



The C/sells Project for decentralised Transformation of the Energy System via Smart Grid

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Managing Director Fichtner IT Consulting GmbH

Milano, Lombardy Energy & Cleantech Day 2018

Gefördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages



C/sells: cellular, participative, pluralistic

C/sells: we carry our Message in our Logo

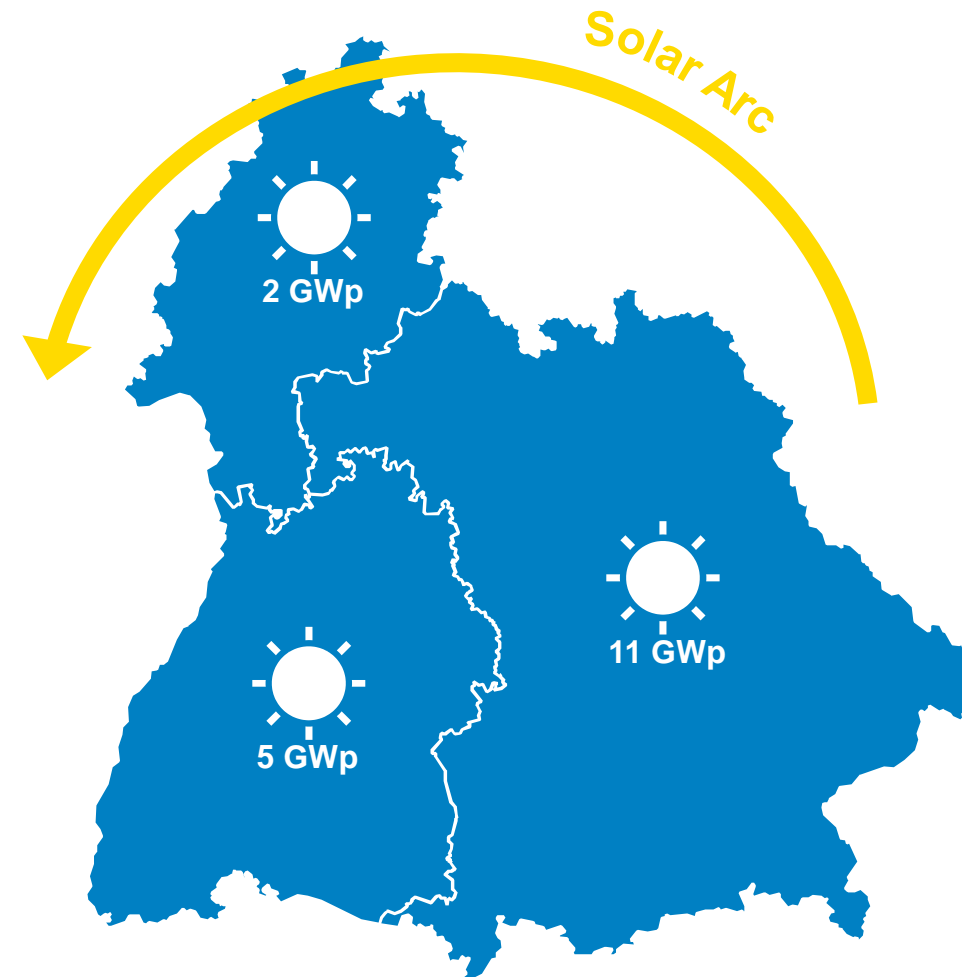


C/sells demonstrates scalable solutions for Energiewende

Factsheet

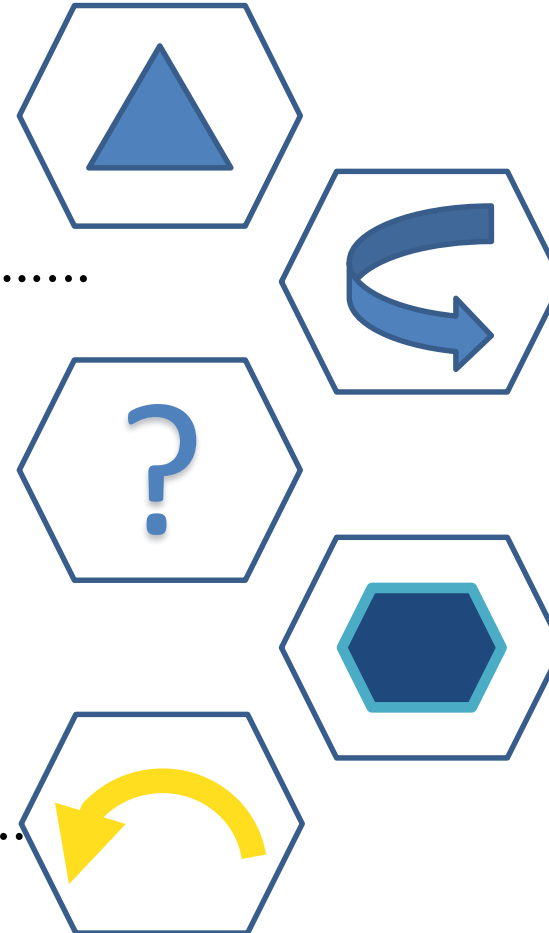


- Demonstration project funded by the Federal German Ministry for Economic Affairs and Energy (BMWi) under the SINTEG program
- ~100 Mio. € Project Turnover; ~50% funded
- Duration 01.01.2017 – 31.12.2020
- Largest SINTEG Showcase, reaches ~30 Mio. citizens
- 58 Partners: Industry, Energy Suppliers, Transmission-/Distribution System Operators, Academia, Economy, NGOs
- > 30 Demonstration Cells



Agenda

1. Political Decision Basis.....
2. C/sells Blue Print of „Energiewende“
3. Uncertainties along the Way.....
4. C/sells Concept.....
5. Our Motivation and C/sells Movement....





We all agree on Decarbonization

Political Targets



50 – 80 – 90



2050: 80 - 95%
CO2-Reduction



2050: mind. 90%
CO2-Reduction

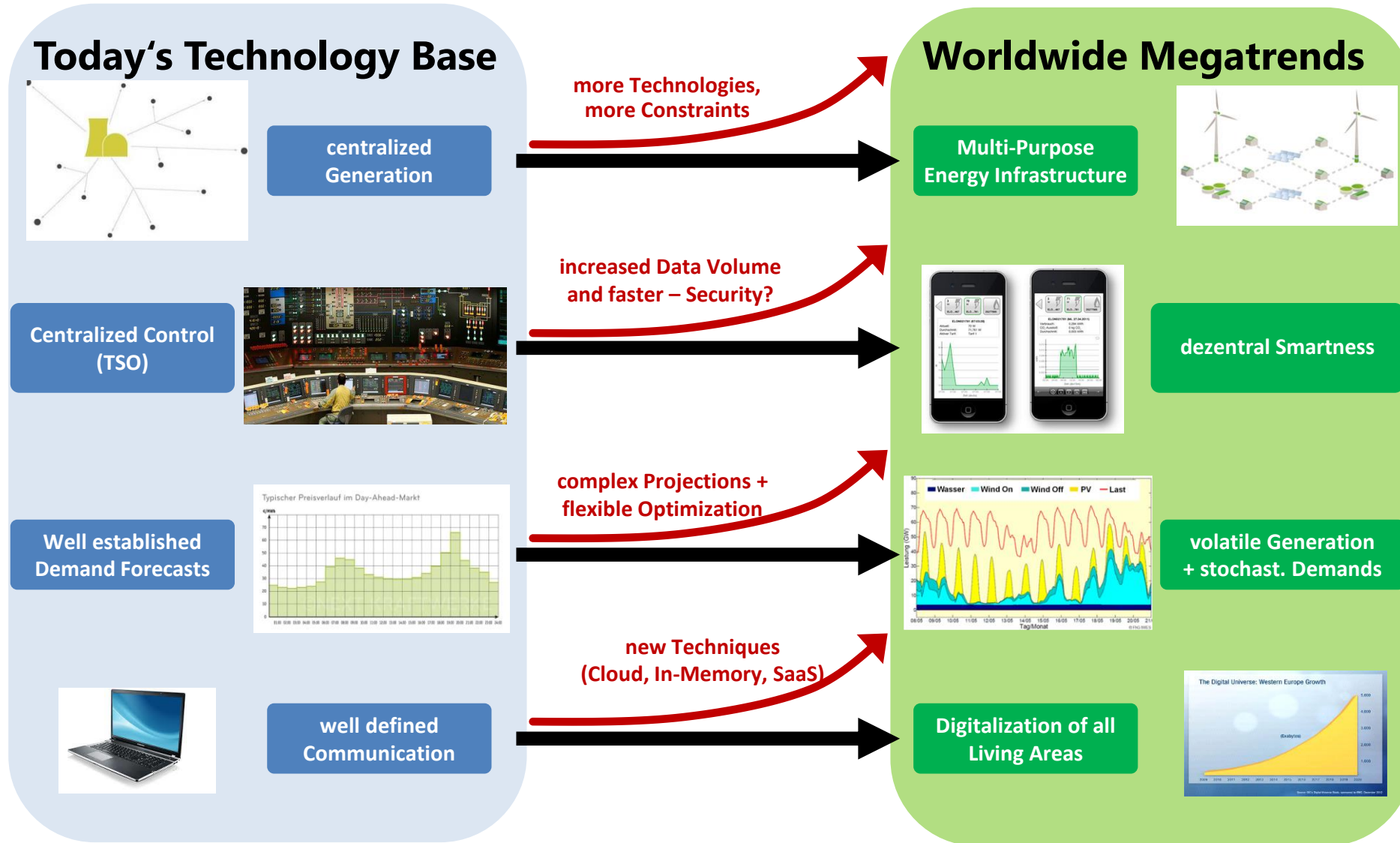


2100: CO2-free
Energy Infrastructure

Quellen:
Arbeitsgruppe Erneuerbare Energien-Statistik (AGEE-Stat); Stand: Dezember 2016
BUNDESMINISTERIUM FÜR WIRTSCHAFT UND ENERGIE (BMWi) 2015
EURACTIV 2015

