



Utilising the potential of sector coupling efficiently – prerequisites for business models

Contribution to a conference on sector coupling organised by the French-German Office for Energy Transition (OFATE/DFBEW)

Wolfgang Fritz | Berlin | March 21th, 2024

Regarding business models for utilising the potential of sector coupling, two types of business have to be distinguished

Business related to the primary use of sector coupling technologies

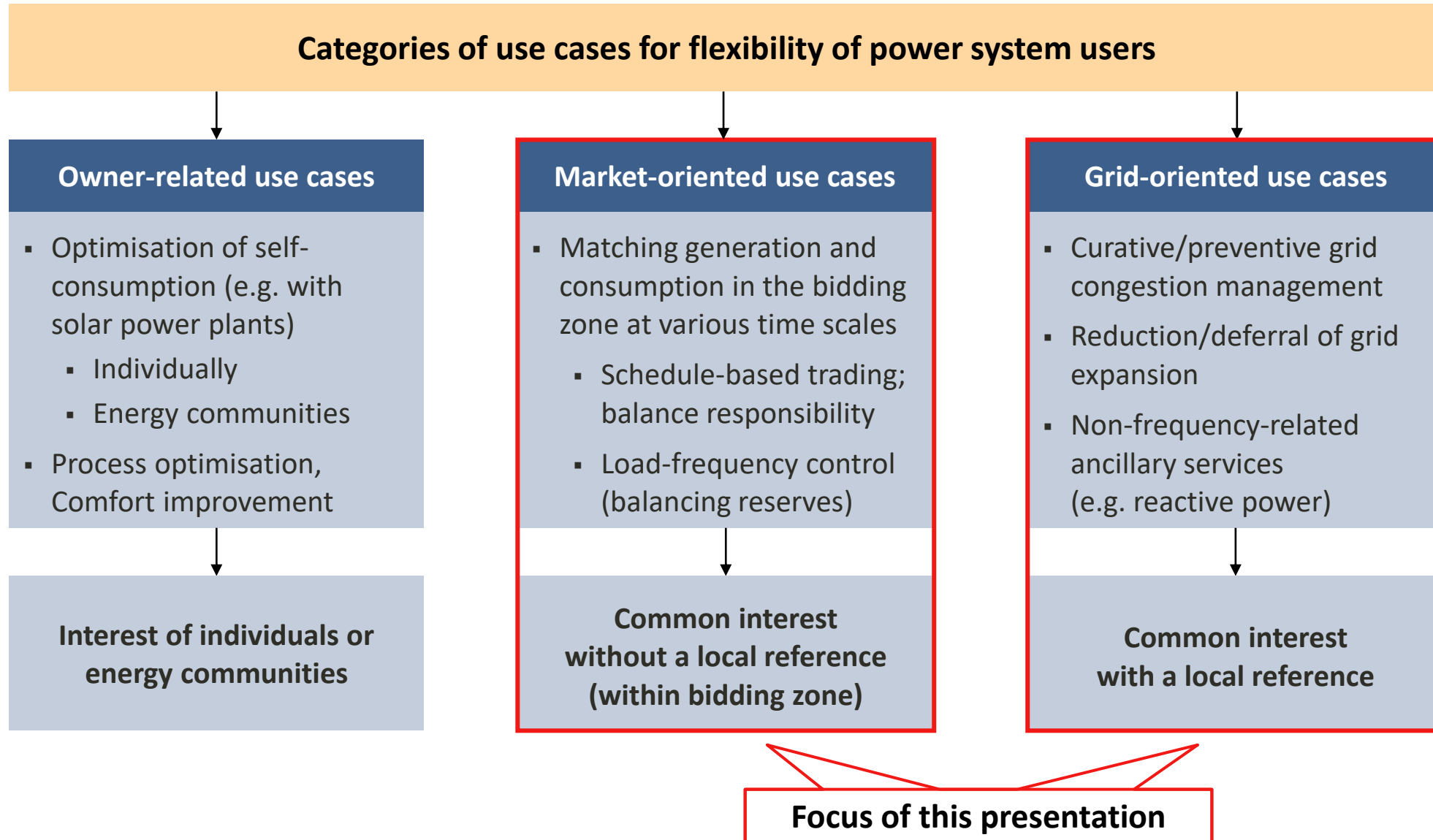
- Provision and operation of equipment e.g. for:
 - Production of green hydrogen
 - Power generation from hydrogen
 - Electric vehicle charging
 - Electric heating/cooling
 - Energy storage
- Financing models (e.g. contracting)
- Etc.

