Interreg North-West Europe
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Two-step Decision Support Tool Cedalion & Orion :

Manual

June, 2021

RAWFILL: supporting a new circular economy for RAW materials recovered from landFILLs

The focus of RAWFILL is on the solid waste sector in the North-West Europe region, with a concentration on landfills and relevant institutions responsible for waste and landfill management in the region. In order for landfill mining to be widely implemented in the North-West Europe region several barriers need to be overcome. Up to now, there has been no general or standard framework for developing enhanced landfill inventories that would allow public authorities and/or private sector partners to make economically informed decisions about launching a landfill mining project for a given landfill site. Furthermore, traditional landfill exploration methods – i.e. methods to assess the viability of a landfill mining project for a given site – are prohibitively expensive as they require costly analysis of multiple excavated waste samples. Cheaper methods, such as geophysical methods, to obtain a rough idea of the economic potential of a given landfill are therefore required (as promoted by RAWFILL).

The current lack of reliable, coherent and affordable data about the economic resource recovery potential of a landfill (quantities, qualities and economic indicators related to the value of materials) is thus a major challenge. Furthermore at the aggregate level only very few regions in North-West Europe have some kind of a comprehensive overview of the potential of their landfills. The few existing inventories (e.g. Flanders, with its 2.260 landfills and Walloon region with its 3.500) do not include suitable datasets that would allow investors to robustly assess the opportunity to launch profitable landfill mining operations for a specific landfill site. The second major obstacle, which is the direct result of the former, is the lack of reliable decisions and prioritization tools that can be used in the North-West Europe region. Hence, there is no common approach to select the high potential landfill mining projects, thereby inhibiting the North-West Europe landfill mining market from development.

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1. Introduction

This manual is part of the dual decision support tool developed by the Interreg North-West Europe RAWFILL project. Its purpose is to give the user a detailed explanation of the decision support tools Cedalion and Orion. First, a general description of the purpose of this two-step Decision support tool is discussed, as well as the coupling with the ELIF and the innovative landfill characterization content method combining geophysics and targeted waste sampling. In chapter 1, the use of the Cedalion tool will be explained. Chapter 2 will be dedicated to the Orion tool.

1.1. Two-step decision support tool

The RAWFILL project developed a data strategy that aims at collecting and analyzing large sets of landfill data. In order to launch smart Enhanced Landfill Mining (ELFM) projects, policy makers, landfill owners, spatial developers, among others need to be able to identify and rank the most promising landfills in terms of valorisation potential and project feasibility. Making decisions is part of life and humans cannot continuously rely on instincts to make them. In that way, Decision Support Tools (DST) can improve decision-making by increasing the efficiency and lowering the uncertainty of the decision-making process. However, data collection is also part of an economic process and has its limits. How can we proceed with minor data supply and take the right decisions? A stepwise approach offers an efficient and cost-effective solution. The two-step approach is realized by a combined DST named after Cedalion (DST 1) and Orion (DST 2). The DSTs take into account data on the characteristics of the (i) content of the landfill (e.g. grade, waste type, stability) and (ii) context of the landfill (e.g. accessibility, land pressure, climate change, vulnerability). This two-step concept was chosen to limit the efforts in the early stage of characterization and evaluation.

1.2. DST1 - Cedalion

Cedalion [1] is an user-friendly application that allows non-experts to update or add information. For the first step,, a low investment in exploration cost is sufficient. The result of Cedalion is a guidance to the next level and hence, is not simplified to a yes/no decision. The results are a ranking for different possible pathways: (i) Waste-to-Materials, (ii) Waste-to-Energy, (iii) Waste-to-Land and (iv) Interim Use. Cedalion was initially designed to screen large landfill databases but the Cedalion tool can also provide results for an individual landfill. Furthermore, landfills can obtain a 'quick response' that indicates the start of setting up a long-term management plan wherein ELFM might be an option. This approach is in line with the concept of Dynamic Landfill Management which aims at a long-term active management of landfill, going beyond containment measures.

[1] Cedalion uses the same methodology and framework as Flaminco but was designed based on new insights, partner input, stakeholder feedback and practical experience.

By means of this prioritization and classification, Cedalion can identify the landfills for which it is worth investing in more detailed landfill content characterization by using the innovative landfill content characterization methodology developed within the framework of the RAWFILL project (see the Landfill Miner guide for more information). The results of these investigations can be used as input for the second step of the two-step DST: Orion.

