



green
energy
lab.at

Austria's biggest innovation lab for a
sustainable energy future.

Demonstration projects and
innovation paths
for the flexible,
customer-oriented
energy system of tomorrow



Green Vision – link between research and market

With our customer-oriented solutions, we create integrated energy systems for a sustainable future.

Video clip





Core region with 5 million people:
Federal States of Vienna, Lower Austria,
Burgenland and Styria

By far the **highest share of renewable energy generation** in this region today:

- 98% of the Austrian wind energy generation
- 64% of the Austrian PV production

Test region with a **variety** of demographic, topographical and economic **structures**

- Metropolitan areas with urban agglomerations (Vienna, Graz)
- Numerous small and medium-sized cities
- Large-scale rural areas

Green Targets 2025



30

New technologies, products and services are developed and launched in Green Energy Lab projects.

10.000

Customers are directly integrated into Green Energy Lab projects.

20

New solutions for integrated energy systems are applied in Green Energy Lab projects.

100.000

Visits generated on the sites of Green Energy Lab demonstration projects.

50

New projects are part of Green Energy Lab.

Green Energy Lab – energy profile

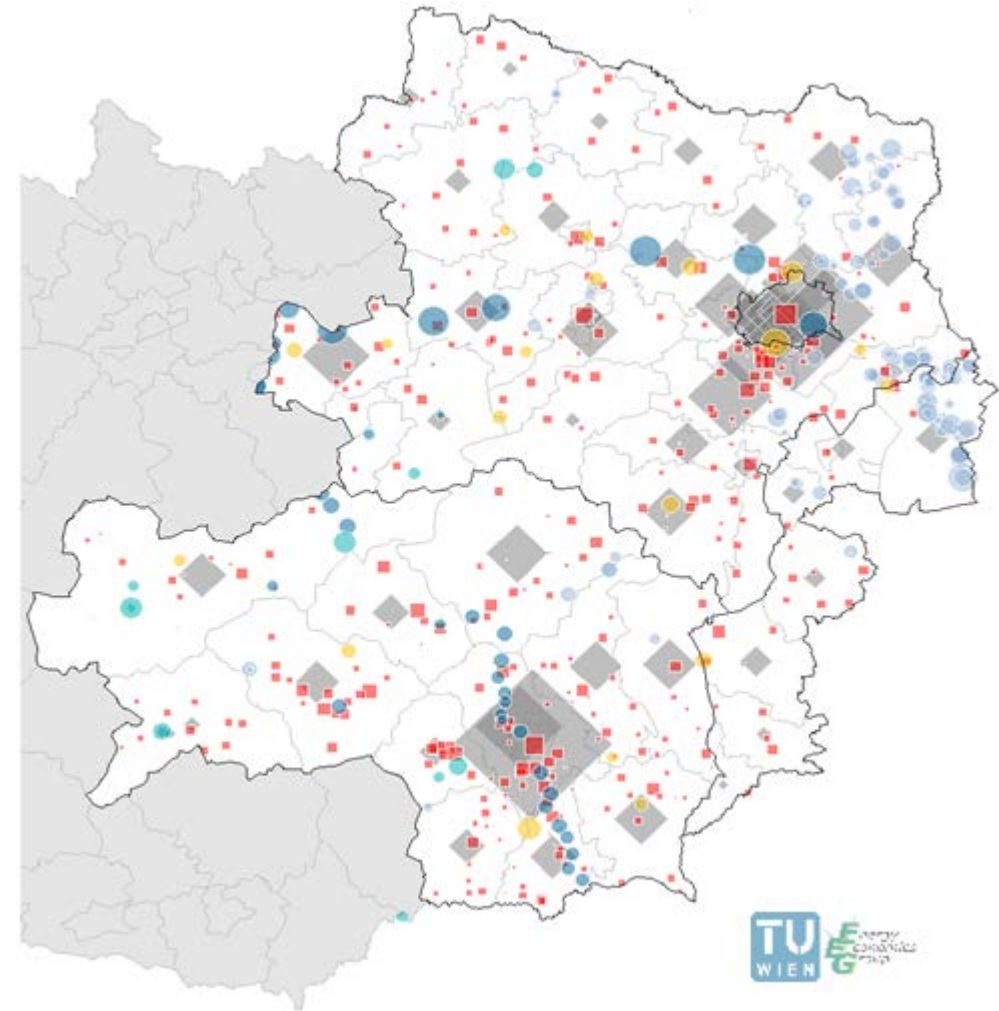


Regional energy profile:

- ◆ Electricity demand
- Connected distric heating units
- Wind capacity
- PV capacity
- Run-of-river capacity
- Pumped hydro capacity

Installed capacities of RES-E in Green Energy Lab projects and their share in total installed capacities in Austria:

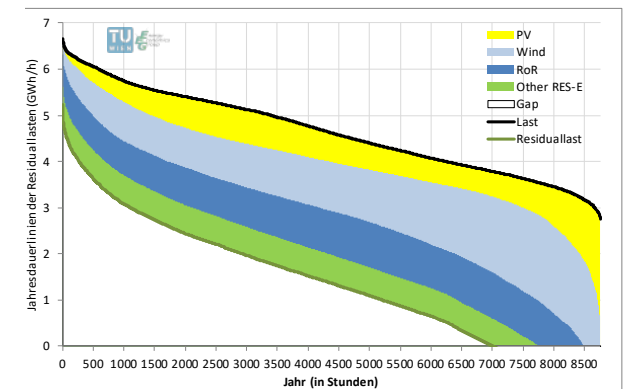
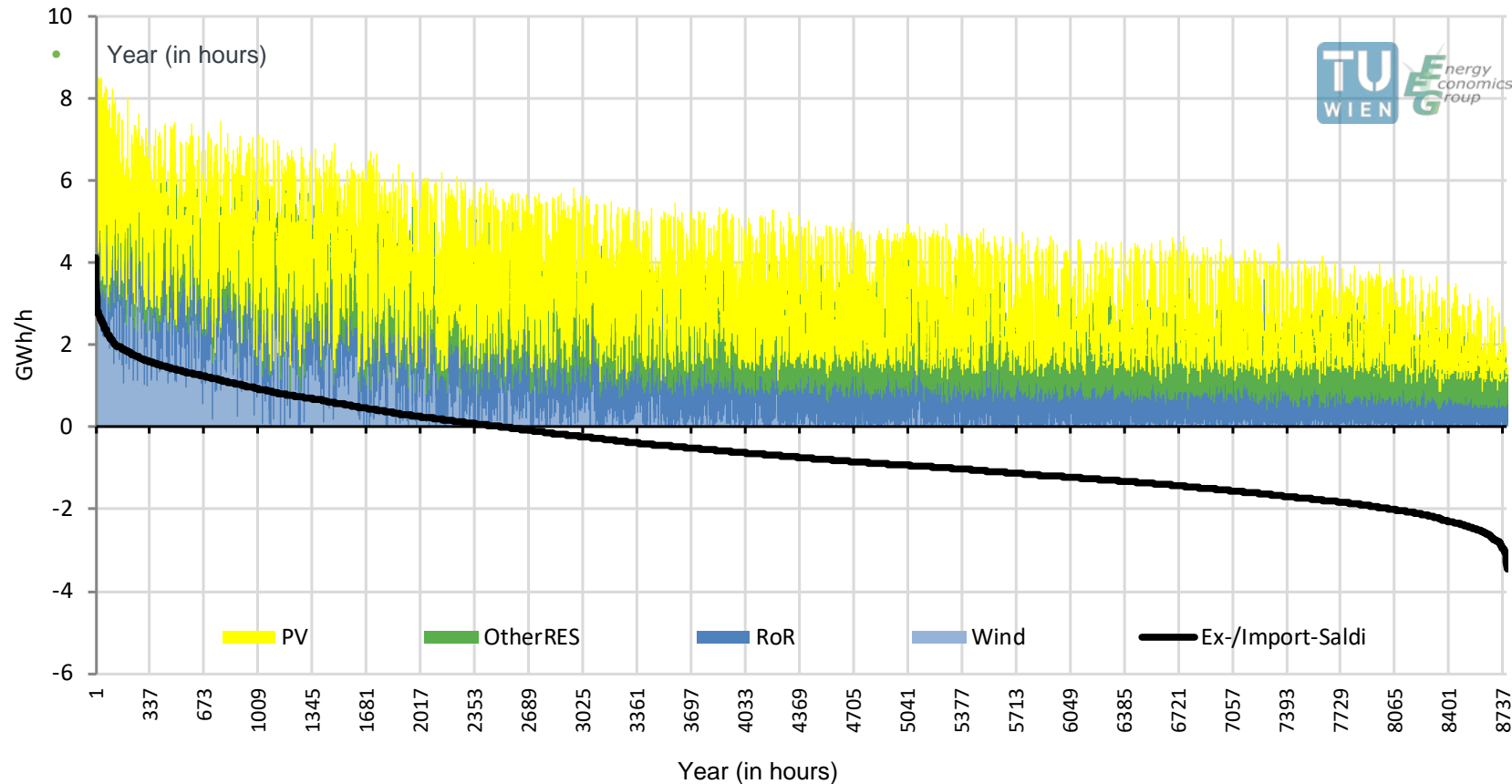
- | | |
|-------------------------|--------------|
| ● Wind | 2.4 GW (98%) |
| ● Run-of-river | 2.0 GW (35%) |
| ● PV | 0.5 GW (64%) |
| ○ Biomass | 0.3 GW (54%) |
| ● (Pump-) Hydro-storage | 0.3 GW (4%) |