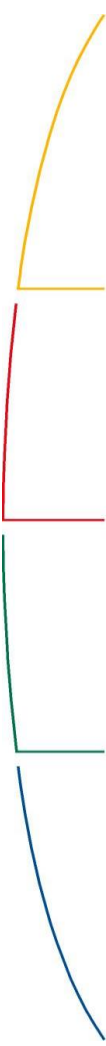
Smart Grids address the future Key Challenges

Technology Basis today and Megatrends worldwide



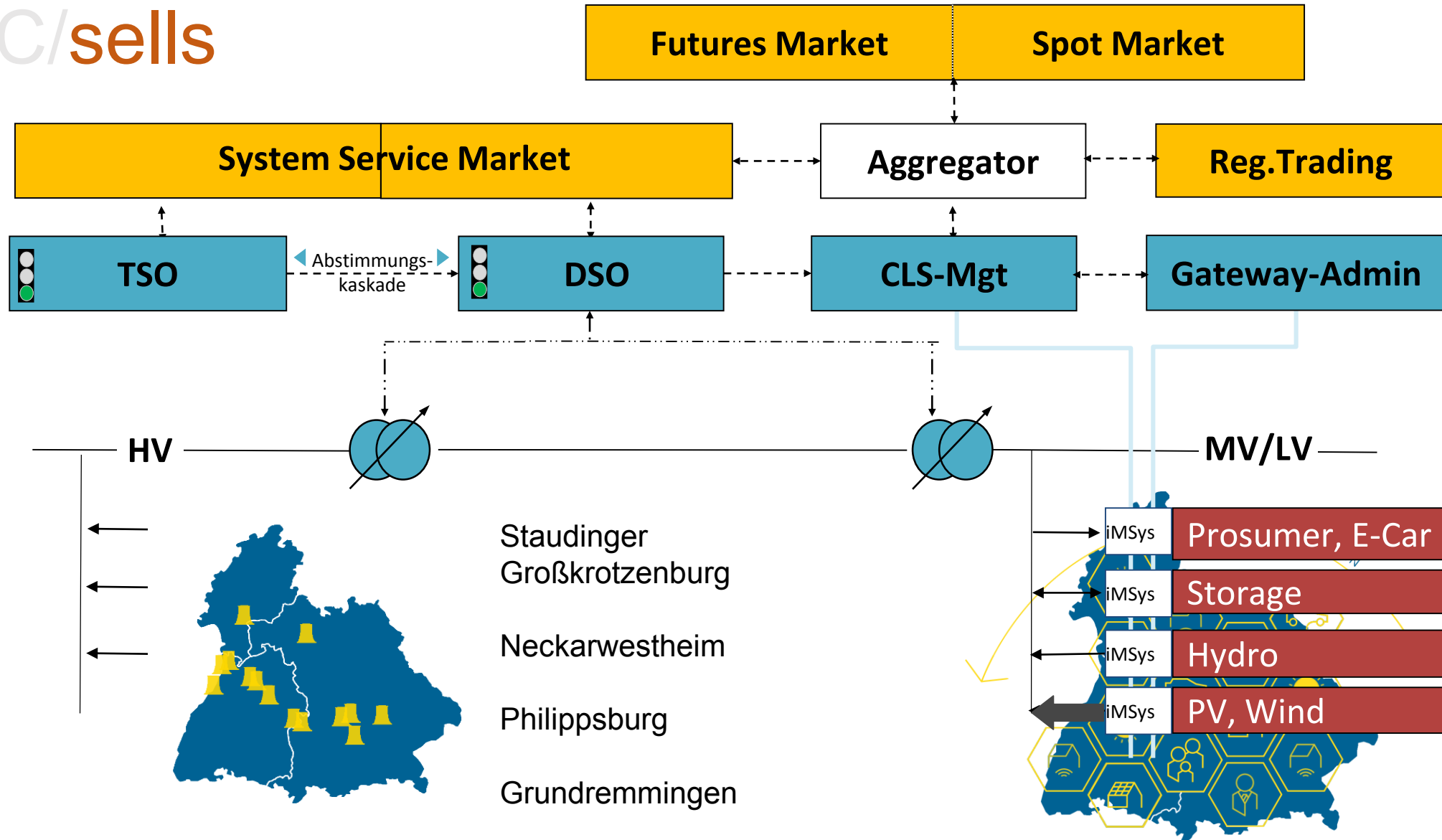


$$\text{Smart Grids} = \int_{\substack{t \rightarrow 0 \\ i \rightarrow \infty}}^{\text{ICT}} (\text{generation} + \text{grids} + \text{storages} + \text{prosumers})$$



