



sonnen

energy is yours

Integrating decentral renewable assets with a network of smart home storage devices

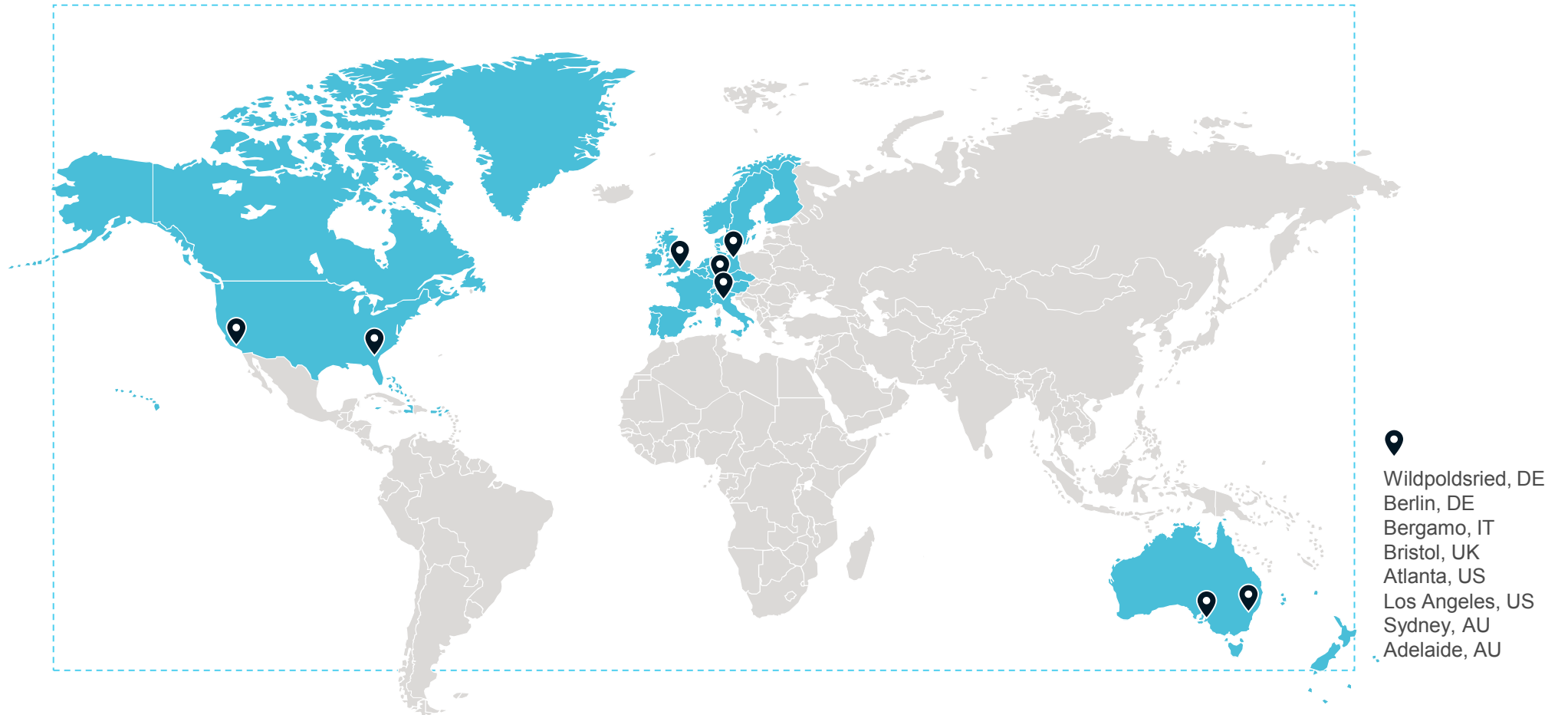
3rd GSM Symposium 2019,
03.07.2019
Lucerne/Switzerland

Matthias Dilthey, sonnen eServices GmbH



Our goal is clean and
affordable energy for everyone.

Locations.