Business related to flexible operation of sector coupling technologies

- Utilisation of flexibility e.g. related to:
 - Storability of hydrogen
 - Electric vehicle charging requirements
 - Thermal inertia of buildings/processes
 - Batteries or other (e.g. thermal) storages
 - Bivalent heating/cooling technologies
- Provision of flexibility services for purposes related to operation of the power system

Focus of this presentation

Flexibility of power system users can be utilised for various purposes



Prerequisites for business models related to grid-oriented or market-oriented flexibility use cases

Competitive business setting

- Business models are typically created by **profit-oriented competitive players** rather than by regulated entities like grid operators

Prerequisites regarding sales opportunities for flexibility

- Adequate **instruments for flexibility use cases** have to be established, including rules on various aspects:
 - Roles and relationships of actors involved
 - Rights of use for flexibilities
 - Remuneration/pricing mechanisms (possibly including markets)
 - Technical and procedural requirements
 - Prioritisation/coordination rules
- Instruments must enable **sufficiently strong and long-lasting profit opportunities** in order to support attractive business models

Prerequisites regarding access to flexibilities

- **Communication** channels for control signals and/or price signals
- Appropriate **metering** equipment (e.g. smart meters)
- Models for **aggregation** of small-scale flexibility
- **Absence of barriers to flexibility** (e.g. related to grid tariffs)

Instruments/markets for market-oriented flexibility use cases are well suited for the development of business models

