European Training Network for Resource Recovery Through Enhanced Landfill Mining (NEW-MINE)

D6.1  First paper by ESR1-15

The NEW-MINE project has received funding from the European Union’s EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No 721185 - http://new-mine.eu/
Public

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Introduction

The European Training Network for Resource Recovery Through Enhanced Landfill Mining (NEW-MINE) is laying the foundations for a resource- and environmentally driven ELFM industry in the EU, through the development of innovative concepts, technologies and methods for integrated resource recovery and remediation of landfills containing municipal solid waste (MSW). More specifically, ELFM refers to the value-chain of exploring, excavating, separating, treating, recovering and upcycling landfilled materials and energy resources as well as reclaiming the land that the landfills currently occupy.

The NEW-MINE project kicked off in September 2016 and unites a team of 15 young, enthusiastic PhD researchers across the E.U. working on resource recovery through enhanced landfill mining. Every six months, the full consortium gathers during a Network-Wide Event (NWE) in which the Early Stage Researchers (ESRs) present their results of the past months. Feedback is provided by (co-)supervisors, partners and peers, and the perspectives towards the future are discussed. Furthermore, during these NWEs, the ESRs discuss the academic work (conference posters, presentations, and journal papers).

Below an overview is given of all publications per ESR until August 22, 2019. It should be considered that the different ESRs have a different starting date of their individual PhDs and therefore have progressed to different levels. All final publications are open access and available in online open repositories; they are also listed on the project website under ‘Communications’ – ‘Science communication’: new-mine.eu/communications/science-communication/

14 of the 15 ESRs have published at least 1 paper. One ESR, ESR7 – Katarzyna Janusz (KTH), has no publications yet, as she joined the project only recently, on January 19, 2019.
Overview publications

ESR1 - Christin Bobe (UGent) - Modelling the landfill subsurface through integration of multi-sensor geophysical data, WP1

Journal papers published


Journal papers submitted


Conference papers published


Abstracts


**ESR2 - Cristina Gloria Garcia Lopez (RWTH Aachen) - Validation and expansion of the geophysical model by mechanical processing (RWTH), WP1**

**Journal papers published**


**Journal papers accepted**


**Journal papers submitted**


**Conference papers published**


C. García López, A. Ni, J.C. Parrodi Hernández, B. Küppers, A. Clausen and T. Pretz. “Characterization of landfill mining material after ballistic separation to evaluate material and energy recovery”. At the Urban Mining Symposium (Bergamo, Italy), May 2018.

C. García López, A. Clausen and T. Pretz. “Potential of the ballistic separator Type STT6000 as a first step for the recovery of RDF from old landfill material: A case study at Mont Saint Guibert Landfill (Belgium)”. At the 4th Enhanced Landfill Mining Symposium (Mechelen, Belgium), February 2018.

A. Clausen, C. García López, M. Kriipsalu and T. Pretz, “MSW management in Estonia: The current situation and future potential for energy recovery from sustainable sources”. At the International Symposium on MBT and MRF (Hannover, Germany), May 2017.


Posters

“The potential of the ballistic separator type STT6000 as a first step for the recovery of RDF from old landfill material: A case study at Mont-Saint-Guibert landfill (Belgium)”. 4th International Symposium on ELF, Mechelen (Belgium), 2018.

“Landfilled material composition at the landfill site in Halbenrain, Austria”. At the 5th International Conference on Sustainable Solid Waste Management, Athens (Greece), 2017.