Who we are.

sonnen

- ... was founded in 2010 by Christoph Ostermann and Torsten Stiefenhofer
- ... is one of the world's largest manufacturers of battery storage
- ... is one of the fastest growing technology companies in Europe
- ... is the operator of the world's largest virtual battery
- ... has received many national and international awards for innovation and growth
- ... has already installed more than 40,000 storage batteries worldwide
- ... operates with the sonnenCommunity, a worldwide unique energy community

sonnenBatterie.

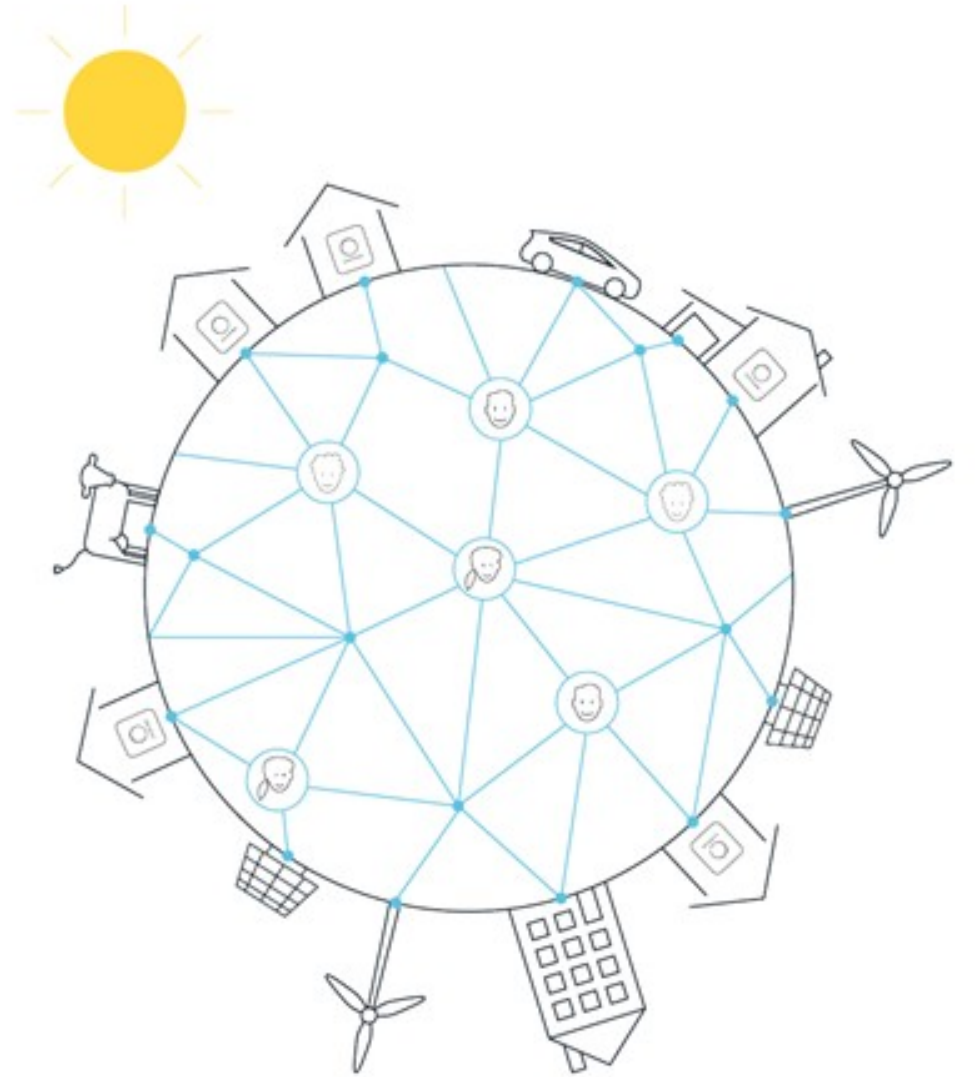
The sonnenBatterie is the world's best-selling electricity storage and reliably supplies over 40,000 households with self-generated electricity. As an interface to the sonnenCommunity, it ensures that people can share their electricity with others. What's more, the aggregation of thousands of sonnenBatteries into a virtual power plant facilitates the stabilisation of the power grid.

