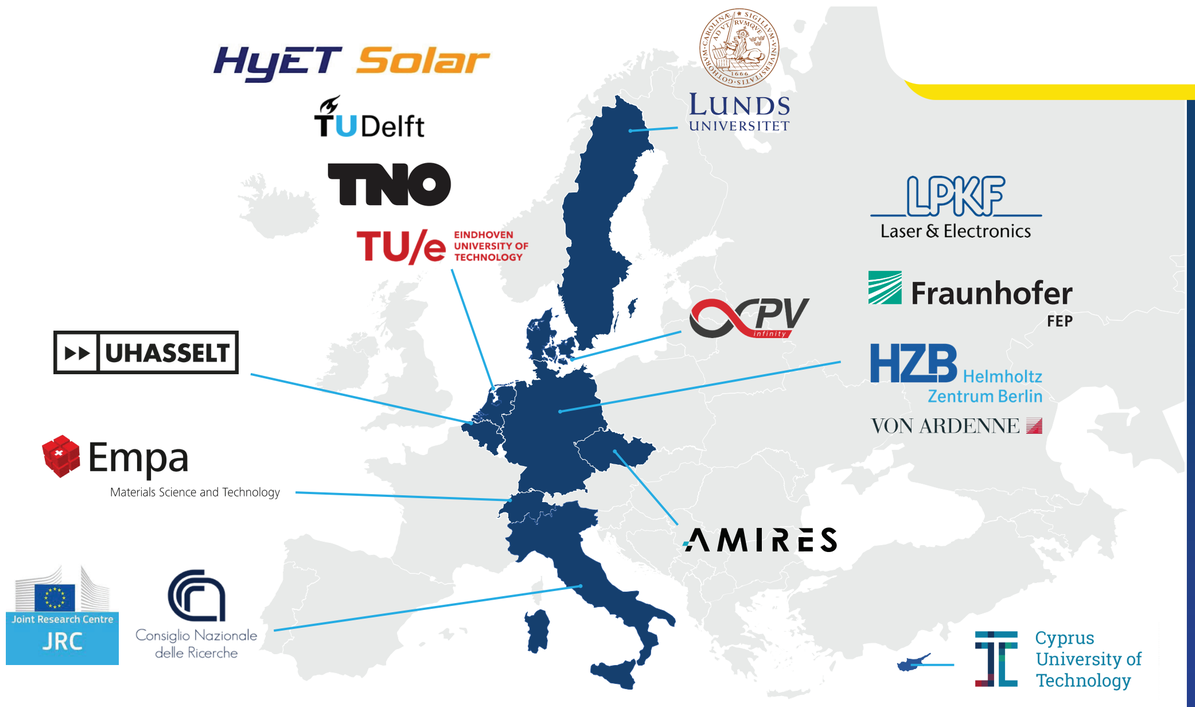
Concept & Objectives: LUMINOSITY is an industry driven project aimed at leveraging the flexible perovskite solar cells (PSC) technology to commercially relevant production scales, using established industrial processes. The project aims to demonstrate roll-to-roll (R2R) processed photovoltaic (PV) module with power conversion efficiency (PCE) of >20% at an area of >900 cm2 and thus overcome the efficiency gap between lab-scale and fab-scale processed devices, elevating the TRL up to 7. One of the unique selling points of this work is the commercial substrate foil based on aluminium with fluorinated-tin-oxide (FTO) electrode layer, which is an intellectual property of HyET Solar, the end user in the consortium.

Large Area Uniform Industry Compatible Perovskite Solar Cell Technology

By using this substrate foil, LUMINOSITY will alleviate the bottlenecks related to limited process window of typical polymer substrate foils – such as high-quality nickel oxide charge transport layer deposition (requires 300°C thermal process) – to reach high stability, efficiency, and lower environmental impact, while keeping the flexibility. LUMINOSITY will achieve operational stability exceeding 20 years that rivals the lifetime of current commercial thin film PV technologies, while ensuring economic (0.14 USD/W at R2R production scale) and environmental feasibility (50% lower CO2 footprint in comparison to c-Si PV), substantiated by comprehensive Life Cycle and Techno-economic Analysis

Project Facts

Start Date: **01 June 2024**
Duration: **48 months**
EU Contribution: **€6,99M**
Call: **HORIZON-CL5-2023-D3-02**
Type of Action: **HORIZON-IA**



