



SUPER PV

SUPER PV PROGRESS REPORT – DEVELOPING & TESTING INNOVATIVE HIGH-QUALITY PV SYSTEMS TO REGAIN EUROPEAN LEADERSHIP IN THE PV MARKET

PURPOSE OF THE PROJECT

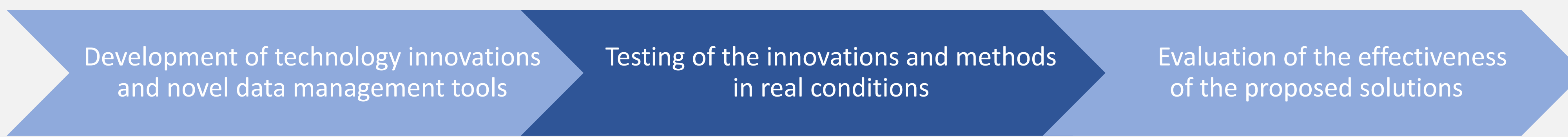
SUPER PV is a **collaborative European-funded project** initiated in 2018 by **26 partners** in reaction to this trend. Together, they target a significant LCOE reduction (26%-37%) for European-made PV by adopting a hybrid approach combining technological innovations and data management methods. Introducing superior quality PV systems will create conditions for **accelerating large scale deployment in Europe and help EU PV business to regain leadership on world market.**

After the first year and a half of implementation, the project is moving from the **development of technologies** to the demonstration phase. The project demonstration sites (six in total & displayed below are **ready for uptake**, as **technical specifications are determined**, and sites are **ready for construction**. While each demo-site is at different level of implementation initial results are anticipated for late 2020/ early 2021.