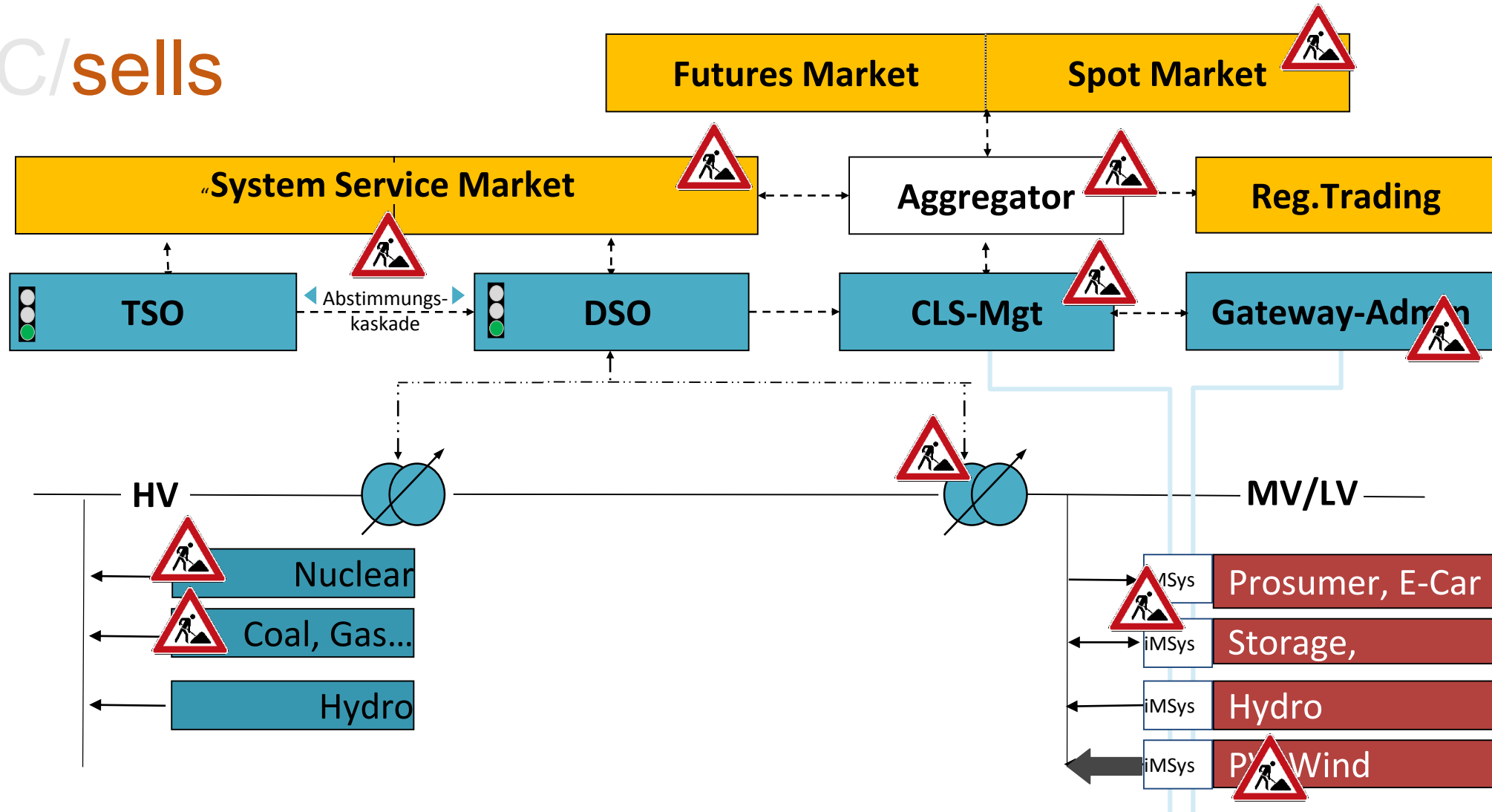
Blueprint of Energiewende

C/sells



Construction Sites of Energiewende

C/sells

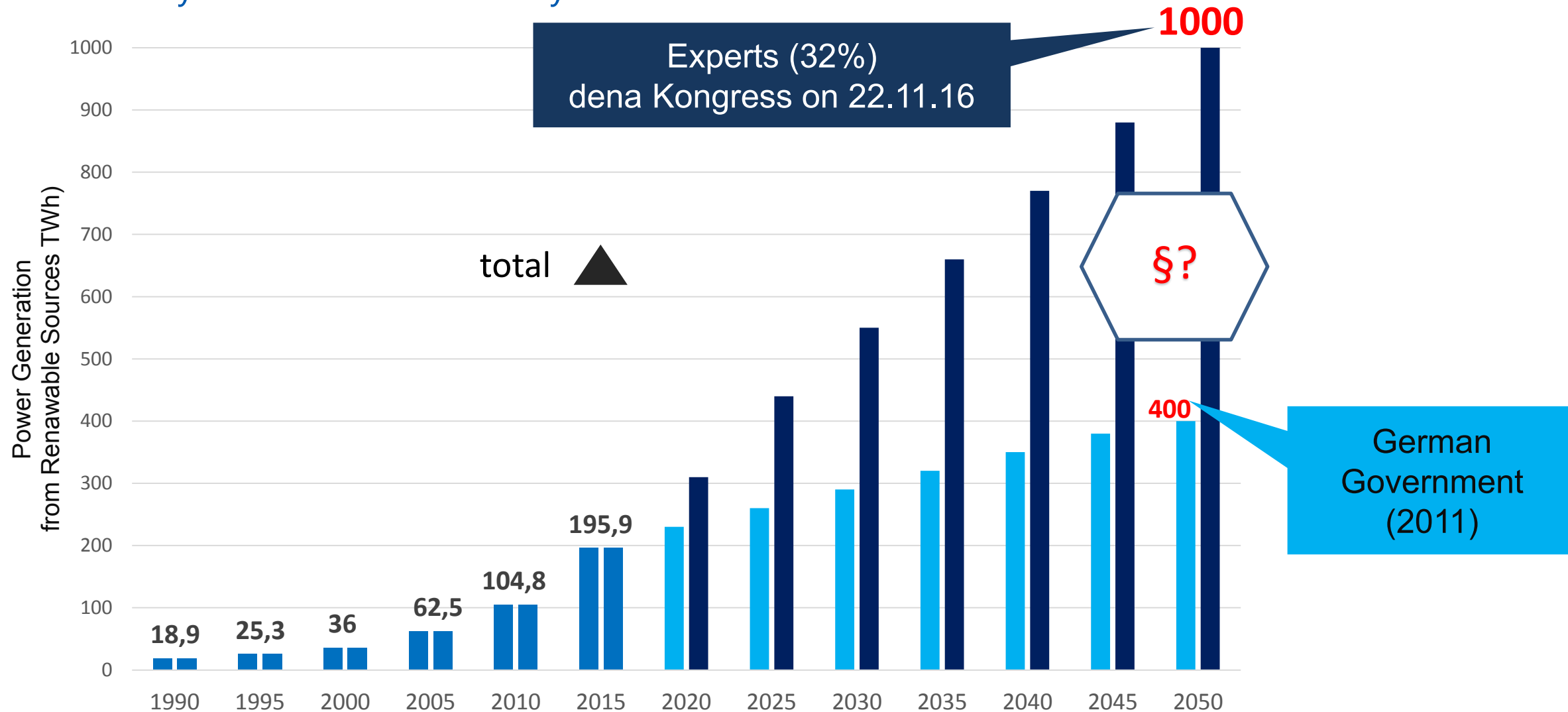


C/sells

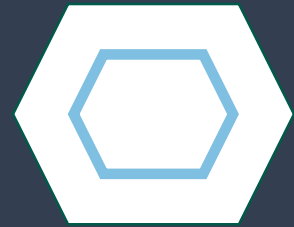


Investment Uncertainties are extremely high

REN-Electricity Generation in Germany- Scenarios til 2050*

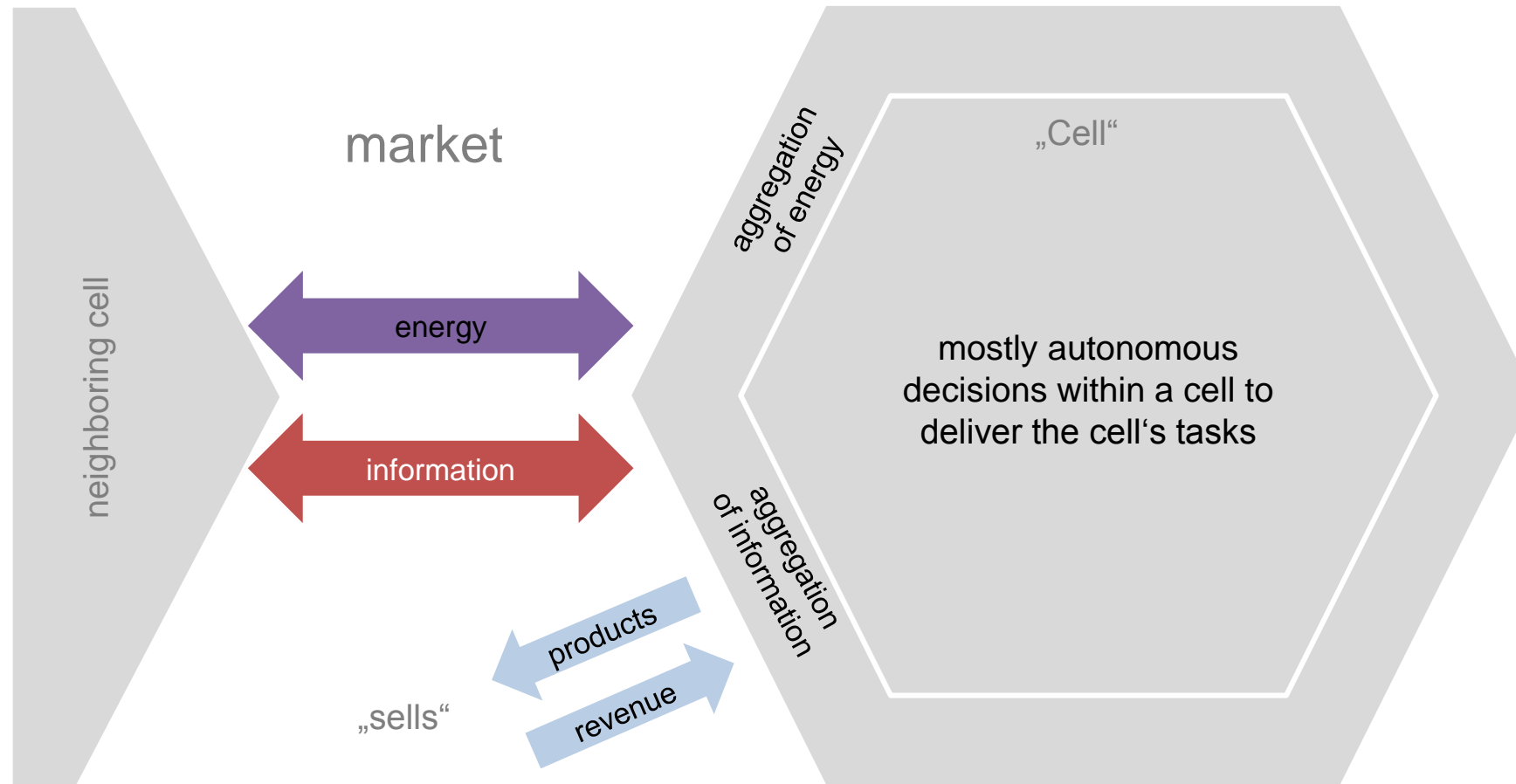


* INKL. FESTE UND FLÜSSIGE BIOMASSE, BIOGAS, BIOMETHAN, KLÄR- UND DEPONIEGAS UND DEM BIOGENEN ANTEIL DES ABFALLS, AB 2013 INKL. KLÄRSCHLAMM
QUELLE: ARBEITSGRUPPE ERNEUERBARE ENERGIEN-STATISTIK (AGEE-STAT); STAND: FEBRUAR 2016
ALLE ÜBER 2017 HINAUS GEHENDEN WERTE: PROGNOSEN



Cells Structures in complex REN Energy Systems deliver resilient Solutions

C/sells: Cell - Structure



C/sells Partners cover all components of a future Eco-System

C/sells Partners

Gefördert durch:



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Suppliers	Services and Grids	Science and Management

C/sells unifies formerly diverging Interests

The guiding Concept behind C/sells at a Glance



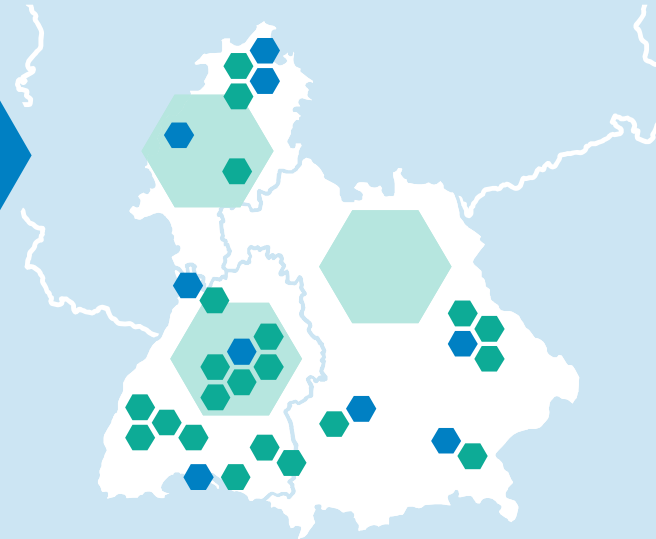
C/sells- solution approach

- cellular
- participative
- pluralistic

C/sells basic instruments

- Infrastructure Information System (IIS)
- harmonization cascade
- regionalized trading of energy and flexibilities