1.3. DST 2 - Orion

The second step, Orion, is a dashboard containing relevant open access tools, software and applications, each with its own strengths and weaknesses. Behind the dashboard, a roadmap is included to guide the user towards the most useful tools depending on the possible outcome for a landfill in terms of valorisation potential. This guidance is based on a couple of straightforward but more complex questions regarding the characteristics of the landfill. It aims at helping the user with estimations about the feasibility of a business case, simulating certain scenarios or finding sustainable interim solutions. The latter, interim use, is the novelty in this dual DST and it should be seen as a loop in the programme. The landfill will be given a function that is beneficial for nature and/or society while bridging time until the landfill valorisation might be profitable. Interim use can go from one year (e.g. energy crops) up to several decades (e.g. solar panels).

1.4. Coupling between DST 1 - Cedalion and the ELIF

The prioritization and classification in the Cedalion DST is based on the content of the landfill and its geographical context. This kind of data is collected and stored in the Enhanced Landfill Inventory Framework (ELIF). Because this information serves as a basis for the Cedalion tool, the specific data can be easily exported to Cedalion. To do so, the ELIF software summarises all data entered and convert them to a format compatible with Cedalion(i.e. spreadsheet called “DST1 input”). Then, the table can be directly copied into the Cedalion tool. The coupling between the ELIF and Cedalion also works the other way around. More specifically, ELIF can automatically import data collected during the site visit and store in the DST 1 - Cedalion. In order to do that the user can copy/past the result of the field visit in the ELIF spreadsheet “Import Cedalion site visit” and click on the button at the top right of the page “Import data from Cedalion to ELIF”. A video tutorial can be found on the e-learning tool website[2].

[2] https://www.rawfill-elearning.eu/en/

2. DST 1 - Cedalion manual

2.1. Structure of the tool

The Cedalion tool is currently available in Excel format. Within this Excel, there are seven different sheets included (**Fig. 1**). The "**introduction sheet"** shortly describes the purpose and structure of the tool and refers to the RAWFILL e-learning tool where you can find a detailed explanation of the tool. The **General_database sheet** is the sheet where all available data can be stored. This data can be provided by a local government or can be entered manually (e.g. from your own archives) according to the database format. Only the data provider can make changes in the general database. In the **Working_database sheet**, the selected data that the user wants to analyse, can be extracted and imported from the general database into this sheet. From this sheet, you can perform the ranking and analysis. Furthermore, a QR code is present that will redirect you to the Cedalion field application. The use of the Cedalion field application will be explained in Section 2.4. Within the **Results_field_visit sheet**, the results of the Cedalion field application can be copied and by means of the **Compare_field_data sheet**, the new data from the field application can be compared with the data present in the working database. Lastly, there are the **ELFM_ranking and ELFM_site sheets**. These two sheets represent the results of the ranking and scoring of the Cedalion tool.

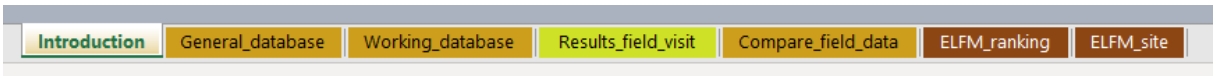

Figure 1: The different Excel sheets within the DST 1 - Cedalion.

2.2. The composition of the general database

The general database (**Fig. 2**) is the main database where all available data on landfills is present (e.g. at the level of a regional authority). The data are divided into six main criteria, which are subdivided in indicators. These indicators are described in **Deliverable T2.1.1 Table of DST indicators**.

The six criteria are the following:

1. Type of waste
2. Age of the landfill
3. Volume of the landfill
4. Use of the landfill
5. Accessibility of the landfill
6. Surroundings of the landfill.

In addition, some general administrative information on the landfills is included: landfill name, municipality, postal code, street, cadastral codes and the coordinates of the landfill.

The primary column is the DLM (Dynamic Landfill Management) ID, which corresponds to the unique number of the landfill.

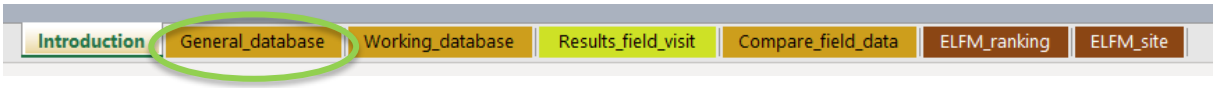

Figure 2: The different Excel sheets within the DST 1 - Cedalion: The general database.