ESR3 - Bastian Küppers (MULeoben) - Modelling and validation of sensor-based sorting technologies of intergrown and surface-defiled waste, WP1

Journal papers published

Characterization of landfill mining material after ballistic separation to evaluate material and energy recovery potential, Cristina García López, Anita Ni, Juan Carlos Hernández Parrodi, Thomas Pretz, Karoline Raulf, Bastian Küppers, Available online in Detritus - In Press, DOI 10.31025/2611-4135/2019.13780

Landfill mining: A case study regarding sampling, processing and characterization of excavated waste from an Austrian landfill, Cristina García López, Bastian Küppers, Adele Clausen, Thomas Pretz, Available online in Detritus - Volume 02 / June 2018 Pages 29-45, DOI 10.31025/2611-4135/2018.13664

Influence of surface roughness and surface moisture of plastics on sensor-based sorting in the near infrared range, Bastian Küppers, Sabine Schloegl, Gernot Oreski, Roland Pomberger, Daniel Vollprecht, WM&R, DOI: 10.1177/0734242X19855433

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ESR4 - Juan Carlos Hernandez Parrodi (Renewi) - Production of Refuse Derived Fuel from presently inappropriate waste fractions, WP1

Journal papers published


Journal papers submitted


Conference papers published


ESR5 - Ilman Nuran Zaini (KTH) - Sustainable Municipal Solid Waste treatment by a steam plasma gasification, WP2

Journal papers published


Conference papers published


Conference papers submitted


ESR6 - Yamid Gomez Rueda (KU Leuven) - Syngas purification by plasma tar cracking, WP2

Journal papers published


Journal papers submitted


Conference papers published


**Conference papers submitted**

Gomez Rueda Y., Helsen L. (Accepted oral presentation). The effect of carbon dioxide and steam on the cracking of naphthalene as tar surrogate. Sardinia Conference 2019. Status: Accepted Oral Presentation

**ESR7 – Katarzyna Janusz (KTH) - Solar-driven thermochemical conversion of RDF – Thermodynamic/kinetic analyses and heat/mass transfer modelling, WP2**

Started on January 18, 2019. No publications yet.

**ESR8 - Marco Gigantino (ETH Zürich) - Solar-driven thermochemical conversion of RDF – Solar reactor development, WP2**

**Journal papers published**


**Conference abstracts**

M. Gigantino, Z. Jovanovic, A. Steinfeld, Integration of concentrated solar energy into continuous gasification of refuse-derived fuel, Presented at 13th SOLLAB Doctoral Colloquium on Solar Concentrating Technologies, Berlin (Germany), 15-17 May 2017


M. Gigantino, A. Steinfeld, High-temperature thermochemical heat storage: development of materials and lab-scale packed-bed prototype, To be presented at SFERA III – 1st Doctoral Colloquium, Font-Romeu-Odeillo-Via (France), 11-13 September 2019
M. Gigantino, A. Steinfeld, Thermochemical energy storage materials for high-temperature concentrated solar energy, To be presented at 12th European Congress of Chemical Engineering (ECCE 12), Florence (Italy), 15-19 September 2019

ESR9 - Hugo Lucas (RWTH Aachen)- Hollow electric arc conditioning of slags from thermochemical

Journal papers submitted


P. Rabelo Monich, R. E. Murillo Alarcón, H. Lucas, B. Friedrich, Y. Pontikes, and E. Bernardo, ‘Upcycling of conditioned MSWI bottom ash into porous ceramics by means of strong or weak alkali activation’, Detritus, 2019

Conference papers published


H. Lucas et al., ‘Primary evaluation of the use and refining of Al scrap recovered from a landfill in Belgium’ Primary evaluation of the use and refining of Al scrap recovered from a landfill in Belgium’, presented at the EMC, Dusseldorf, Germany, 2019, vol. 1, pp. 51–61.

Conference papers submitted


Conference abstracts


ESR10 - Georgia Flesoura (KU Leuven) - Novel mechanical and electro-thermal techniques for the conditioning of slags from thermochemical conversion technologies, WP3

Journal papers accepted

G. Flesoura, B. Banos, J. Civera, J. Vleugels, Y. Pontikes In-situ measurements of high-temperature dielectric properties of municipal solid waste incinerator bottom ash, Ceramics Internation xx, xxxx (2019).