More than 30 demo cells
and 9 participation cells



Objectives of the German Government's Energy Transition

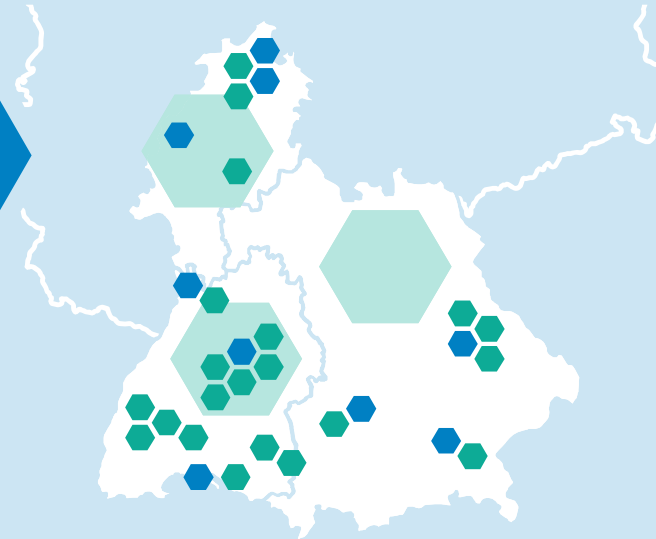
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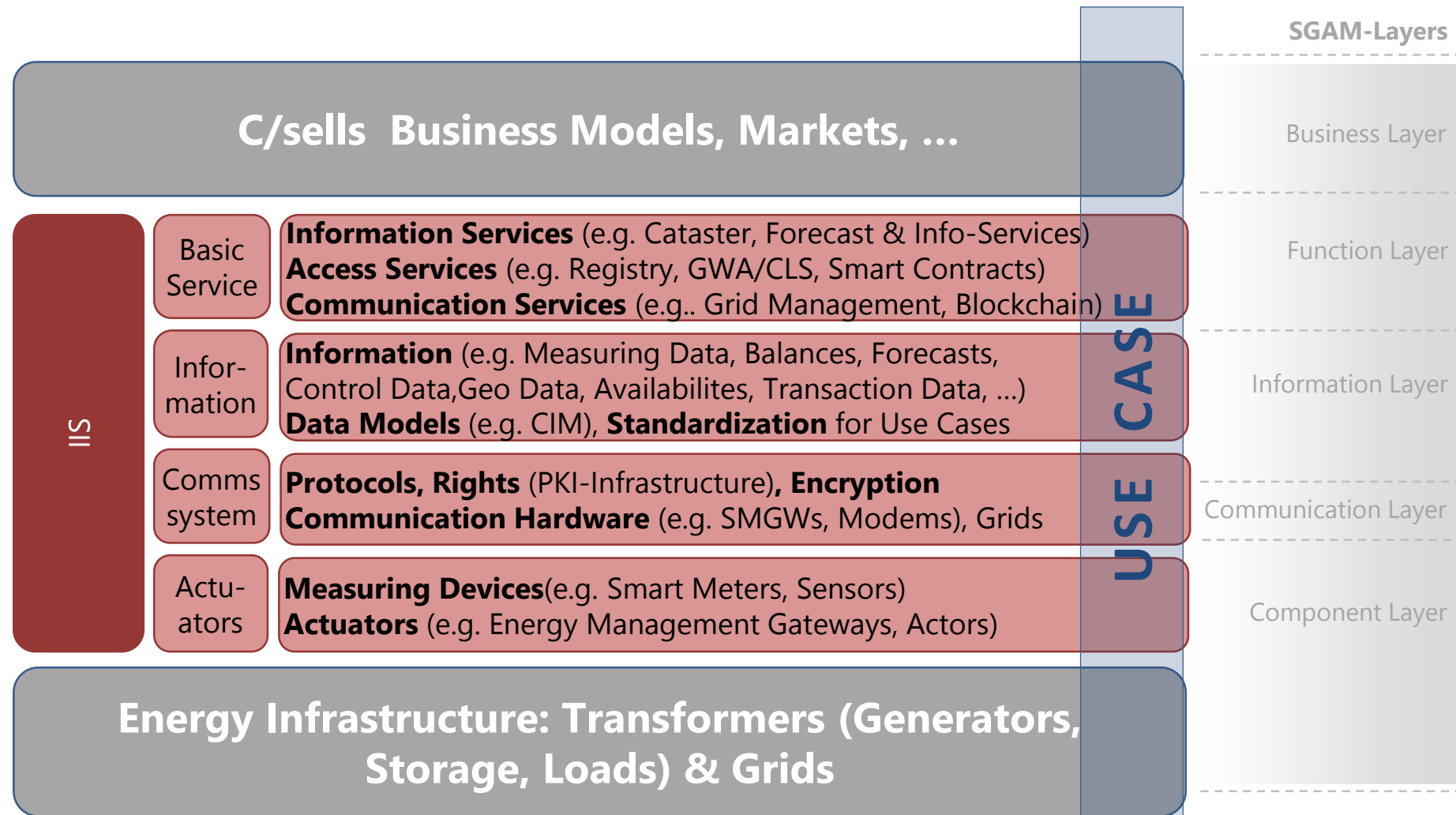
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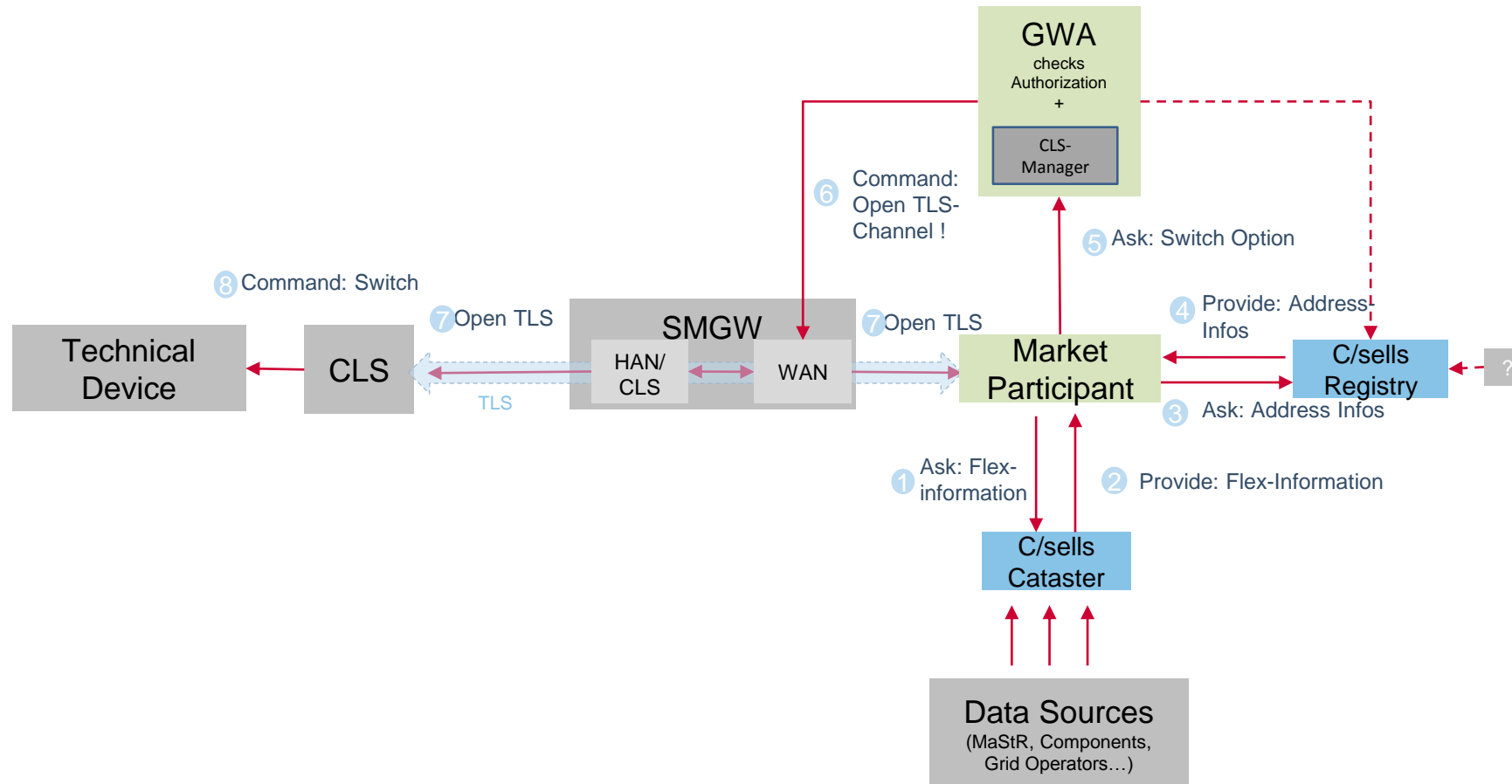
Infrastructure Information System is Enabler for Flexibility Trading

