

SIREVIVAL

(01.03.2022 – 28.02.2025)



LEAP-RE

Long-Term Joint EU-AU Research
and Innovation Partnership on Renewable Energy

Pillar-1 project



The LEAP-RE project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 963530.

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Consortium

Project coordinator:

- Université catholique de Louvain - UCLouvain (**Belgium**)

Project partners:

- Centre de Recherche en Technologie des Semi-conducteurs pour l'Energétique - CRTSE (**Algeria**),

- Université catholique de Louvain - UCLouvain (**Belgium**),

- CNRS, Institut d'Electronique, de Microélectronique et de Nanotechnologie - IEMN (**France**),

- École nationale supérieure d'ingénieurs de Tunis - ENSIT, and Centre de Recherche et des Technologies de l'Energie - CRTEN (**Tunisia**).

Aim of the project

SIREVIVAL aims at the reduction of the environmental impact of spent photovoltaic (PV) modules. The effort is focused on the use of recycled materials, like Si, to build all solid-state supercapacitors and to integrate them with modern photovoltaic cells, in order to meet instantaneous power generation and delivery.

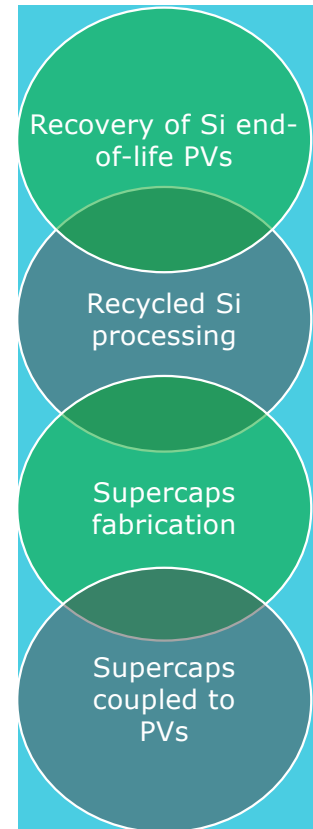
Relevance vs MARs

SIREVIVAL relies on interlinked chemistry, physics and engineering activities and is relevant for two multi-annual roadmaps: end-of-life and second-life management and environmental impacts of renewable energy components (MAR 2) and smart stand-alone systems to ease the access to energy in all its forms (MAR 3).

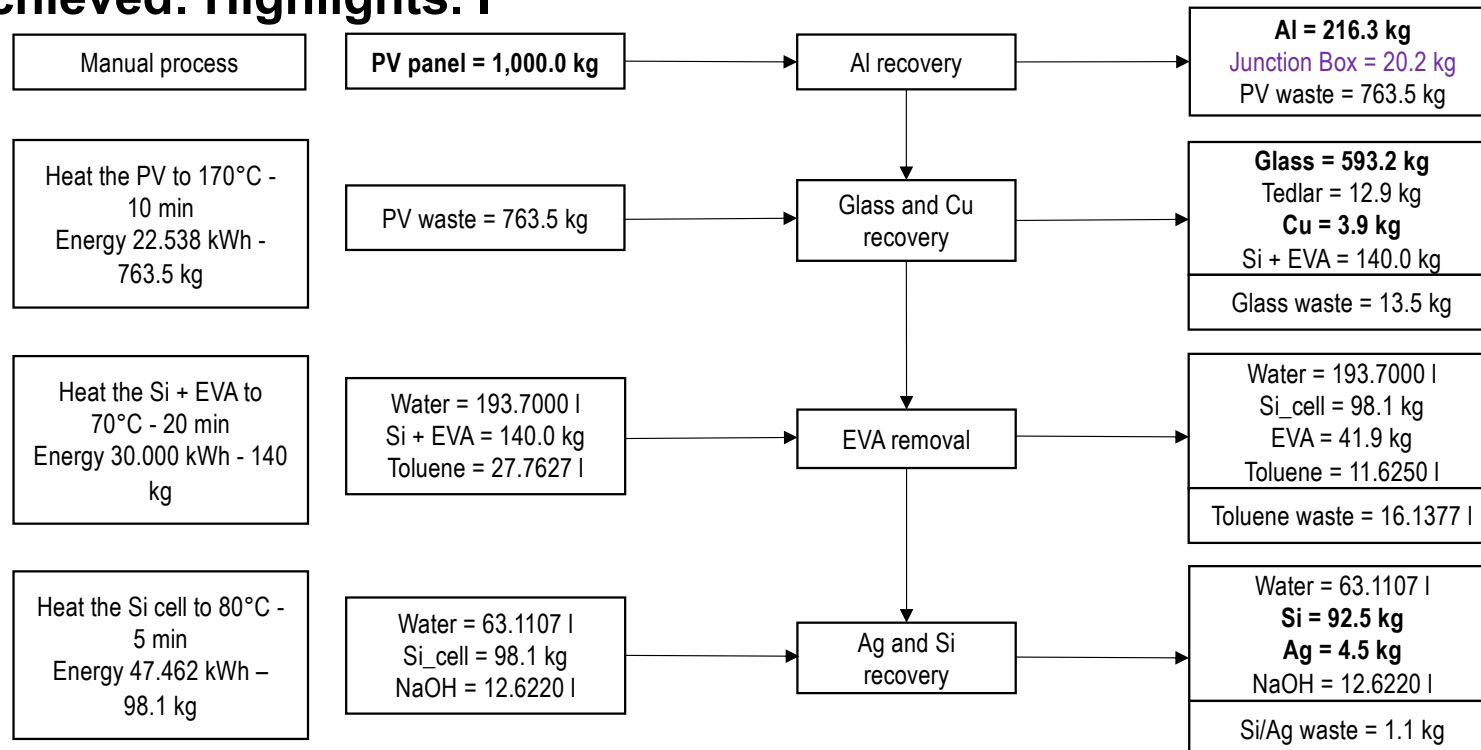
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Presentation of scientific and/or technical objectives as defined in the initial proposal submitted to the LEAP-RE program