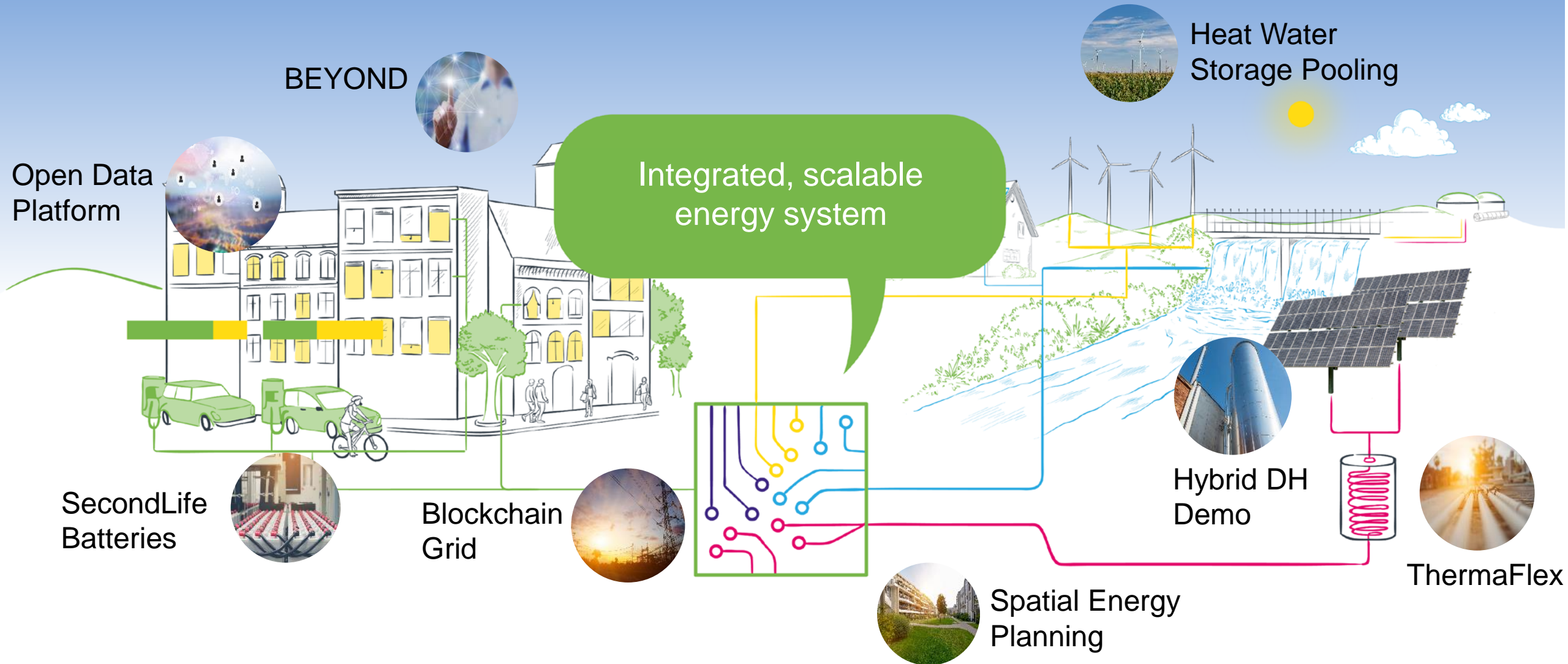
Challenge: energy trade balance

Required: Compensation and flexibility measures



E.g. the generation of renewable electricity and the energy trade balance in 2030 for the Green Energy Lab region, data: ENTOS-E DG scenario

Green Energy Lab projects: building blocks for an integrated energy system



Blockchain Grid

Retrieval of flexible capacities in distribution grids

Project tasks and goals

- Optimization of the integration of renewable energies by analyzing different uses of free grid resources
- Experimental implementation of a blockchain-based platform to allow prosumers to make use of free grid resources
- Elaboration of recommendations based on the results of the abovementioned platform and the analysis of the regulatory framework

Expected results

- Analysis of technical and organizational requirements for a testbed in Heimschuh, Styria
- Recommendations for an adapted regulatory framework
- Analysis of the scalability and reproducibility



KEY DATA

Duration: 11/18 – 10/20

Funding Programm: Flagship
Region Energy

Budget: € 1.2 Mio.

