



**SMART** data collection and inte**GR**ation platform to enhance availability and accessibility of data and info**R**mation in the **EU** territory on Se**co**NDary Raw Materials

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## Acronyms and Glossary

Acronyms/Abbreviations	Description
CAPEX	Capital Expenditure
CBA	Cost Benefit Analysis
CRM	Critical Raw Materials
DST	Decision Support Tool
ELFM	Enhanced Landfill Mining
GHG	Greenhouse gases
LFM	Landfill Mining
MSW	Municipal Solid Waste
NO <sub>x</sub>	Nitrous Oxides
OPEX	Operating Expenditure
PM	Particulate Matter
REE	Rare Earth Elements
RM	Raw Materials
SRM	Secondary Raw Materials
SO <sub>x</sub>	Sulfur Oxides
VOCs	Volatile Organic Compounds
WtE	Waste to Energy
WtM	Waste to Materials
WP	Work Package

**Table 1:** *Acronyms and Glossary*



## Executive Summary

This document sets out the strategy and options for the development of training materials on Critical Raw Materials (CRM) and secondary raw material (SRM) recovery from both Municipal Solid Waste (MSW) and mining waste disposal sites. The training materials are based on the outputs of the SMART GROUND project (<http://www.smart-ground.eu/>). The training objectives and the target audiences are described and the training programme is outlined explaining the distinction between physical and online training. The needs of the key stakeholders including problem holders (i.e. site operators, site owners), market suppliers (i.e. supply chain industry/technology providers, funders), end users (citizens, non-governmental organizations and consumers), service providers (civil organizations, consultants and researchers) and regulators (governmental agencies and) have been explored via an online survey between November 2016 and March 2017 ([Survey on Secondary Raw Materials – March 2017](#)) as part of the Work Package (WP4 of the SMART GROUND Project and have been accounted for when planning all training materials and activities. Training materials and activities include online tutorial support for the SMART GROUND platform database, decision support tools to assess the environmental, economic and social aspects of landfill mining activities, a series of toolkits aiming to provide an overview of the information needed to best exploit the opportunity of SRM recovery from MSW and mining waste disposal sites, workshops and annual M-courses and web-based learning.

## Introduction

With the recent move towards a more circular economy, the waste industry is shifting management and treatment practices which offer opportunities to reduce pressures on the environment and to enhance security of supply of both CRM and SRM in the EU (Dino et al., 2016). The European Commission further acknowledges that to achieve the resource efficiency targets set in their “*Closing the Loop – EU Action Plan for the Circular Economy*”, an increment in reuse and recycling of key waste streams should be undertaken by making a specific reference to enhanced landfill mining (ELFM) (EURELCO, 2017).

In Europe there are between 150,000 and 500,000 landfills, thus SRM resource potential is considered to be significant. Nevertheless, there is to date no inventory of SRM at EU level. The SMART GROUND project aims to facilitate the availability and accessibility of data and information on SRM in the EU, as well as creating synergies and collaboration between the different stakeholders involved in the SRM value chain.

The SMART GROUND project is also actively supporting interactions and networking between key stakeholders. Stakeholder engagement has been identified as important due to a wide range of stakeholders with diverse backgrounds and concerns being involved in the onset and completion of SRM recovery projects (Jones et al., 2013, Frändegård et al., 2013, Lapko, Trucco and Nuur, 2016).

Crucial to achieving these aims is to facilitate access to the SMART GROUND platform database and to provide relevant training for key stakeholders. The training plan is based on the outputs from WP1 - Characterization and modelling of potential sites, WP2 - Materials flow, socio-economic and environmental impacts and WP3 - Databank creation of the SMART GROUND project. Additionally, the needs of the key stakeholders were explored via an online survey between November 2016 and March 2017 ([Survey on Secondary Raw Materials – March 2017](#)) as part of WP4 Implementation - Training and Networking. Findings from the survey have been considered when planning all training materials and activities.

This report provides a brief overview of the stakeholders and target audience and details the training strategy of the SMART GROUND project including the materials developed, the training course preparation and the planning for the delivery of three open sessions.