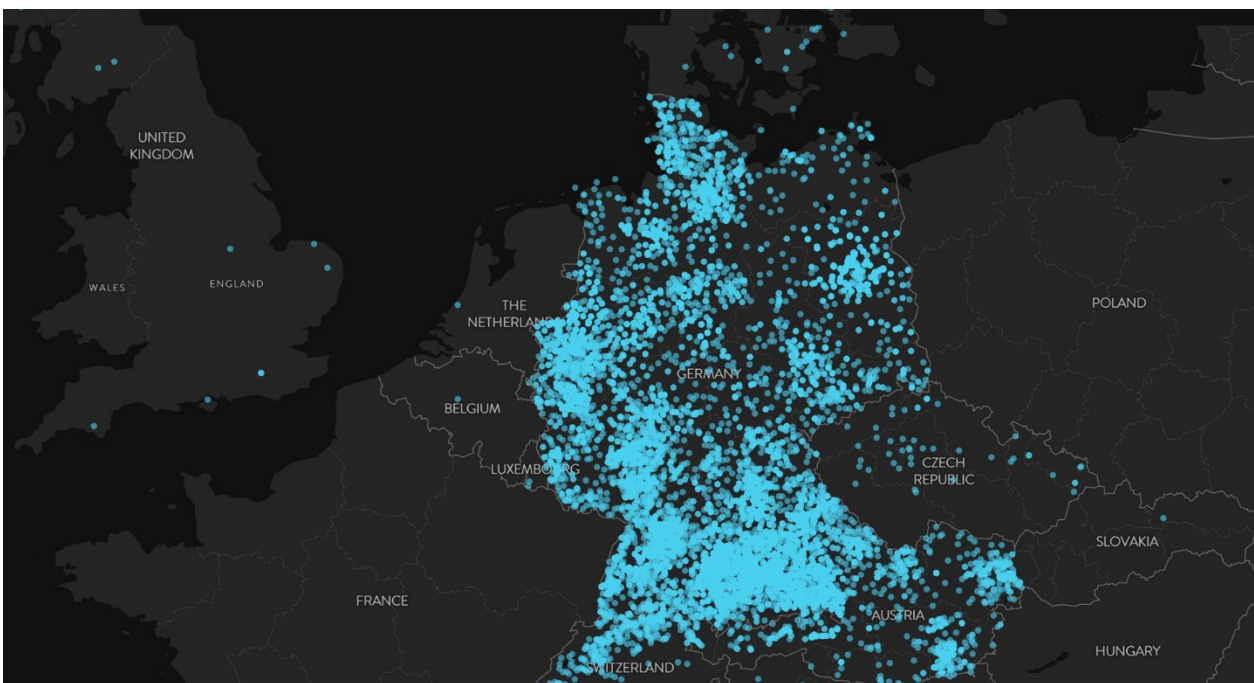
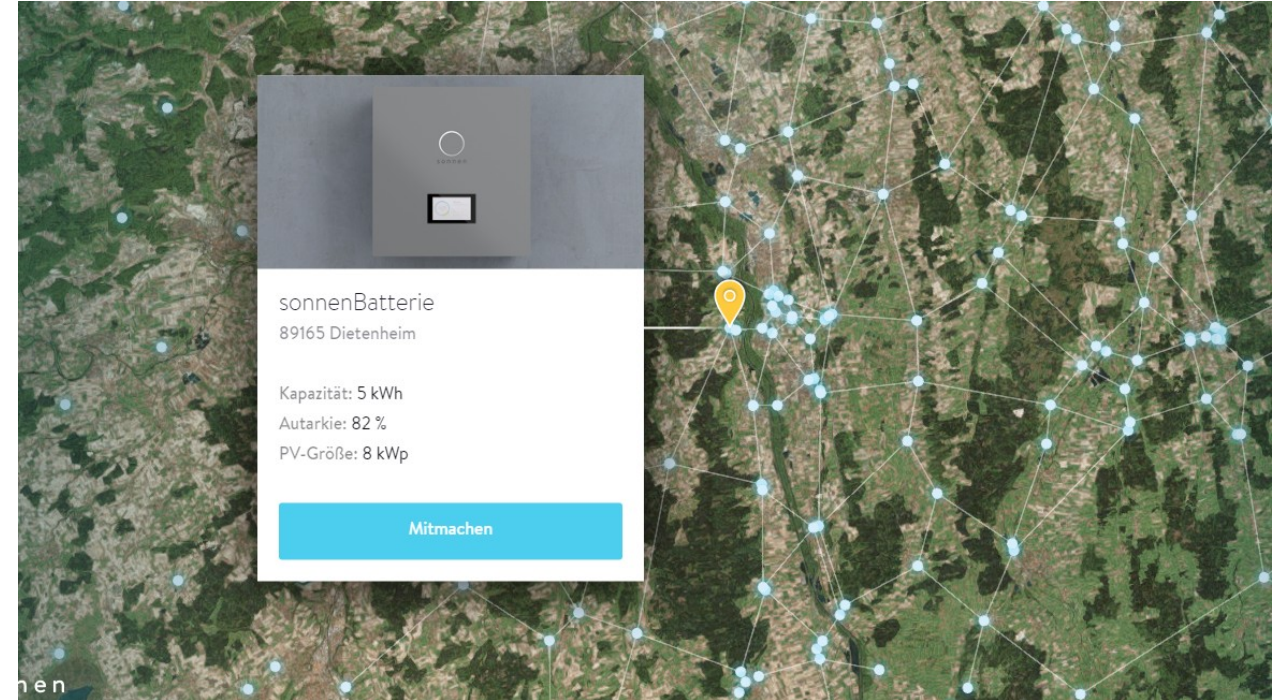
- 10-year full warranty
- Extra-long lifespan with over 10,000 charging cycles
- Top quality
"Made in Germany"
- Modern, compact all-in-one system
- Smart Home-ready
- Highly scalable
- Safest, most durable cell technology made of lithium iron phosphate
- Intuitive control via touch display, app or portal