IIS



Even simple Processes are complex – and will become IT-diven

C/sells Use Case „Flexibility Sales and Action“



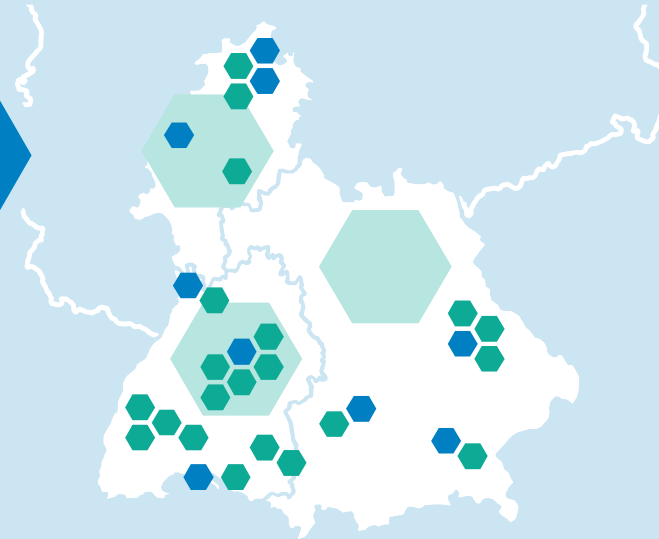
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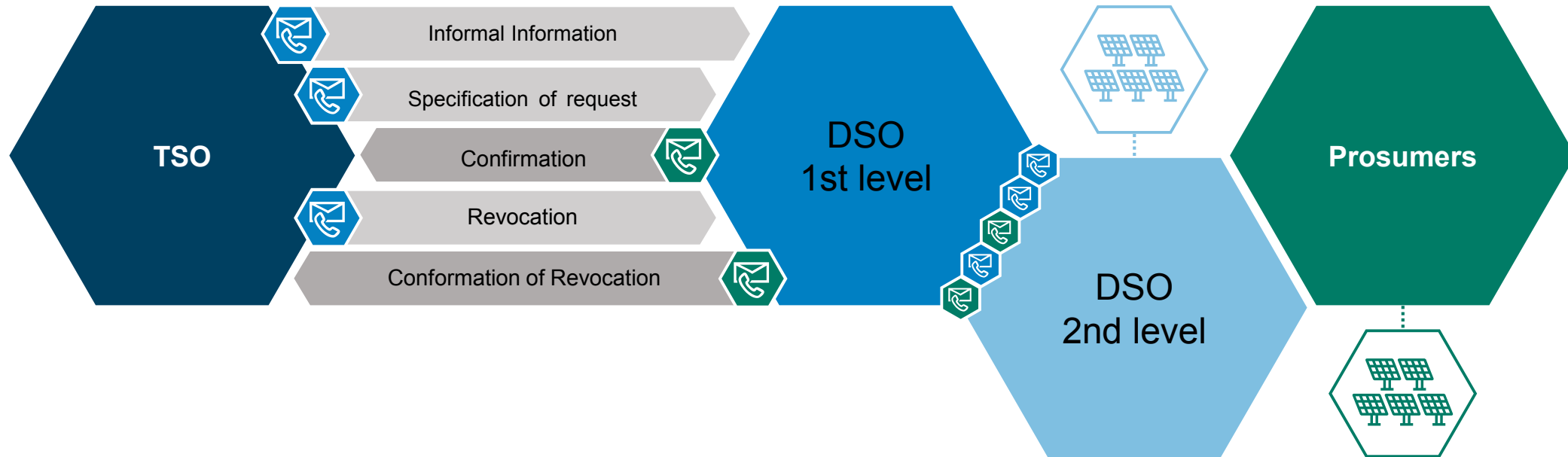
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Objectives of the German Government's Energy Transition

Today: manual operating procedures

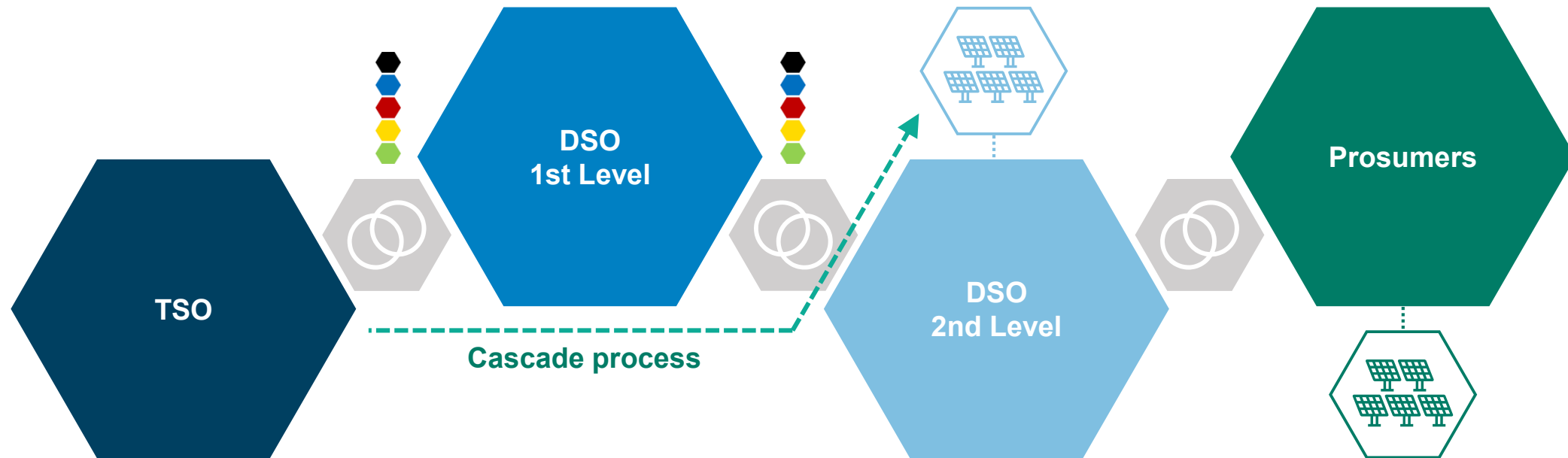
Present communication between TSOs and DSOs



- high manual input for processing
- use of forms
- time intensive process for implementation of measures
- only limited possibility for taking the present situation into account, as use is made of statistics

C/sells: Automatic Communication

C/sells "harmonization cascade" between TSO and DSOs



- Setting up a **traffic light concept** and implementation of the **cascade process** via **links between control centers**
- **Grid status traffic light:** Registering grid status to identify possible measures under §13(1) EnWG (German Energy Industry Act) for grid- and market-related actions and limit values with visualization in network operators' control systems
- **Cascade process:** Control model derived from the EnWG cascade process and/or feed-in management for which purpose installations are accessed via lower-level power network operators (legal basis: §13(2) EnWG)
- **Harmonization cascade:** Cascaded, automated information exchange between power network operators in all traffic light phases

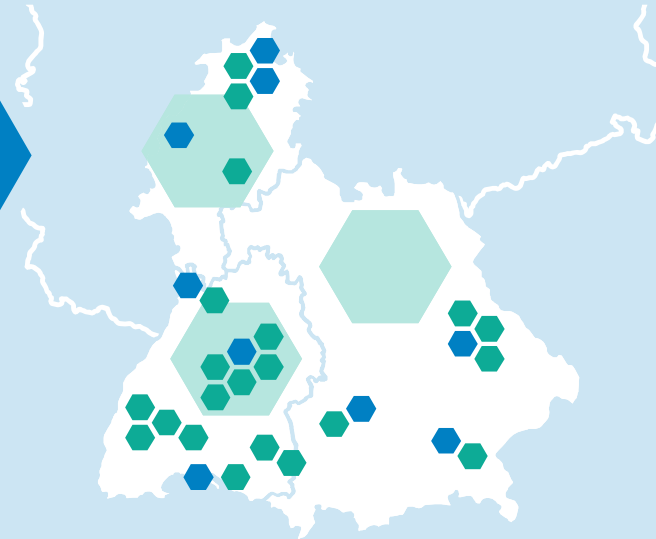
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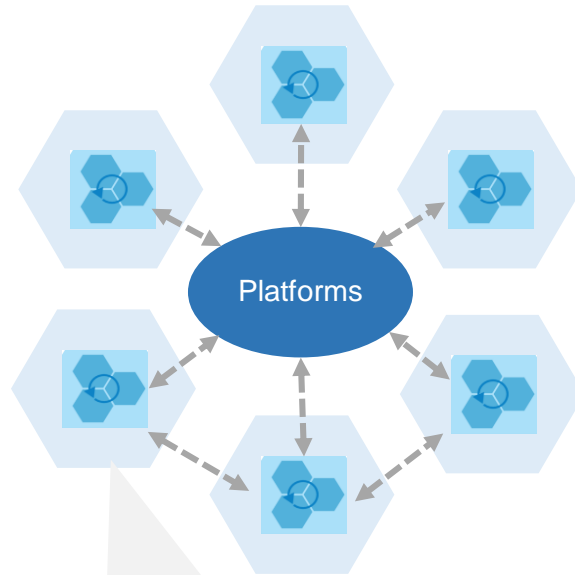
Objectives of the German government's energy transition