## 1. Stakeholders and Target Audience

The SMART GROUND training plan aims to engage all stakeholders within the SRM value chain, who often come from different backgrounds and raise different issues and concerns for realizing any SRM recovery project. Therefore a stakeholder engagement strategy has been designed and carried out as part of the SMART GROUND project (see WP4 - Deliverable 4.1). A summary of the main stakeholder groups identified is provided in Table 2. As the training materials are being developed to fulfill the requirements of all stakeholders involved, the next section will run through the identified needs for each stakeholder group.

Stakeholder Group	Stakeholder Type
Source Phase	Site Owner
	Site Operator
Market/End User	Supply Chain Industry/Technology Provider
	Citizens/Users/Consumers
	Consultants
Academic	Academics/Researchers
Governments and Public Bodies	Regulators and Government Agencies
	Civil Society Organisations and NGO's

Table 2: Summary of Key Stakeholders

### 1.1 Source Phase Group

The source phase group comprises of stakeholders at source-end of SRM recovery projects. These stakeholders are those that will be undertaking an ELFM project. Therefore, of importance to them is likely to be a need to evaluate project feasibility and profitability and to understand the process of initiating and undertaking an ELFM project. Key themes that will be addressed by the training materials include:

1. Economic information and incentives relating to ELFM.
2. Legal and regulatory information required for ELFM projects.
3. Details on the value of recovered SRM.
4. Tools to evaluate the economic and environmental impacts of a proposed ELFM project.
5. Case studies on ELFM implemented projects.

### 1.2 Market and End Users Group

The market and End Users group comprise stakeholders operating both at the investment end of an ELFM project and towards the market end, buying the SRM recovered from waste. Therefore, of importance to these stakeholders are financial evaluations of ELFM projects, understanding the rationale behind sourcing RM from waste streams, their availability and their price. Key themes that will be addressed by the training materials include:

1. Information on economic incentives.
2. RM and SRM price.
3. Market demand.
4. Improved communication and data sharing to create synergies.

### **1.3 Academics and Researchers Group**

These stakeholders are well-placed to direct the parameters needed for certain training tools and to provide further input. This includes tools within the SMART GROUND database, parameters for estimation tools and parameters for a Cost-Benefit Analysis (CBA) tool. Full details can be found in Deliverable 4.1. These stakeholders may also be interested in using the tools and training materials provided as guidance for their research. They will also act as a data source for the SMART GROUND database and so their engagement with the project is crucial. Key themes that will be addressed by the training materials include:

1. Environmental, economic and social valuation tools.
2. Case studies.
3. Landfill mining and extractive industry recovery toolkits.
4. Databank platform and data open access.

### **1.4 Governments and Public Bodies Group**

This group generally includes regulatory bodies that will have a key interest in the environmental and social outcomes of an SRM recovery project. They are likely to be interested in how SRM recovery fits in to policy and legislation and how legislation can aid increased SRM recovery. They will be also interested to understand potential contamination of surroundings during excavation and what mitigation strategies can be implemented. Of importance, the stakeholder analysis revealed a desire for case studies of implemented project to be made available. Key themes that will be addressed by the training materials include:

1. Toolkits and guidance for landfill mining and extractive industry recovery.
2. Case studies.
3. Databank platform and data open access.
4. Improved communication and data sharing to create synergies.

## 2. Training Objectives

Compiling the expected outputs of the SMART GROUND project with target audience needs, SMART GROUND identifies the following objectives for the SMART GROUND training plan:

- **Objective 1: Provide a databank and online platform on SRM from both MSW and mine waste disposal sites based on the outcomes of WP1, 2 and 3.**

Such online platform will show stakeholders the features of the database and how to use it for their individual purposes. This will be facilitated via webinars and interactive workshops at dedicated international conference such as Sardinia Symposium 2017 (<http://www.sardiniasymposium.it/>).