Digital Twin for the Vilnius demonstration site

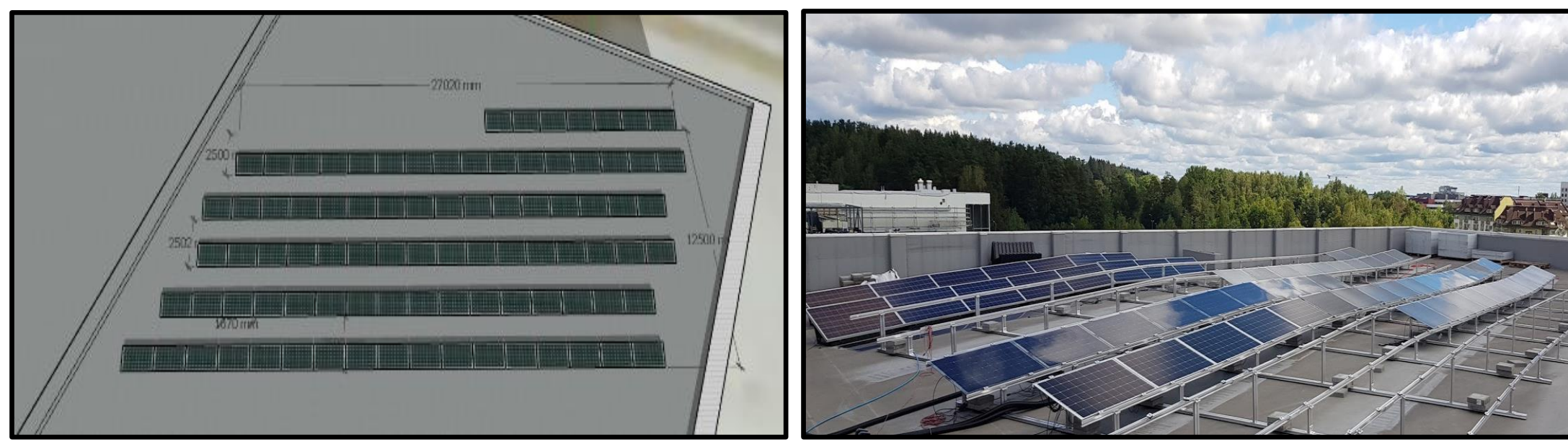
OVERALL PROJECT APPROACH



UPCOMING ASSESSMENT OF RESULTS

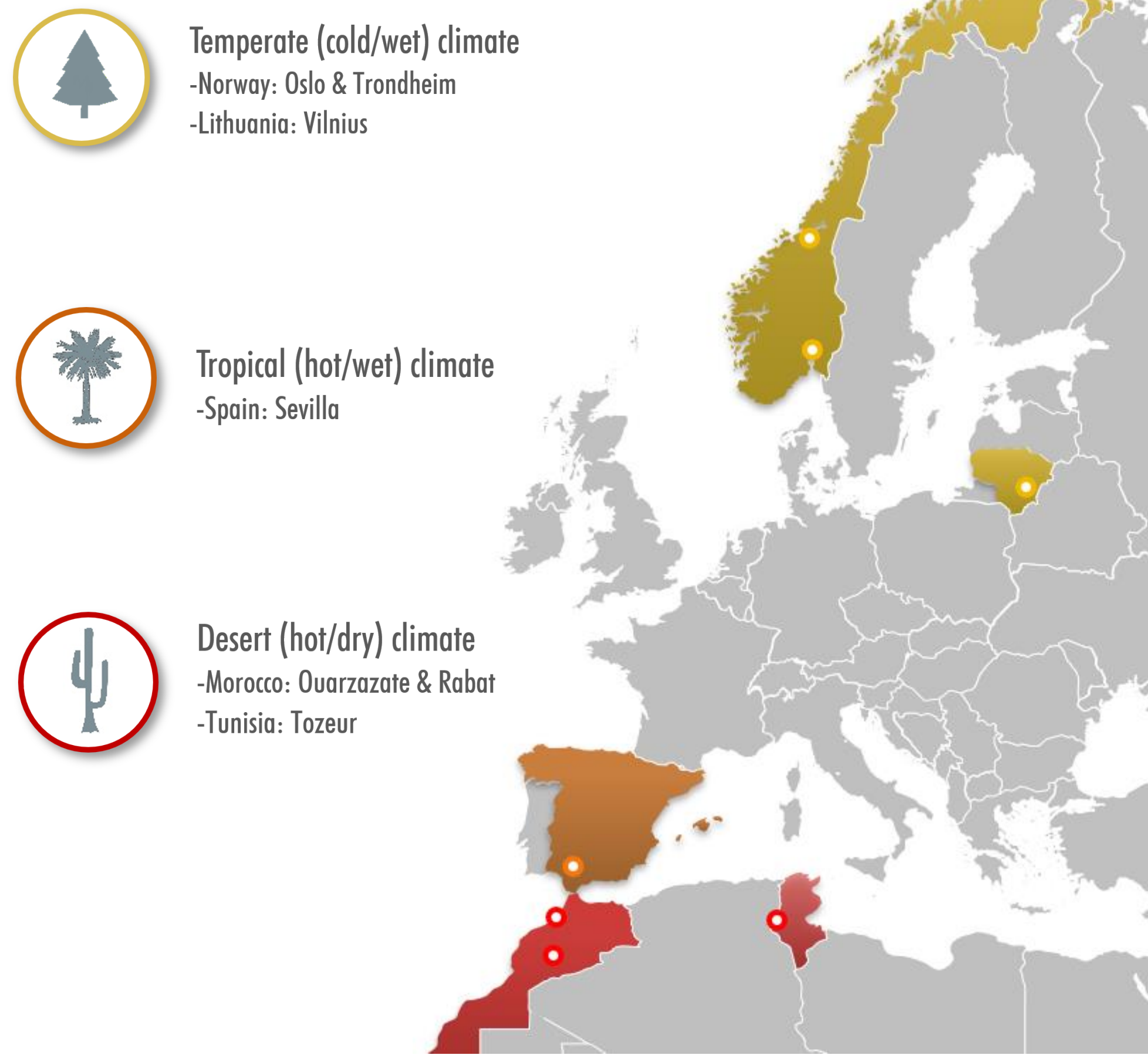
With demo-site construction measures currently underway at the **six demo-sites**, project results are soon to follow. They will be tested and evaluated in demonstration sites in **3 different climatic regions of extreme conditions and in markets of primary importance** for European PV producers.

SUPER PV Demo-Site: Vilnius, Lithuania



Physical layout with 88 flat-roof mounted modules on top of the Solitek factory

Bifacial and monofacial modules being installed for testing



DEFINED KEY PERFORMANCE INDICATORS (KPI's)

- KPI 1 - Solar module cost reduction
- KPI 2 - BoS components costs
- KPI 3 - Total installation cost

The module cost and BoS components costs (€/Wp) are technology dependent and subject to the global marketplace, while system installation costs adding up to the final LCOE are more specific to location and segment. Thus, module and BoS components costs will tell whether a technology developed in SUPER PV is competitive at a European level. The LCOE metric on the other hand will tell whether SUPER PV is a viable energy source in different regions of Europe.

