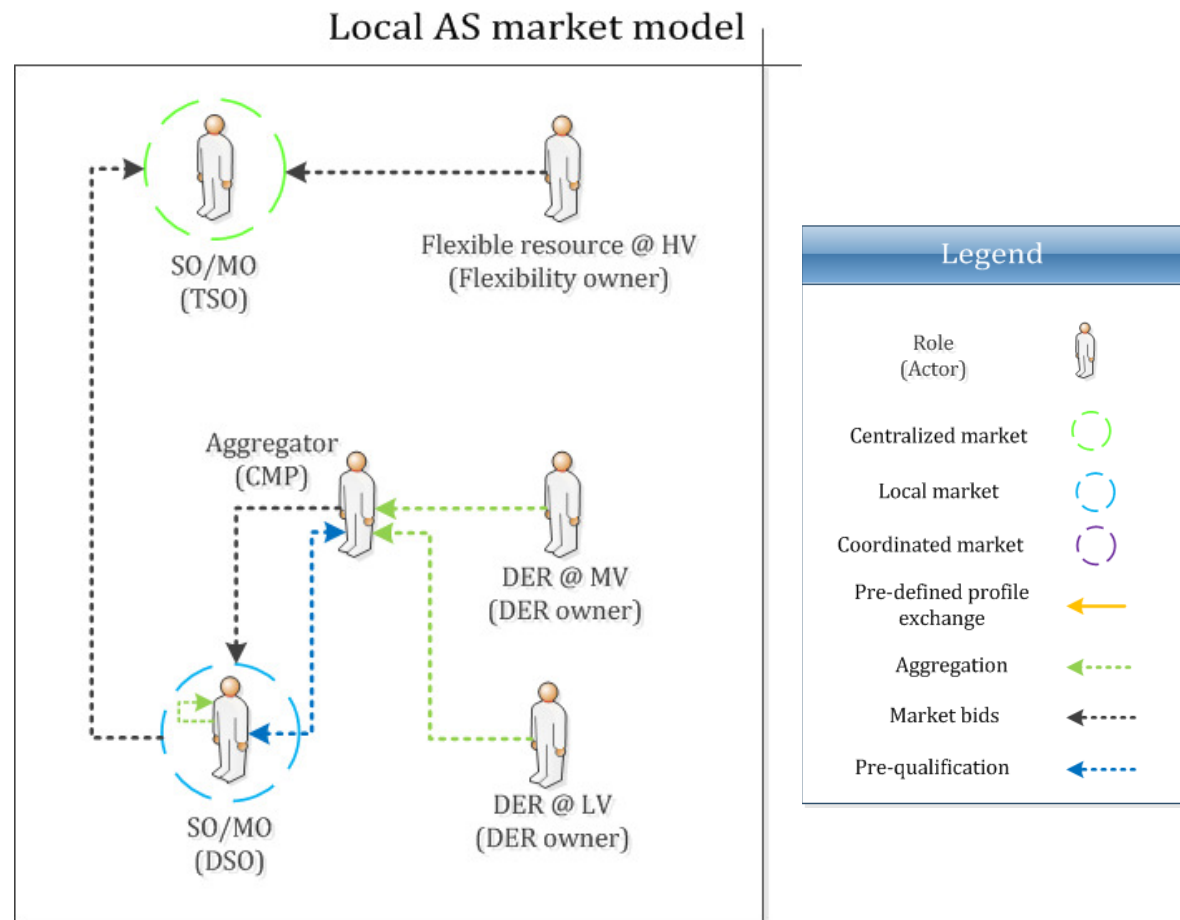
- 1 common ancillary services market managed by TSO
- Separate DSO process for checking distribution constraints (e.g. prequalification)



# Five possible TSO-DSO coordination schemes:

## 2) Local AS market model

- Separate local market managed by DSO for local issues
- Transfer remaining flexibility to TSO ancillary services market level

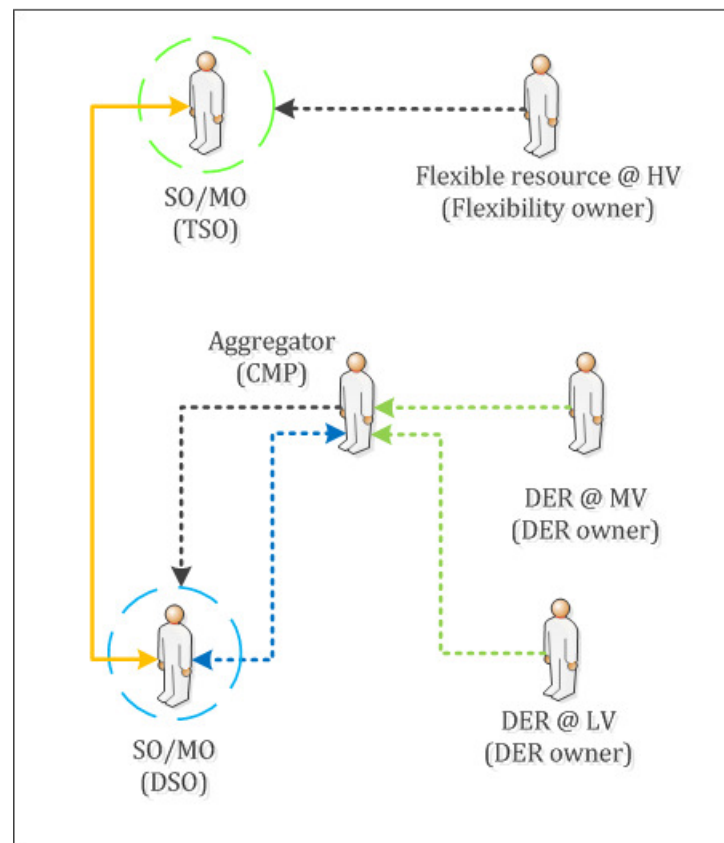










# Five possible TSO-DSO coordination schemes:

## 3) Shared balancing responsibility model

- Ancillary services market for transmission grid-connected resources managed by TSO
- Local market for distribution grid-connected resources
- Agreed pre-defined TSO-DSO scheduled profile