1. Criterion 1: Type

This criterion focuses on the content of the landfill. This criterion included the type of waste deposits, the harmfulness of the waste materials present on site as well as the internal structure of the landfill (i.e., heterogeneous, layered or monolandfill). The following types of waste materials can be distinguished:

1. Municipal solid waste (MSW),
2. Industrial waste,
3. Dredging materials,
4. Waste water treatment (WWT) sludge,
5. Inert materials,
6. Fly ash,
7. Asbestos,
8. Metal slags,
9. Mining waste,
10. Military waste,
11. Other.

The type "Other" can be used only for specific cases. For instance, monolandfills that have a content not abundantly found in other landfills across the EU like monolandfills containing gypsum or kroon and steel deposits.

2. Criterion 2: Main period of landfilling activities

To every type of deposited waste, a time span can be assigned which influences its content and potential. This time span is based on known or documented activity of the landfill site (e.g. permits). To work properly, users must indicate the period in which the landfill was most active (i.e., period where most of the waste materials of the landfill were landfilled), in case the activity goes beyond a given timeframe. Within the RAWFILL project, we defined four timeframes (**Table 1**).

Table 1: Timeframe defined in the framework of the RAWFILL project.

Timeframe	Explanations
<1955	MSW, industrial, mixed and some landfills classified as 'others' with a peak activity before 1955. These landfills have a low economic value for LFM projects. In addition, the potential for energy recuperation is low because of the high share of inert materials.
1955 - 1980	The massive consumption of plastics can be taken as a first game changer in the composition of the waste material. Large scale production of the most common plastics we know today began in the 1950s (Wallace, 2017). Most of these plastics end their product cycle the same year they were produced (Dengler, 2017). We took 1955 as a reference year, halfway the plastic emerging decade.
1980-1999	At the end of the seventies, the recycling of plastics took off (Geyer *et al*., 2017), but a new type of waste emerged: electronic waste. The 'Khian Sea' waste disposal incident in 1986 (R3E, 2016), is still one of the best examples of the disposal attitude in that decade and lead to the Basel Convention to restrict countries in exporting their e-waste abroad (CDR Global, 2015). Therefore, 1980 marks the start of the third time interval.
> 1999	The Council directive 1999/31/EC of the EU (European Commission, 1999) marks the transition from an undocumented landfill policy to a controlled, consequent managing of waste streams. However, we cannot avoid the fact that some regions like Germany, Flanders and the Netherlands already posed a well-developed waste policy by that time (COCOON, 2018).

3. Criterion 3: Volume

Using the Flemish landfill database as a reference, the definition of a small, medium and large landfill were redefined. As the actual volume of many landfills still needs to be collected, the categorization (small, medium, large) was calculated by multiplying the surface area of land plots, known historical waste depositions and an assumed average waste depth of three meters (OVAM, 2013). The total number of records that was used was 3318 (**Fig. 3**). These records were divided in intervals of 1,999 m³ (e.g. 0-1,999 m³;

2,000-3,999 m³ and so on). After this, the cumulative percentage of frequencies was used to determine the three categories of volume (small, medium, large):