- **Objective 2: Develop Decision Support Tools [DST] based on the outcomes of WP1 and 2.**

The tools will aid decision-making in regards to EFLM project feasibility and viability, the expected monetary and environmental outcomes and the best process(es) to use.

- **Objective 3: Create toolkits for EFLM from MSW and mine waste streams based on the outcomes of WP1 and 2.**

Two separate toolkits will be designed to give stakeholders an overview of the information necessary to initiate CRM/SRM recovery from landfill sites (MSW) or extractive waste facilities (mine waste). The toolkits will allow users to understand EFLM and recovery processes and to scope out the potential viability of reuse of CRM/SRM in their specific circumstances. The toolkits cannot, however, be used to provide a full engineering study for a project, nor a complete and detailed business case. Rather, it will give users the understanding and basic data for progression into more detailed analysis with potential suppliers and technical advisors, to build a technical and business case for their project.

- **Objective 4: Deliver three training workshops around Europe based on the outcomes of WP1, 2 and 3.**

This will combine all elements of the training plan into three workshops across Europe. Each workshop will focus on analyzing the different steps needed for an EFLM feasibility study, including practical recommendations. SMART GROUND will make an effort to organize the training workshops alongside international/national community events, so as to build synergies, facilitate participation and maximize impact of the SMART GROUND training. The workshops will be planned and announced in advance so that there is ample time for promotion within the relevant communities to increase participation. Moreover, the workshops will be conducted in different European cities to reach as many different stakeholders as possible.

- **Objective 5: Develop e-learning and e-guidelines based on the outcomes of WP1, 2 and 3.**

This will allow the integration of the different training elements into online and interactive materials that will enhance access and combine all elements into one location. This will be hosted on the SMART GROUND website at <http://www.smart-ground.eu/training.php>.

### 3. Structure of the Training Plan

An overview of the training plan elements is given in Figure 1. The database (WP3), the market information, LCA and business model (WP2) and the background information and case studies (WP1) will be pooled together to produce database webinars, a DST, toolkits and e-books. SMART GROUND aims to tailor different elements to the relevant stakeholders and their needs, while maintaining continuity between materials to ensure brand identity. This section will discuss further the individual elements of the training plan.

