ENERGIEKOPPLER

Wir vernetzen im Schwarm

VPP projects
Challenges for flexibility aggregation

Jens Werner, CEO and Co-Founder

DieEnergiekoppler

- *Established in 2020 as spinoff of Technical University Dresden*
- *Market entry in 2021*

- ***About:***
  - *Technology provider of the Flexibility Plant for aggregation and connection of controlable assets*
  - *Utilization of flexibility in the sectors electrical energy, heat and mobility*

Dipl.-Ing. Tobias Heß

Co-Founder
CTO

M.Eng. Irina Weis

Co-Founder
Geschäftsführerin

Dipl.-Ing. Jens Werner

Co-Founder
Geschäftsführer

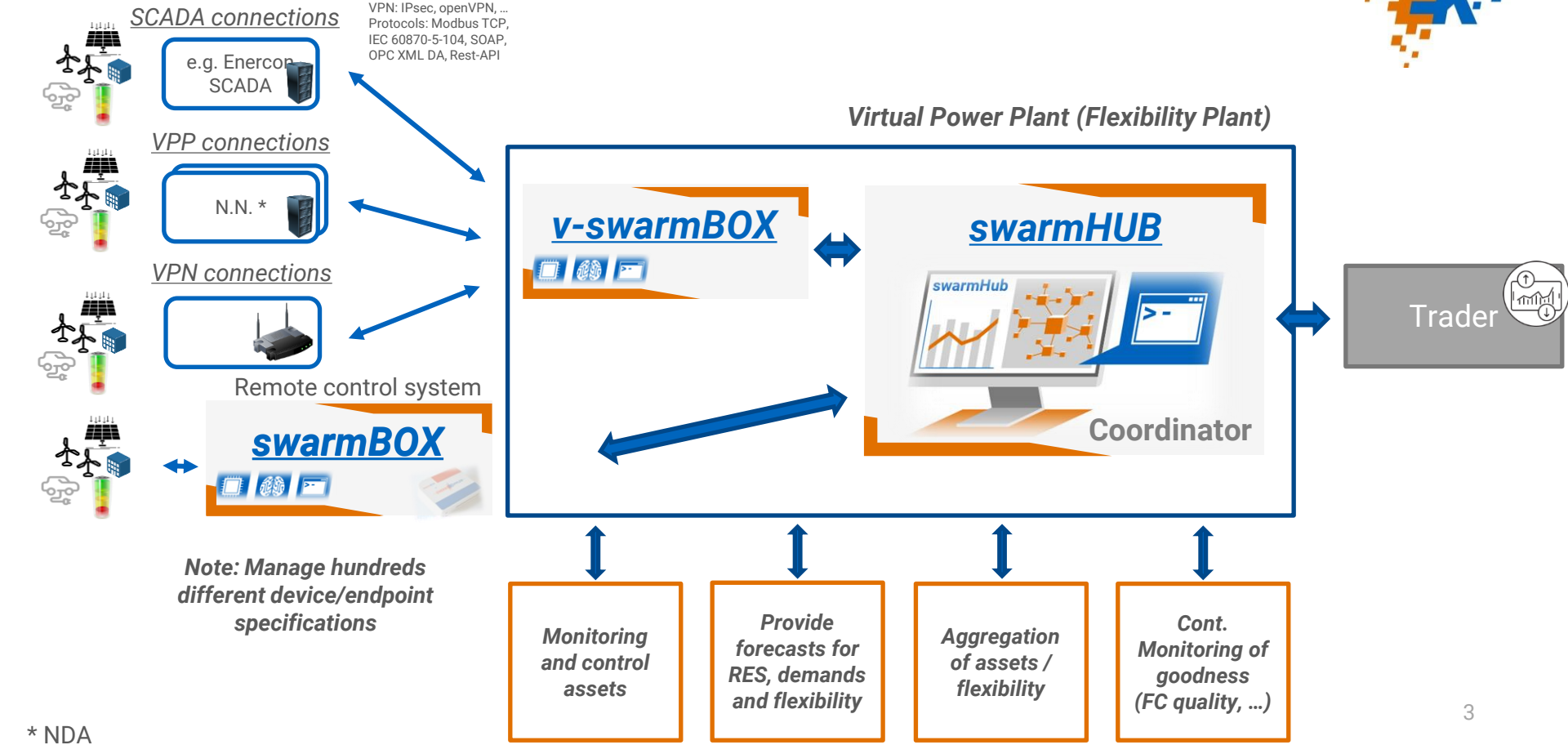
eXIST
Existenzgründungen aus der Wissenschaft

9 years research

EWE

Practical Demonstration
(2014-2018)

VPP in the middle



* NDA

Challenge VPPs

Trends and requirements

- *Decentralized and compartmentalized*
- *Hybrid and diverse asset structures*
- *Continuously changes in the regulatory and market situation*

Requirements to VPPs as key element in Smart Grids

- ***Scalability*** *– connection of thousands assets*
- ***Abstraction*** *–asset modelling and VPP design independent of the asset technology*
- ***Holistic optimization*** *– allow parallel fulfilment of different marketing options to realize economical operation*
- ***Standardization*** *– be variable in the usecase and the asset technology*
- ***Automation*** *– use helpers for boarding and operation the VPP*
- ***Flexibility Handling and Aggregation***

Challenge Flexibility and Aggregation

What is Flexibility:

Definition Energiekoppler:

*Flexibility describes the **usable controlability of an asset** under consideration of **various restrictions**, to **adjust** generation or consumption **in time and in height** -> **POWER** AND **ENERGY***

Challenge Flexibility and Aggregation

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What needs the TRADER?