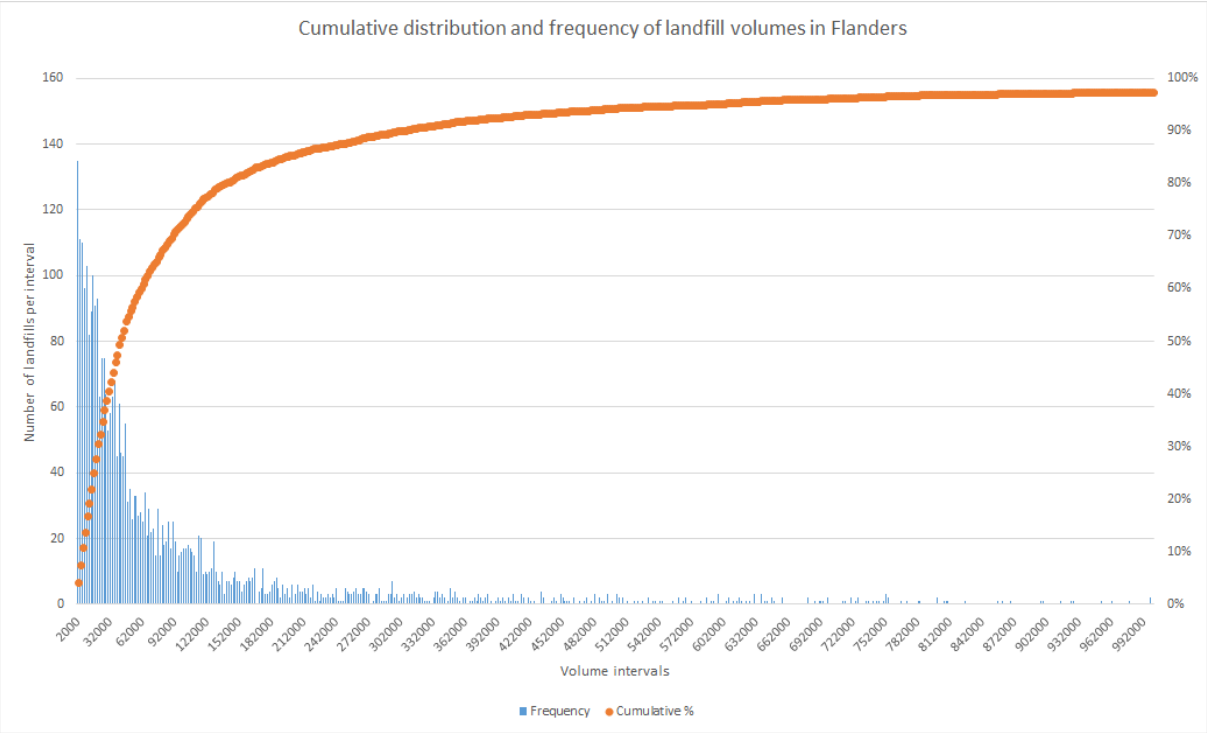

Figure 3 - Cumulative distribution and frequency of landfill volumes in Flanders.

1. All landfills with a volume less or equal to 29,999 m³, corresponding to the lower 40% of the landfills are considered to be small;
2. All landfills between 30,000 m³ and 299,999 m³, corresponding to 50% of the total are considered to be average;
3. All landfills greater than 300,000 m³, corresponding to the upper 10% of the total landfills are considered to be large.

The precise volume can be based on actual measuring data (e.g. geophysical imaging, topographic survey) or other forms of experimental determination. It is also possible to use default values in Cedalion. The volume, itself, is not used to decipher the priority of the LFM investigations. It requires to be coupled with the landfill content. For instance, a small landfill with a lot of metal content can have a higher priority than a large landfill filled with plastics. Another example includes the difference in the surface area between landfills, that can be many times smaller/greater while containing the same volume of waste deposits, influencing the return on investment strongly because the value of the reclaimed land is proportionate to the surface area.

Besides the surface area and volume of the landfill, also the depth below ground level and the height above ground level are included.

4. Criterion 4: Use

The criterion regroups the following parameters: the type of cover used on the top of the landfill (soil, mineral cover or a geomembrane), the surface conditions (grass, shrubs, trees or a rough area) and the slope of the landfill. The slope of the area is categorized in three classes: a flat area, a less than 15° slope and a more than 15° slope. All the parameters are strongly related to the possibilities of redevelopment on site. Also an indication of the erosion status on site is included. The erosion on site could be none, weak, severe or potential.

5. Criterion 5: Accessibility

The criterion is used to evaluate the accessibility of the landfill. This concerns both on-site accessibility (possibility for the road to support heavy trucks, presence of paved roads on the landfill itself) and connectivity of the landfill site with different transport systems (distance to the road network, proximity of a train station, proximity of a CEMT canal). Accessibility is important when you start a landfill mining project. A lot of heavy machinery will be necessary and a large volume of waste will need to be transported to e.g. treatment facilities.

6. Criterion 6: Surroundings

The criterion surroundings contains the proximity of drinking water protection areas, presence of Natura 2000 areas or other conservation areas and general land use.

For **groundwater protection zone**, regional policies vary because other definitions are used but often consists out of up to three different zones (Vlaamse Milieumaatschappij, s.a.; Chelmi, 2015; InfoMil, s.a.). In Flanders, for instance, three zones are defined:

1. The 24-hour zone (i.e.“critical” in Cedalion) corresponding to a restricted area where contamination can reach the source of drinking water within 24 hours;
2. The bacteriological zone (i.e. “severe” in Cedalion) corresponding to the zone surrounding the 24-hour zone. Contaminations can reach the source within 60 days or is located within a 300 m radius;
3. The chemical zone (“acceptable” in Cedalion) corresponding to the largest zone: contaminations are present within a maximum radius of 2 km.