C/sells gives Preference to Market Solutions


Regionalized Trading Spots in C/sells



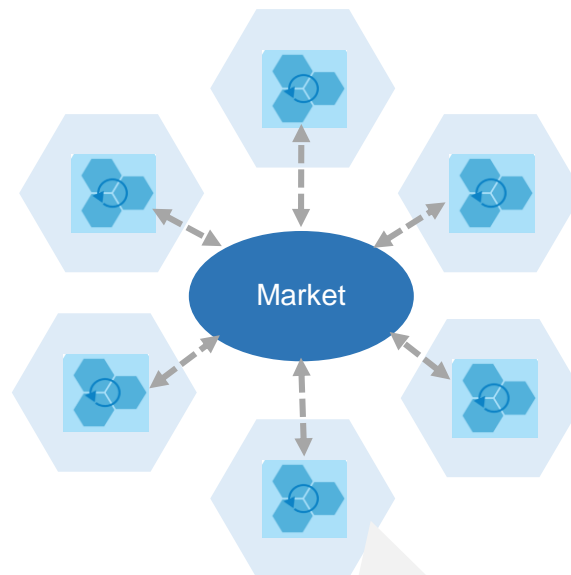
Regional Trade serving Markets



C/sells Example: Mr. Meier in Dillenburg sells „his solar power to Mrs. Beck, who has regional preferences. This is done through a platform or P2P with Blockchain-Technology.

 Platform for regional Trade (Development & Demo)

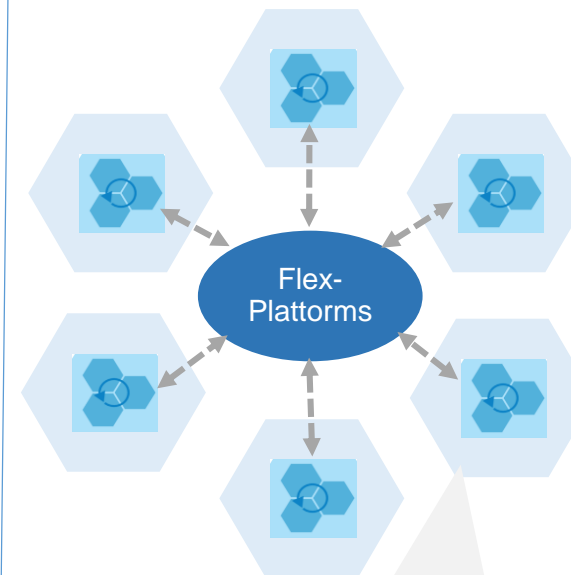
Central Trading supporting Markets & Grids




C/sells-Example: C/sells cell „Franklin“ offers reserve capacity. The offered flexibility is a result of a large number of optimized individual installations.

 Cross sectoral Optimization in smart Quarters

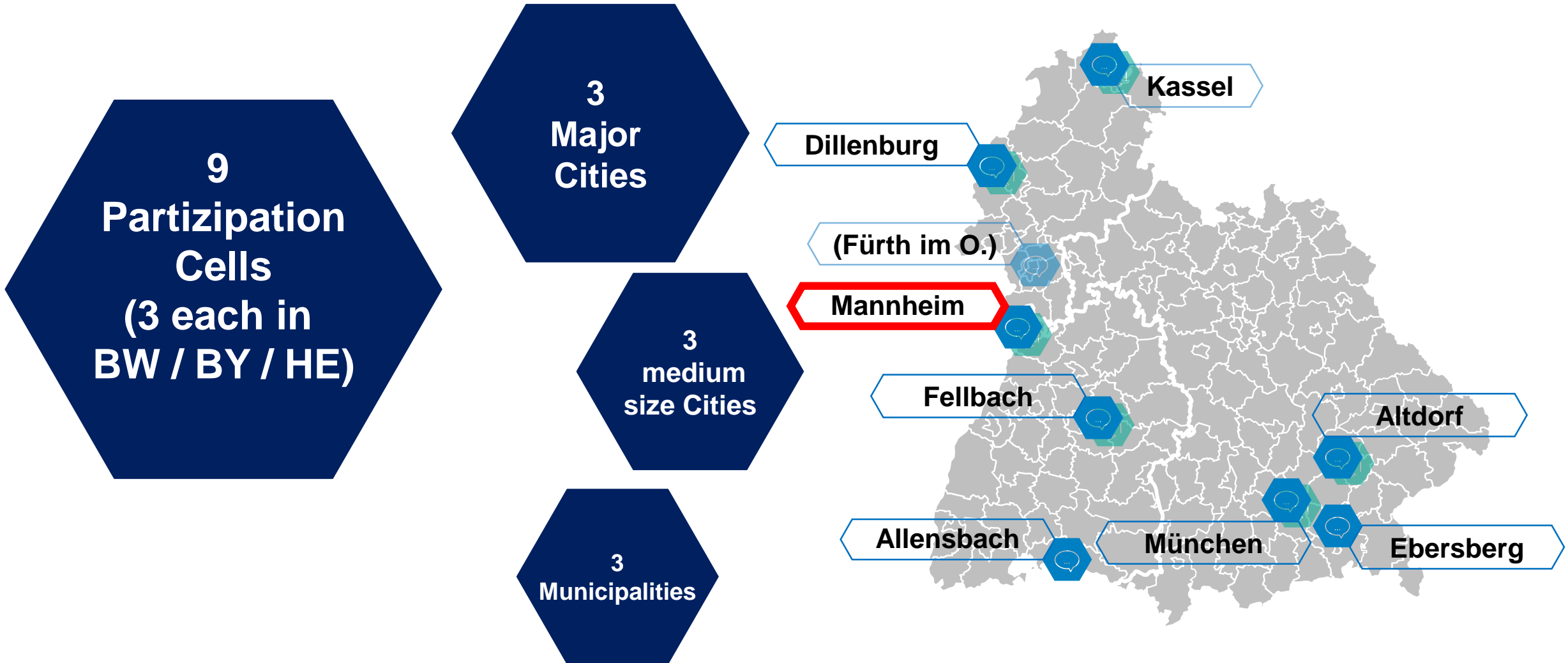
Trade supporting Grid Services



C/sells-Example: Plant operators in „Altdorf“ offer flexibilities from their installations to support the grid operator’s congestion control via a flexibility platform. This may prevent critical grid situations.

 Market based Congestion Mgt (Development&Demo)