Lead:

- Energienetze Steiermark GmbH

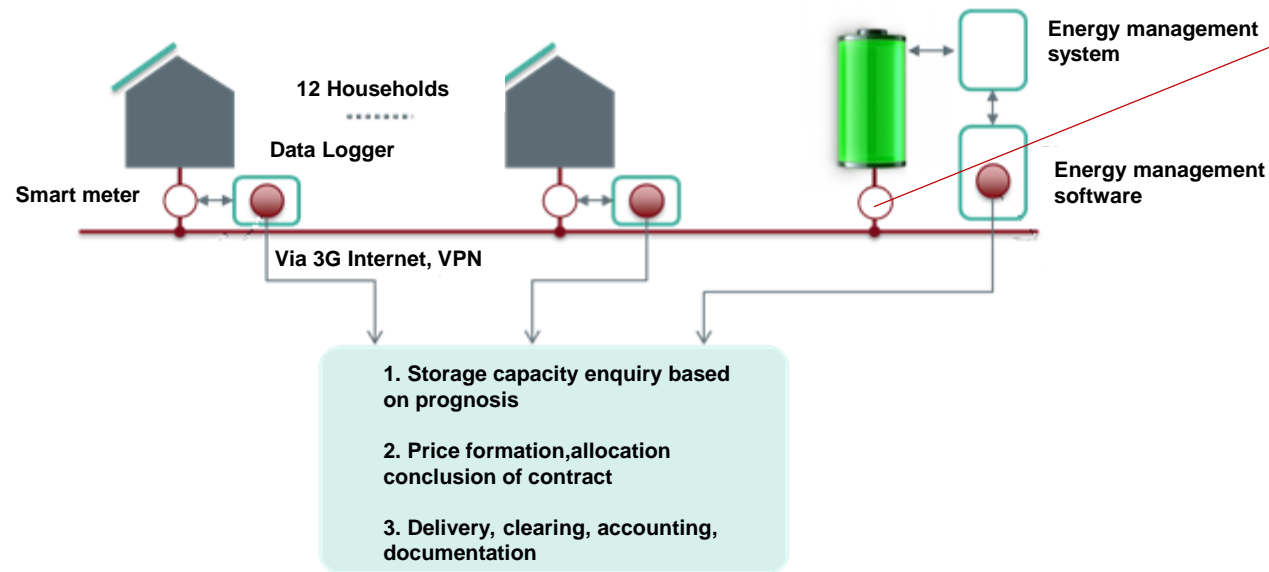
Partners:

- AIT Austrian Institute of Technology GmbH
- Siemens AG Österreich
- Energie Burgenland GmbH



Blockchain Grid

Blockchain pilot in a nutshell



Blockchain Grid use-cases:

- Energy storage marketability
- P2P Trading
- Grid capacity marketability

Source: AIT Austrian Institute of Technology GmbH
and Energienetze Steiermark GmbH
Green Energy Lab-Partner

Heat Water Storage Pooling

Optimized management and enhanced flexibility through DHW pooling

Project tasks and goals

- Minimization of costs for customers and suppliers due to optimized storage operations
- Facilitation of the integration of renewable energies by shifting to power-to-heat operations during production peaks
- Improvement of the interaction between different water storage systems
- Avoidance of shutdown of wind facilities

Expected results

- Optimization of the energy system through scalability and reproducibility with a potential nationwide application
- Market integration of wind energy
- Medium / long-term vision: energy hub for wind energy



KEY DATA

Duration: 09/19 – 08/22

Funding Program: Energy research

Budget: € 1.4 Mio.

Lead:

- Forschung Burgenland GmbH

Partners:

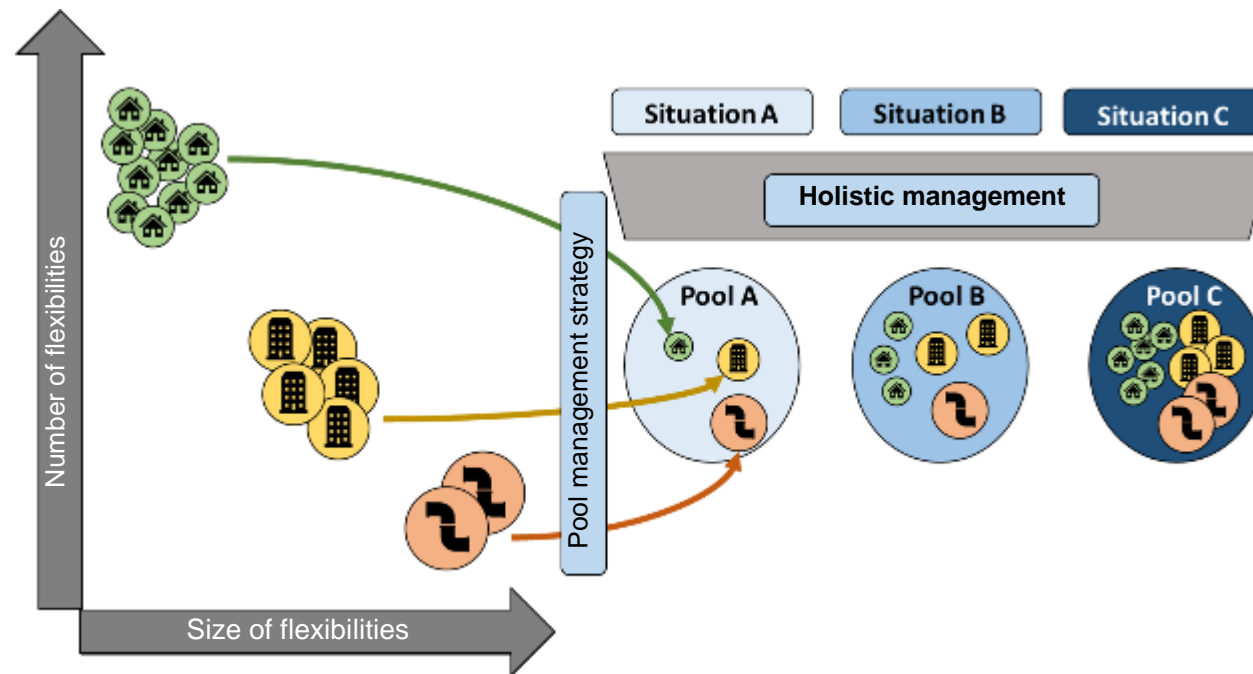
- Energie Burgenland AG
- 4ward Energy Research GmbH
- energy & meteo systems GmbH
- Pink GmbH



