

GREEN ENERGY LAB – ACCELERATING USER-CENTRIC INTEGRATED SOLUTIONS FOR THE RENEWABLE ENERGY SYSTEM OF TOMORROW

Christian PANZER¹, Georg LETTNER², Susanne SUPPER³, Tobias SCHWAB⁴,
Thomas NACHT⁵, Christian FINK⁶

Vision and Goals

The Green Energy Lab will actively accelerate the transformation of the energy system towards CO₂ neutrality and will pro-actively identify, address and solve today's and even more tomorrow's energy related challenges by demonstrating solutions for a user-centric energy system relying on renewable energy sources and thus accumulating and using the required system flexibilities. The focus is set on the sectors electricity and heat by a systematic realisation of interlinked and interdependent research and demonstration projects following our joint vision – the vision of the Green Energy Lab. According to our vision we want to create a better energy future for all by merging single heat, electricity and energy relevant mobility solutions to form the integrated, flexible and renewable energy system of tomorrow, capable of handling up to 100 % energy from renewable energy sources at times. Thus, within the Green Energy Lab more than 100 partners and thousands of lead users are ready to join the common cause to take up the challenge to develop and demonstrate the future energy system together as well as to scale up and disseminate successfully developed technologies and solutions nationally and internationally, making our vision come true.

Methodology of innovation process

The Green Energy Lab trusts in the value and benefit of cooperative innovation. An open innovation system is being established with more than 100 innovation chain actors already joined, and more invited to join in future. The Green Energy Lab dedicates itself to putting the focus on the user through user-centric innovation projects including suitable business models, support the acceleration and launch of developed products and services and strengthen the open innovation competence and culture within enterprises, research and administration. The open innovation process is based on the "BIG Picture™ Innovation Model" which is also part of teaching at Harvard University. The process contains four phases, see Figure 1.

(1) **Explore:**

International market and user needs, technology strengths and innovation gaps in the field of integrated energy systems are the starting point for successful innovation action. Therefore, respective data will be collected and distributed by the Green Energy Lab.

(2) **Ideate & Create:**

Within this core phase interdisciplinary, transdisciplinary and inter-sectoral open innovation collaboration will be actively supported. The ideation and co-creation processes will foster the origination of new and innovative ideas within the Innovator Circle. Based on up to date innovation tools like design thinking, lean start-up, customer co-creation and business model canvas a strong customer and market integration is secured.

¹ Verein Forschungsinitiative Green Energy Lab, Thomas-Klestil-Platz 14, 1030 Wien, Tel.: +43 664 6232009, christian.panzer@greenenergylab.at, www.greenenergylab.at

² Vienna University of Technology, Institute of Energy Systems and Electrical Drives / Energy Economics Group, Gußhausstraße 25-29/E370-3, 1040 Vienna, Tel.: +43 1 58801 370376, Fax: +43 1 58801 370397, lettner@eeg.tuwien.ac.at, www.eeg.tuwien.ac.at

³ Cluster Manager Green Energy Lab, c/o eNu - NÖ Energie- und Umweltagentur, Wiener Straße 2, Top1.03, 2340 Mödling, Tel.: +43 2236 860664 523, susanne.supper@greenenergylab.at, www.greenenergylab.at

⁴ Open Innovation Manager Green Energy Lab, c/o Green Tech Cluster Styria GmbH, Waagner-Biro-Straße 100, 8020 Graz, Tel.: +43 316 40774414, tobias.schwab@greenenergylab.at, www.greenenergylab.at

⁵ 4ward Energy Research GmbH, Reininghausstraße 13a, 8020 Graz, Tel.: +43 664 88 500 336, thomas.nacht@4wardenergy.at, www.4wardenergy.at

⁶ AEE INTEC - Institut für Nachhaltige Technologien, Feldgasse 19, 8200 Gleisdorf, Tel.: +43 3112 5886-0, Fax: +43 3112 5886-18, office@aee.at, www.aee-intec.at

(3) **Demonstrate:**

In this phase the focus is set on the projects linked to the Green Energy Lab, with the goal to reach their respective goals while focusing on research and demonstration. Additionally, project partners will be actively involved in the process of exchange of knowledge and idea generation. This exchange of first results and challenges will lead to the generation of new ideas. Furthermore, initial results and demonstration facilities will be used to address customers and to involve interested stakeholders as well as to sharpen the future business models. This will ensure that the projects are already prepared for a subsequent scaling and market entry.

(4) **Launch:**

Finally, the developed solutions will be supported for scaling to national markets as well as to international markets. Presentations in front of a high-level group of potential customers will be organised. Special attention will be paid to also involve non-traditional players in research funding to strengthen new open innovation partnerships.

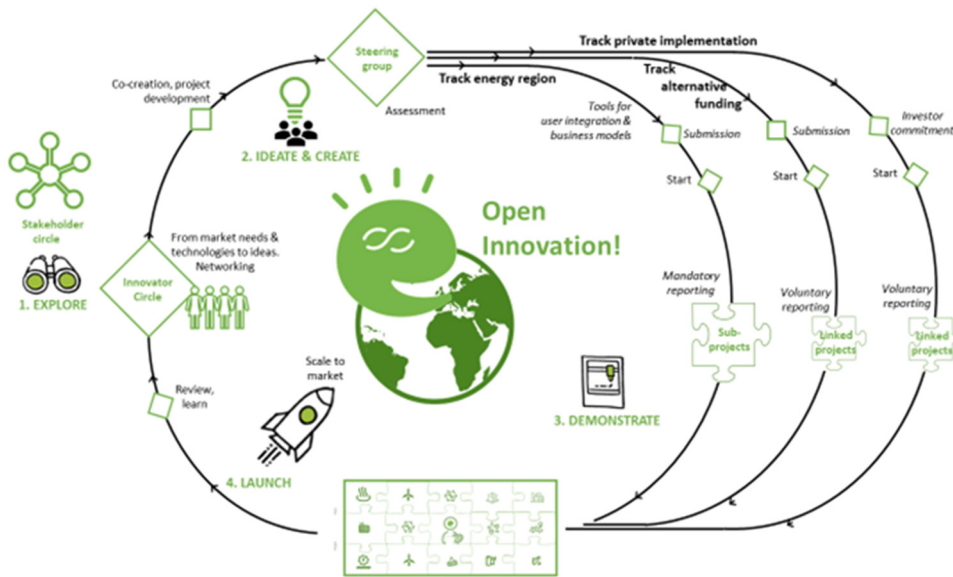


Figure 1: Green Energy Lab – Open Innovation Process

Conclusion

Based on our vision to merge single heat, electricity and energy relevant mobility solutions to form an integrated, user-centric and flexible energy system, five key innovation fields (KIFs), which are highly interwoven, were identified:

- KIF 1: Flexibility
- KIF 2: Digitalization
- KIF 3: Integrated systems
- KIF 4: Customer integration
- KIF 5: Business Model Development

To ensure, that the common goals are reached, and the sub-projects as well as the Green Energy Lab itself are working efficiently and evolving properly, key performance indicators (KPIs) were defined. The key performance indicators strongly relate to the key innovation fields of Green Energy Lab, but also to other highly relevant factors.

According to the aims of Green Energy Lab, important KPIs are e.g. the integration of more than 100,000 customers in the sub-projects, the development of more than 150 new technologies, products or services in the sub-projects and their market launch, the reduction of total energy consumption by more than 18TWh and many more. These KPIs will act as success indicators of Green Energy Lab and will be evaluated constantly.