sonnenCommunity.

- The sonnenCommunity is the first decentralised energy system that allows its members to share electricity independently.
- Via Europe's largest electricity-sharing platform, members can transparently share clean electricity with each other. Surplus electricity goes into a virtual electricity pool. Those who need it can use it there.
- Thanks to the intelligent network of members, the sonnenCommunity can flexibly manage supply and demand and directly offset the differences between generation and consumption.
- Existing electricity companies will thus be replaced by many smaller, decentralised energy producers. The energy revolution is happening at home.





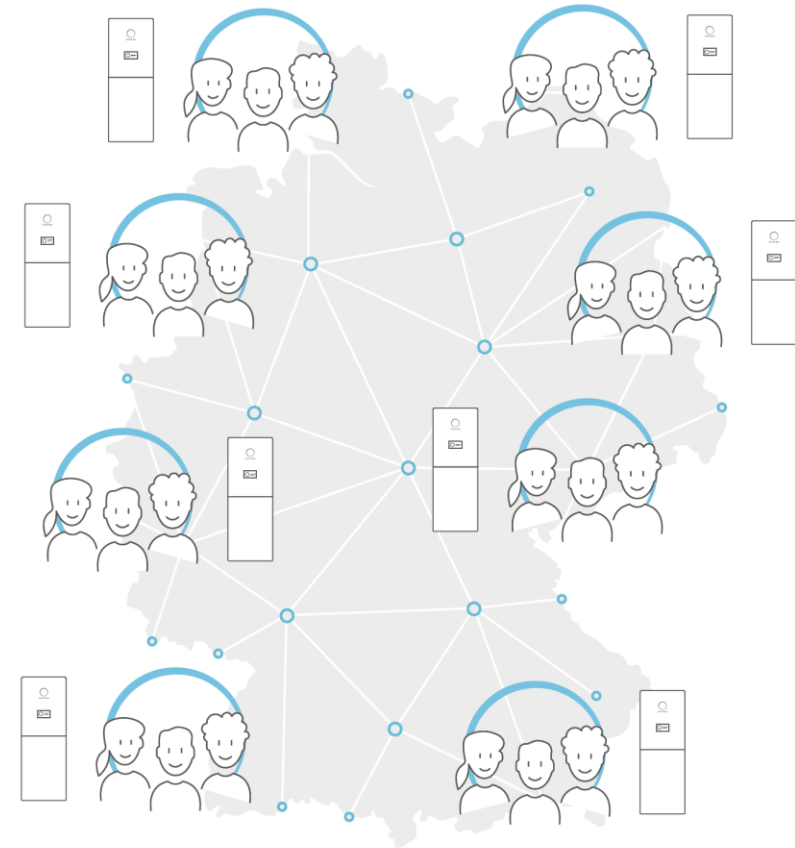
sonnenFlat.

