A holistic enhanced landfill mining project –
The value chain of the NEW-MINE training network

ELFM foreword

- Between 150,000 and 500,000 landfill sites in Europe
- 90% of them are “non-sanitary” landfills
- Remediation measures are very expensive
- With the increasing interest in sustainable waste management solutions, landfills represent an opportunity for a combined resource-recovery and remediation strategy
  - Reduce future remediation costs
  - Claim valuable land
  - Unlock valuable resources.

Work Package 1

Landfill Exploration, Excavation and Processing

- Materials Flow
  - Excavated material
  - Mineral fraction
  - Organic fraction
  - Calorific fraction
  - Metallic fraction
  - Contaminant fraction

- Material Handling
  - Building Material
  - Compost
  - RDF
  - Clean Fraction

Christin Bobe (ESR1)
- Uses electric, magnetic and electromagnetic techniques to develop geophysical models.

Cristina García López (ESR2)
- Validates and expand the geophysical model by mechanical processing.

Bastian Küppers (ESR3)
- Models and validates sensor-based technologies.

Juan Carlos Hernández (ESR4)
- Recovers caloric and mineral fractions from the fine fractions.

Work Package 2

Solar and Plasma thermochemical conversion

- RDF From WP1
  - Gasification [ESR5]
  - Low temperature
  - High temperature
  - Gas heated by solar power [ESR7-ESR]

Zaini Iman Nurain (ESR5)
- Optimizes the RDF conversion into energy forms by reducing gas emissions and minimizing solid waste.

Yamid Gomez Rueda (ESR6)
- Uses hybrid reactors to diminish tars concentration in the syngas.

ESR7
- She/he will focus on fundamental and applied aspects of solar-driven thermochemical conversion of RDF.

Marco Gigantino (ESR8)
- Pre-heats the gasifying fluid (air/steam) with solar thermal energy from concentrated solar systems.

Work Package 3

Advanced upcycling of ELFM by-products

Hugo Ignacio Lucas (ESR9)
- Develops pyrometallurgical proceedings for metal recovery and generation an precursor slag.

Georgia Flessora (ESR10)
- Uses microwave furnaces to improve the slags final proprieties.

Guilherme Ascânto (ESR11)
- Converts the vitreous slag into innovative value-added low-carbon products by means of alkali activation.

Patricia Raabé Monich (ESR12)
- Develops multifunctional glass-ceramic with based on residues delivered by WP2.

Add-value products developed by WP3:
- Novel glass-ceramics from IP processing
- Metallo-ceramic functionality
- Multilayer insulating panels
- Brick tiles
- Additives for concrete

Work Package 4

Multi-Criteria Assessments for improved ELFM concepts, technologies and policies

- [ESR13]
  - Joint training in systems analysis, theories and methods
- [ESR14]
  - Common case studies
- [ESR15]
  - Environmental and economic assessment
- [ESR16]
  - Techno-economic assessment
- [ESR17]
  - Local risk assessment
- [ESR18]
  - Extended techno-economic assessment
- [ESR19]
  - Multi-criteria assessment
- [ESR20]
  - Dynamic Life cycle assessment

- [ESR21]
  - Environmental and economic assessment
- [ESR22]
  - Techno-economic assessment
- [ESR23]
  - Local risk assessment
- [ESR24]
  - Extended techno-economic assessment
- [ESR25]
  - Multi-criteria assessment
- [ESR26]
  - Dynamic Life cycle assessment

Giovanna Saou (ESR13)
- Uses integrated LCA and RA methodology for environmental assessment of ELFM.

John Laurence Eguerra (ESR14)
- Performs techno-economic and Multi-Criteria Assessments of ELFM concepts and technologies.

Paul Einhaub (ESR15)
- Analyses policy and market interventions for facilitating ELFM implementation.

NEW-MINE trains 15 early-stage researchers (ESRs) in all aspects of landfill mining in terms of both technological innovation and multi-criteria assessments:
- Advanced landfill exploration
- Mechanical processing
- Plasma/solar/hybrid thermochemical conversion and upcycling
- Valorization of residues into new low-carbon materials
- Multi criteria assessment of combined resource-recovery/remediation methods.

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