


1st day: Monday 09/09/2024
Raw Materials

- 8:30-9:00 Registration of participants
- 9:00 – 10:00 **Raw materials issues**
(Fabio Ferri - EIT Raw Materials)
General introduction on the classification of raw materials into essential, critical, and strategic categories, focusing on the importance of raw material availability, supply chains, and geopolitical considerations.
- 10:00 – 10:30 **Coffee break**
- 10:30 – 12:00 **The role of critical and strategic materials in current and future PV**
(Vanni Lughi - UNITS)
- 12:00 – 12:30 **Raw materials in PV power processing systems**
(Giovanni Spagnuolo – UNISA)
- 12:30 – 13:00 **Life Cycle Assessment (LCA) in electronics**
(Luca Ragusa – BITRON)
- 13:00 – 14:30 **Lunch**
- 14:30 – 15.30 **Why the LFP Battery is a Safe Choice for Solar Energy Storage**
(Bernardo Barbiellini - ELMO-LION Summer School)
- 15.30 – 16.30 **Presentation of the Work Project: work organisation and working group formation**
(led by ERION)
- 16.30 – 18.30 **Groups working on the project**

2nd day: Tuesday 10/09/2024
Manufacturing

- 9:30 – 10:30 **Introduction to the manufacturing process of PV cells and modules**
(Torsten Büchner, Anhalt University of Applied Sciences)
- 10:30 – 10:45 **Coffee break**



- 10:45 – 12:00 **Industry lectures about cell and module manufacturing**
(Hamed Hanifi, Director of Research and Development AE Solar - Nicola Baggio, Project Director of FuturaSun)
- 12:00 – 13:30 **Lunch**
- 13:30 – 15:00 **Introduction PV system modelling and diagnostics**
Carlos Meza, Anhalt University of Applied Sciences – Stephanie Malik, Fraunhofer CSP/IMWS - Kai Kaufmann, COO DenkWeit - Dominik Lausch, CEO DenkWeit)
- 15:00 – 17:00 **HANDS on TRAINING: PV system modelling and diagnostics**
(Hochschule Anhalt)
Identification of PV faults using Visual inspection, UV-fluorescence, Magnetic field imaging and Thermal imaging; tutorial on how to model and analyse a PV system for diagnosis using Python libraries such as Pandas, PVLib, and other data-science libraries.
- 17.00 – 18.30 **Groups working on the project**
- 20.00 **Social Dinner**

3rd day: Wednesday 11/09/2024

Recycling

- 8:30 – 9:00 **Photovoltaic panel circular value chain: “end-of-life” focus**
(Emiliano Tulusso - Erion)
- 9:00 – 10:00 **The PV landscape in Italy, forecasting of PV waste generation in the future decades, the status of the photovoltaic panels' collection, and Italian/EU Regulations (Policy and Regulatory Frameworks)**
(Emiliano Tulusso and Francesca Fattori - Erion)
- 10:00 – 10:30 **Coffee break**
- 10:30 – 11:30 **The pre-treating and recycling phase: assessing currently available methodologies and technologies**
(Pietro Giovanni Cerchier – 9TECH)
- 11:30 – 12:00 **The "closing the loop" phase: reintroduction on the market of output secondary raw materials. Ongoing European projects on the topic**
(Emiliano Tulusso and Giulia di Mari)



- 12:00 – 12:30 **Lunch**
- 14:00 – 18:00 **Visit to WEEE management plant and PV modules (Feragame S.r.l., Broni)
+ cultural trip (guided visit to Certosa di Pavia)**

4th day: Thursday 12/09/2024

Technological Innovations and Emerging Materials

- 9:00 – 9:30 **Sustainability of the materials for DSSC** (Matteo Bonomo UniTO)
- 9:30 – 10:30 **Sustainable implementation of DSSC on the industrial scale**
(Frederic Sauvage CNRS France)
- 10:30 – 11:00 **Coffee break**
- 11.00 – 12:00 **Raw material in Chalcogenide-based solar cells**
(Philip Dale University of Luxemburg)
- 12:00 – 13:00 **Sustainability of the materials in Perovskite solar cells**
(Aldo Di Carlo University of Tor Vergata)
- 13:00 – 14:00 **Lunch**
- 14:00 – 15:00 **LCA of emerging solar cells**
(Maria Laura Parisi Università di Siena)
- 15:00 – 15:30 **Coffee break**
- 15:30 – 18:30 **Groups working on the project**

5th day: Friday 13/09/2024 lab to market

Lab-to-market and final evaluation of the project

- 9:00 – 13:00 **Lab-to-Market short course**
(EIT Raw materials and speakers from startups (to be confirmed))
- 13:00 – 17:00 **Lunch, poster presentation of the projects realised by the students and
award ceremony**
- 17.00 **Closing of the school**