The sonnenCommunity stabilises the electricity grid

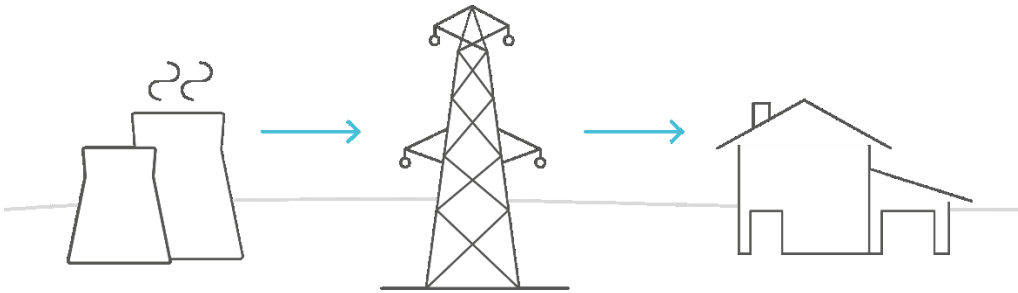
- Thousand of sonnenBatteries are digitally networked and aggregated into a large, virtual power plant.
- When there are transmission bottlenecks in the grid, the mass storage can supply or absorb electricity as needed and thus contribute to stabilising the grid.

- Energy from renewable sources, which are heavily dependent on the weather, can thus be more flexibly controlled and better exploited.
- This storage capacity, which is being marketed on the energy market, generates revenue and makes it possible to offer the sonnenFlat rate.
- This means up to 8.000 kWh of free electricity, depending on the chosen package and the respective annual electricity consumption of a household.

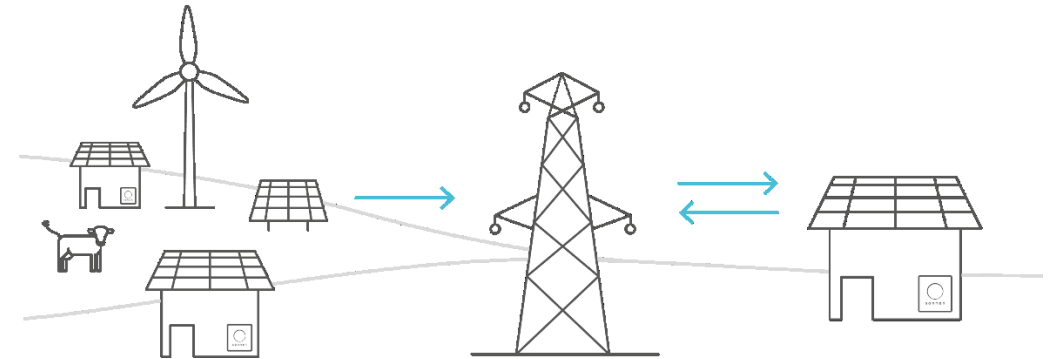
Prequalified



The transformation of the energy system.