Heat Water Storage Pooling

Experimental implementation of innovative storage management in Burgenland

- At least 30 individual customers and 5 multi-storey residential complexes as well as a district heating system will be connected to the control room of a wind farm operator:



Source: Forschung Burgenland GmbH,
Green Energy Lab-Partner

Hybrid DH Demo

“Energy hub” business models bring a breath of fresh air to Neusiedl am See

Project tasks and goals

- Reduction of shutdowns of Energie Burgenland wind turbines by 20%
- Increase of the share of renewables in the energy mix (excluding fuels) in Neusiedl by 5%
- Optimization of the district heating network to reduce losses by 2%

Expected results

- “Energy hub” business models based on the open innovation approach
- Economic, technical, and ecological optimization of the energy flows within the “energy hub”
- Stabilizing the cost of district heating in comparison to the production cost of alternative projects



KEY DATA

Duration: 04/19 – 03/22

Funding Program: SmartCities Demo

Budget: € 1.3 Mio.

Lead:

- 4ward Energy Research GmbH

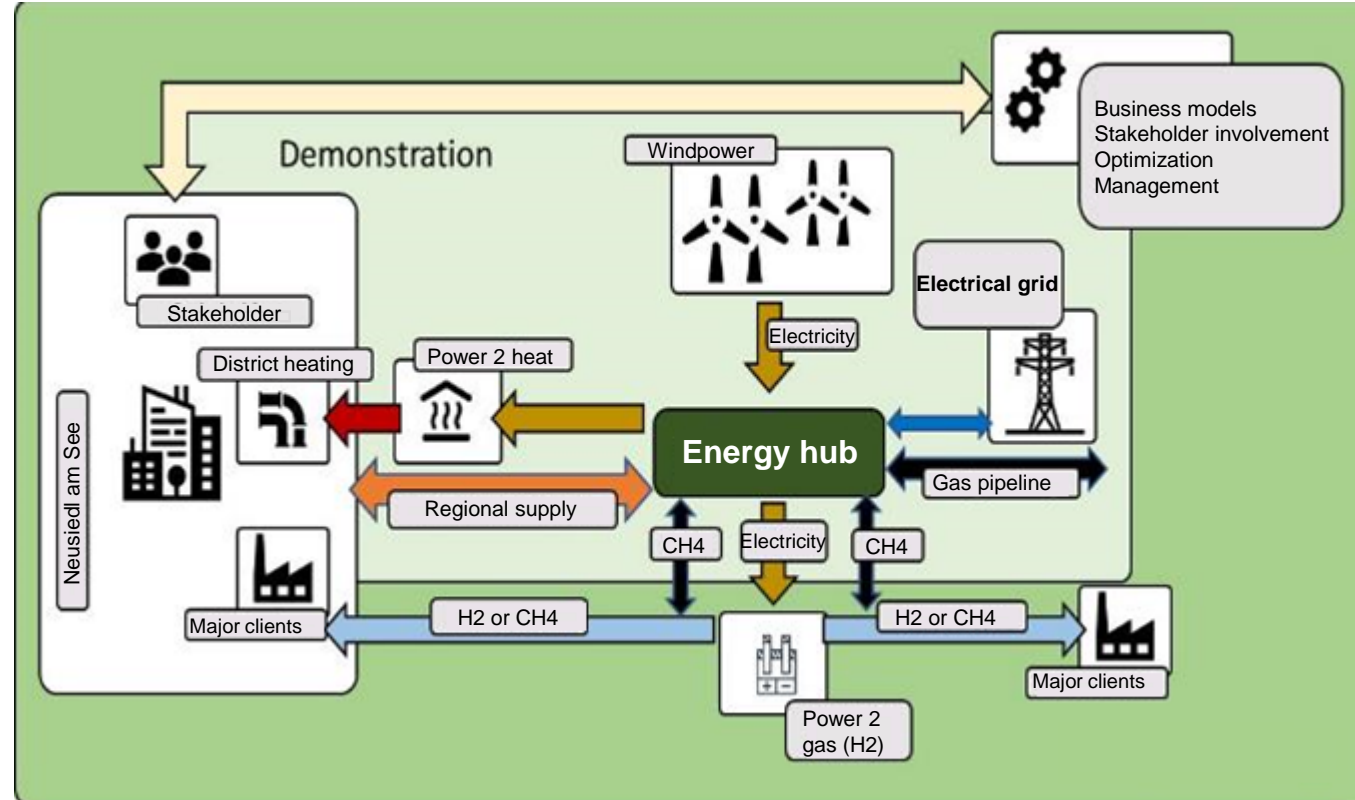
Partners:

