# Paris Session 2022



# Dealing with large numbers of system participants

**C6** 

PS2, Q2.1

Are there any challenges or issues related to DER integration and operation on the actual power system, which are not only technology related but also others, such as political, regulatory, business or economic matters?

Is there any unexpected or unusual behaviour of the DER or phenomena affecting the power

grid due to RES/DER integration?

Does the level of DER penetration affect such behaviour?

Felix Flatter, Germany

Group Discussion Meeting

© CIGRE 2022



### Motivation

- Number of active system participants will rise exponentially
- Market design is not suited to manage large numbers of system participants
- Power system operation gets increasingly challenging as as of now behavior of new active system participants

## Proposed solutions

- Refinement of existing processes
  - "Smarter" Redispatch
- Additional processes (incremental) to enhance existing structure
  - Local energy or flexibility markets, often as sequential add-on
- New innovative processes (disruptive)
  - Microgrids and Energy Communities

## Recommended Solution

- Wholistic organization structure
  - "Web of Cells", "Cellular Energy System"
  - Based on system levels and geographical extent
  - Hierarchically ordered
  - Decomposition of large system is possible
- Amount of data exchange is reduced in each system, as only communication with neighbor required.
- Execution of market power is prevented as one single market clearing process is applied.
- Use of both local and remote flexibilities is incentivised by adequate pricing scheme.

Central Level (e.g., TSO)
Security Constrained Economic Dispatch
Day-head & intra-day
System responsibility

Ancillary services
Utilization of transmission capabilities

Aggregated Bids

Individual result

#### Local Level (e.g., DSO)

Aggregation & disaggregation of bids and SCED results
Local responsibility for safe and secure operation
Utilization of local flexibilities

Bids

Disaggregated result

→ Active power setpoint

#### Units of end customers

Internal optimization based on forecasts and energy prices Submission of bids

Internal responsibility for safe and secure operation
Responsibility to support superior levels' responsibilities
Utilization of internal flexibilities

**Group Discussion Meeting**