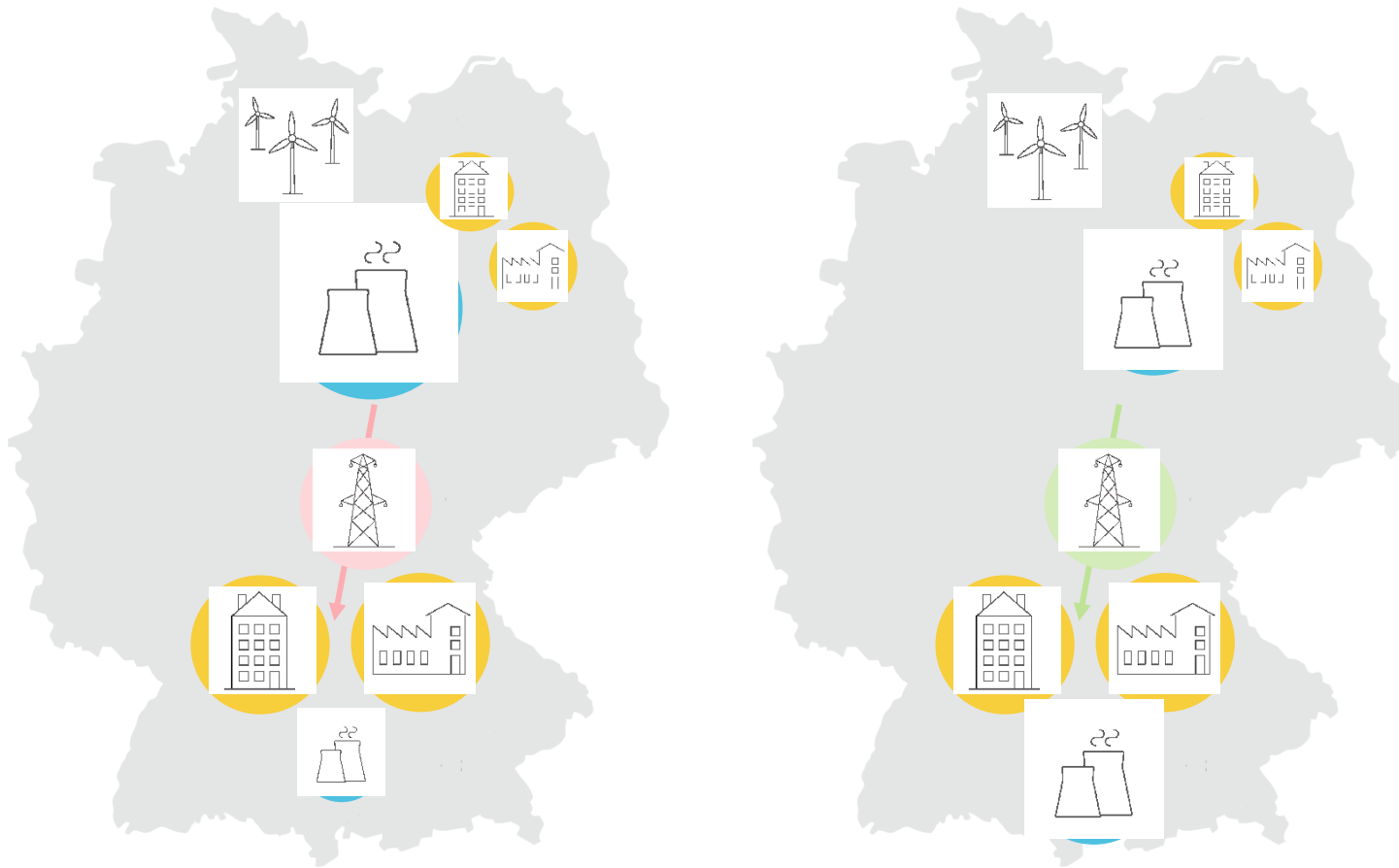
Conventional energy system
centralised · environmentally harmful · analogue