1. *Material recovery from end-of-life PV panels with >85% overall efficiency*
2. *Ionogels with a large temperature operational window*
3. *Solid-state micro-supercapacitors, based on recycled Si materials*
4. *Engineering of new systems for energy production and storage*



Results achieved: Highlights. I

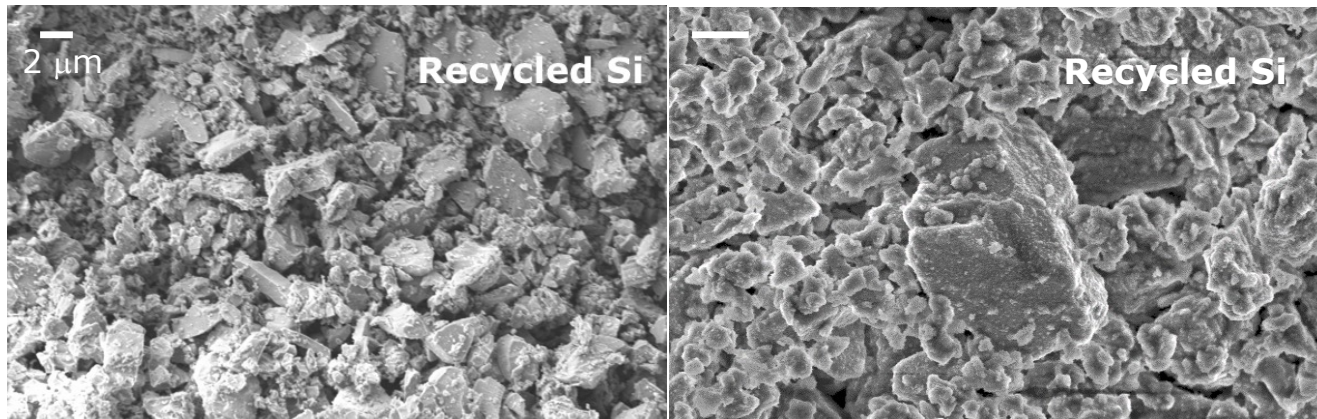


The results obtained in life cycle analysis implementation of the recycling of 1000 kg of Si-based EoL PV panels are in accordance with those obtained in the work of Latunussa *et al.*, in which a similar process is evaluated for the recycling of 1000 kg of EoL PV panels with a similar method, but using the SimaPro software and the Ecoinvent 3 database. [C. Latunussa *et al.* Sol. Energy Mater. Sol. Cells, **2016**, 156, 101]

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Progress compared with the state of the art. I

SIREVIVAL vs ReSiTec [<https://www.resitec.no/>]