Also **flooding risk** is an important aspect to take into account when prioritizing landfills for ELFM projects. Landfills located in areas with a high flooding risk could pose a significant threat to the environment. On the one hand, flooding will increase the amount of erosion, which can result in increased amounts of eroded waste ending up in rivers and seas. On the other hand, when a landfill site is flooded, the volume of generated leachate will increase due to increasing percolation of water, resulting in a higher rate of leachate

leakage ending up in the environment. Both pathways could affect protected areas in the vicinity of the landfill. Therefore, the flooding risk on a landfill will have an effect on the prioritization of ELFM projects on landfills.

The **spatial development type** is strongly correlated with the value of the land and therefore can be vital to ensure a profitable landfill mining activity. However, in case the conditions are not favorable enough and interim use is necessary, it can also help to determine which form of interim use suits the best for the surrounding neighborhood.

There are eight types of land use (LUCAS, 2009) of which seven are relevant to the context of landfills in Europe. The seven types are:

- Artificial land
    - Residential areas (e.g. houses, apartments)
    - Commercial areas(e.g. parking's, malls, hotels)
    - Industrial areas
    - Recreational land (e.g. resorts, golf courses, ball fields, camping)
- Cropland (e.g. permanent crops, arable land)
- Grassland: same function as pastureland, but with native vegetation;
- Woodland: deciduous, coniferous and mixed forests;
- Water (e.g. streams, canals, lakes, reservoirs) ;
- Wetlands (e.g. marshes, coastal and tidal wetlands,) ;
- Bareland including beaches, quarries, gravel, sand and clay pits.

In Cedalion, these land use types are divided in five classes: Residential area, industrial area, recreational/touristic area (including commercial areas), agricultural area (including crop-, grass- and woodland) and natural area (including water, wetlands, shrubland and forest).

Difference between present and future land use

For each land use class, the difference is made into **present and potential/future land use**, the first one being the current occupation of the landfill body and its surroundings whereas the second one being the actual assigned land type based on local planning initiatives.

The present land use is based on the land use of the landfill site itself and the land use of the site surroundings in a radius of max. 50 metres, or as far as the user can see during the field visit (in case of the view is obstructed). When the user has access to local spatial development plans, these plans can be used to indicate the potential/future land use of the landfill. By means of various existing policy instruments, landfills can get a new function within new or existing spatial development plans.

Example:

*A landfill and its immediate surroundings are currently partially used as a site where agricultural activities take place (Present agricultural: Y; **Fig. 4**). Moreover, a part of the landfill contributes to the natural open space (Present natural: Y). Because the landfill site does not contribute to a larger network of corridors for animals nor has a high ecological value, policy makers have decided not to develop the landfill into a full natural area in the future (Future natural: N). It could therefore be used completely for cultivation (Future agricultural: Y) if the safety of the site is demonstrated. However, because the landfill is located next to a large interregional road, the location could also be very interesting for commuters (Future residential: Y). For such aspects, spatial development plans need to be consulted.*

Criterion 6. Surroundings									
Residential		Recreational / Touristic		Agricultural		Industrial		Natural	
Present Res	Future Res	Present Rec	Future Rec	Present Agr	Future Agr	Present Ind	Future Ind	Present Nat	Future Nat
N	Y	N	N	Y	Y	N	N	Y	N

Figure 4: Surroundings filled in for a hypothetical example in order to illustrate the difference between present and future land use.

Difference between nature area and natural land use

A **natural area** is a type of land use which can be defined as land that does not have any residential, recreative, industrial or agricultural purpose. Hence, it is the remaining open space between everything else. Natural areas can be little patches of forests or just common grounds.

A **nature area** is land protected by law (i.e. local, regional, European) to protect endangered and threatened species or landscapes. Such areas are often characterized by high biodiversity value and are managed by organisations with the right knowledge on the natural value. Landfill mining projects are in general much more difficult to be implemented in these kinds of areas and therefore, we make the distinction between these two categories in Cedalion.

Note: all the 'nature areas' can be marked as 'natural' land use but not all the 'natural' land use is considered to be a nature area.

2.3. How to use the working database

In this section, the working database will be explained (**Fig. 5**). More specifically how the data from the general database can be exported to the working database.