Future energy system
decentralised · clean · networked

Regional imbalance between production and consumption

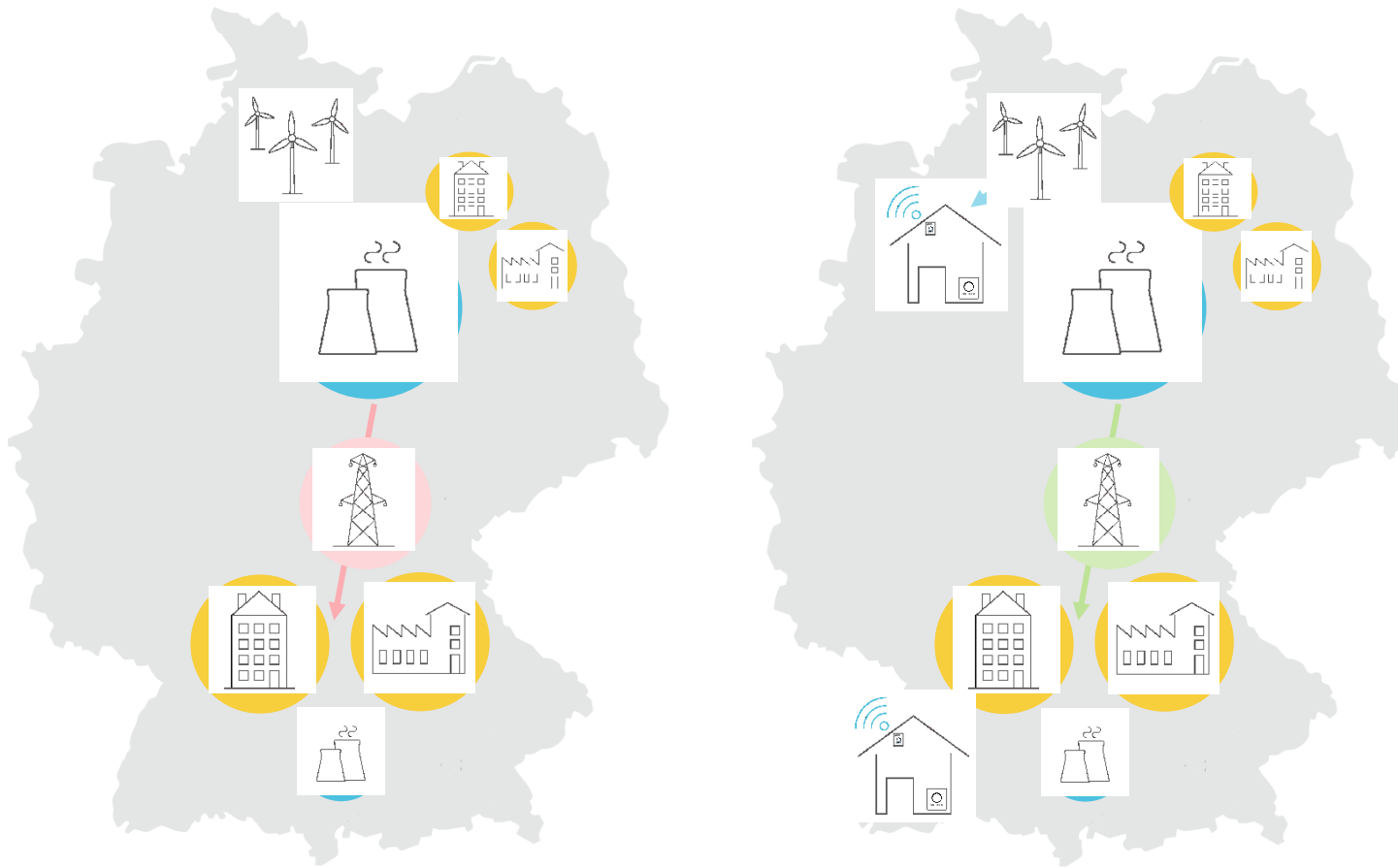
Redispatch



- Redispatch is an intervention of the grid operators, where the output of power plants is changed in order to avoid overload situations in the high voltage grid (TSO level)
- The grid operators have to cover the cost for this, in the end this burden is carried by the consumers