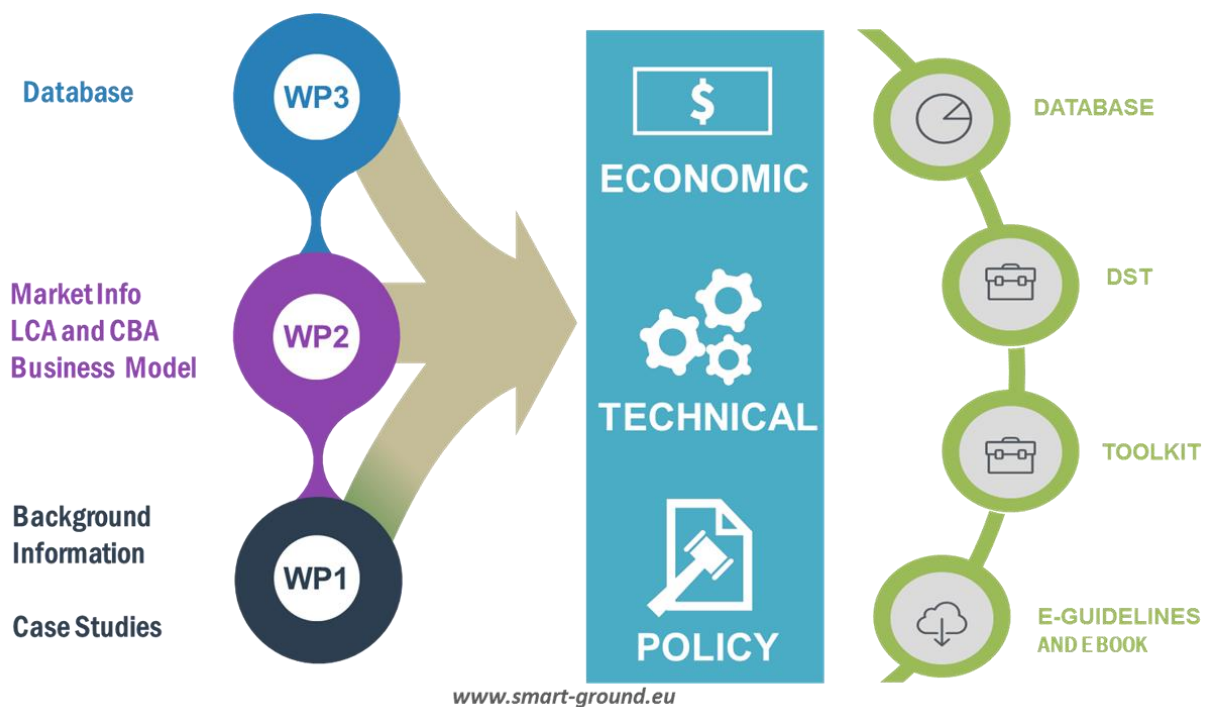


Figure 1: Training plan overview

#### 3.1 Database Support

Database support will be produced as webinars and training videos and will be based on WP3. Such videos will demonstrate the different features of the SMART GROUND databank and platform and how to use them for individual needs. The user-specific nature of the training webinars will enable SMART GROUND to tailor training towards different stakeholders and allow stakeholders to understand how to best take advantage of this tool. The webinars will take the format of audio description with a visual of the database, following the format of the prototype video (<https://www.youtube.com/watch?v=ncSffFkeigU>). A list of planned webinars is given in Table 3.

User Code	User Case	Description	Stakeholder Types
UC-01	Willingness to share and publish information about SRM	Either the site owner or site operator registers on the SMART GROUND database to publish information about SRM either in: <ul style="list-style-type: none"> <li>1) Urban landfill site</li> <li>2) Mine disposal site (waste from extractive industries)</li> <li>3) Waste recycling facilities</li> </ul>	Source Phase Academics/Researchers
UC-02	Query for suitable SRM providers	User can search for SRM availability across the three categories mentioned in UC-01. Criteria for the selection include proximity, supply time, price and material quality	End Users
UC-03	Estimation of SRM available at a considered site	User can use the SMART GROUND database to obtain a prediction of the SRM remaining in a specific site	Source Phase End Users Academics/Researchers
UC-04	Evaluation of the environmental impacts of SRM recovery	The platform provides decision-making support for the feasibility of ELFM projects. . The user will evaluate the environmental outcomes of ELFM activity at a certain site	Source Phase Academics/Researchers Governments and Public Bodies
UC-05	Economic Assessment	The platform will provide decision-making for the feasibility of landfill mining processes. The user will evaluate the financial feasibility of investing into ELFM activity at a certain site	Source Phase End Users Academics/Researchers

**Table 3:** User cases for SMART GROUND Database Support Materials

### 3.2 Decision Support Tools

The DST will give prospective ELFM projects support by providing an economic evaluation, an environmental assessment and a social valuation for a proposed ELFM project. The tools are therefore directed towards Source Phase stakeholders, Market and End Users (i.e. investors) and Academics/Researchers.

To date, a landfill mining DST has been developed providing users with 5x MSW composition scenarios based on those reported in the literature. Users can also input their own waste composition data and own input parameters. The tool runs a cost benefit analysis [CBA] for 9 different ELFM scenarios differing in the level of technology and processing effort (see Table 4). The full list of input parameters used by the tool is provided in Table 5. The user can decide which criteria are used to determine the best scenario as displayed in Table 6.