- Energie Burgenland AG
- ENERCON Service Austria GmbH
- Forschung Burgenland GmbH
- TBH Ingenieurbüro GmbH



Hybrid DH Demo

“Energy hub” business models bring a breath of fresh air to Neusiedl am See

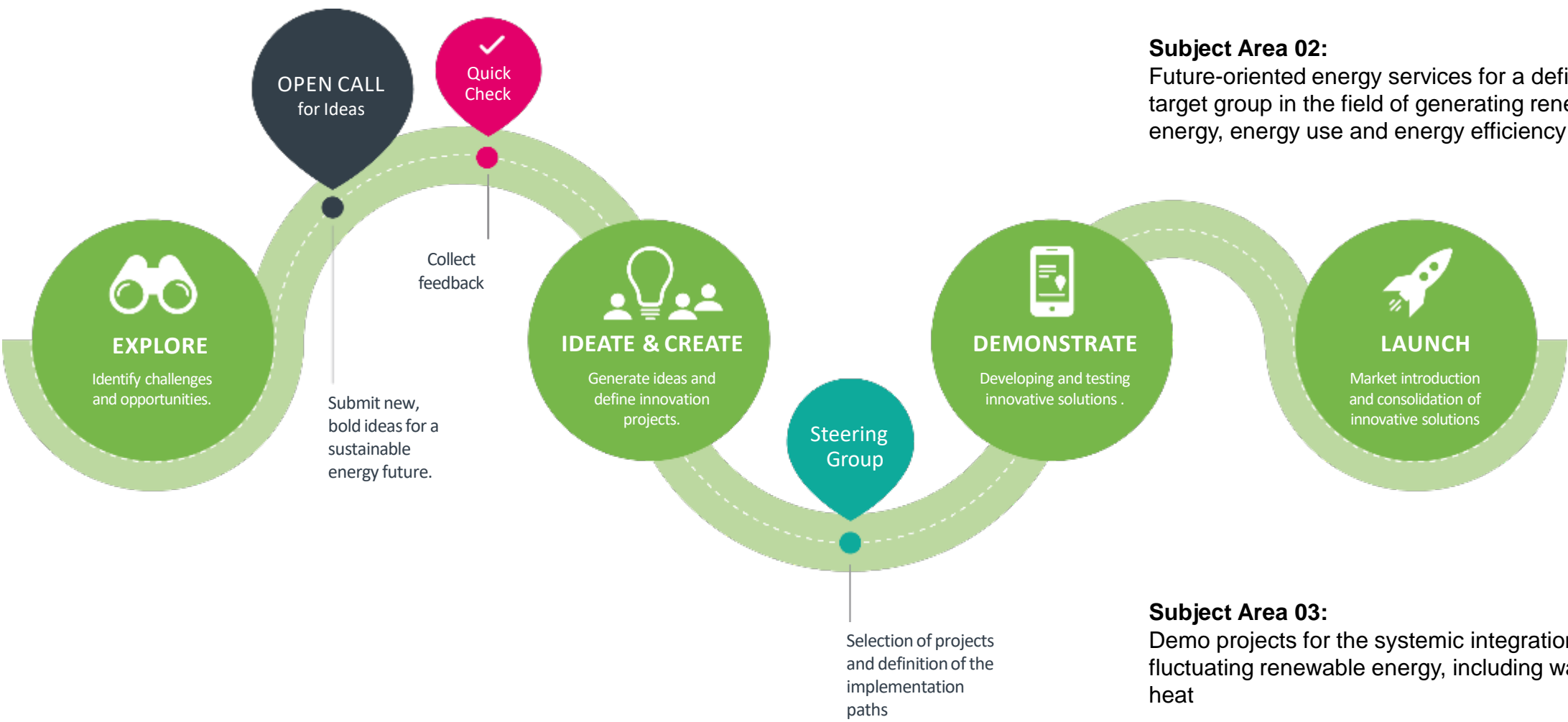


Source: 4ward Energy Research GmbH,
Green Energy Lab-Partner



Open Innovation Process

Process of Implementing the Innovation Journey



Subject Area 01:
Digitization enables customer-oriented solutions

Subject Area 02:
Future-oriented energy services for a defined target group in the field of generating renewable energy, energy use and energy efficiency

Subject Area 03:
Demo projects for the systemic integration of fluctuating renewable energy, including waste heat



Innovator Circle and Stakeholder Circle

Innovator Circle

Open platform for institutions that want to actively shape the energy future: companies, research institutions, startups, cities and municipalities, associations etc.