PROJECT TEAM

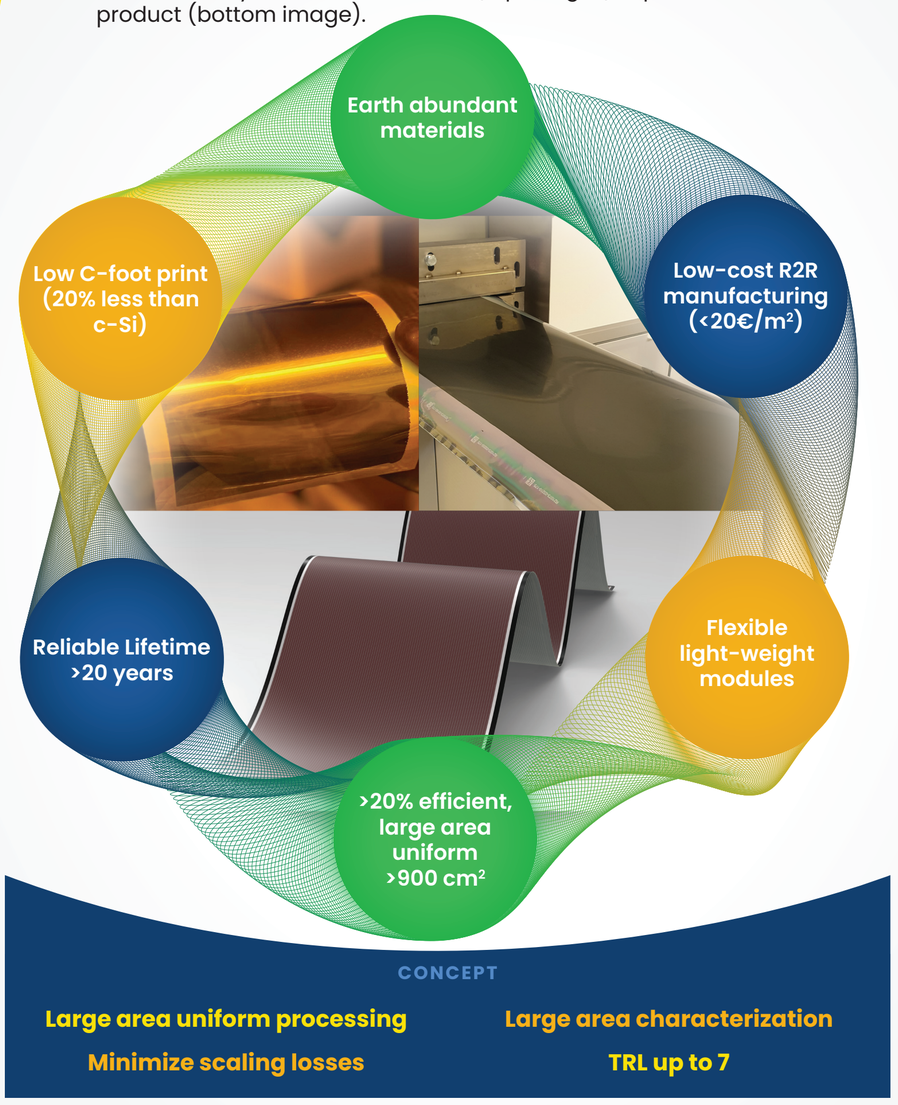
Coordinator:
TNO

Academia:
TU/e, TUD, LU, UH, CUT

RTO:
EMPA, FEP, HZB, CNR

Companies:
IPV, LPKF, VA, EMPA, AMIRES

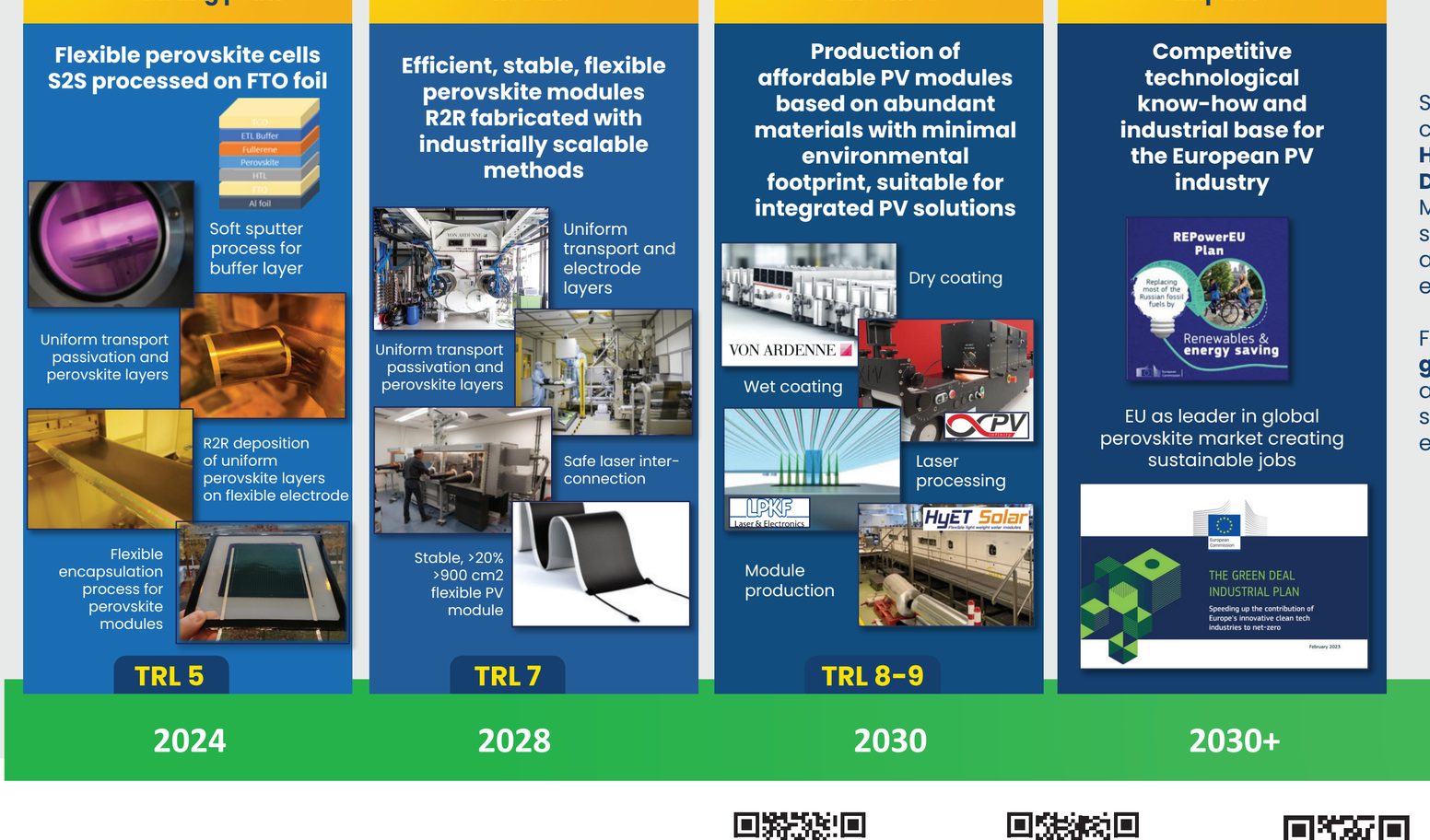
Figure: Principal advantages of LUMINOSITY technology and the prototype R2R coated layers on flexible FTO foil (top images) to produce the envisioned product (bottom image).



To achieve the objectives of LUMINOSITY, a multidisciplinary and complementary consortium has been gathered with members who have proven a strong innovation and/or industrial experience and the capacity to achieve the objectives and milestones set out in the project. The consortium encompasses the full value chain from research and technology developers, equipment manufacturers, suppliers, and industrial end-users.

EXPECTED IMPACT

- Increase the lifetime, efficiency and minimize the environmental impact of Perovskite PV.
- Enlarge with novel perovskite device architectures the integration and application possibilities of PV technology.
- Increase the potential for industrial production and commercialisation of perovskite PV creating a competitive technological know-how for the European PV industrial base.
- More effective market uptake of sustainable renewable energy and fuel technologies to support their commercialisation and provide inputs to policy making.
- Enhanced security and autonomy of energy supply in the EU.



Significant contribution to **Horizon Europe Destination**
More efficient, clean, sustainable, secure and competitive energy supply

Fostering **European global leadership** in affordable, secure and sustainable renewable energy technologies

Funded by the European Union

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