	Technologies train process								
	1	2	3	4	5	6	7	8	9
<b>Scenario 1</b>	Soil flushing	-	-	-	-	-	-	-	-
<b>Scenario 2</b>	Soil flushing	Excavation	Screening	Shredding	Ballistic separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)	-
<b>Scenario 3</b>	Soil flushing	Excavation	Screening	Fines Ferrous metal separation	Shredding	Ballistic separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)
<b>Scenario 4</b>	Soil flushing	Excavation	Screening	Shredding	Air separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)	
<b>Scenario 5</b>	Soil flushing	Excavation	Screening	Fines Ferrous metal separation	Shredding	Air separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)
<b>Scenario 6</b>	Excavation	Screening	Shredding	Ballistic separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)	-	-
<b>Scenario 7</b>	Excavation	Screening	Fines Ferrous metal separation	Shredding	Ballistic separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)	-
<b>Scenario 8</b>	Excavation	Screening	Shredding	Air separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)	-	-
<b>Scenario 9</b>	Excavation	Screening	Fines Ferrous metal separation	Shredding	Air separation	Ferrous metal separation	Non ferrous metal separation	ATT (gasification)	-

**Table 4:** Scenarios

**Table 5: Input parameters for the DST**

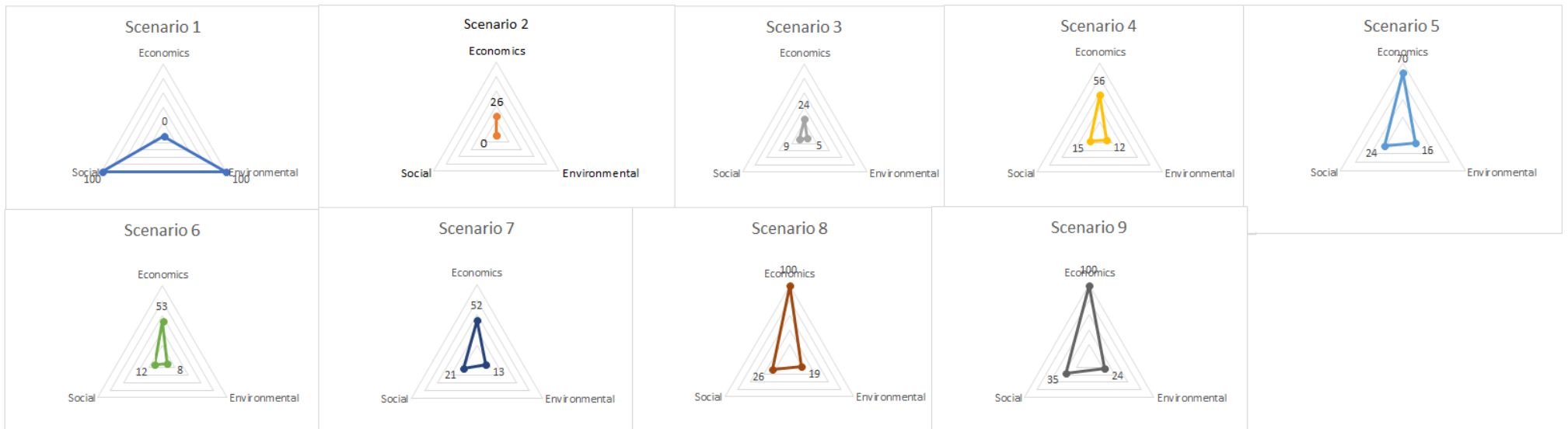
Input Parameters
Total amount of waste in landfill (tonnes).
Total landfill area (ha).
Waste composition (% of weight).
Is there a liner in the landfill?
Number of residents within 1 km radius (PE).
Values of remediated land (€/m <sup>2</sup> ).
Distance from the landfill to Waste treatment facility (km).
Distance from waste treatment facility to waste to energy plant (km).
Distance from the landfill to Waste to Energy plant (gasifier) (km).
Criteria for selection of the best scenario

**Table 6: Criteria for best scenario**

Criteria for selection of the best scenario
The highest best case net income
The highest best case revenues
The lowest best case costs
The highest worst case net income
The highest worst case revenues
The lowest worst case costs
The best environmental score
The best social score

The user is then able to run the analysis to identify the best ELM process approach based on the economic, social and environmental valuations (Figure 2). The scale of the radar chart varies from 0 to 100 where zero represents the worst impact and one hundred the best impact. Examples of outputs are shown in Tables 7-9.