Franklin: H O M E of 10.000

C/sells – Franklin Village, the Future City



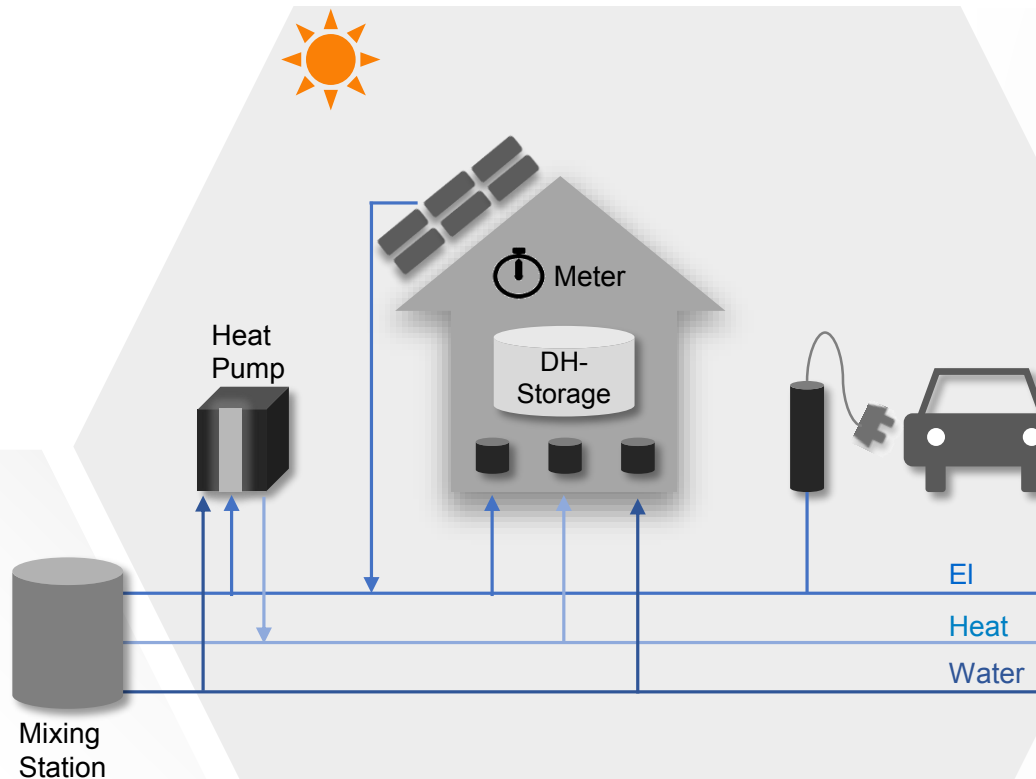
Source: MVV

Franklin: a C/sells Showcase as big as the Core Center of Mannheim

Franklin – Fact Sheet



C/sells goes Franklin



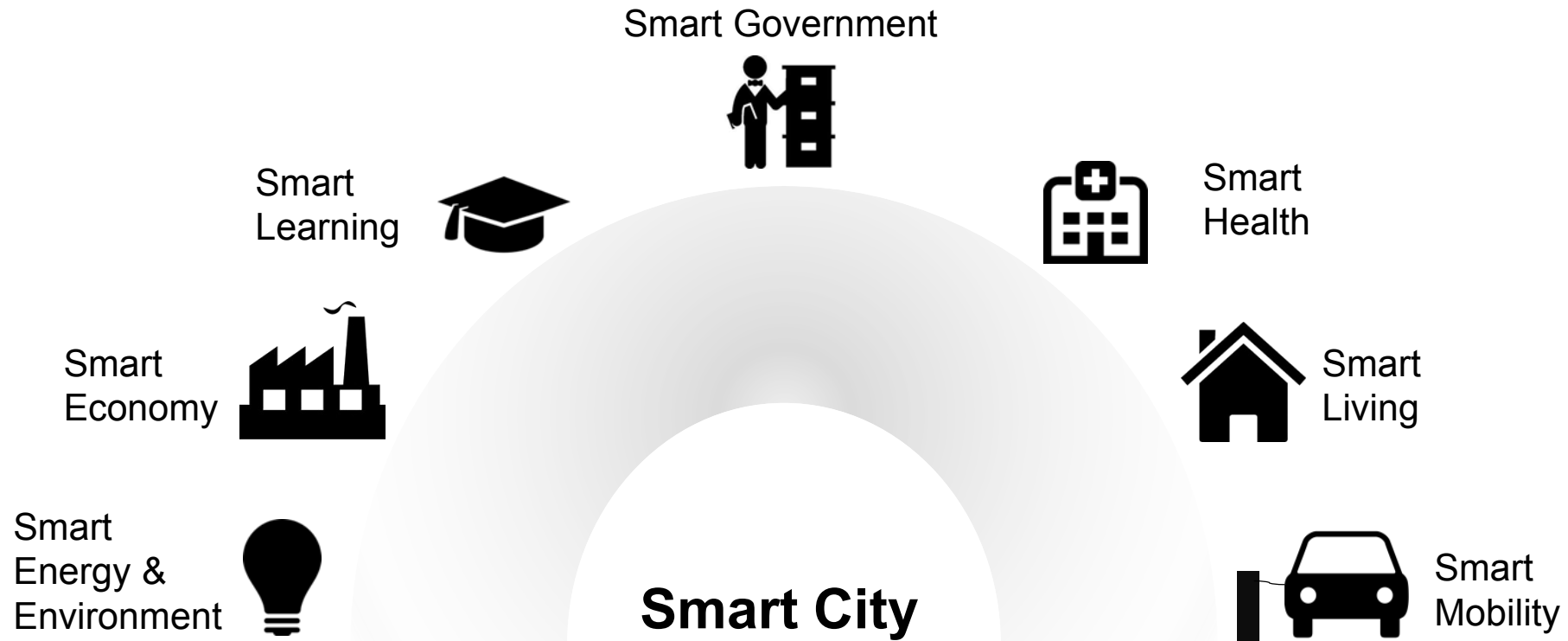
Transparency of Flows:
EI, Heat, Water, Mobility...
high resolution & real time monitoring

Loading Infrastructure:
75 flexible and interlinked loading
sites

Smart Heat & Cooling Cells:
Optimized storage management and
energy production – solar based

C/sells contributes to the Smart Infrastructure Vision in Fanklin

Franklin Vision



Source: MVV



C/sells Sustainability Eco-System unifies

Participation - two different Groups to adress



Citizens (private)

- ~30 Mio. in C/sells Area
- Heterogenous Motivation
- Low individual Potentials of Flexibility
- High Hurdles (Security, Privacy,...)
- Low Affinitiy for the Subject
- Low financial Benefits
- Relevant for political Support

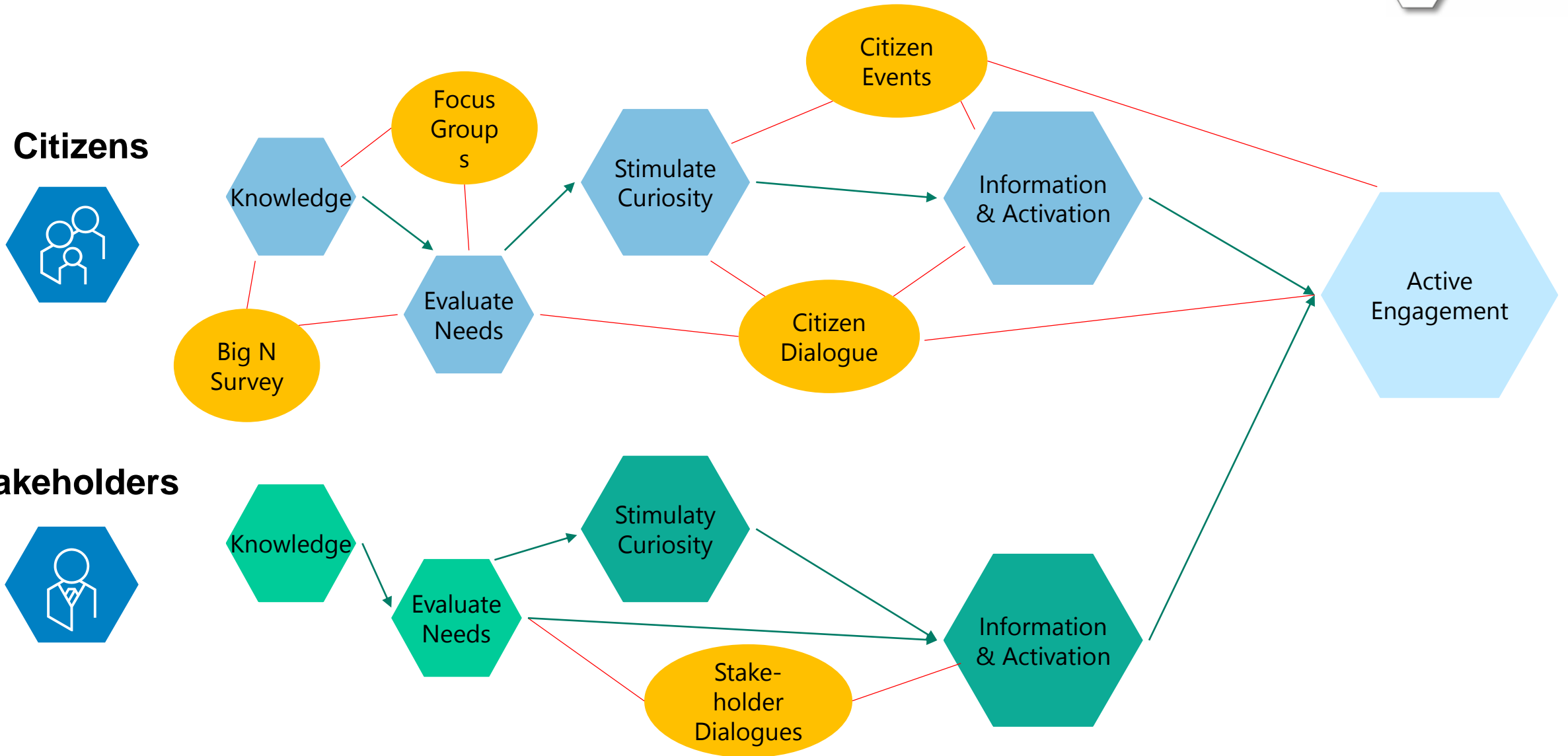


Stakeholders

- Cost/ Benefit oriented
- Heterogenous Motivation
- High technical Potentials

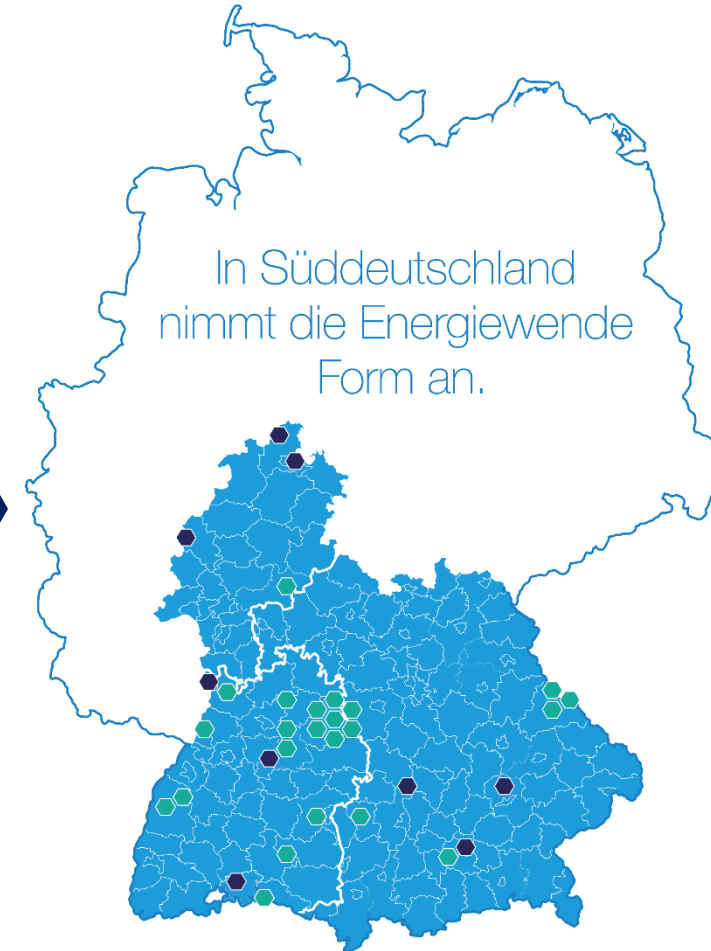
Participation is Core-Science with little Experience so far