KPI 4 - Performance Ratio (PR)

The Performance Ratio (quotient of AC yield and the nominal yield of the generator's [DC]) is a globally accepted indicator to judge the performance of grid connected PV Plants. PR is affected by the solar module's operating temperature, inverter's conversion efficiency, soiling (dust, snow), shading, wiring losses and electrical mismatch between solar cells and between modules.

KP5 - Reduction of lifecycle costs per kWh, expressed by the Levelized Cost of Energy



The LCOE is one of the solar industry's most commonly used metrics and it is also widely used to compare lifetime performance of different electricity generating technologies.




KP6 - Recyclability and environmental footprint of solar modules

Life Cycle perspective approach will be adopted to assess this technology and, specifically, Life Cycle Assessment (LCA) methodology will be applied, following the ISO 14040 and ISO 14044. Special attention will be paid to resources consumption and materials recovery.

SCOPE OF SUPER PV


To achieve ground-breaking impact on cost reduction, the project concept tackles in an **integral way the following three cornerstone** steps impacting PV system performance and, thus, LCOE:



PV module innovations
introducing and combining five PV module innovations applied to c-Si based bifacial modules and CIGS modules.



Module Level **Power Electronics (MLPE)** developments ensuring higher power output, performance monitoring and data collection on string level, and long-term stability of operation.



PV system integration and process innovation, developing a new digital and holistic process: PIM (PV information Modelling/Mgmt.)

AMBITION FOR SUPER PV CUMULATIVE LCOE REDUCTION

The SUPER PV project aims to demonstrate an innovative PV system **LCOE reduction of 26-37%** by adopting a hybrid approach, combining technological innovations and Data Management methods along the PV value chain.