To supplement the DST, webinars will be provided in a similar format to the database support materials, providing a step-by-step guide of how to use the tool and its features.



**Figure 2:** Output radar charts for scenario comparison



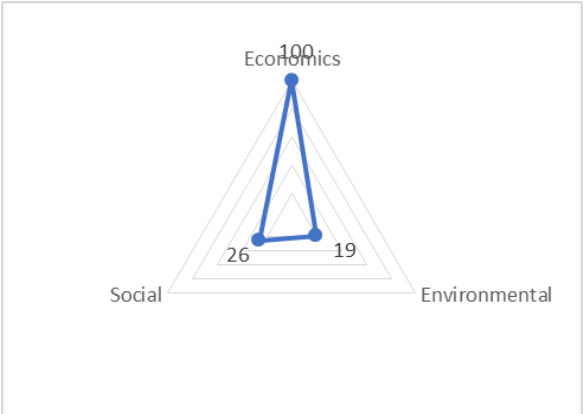
ECONOMIC ASSESSMENT											
	Worst case	Best case	Unit		Worst case	Best case	Unit		Worst case	Best case	Unit
<b>NET INCOME</b>	-3,778,824	17,212,579	€	<b>REVENUES</b>	3,262,716	20,626,730	€	<b>COSTS</b>	7,041,540	3,414,151	€
	<b>Revenue from WtM</b>	602,092	636,927	€	OPEX excavation & sorting	1,928,635	1,928,635	€			
	Amount of ferrous metals	1,094	1,094	t	OPEX WtE	1,485,515	1,485,515	€			
	Amount of non-ferrous metals	252	252	t	OPEX Transport WtE only	45,180		€			
	Revenue ferrous	142,353	155,372	€	OPEX Transport WTF + WtE	1,373,032		€			
	Revenue non-ferrous	459,739	481,555	€	CAPEX excavation & sorting	1,137,788		€			
	<b>Revenue from WtE</b>	2,660,624	4,489,803	€	CAPEX WtE	1,116,569		€			
	Amount of RDF	22,172	22,172	t							
	<b>Revenue from land</b>										
	Residential	15,500,000	15,500,000	€							
	Industrial	8,000,000	8,000,000	€							
	Agricultural	1,000,000	1,000,000	€							
	Nature	300,000	300,000	€							
	Landfill	0	0	€							

Table 7: Economic Assessment Output

WtM: Waste to Materials; WtE: Waste to Energy; OPEX: Operating expenditure; CAPEX: Capital Expenditure

ENVIRONMENTAL IMPACTS													
Process option considered	GHG	PM	Odour	VOCs	NOx, SOx	Water contamination	Soil contamination	Biota	Noise	Waste production	Metal recovery	Plastics, paper, textile recovery	Total Score
No Transport	5.5	5.5	9	4.25	3	-3	-3	3	7.25	0.5	-6	-3	23
Transport WtE only	6.4	5.5	9.25	4.25	4.8	-3	-3	3	8	0.5	-6	-3	26.7
Transport WTF + WtE	8	5.5	9.25	4.25	6	-3	-3	3	8	0.5	-6	-3	29.5

**Table 8: Environmental Impacts Output**

GHG: Greenhouse gases; PM: particulate matters; VOCs: Volatile organic compounds; NOx: Nitrous Oxides; SOx: sulfur oxides

SOCIAL IMPACTS						
Process option considered	Human health risk	Nuisance on neighbourhood	Community involvement	Ethical considerations	Uncertainty, Evidence of sustainability	Total Score
No Transport	5.5	8.25	5	5.5	-17	7.25
Transport WtE only	6.5	11.25	7.5	8.5	-20	13.75
Transport WTF + WtE	6.5	11.25	7.5	8.5	-20	13.75

**Table 9: Social Impacts Output**

### 3.3 Toolkits

Two toolkits will be designed, one for EFLM from MSW streams (Figure 3), and the other for EFLM from extractive industry wastes. They aim to give stakeholders interested in starting an EFLM project an overview of the information needed to put this into practice. Therefore, the toolkit is primarily aimed at Source Phase stakeholders and Market and End Users (i.e. investors), with further stakeholders and beneficiaries including Academics/Researchers and Government/Public Bodies. Therefore, the toolkit was designed with all stakeholder groups in mind by splitting it into relevant topic sheets.