Participation - Stimulating Engagement



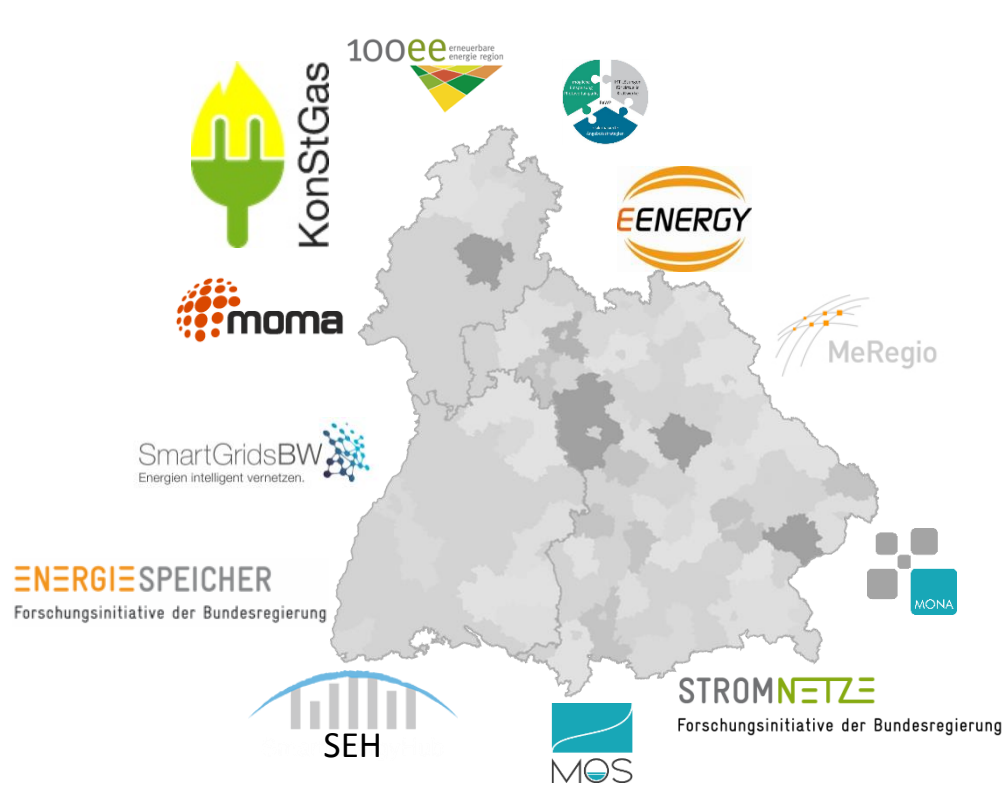
Synthesis of social Media and individualized Communication

Communication Methods

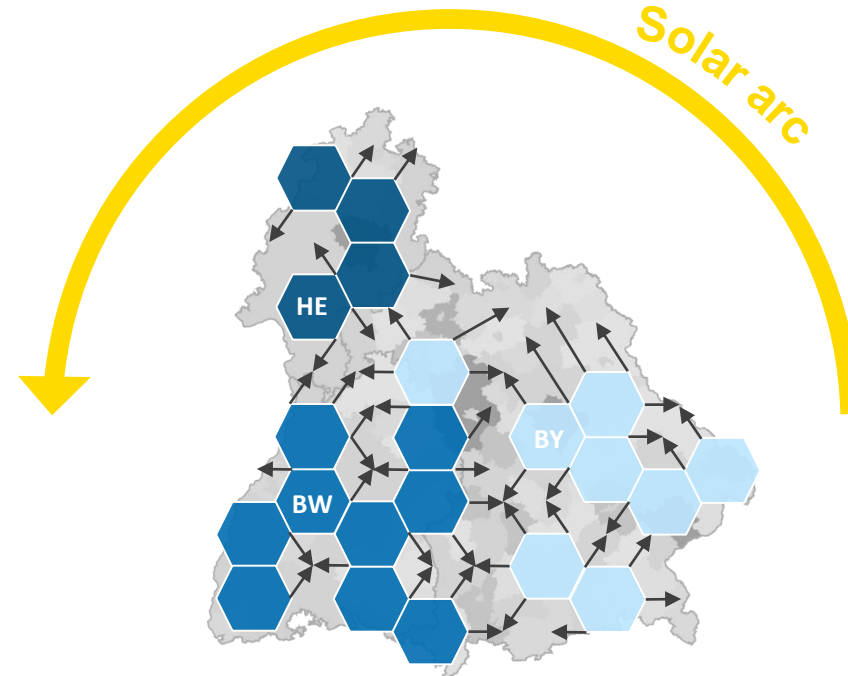
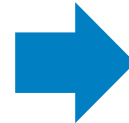


From specific Solutions to a widespread Product

Our Plan

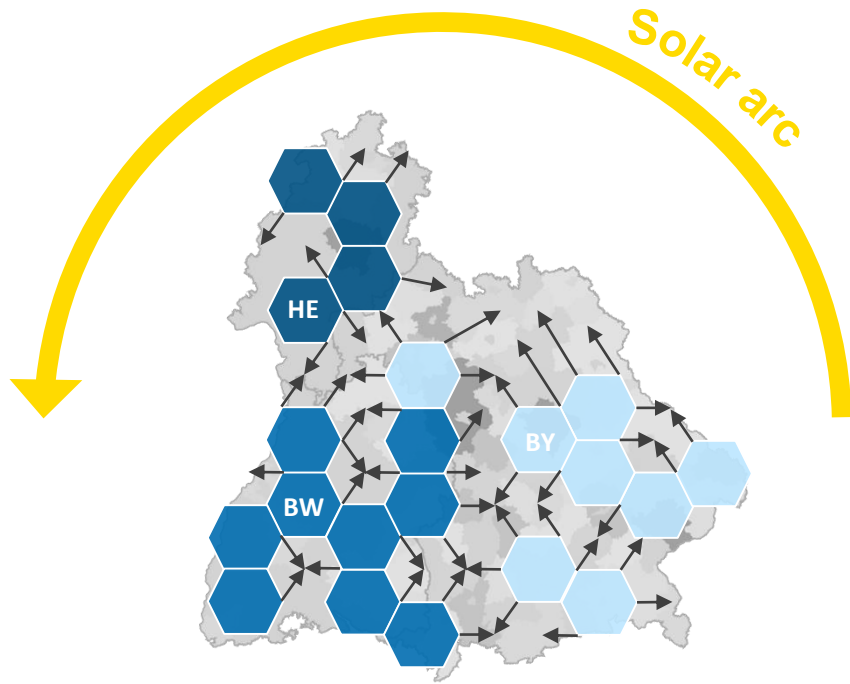


The groundwork has been provided through numerous research projects

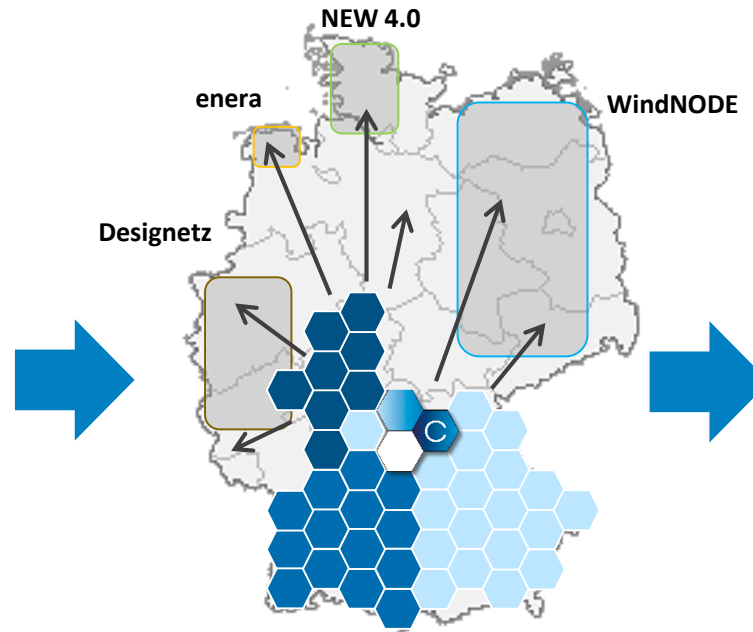


C/sells as a proof-of-concept project with blanket coverage puts the findings of its predecessor projects into actual practice and adds value by optimizing the system as a whole

... and Roll-out beyond the Boundaries of the Project



C/sells as proof-of-concept project with blanket coverage



Synergies with other showcase projects



Germany as trailblazer in the application of smart energy systems



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