ELECTRICAL FLEXIBILITY IN CHEMICAL INDUSTRY: TECHNICAL POSSIBILITIES, VALORISATION PATHS AND ECOLOGICAL BENEFITS

Electrical flexibility, what is it used for?
Being electrically flexible
- Having possibility to adapt electric consumption or production
Balancing the grid
- Large scale power storage not feasible
- Production and consumption need to adjust to each other
- Grids frequency is parameter
- Responsibility of TSO (transmission system operator)

Ancillary services
- Services supporting the transmission of electric power
  - Various types of products exist
  - Still mainly for producers, opening up for consumers
  - Balancing market

Role of the chemical industry
- Industry consumes one third of electricity in Belgium
- Chemical industry: 24/7 regimes and large consumers

Research questions
- Technically possible to intervene in processes?
- Economically feasible? Remunerations?
- Flexibility with or without impact on the processes?
- Own electricity production, interesting?
- Legal aspects: role of aggregator, power suppliers, TSO, etc.

Ecological aspect of grid balancing
Current practice: Producers take the lead role of balancing in the grid following the electricity profiles of the consumers
- OCGTs (open cycle gas turbines), the most flexible producers
- Low efficiency, high CO₂ emissions
- High operating costs

DSR (Demand Side Response)
- Shift balancing role from producer to consumer
- Adapt consumption profile instead of production profile
- Shift from fossil to renewable even more need for balancing!

Defining technical possibilities of flexibility
Identifying industrial process with flexibility potential
- Type of consumers, power consumption profile, load factor, etc.
- Already available and future potential

Modeling of processes & machines
- Defining time constants, to link to types of ancillary services
- Impact on process of activating flexibility

Valorisation paths, markets & legislation
External valorisation: selling flexibility
- Directly to TSO or via aggregators/ power suppliers?
- Increasing predictability is decreasing price?

Balancing markets
- Evolving fast, supported by EU energy transition
- Follow up on available products

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