The topic sheets will take users through the whole EFLM planning process. This will include:

- A description of the concept.
- The opportunities and challenges.
- An overview of the process and technologies involved.
- How to conduct a site investigation.
- Analytical methods involved for analysing the waste fractions.
- Details of how to conduct a CBA.
- Details regarding the DST; and
- Case studies of EFLM projects.



Figure 3: EFLM toolkit cover page

A full list of the topic sheets for the MSW EFLM toolkit is shown in Table 11.

Topic Sheet	Topic	Details
1	<b>EFLM Concept</b>	Definitions, concept overview
2	<b>Opportunities and Challenges</b>	Policy drivers, market drivers, social drivers, potential barriers, future outlook
3	<b>Process and Technologies</b>	Process of EFLM overview, overview of some technologies involved resultant waste fractions and potential valorisation routes, next steps
4	<b>Site Investigation</b>	Sampling strategy, protocol and techniques, sample sorting, resultant waste fractions
5	<b>Analytical Methods</b>	Analytical methods to the characteristics of a waste fraction, particularly combustibles and fines
6	<b>Cost-Benefit Analysis</b>	Full details on how to perform a CBA including assessing costs and revenues, calculating financial indicators, calculating environmental indicators, interpreting results, sustainability, sensitivity and risk assessment
7	<b>Decision Support Tool</b>	Details of the SMART GROUND tool available
8	<b>Case Studies</b>	Three case studies from across Europe investigating the economic, socioeconomic and environmental consequences of EFLM projects with overall conclusions drawn
9	<b>Appendix 1</b>	Further details on sampling and sample sorting
10	<b>Appendix 2</b>	Further details on sample characterisation

Table 10: MSW EFLM Toolkit Topic Sheets

The EFLM toolkits will be produced in an e-book format to reduce the carbon footprint of the project. It will be available to download and print as pdf if the user so desires. The e-book format also allows for increased interactivity with the toolkit, making it less of a document/report and more of a learning environment.

### 3.4 Training Course Workshops

#### 3.4.1 Workshops at international conferences

Initially, SMART GROUND will highlight three international conferences to host a training workshop. The training workshop is aimed at all stakeholders interested in ELFM. The training session will be divided into three main parts:

**1. Characterisation of potential sites (background information and modelling activities).**

The training courses will start with an introduction to ELFM based on the toolkit developed, and will follow the structure of the toolkit. The different topic sheets will be distributed to participants, who will be given the time to analyze and discuss the information in groups.

**2. Materials flow, socio-economic and environmental impacts.**

The second part of the training session will start with the facilitator presenting the DST to the participants. This will be followed by a practical application in which participants will have the opportunity to use and try the DST. The facilitator will take the role of assisting the participants in using the tool.

**3. SMARTGROUND database exploration.**

Finally, after understanding the potentialities and barriers for ELFM, the participants will be able to explore the full potentiality of the database. This section starts with the facilitator presenting the webinars and explaining how they are tailored for the specific needs of each stakeholder. Participants will then be able to watch the webinar specific to their case and then explore the database by themselves.

The session ends with a synthesis by the facilitator stressing the main points of the training and stating again the potentialities of the database.

To date, SMART GROUND has delivered one training course at the third Symposium on Urban Mining (SUM 2016, 23-25 May 2016, Italy (<http://www.smart-ground.eu/news-zoom.php?id=25>)) and plan to deliver future training courses at the 16<sup>th</sup> International Waste Management and Landfill Symposium in Sardinia on 2<sup>nd</sup>-6<sup>th</sup> October 2017 and at the 4<sup>th</sup> International Symposium on Enhanced landfill Mining (ELFM IV) in Belgium on 5<sup>th</sup>-7<sup>th</sup> February 2018. A third conference will be chosen in due course and before the end of the SMART GROUND project.