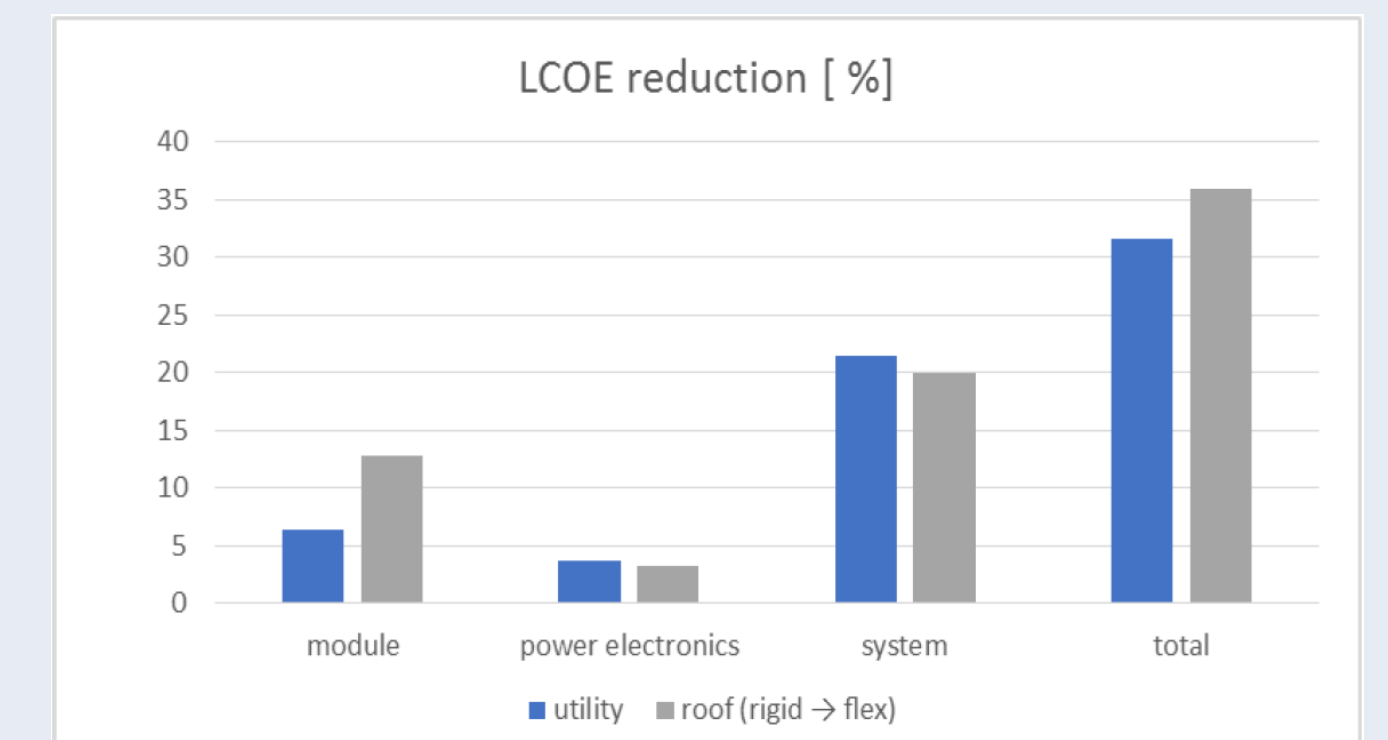
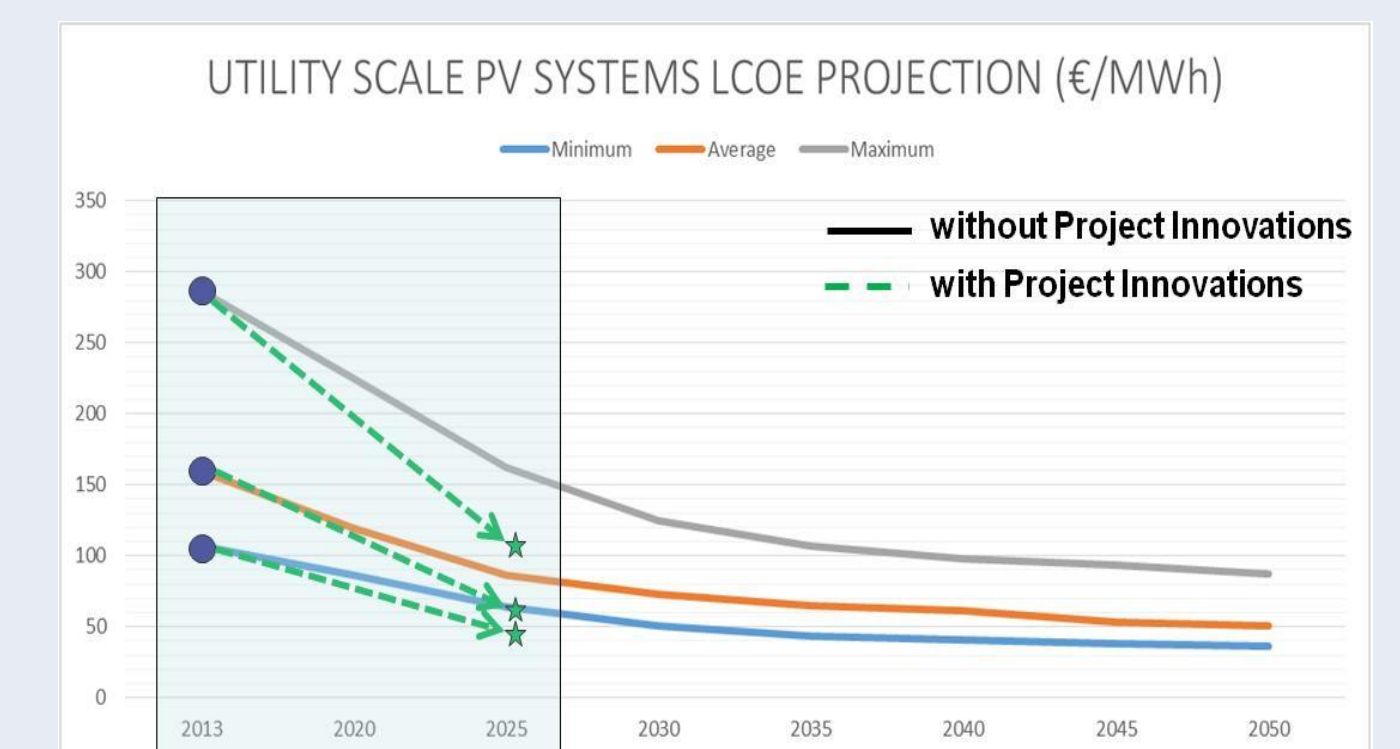


Figure above is presenting cumulative picture of targeted by SUPER PV cost reduction expressed by LCOE relative to reference products reduction for each of value chain steps addressed by the project (PV module, PE and system integration).

Taking into account predictions for PV system cost reduction according to various sources, by the planned end of the project in 2022 SUPER PV systems will be **superior product on the worldwide market** according to the figure below regarding utility scale. For Rooftop PV system a similar impact on LCOE is expected for SUPER PV innovations.



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