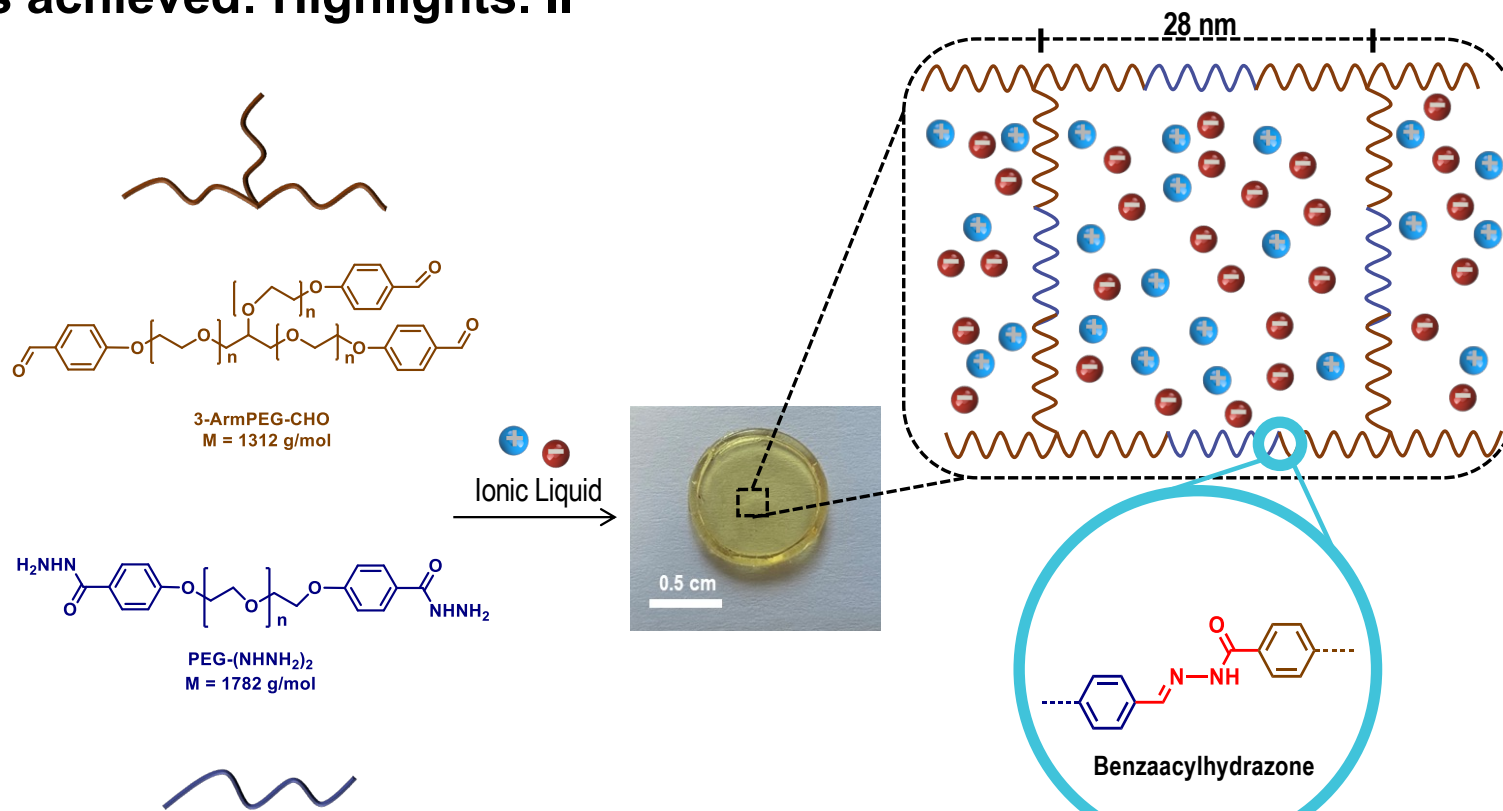


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Results achieved: Highlights. II