#### 3.4.2 Annual Courses

The training course will be developed in the project's partner universities and will provide a permanent data collection system for the database. They will be aimed at Source Phase stakeholders, Market and End Users (investors) and Academics/Researchers. The annual courses are structured around the activities developed in the WP1 and WP2 of this project. The following documents have been already developed and will be used in the training course:

- Sampling guidance for mining MSW landfills.
- Sampling guidance for mining waste from extractive industries streams.
- Enhanced landfill mining: resources or fuel?
- Landfill mining threats and opportunities.



- Rare Earth Elements and Critical metal content of extracted landfilled materials.

The training will also use the toolkit developed which covers sampling and analysis procedures.

### 3.5 E-Guidelines

All training materials will be combined into a single e-learning platform hosted by the SMART GROUND website (<http://www.smart-ground.eu/training.php>). This will host all training materials in the training plan, including:

- Webinars.
- DST.
- Toolkits.
- Annual training course outline and activities.
- Training course materials and e-sheets.

Any training materials of videos created outside of this plan that would aid training will also be included on this platform. Furthermore, SMART GROUND aims to create an introductory video for the platform to communicate the overarching message and introduce the ELM concept. This video will aim to be personal and have a strong narrative to increase engagement. A first-draft boiler-template storyboard is given in Table 11.

Images	Audio
Show woman decorating new home	"Hi, I'm Lucy and welcome inside my new home. You'll have to excuse me but I'm just doing some decorating, we have only just moved in! I love my new home, but you may not believe that what used to be here instead..."
Grassy area	"This land used to look like this"
Pan camera below grass to show waste buried	"But buried beneath was all this waste. Except, if you look closely, it's not all waste..."
Pan camera into waste to see some copper, aluminium, plastics etc	"This <i>waste</i> is, in fact, valuable materials"
Show Mr. Green in suit with clipboard	"So, Mr. Green decided to recover these materials"
Show digger excavating the waste from under the ground	"He dug them up..."
Show materials on conveyor belts	"and separated out the materials."
Show power plant	"He used the combustibles to make green energy..."
Show Mr ... shaking hands with another businessman	"and sold the valuable materials back into the market..."
Show street with houses	"then use the land build these lovely new homes"
Woman stood inside home with appliances	"Who knows, maybe some of our new appliances are made from the materials recovered right here!"
Hold toolbox forwards	"Oh, want to learn more about Landfill Mining? You want to give it a go yourself?" "Well, here are all the tools you need."
Zoom in on toolbox, opens out to show tools with overlay titles of the different sheets within the toolkit	

**Table 11:** Boiler-Template Storyboard for SMART GROUND Introductory Video

#### 4. Conclusion

SMART GROUND has developed a comprehensive training plan tailored to different stakeholder needs. The training plan elements and their target stakeholder group are summarised in Table 12.

Training Element	Stakeholder Group
Database support	Source Phase
	Market and End Users
	Academics/Researchers
	Governments and Public Bodies
DST and support elements	Source Phase
	Market and End Users
	Academics/Researchers
	Governments and Public Bodies
ELFM toolkits	Source Phase
	Market and End Users
	Academics/Researchers
	Governments and Public Bodies
International conference workshops	Source Phase
	Market and End Users
	Academics/Researchers
	Governments and Public Bodies
Annual courses	Source Phase
	Market and End Users
	Academics/Researchers
E-guidelines	Source Phase
	Market and End Users
	Academics/Researchers
	Governments and Public Bodies

**Key:**

Primary Stakeholder

Secondary Stakeholder

**Table 12:** Training Plan Elements and Target Groups

By engaging all stakeholders and providing training on ELFM using the outcomes of the SMART GROUND project, this will increase knowledge across stakeholders, promote networking activities and promote synergies, all with the aim of increasing the number of ELFM projects in practice across the EU.

## 5. References

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