Flexibility provided by the sonnenCommunity

sonnen Redispatch pilot projects



- sonnenBatteries in specific regions are charged or discharged in order to help solving congestions in the high voltage grid (TSO level)
- The batteries replace conventional power plants in the redispatch-process



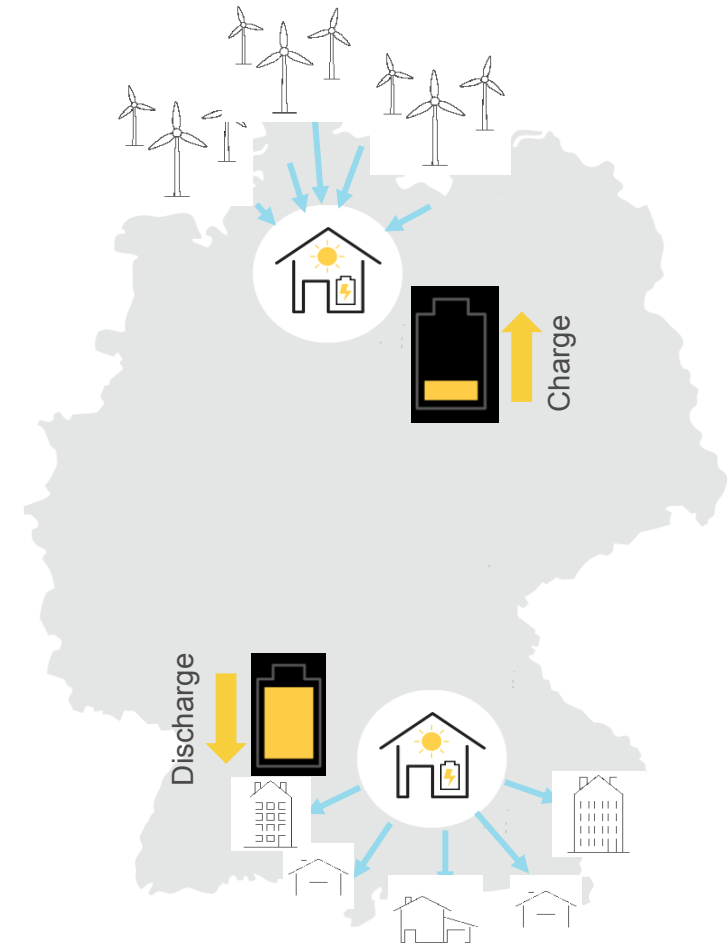
Redispatch with TenneT

Congestion management with sonnenBatteries is "live", blockchain enabled

Congestion Management

German and Dutch TSO TenneT lauds sonnen's ability to provide green & decentral congestion management

- sonnenBatteries and TSO are connected via blockchain
- Complete processing via blockchain
- High transparency and safety



<https://www.youtube.com/watch?v=MMUrMkgWO4U>

<https://sonnen.de/presse/blockchain-pilot-zeigt-potenzial-von-dezentralen-heimspeichern-fuer-das-energiesystem-von-morgen/>

Forced reduction of feed in from renewable sources

Einspeisemanagement.



- Einspeisemanagement (Curtailment) is a forced reduction of feed in from renewable sources (wind and PV), initiated by the DSO if specific areas of the grid are congested
- The operators of the affected units receive a compensation payment from the DSO for the enforced shutdown
- The total cost of these events is allocated to the grid fees consumers have to pay

Flexibility provided by the sonnenCommunity

sonnen Einspeisemanagement pilot projects



- The sonnenCommunity is absorbing “green” energy from the grid
- Only in specific locations, where it helps most to reduce congestions in the grid
- Renewable energies do not have to be wasted
- Several projects with DSOs in that context, for example
<https://www.transnetbw.de/de/presse/presseinformationen/presseinformation/netzsicherheitsinitiative-bw-geht-in-die-pilotphase>

Grid services of the sonnenCommunity in Germany

- Primary reserve control (frequency control, “Primärregelleistung”)
- Pilot projects redispatch
- Pilot projects “Einspeisemanagement” (curtailment)



Thank you for your attention.



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