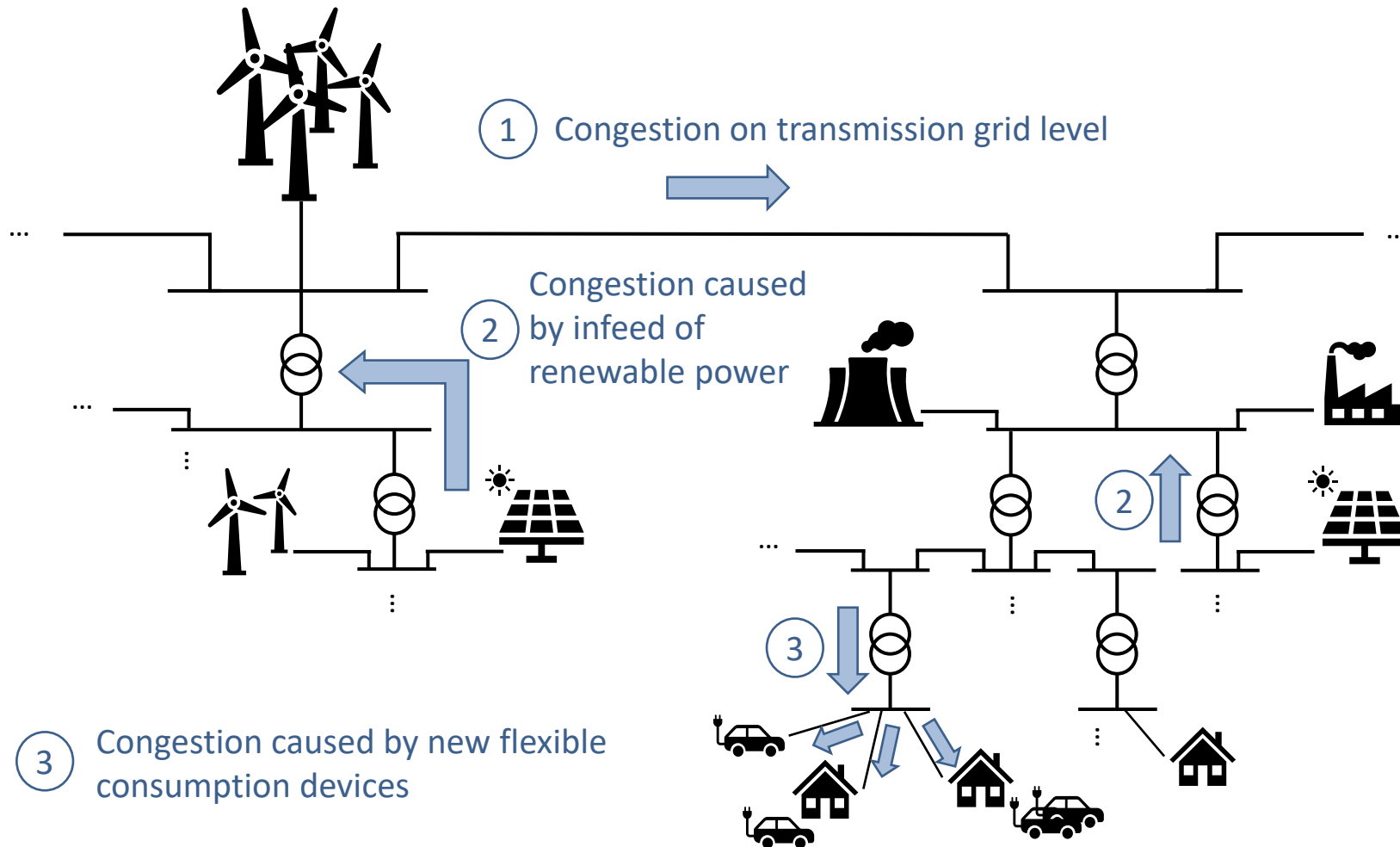
Market-oriented flexibility instruments	Suited for flexibility of generators	Suited for flexibility of storage	Suited for flexibility of consumers	Potential for business models?
Power trading markets, e.g. spot markets	✓	✓	✓	✓
Balancing reserves markets	✓	✓	✓	✓
Balancing within the perimeter of balance responsible parties	✓	✓	✓	✓
Dynamic electricity tariffs	✗	✓	✓	✓

Regarding instruments for grid-oriented flexibility use cases, the suitability for business models is limited

Grid-oriented flexibility instruments (established/discussed in Germany)	Suited for flexibility of generators	Suited for flexibility of storage	Suited for flexibility of consumers	Potential for business models?
Redispatch incl. renewables curtailment	✓	(✓)	✗	✗
Controllable consumption on low-voltage level (§ 14a EnWG)	✗	(✓)	✓	✗
Flexible connection agreements	✓	✓	✓	✗
Local flexibility markets (*)	?	(✓)	(✓)	(✓)
Time-of-use or dynamic grid tariffs	✗	(✓)	✓	✓

(*) Feasibility of local flexibility markets is debated controversially in Germany for different reasons, e.g. risks of strategic behaviour in cases of predictable congestion

A further aspect of complexity: Grid-oriented flexibility use cases can relate to different types and locations of grid congestion



A few conclusions

- Flexibility of sector coupling technologies is a valuable resource that can be used for various purposes related to the power system
- Business models aiming at utilising this potential require appropriate flexibility instruments (= markets/regulations) enabling sufficiently strong and long-lasting profit opportunities
- Regarding market-oriented flexibility use cases, several suitable instruments already exist
 - e.g. spot markets, balance responsibility and balancing reserves markets
- Regarding grid-oriented flexibility use cases, it appears more difficult to create attractive business opportunities due to the strongly regulated nature of grid operation
 - time-of-use grid tariffs and perhaps local flexibility markets can be promising instruments
- Furthermore, various regulatory and technical prerequisites should be fulfilled to provide efficient access to flexibilities
 - e.g. communication and metering infrastructure and absence of barriers due to grid tariffs



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