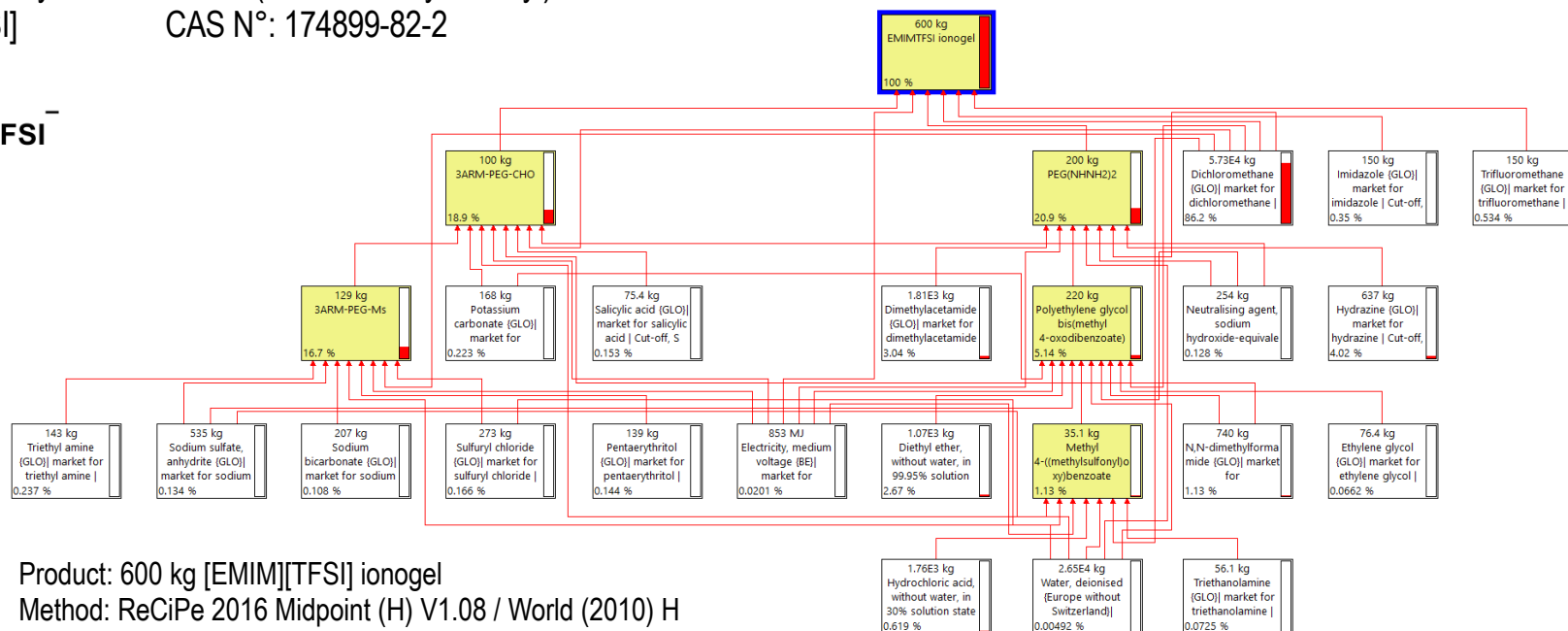
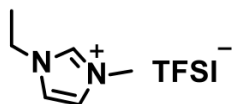


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Progress compared with the state of the art. II

Ionic liquid:

1-Ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide
[EMIM][TFSI] CAS N°: 174899-82-2

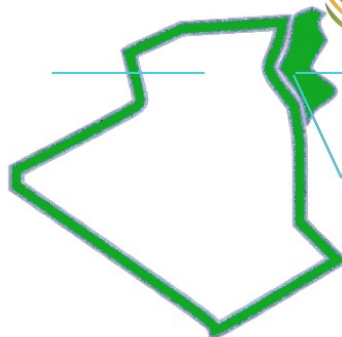
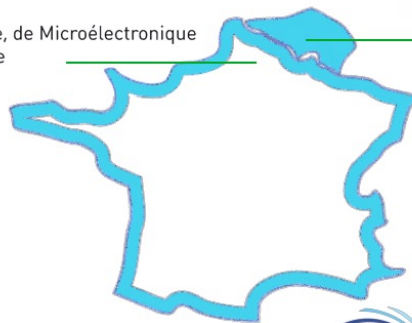




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Possible evolutions of the objectives in progress of the project, due to qualified personnel available in the participating teams: More datasets for PV recycling



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End of project expected results (2025)

- *Planned follow-up work: Assessing the micro-supercapacitors built with recycled Si materials*
- *New collaborations initiated thanks to the results of the project: Dissemination of the comparative methodological approach for life cycle analysis is underway*
- *New collaborations planned for the future to answer the digitalized life cycle analysis and traceability of recycled materials*

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Expected outcomes in case of success of the project (2030)

- 1. Traceability of the PV panels across the full value chain (e.g. blockchain technology), beyond life cycle assessment*
- 2. Smart methods to inspect PV panels (e.g. drones) to maximize productivity and collection of end-of-life PV panels (e.g. free of charge removal or relocation)*
- 3. Automated, ultrafast processes of recycling*

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Contribution of the project to AU – EU R&D partnership

Reinforcement of scientific and innovation cooperation in the renewable energy sector between Algeria, Belgium, France and Tunisia through several scientific visits and workshops

Capacity building of the participating teams in the area of circular economy

Interest of Consortium members in participating in LEAP-RE clustering activities

Aggregated datasets (recycling technologies)

Life cycle analysis (digital technologies)

THANK YOU

CONTACT US FOR MORE INFORMATION



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