Conference papers published


G.Flesoura, A.Peys, J.Vleugels, Y.Pontikes, Alkali Activation of Synthetic SiO2-CaO-FeOx-Al2O3-MgO glass, 6th International Slag Valorisation Symposium, Mechelen (Belgium), 01-05 April 2019,
Conference abstracts


ESR11 - Guilherme Ascensão (Italcementi) - Responsive inorganic polymers being reusable and recyclable for near-zero energy dwellings, WP3

Journal papers submitted


Conference papers published

G. Ascensão et al., The effect of CaO-rich admixtures on controlling drying shrinkage of alkali activated materials, *6th International Slag Valorization Symposium, Mechelen (Belgium), 1-5 April, 2019.*


ESR12 - Patricia Rabelo Monich (University of Padova) - Waste-derived glass-ceramic products with novel functionalities, WP3

Journal papers published


Journal papers submitted

P. Rabelo Monich, F. Dogrul, H. Lucas, B. Friedrich, E. Bernardo, Strong porous glass-ceramics from alkali activation and sinter-crystallization of vitrified MSWI bottom ash. The paper was submitted to Detritus and it was accepted on 23/07/2019.


Conference papers published


Conferences abstracts

P. Rabelo Monich, R.E. Murillo Alarcón, H. Lucas, B. Friedrich, Y. Pontikes, E. Bernardo, Upcycling of conditioned MSWI bottom ash into porous ceramics by means of strong or weak alkali activation, XVI ECerS Conference, Turin (Italy), 16-20 June 2019.

P. Rabelo Monich, H. Lucas, B. Friedrich, E. Bernardo, High strength cellular glass-ceramics from glass by-products of metal extraction processes applied on MSWI bottom ash, Materials Science and Technology 2018 Technical Meeting and Exhibition (MS&T18), Columbus (USA), 14-18 October 2018.

P. Rabelo Monich, D. Desideri, E. Bernardo, Upcycling of vitreous by-product of the plasma heating of MSW into multifunctional porous glass-ceramics, Materials Science and Technology 2018 Technical Meeting and Exhibition (MS&T18), Columbus (USA), 14-18 October 2018.
P. Rabelo Monich, A. Rincon Romero, F. Bottaro, E. Bernardo, Upcycling of porcelain stoneware polishing waste into highly porous ceramic foams, Materials Science and Technology 2018 Technical Meeting and Exhibition (MS&T18), Columbus (USA), 14-18 October 2018.


E. Bernardo, A. Rincon Romero, P. Rabelo Monich, Highly porous silicate ceramics from alkali activation of engineered mixtures, 9th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing (MS&T17), Pittsburgh (USA), 8-12 October 2017.

E. Bernardo, P. Rabelo Monich, Glass-ceramics from sinter-crystallization of engineered waste glass mixtures, 9th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing (MS&T17), Pittsburgh (USA), 8-12 October 2017.

P. Rabelo Monich, E. Bernardo, Optimisation of the sinter-crystallization of waste glass mixtures, 12th International Symposium on Crystallization in Glasses and Liquids (Crystallization 2017), Segovia (Spain), 10-13 September 2017.


ESR13 - Giovanna Sauve (KU Leuven) - Integrated LCA and RA methodology for environmental assessment of ELFM, WP4

Submitted Journal papers


Published conference papers

Sauve G., Van Acker K., How the evolution of MSW composition affects the environmental impact of landfills: A review on European case studies, Proceedings of the 16th International Waste Management and Landfill Symposium, Sardinia (Italy), 2-6 October 2017

Sauve G., Van Acker K., To mine or not to mine: a review of the effects of waste composition, time and long term impacts of landfills in the decision making for ELFM. Proceedings of the 4th International Symposium on Enhanced Landfill Mining (ELFM IV), Mechelen (Belgium), 5-6 February 2018.


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**Abstracts**


**ESR14 - John Laurence Esguerra (Linköping University) - Techno-Economic and Multi-Criteria Assessments of ELFM concepts and technologies, WP4**

**Journal papers published**


**Journal papers submitted**


**Conference Papers published**


**Abstracts**

ESR15 - Paul Einhäupl (KU Leuven) - Policy and market interventions for facilitating ELFM implementation, WP4

Journal papers submitted


Conference papers published


Conference papers submitted