Shared balancing responsibility model



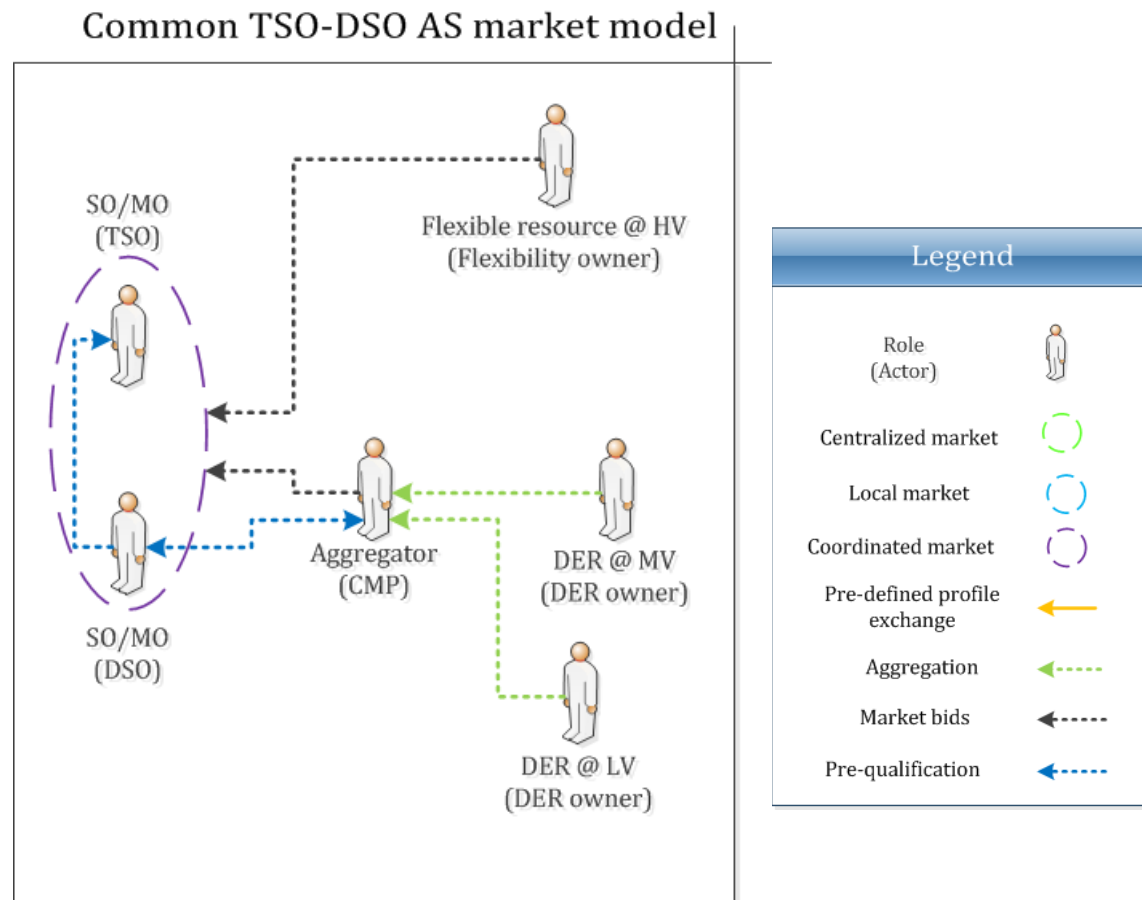
Legend	
Role (Actor)	
Centralized market	
Local market	
Coordinated market	
Pre-defined profile exchange	
Aggregation	
Market bids	
Pre-qualification	



# Five possible TSO-DSO coordination schemes:

## 4) Common TSO-DSO AS market model

- Common flexibility market managed jointly by TSO & DSO
- Variants:
  - One optimization with all grid constraints
  - Two optimizations: distribution & transmission constraints





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- Characteristics of 5 TSO-DSO coordination schemes for flexibility-based services
- **Conclusions**

# TSO-DSO coordination schemes: conclusions

- Different possible TSO-DSO coordination schemes: each have their own benefits and risks
- Different coordination schemes imply different roles, responsibilities, market design, regulation, grid operation, cost of implementation, ...
- Public deliverable available
  - [http://smartnet-project.eu/wp-content/uploads/2016/12/D1.3\\_20161202\\_V1.0.pdf](http://smartnet-project.eu/wp-content/uploads/2016/12/D1.3_20161202_V1.0.pdf)

*If they want to go fast, system operators could go alone;  
if they want to go far, they should go together,  
turning challenges into opportunities*



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## Basic schemes for TSO-DSO coordination and ancillary services provision

D1.3

### Authors:

Helena Gerard (VITO / EnergyVille)  
Enrique Rivero (VITO / EnergyVille)  
Daan Six (VITO / EnergyVille)

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Thank You

Daan Six



**Contact Information**

Affiliation: VITO / EnergyVille

Phone: +32 14 33 58 47

Email: [daan.six@vito.be](mailto:daan.six@vito.be) / [daan.six@energyville.be](mailto:daan.six@energyville.be)