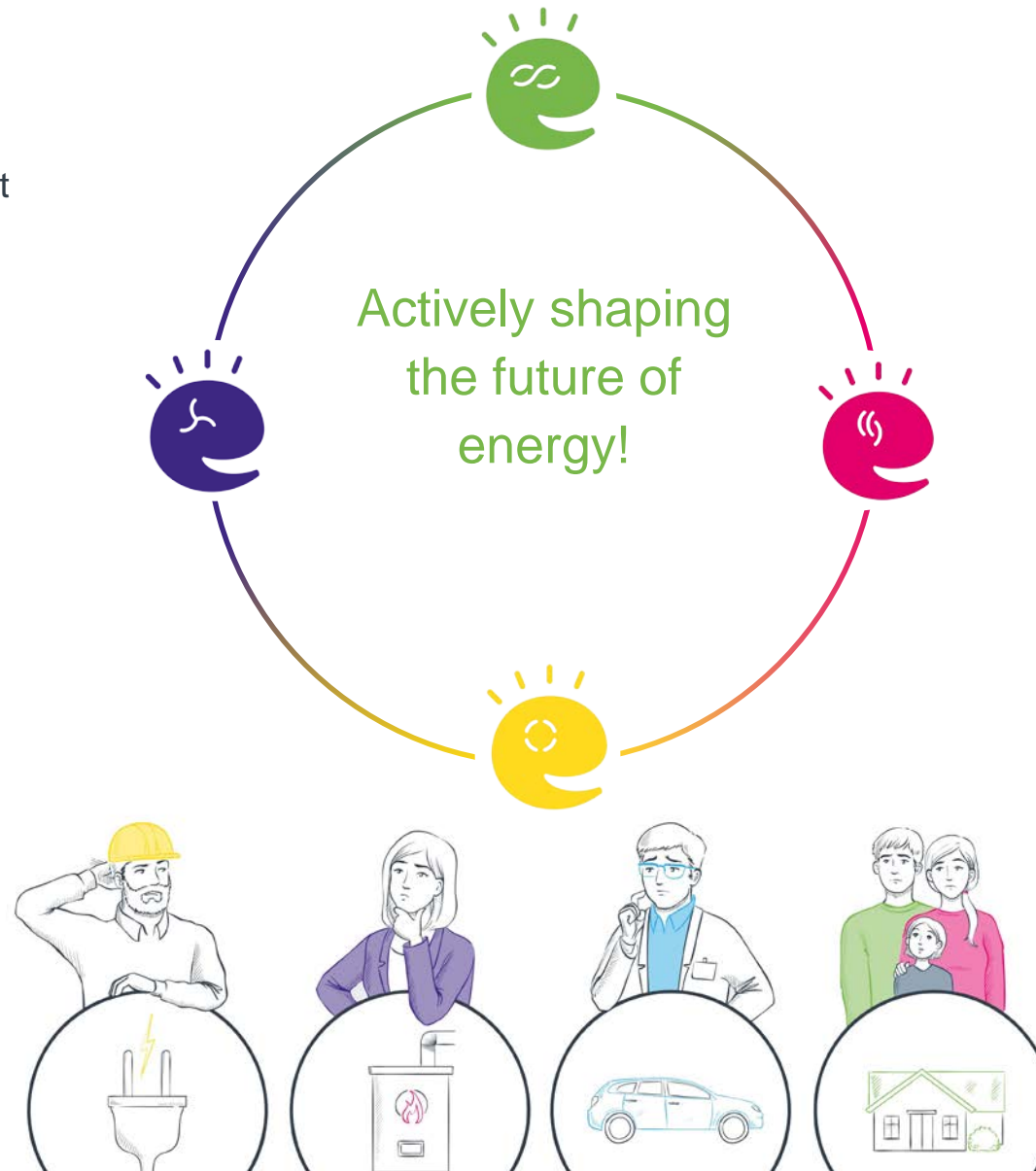
More than **100 partners** today generate innovative ideas and generate impulses for their implementation.

Stakeholder Circle

Networking and exchange of experience on **international level**.

Feedback and **strategic advice** on the long-term development of Green Energy Lab.

Comprising of around 20 international **high-level research** and **innovation experts**.