*A reliable forecast of the tradable **power** and **energy** for > 48 h.*

Challenge Flexibility and Aggregation

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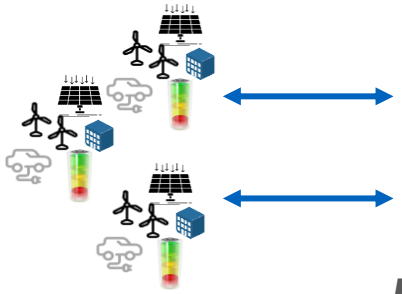


FLEX-Potential

Limitations

Dispatch

What needs the TRADER?

*A reliable forecast of the tradable **power** and **energy** for > 48 h.*

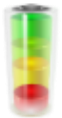
Flexibility Aggregation

- *MUST HAVE DEMANDS*
- *ASSET PARA. and LIMITs*
- *ASSET AVAILA-BILITY*
- *MIXED-ASSET Pool*

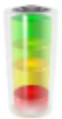
Challenge Flexibility and Aggregation

ASSET PARAMETERS and LIMITATIONS

- Battery example



Battery 1(100 kW, 100 kWh, SoC: 25%):
- *Chargeable for 45min*
- *Dischargeable for 15min*



Battery 2 (100 kW, 100 kWh, SoC: 75%):
- *Chargeable for 15min*
- *Dischargeable for 45min*

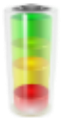
to TRADER

Aggregated Battery (200 kW, 200 kWh, SoC: 50%)
- *Chargeable for 30min with full power*
- *Dischargeable for 30min with full power*

Challenge Flexibility and Aggregation

ASSET PARAMETERS and LIMITATIONS

- Battery example



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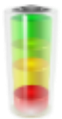

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Mismatch to physical situation at single assets

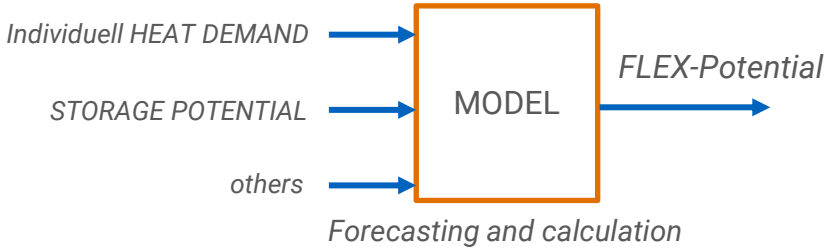
Note: Handle the information loss during aggregation

Challenge Flexibility and Aggregation

MUST HAVE DEMANDS

CHP or HEAT PUMPs example

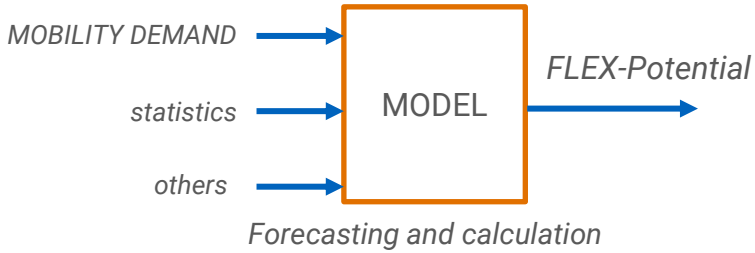
Note: primary supply task is HEAT



ASSET AVAILABILITY

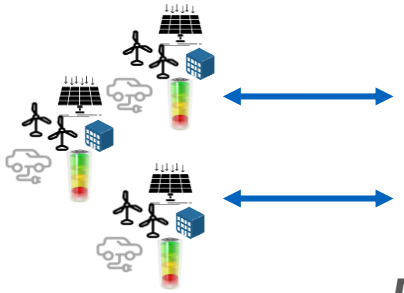
E-Mobility example

Note: unplugged car – no flexibility



Challenge Flexibility and Aggregation

Behind the Meter (BtM):



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Flexibility Aggregation

MUST HAVE DEMANDS	*ASSET PARA. and LIMITs*	*ASSET AVAILA-BILITY*	*MIXED-ASSET Pool*
BtM Aggre-gation	*STATIC DEMANDS*	*SELF CONSUMPTION vs. PEAK SHAVING vs. Flexibility Marketing – CONTRACT RESTR.*	

For solution contact us ! ;-)

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Wir vernetzen im Schwarm

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Challenge VPPs

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- ***Forecast based*** *- Consideration of restrictions (e.g. demand, power system, marketing restrictions)*
- ***Holistic optimization*** *– Allow parallel fulfilment of different marketing options to realize economical operation*
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