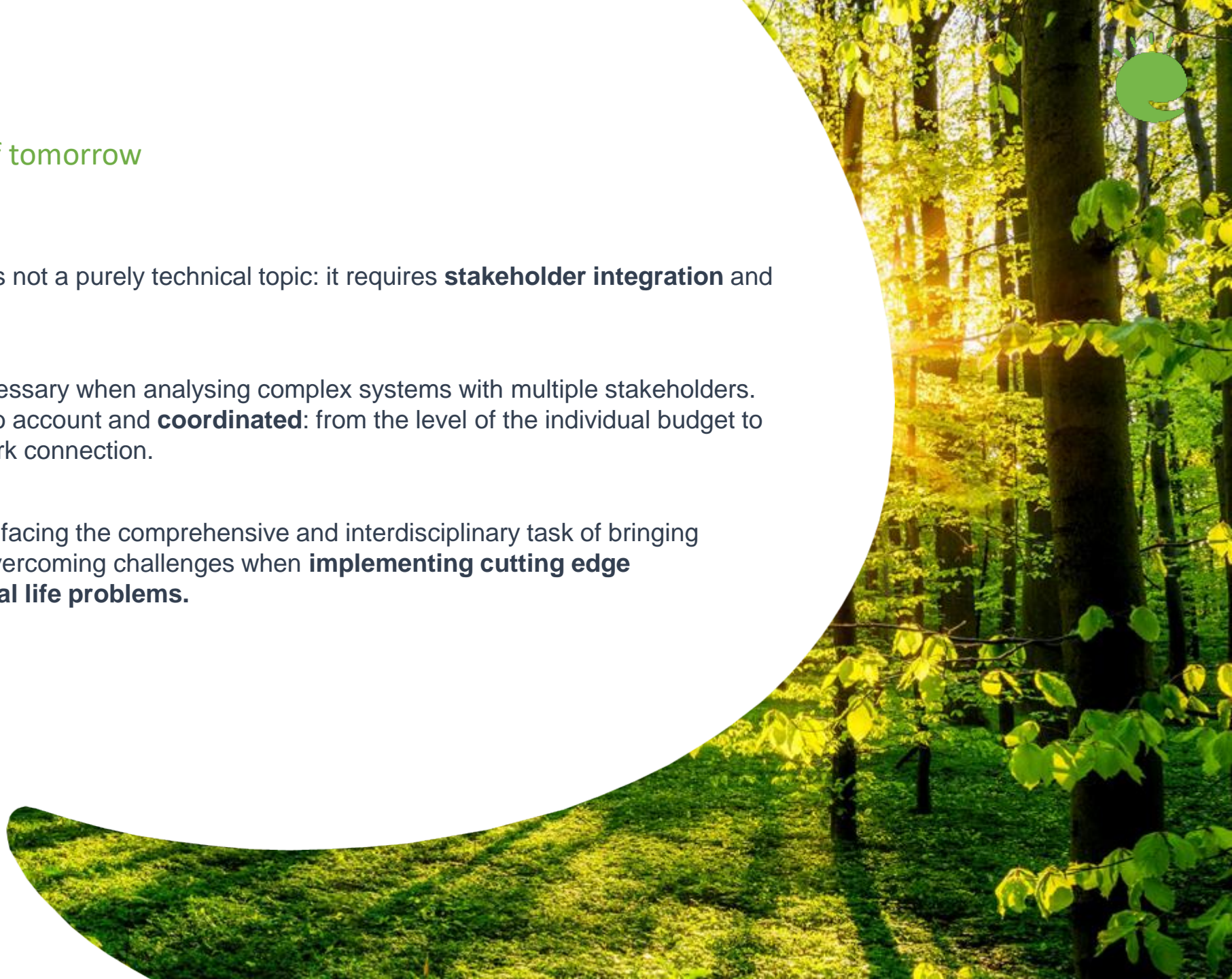


Be part of the
STAKEHOLDER CIRCLE!
welcome@greenenergylab.at

Key findings

Shaping the energy system of tomorrow

- Increasing **system flexibility** is not a purely technical topic: it requires **stakeholder integration** and **end-user involvement**.
- A **multi-level approach** is necessary when analysing complex systems with multiple stakeholders. **All levels** need to be taken into account and **coordinated**: from the level of the individual budget to questions relating to the network connection.
- **Open innovation** is the key to facing the comprehensive and interdisciplinary task of bringing together different actors and overcoming challenges when **implementing cutting edge technological solutions to real life problems**.



WITH CUSTOMER-ORIENTED
SOLUTIONS, WE CREATE AN
INTEGRATED ENERGY
SYSTEM FOR A SUSTAINABLE
FUTURE.



green
energy
lab.at

www.greenenergylab.at

DI Susanne Supper | Cluster Manager of Green Energy Lab
T: +43 676 471 81 77 | E: Susanne.supper@greenenergylab.at