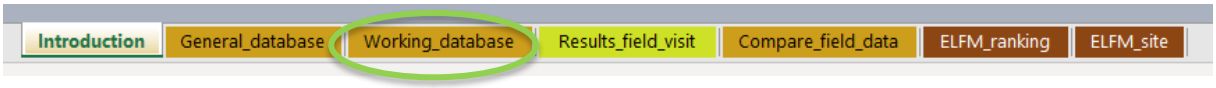

Figure 5: The different Excel sheets within the Cedalion DST1: The working database.

Above the working database itself, some options are included to import data from the general database to the working database (**Fig. 6**). In the working database, you should import the data that you would like to analyse with the Cedalion ranking algorithm. There are three different options to select the right data:

1. select data using the site ID (i.e. DLM ID);
2. select data for specific municipality(ies);
3. copy all data present in the general database.

For option 1, there are different possibilities to select the landfill ID site that the user would like to analyse and screen. If the user wants to analyse the first 10 landfills in the database, he can type 1-10. If the user would like to select the first 14 landfill sites, excluding number 11, he can type 1-10;11-14. Then press 'Select' and the right sites will be listed within the working database. Another possibility is to type all wanted numbers separately, by clicking on the select button for each number. If the user writes a new number that does not exist in the database, the new number will be automatically added to the data already present in the working database. If the user wants to start with a blank database, use the 'Reset' button.

The same principles apply to option 2.

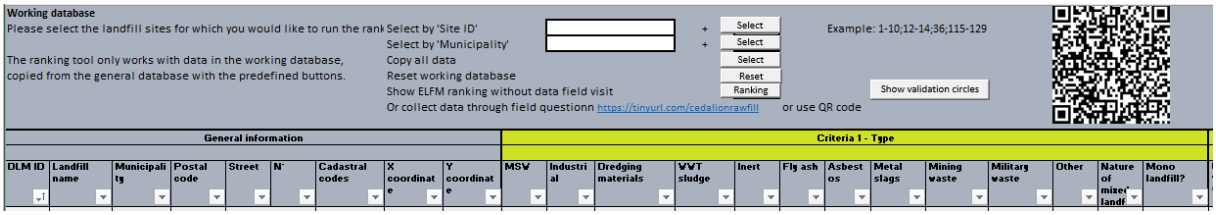

Figure 6: Different options within the working database.

When the right data has been copied to the working database, it is important to validate the data to check if it is present in the right format. For criteria that are divided in certain categories, typos need to be avoided to ensure that the model works. The "show validation circles" button identify where the format of the data does not correspond with the programming of the model. In that way, the user knows exactly where some errors can be found and can correct them accordingly.

When all the data is validated, the 'Ranking' button is ready for use and results will appear in the "ELFM_ranking" and "ELFM_site" sheets.

In the following section will be explained how the Cedalion field application[3] can be used to update and validate the Cedalion data. The Cedalion field application is available in English, in French, in German and in Dutch.

[3] Available with the QR code or https://tinyurl.com/cedalionrawfill.

2.4. How to use the field application to update your data

It could be the case that the data received or entered in the general database are outdated (e.g. when the data is based on information from old archives). A site visit with the Cedalion field app encourages the user to collect key up-to-date information for the tool. The online app can be opened in two ways: via the link https://tinyurl.com/cedalionrawfill or via the QR code.

1. Using the field application

Before going on the field to collect data for specific landfills, it is important that the DLM ID of the landfill(s) is known. The online application is a questionnaire, designed to use when standing in the vinicity of a landfill, doing a quick 360° check. The questions in the field app match with the format of the Cedalion tool and hence, the data can be easily updated. Based on the language setting of the user's tablet or phone, a different language might appear. The user can change select the language of the app: English, French, German or Dutch.

The survey starts with filling in the DLM number and landfill name (**Fig. 7**). Once these are filled in, click on 'next'. If the landfill doesn't have its proper name, just enter the reference or a relevant name by which the link between the landfill and the data can be made (e.g. street name or neighbourhood).

The following questions are about the dimensions of the landfill body. If the user is not certain about the dimensions, there is always the possibility to compare his answers with existing data in a later stage. Hence, the user can make a nuanced estimation. On the following pages, the questions on 'use', 'accessibility' and 'surroundings' will be asked. It is important to take time to go through the questionnaire and to make the right observation on site. Choose the most suitable answers and click on 'next' until the final page, where the user can submit the questionnaire (**Fig. 7**). Before submitting, an email address is needed. The user can also indicate his regional authorities, so they can receive a copy of the field data. In that way, local or regional authorities can also update the data if they want.

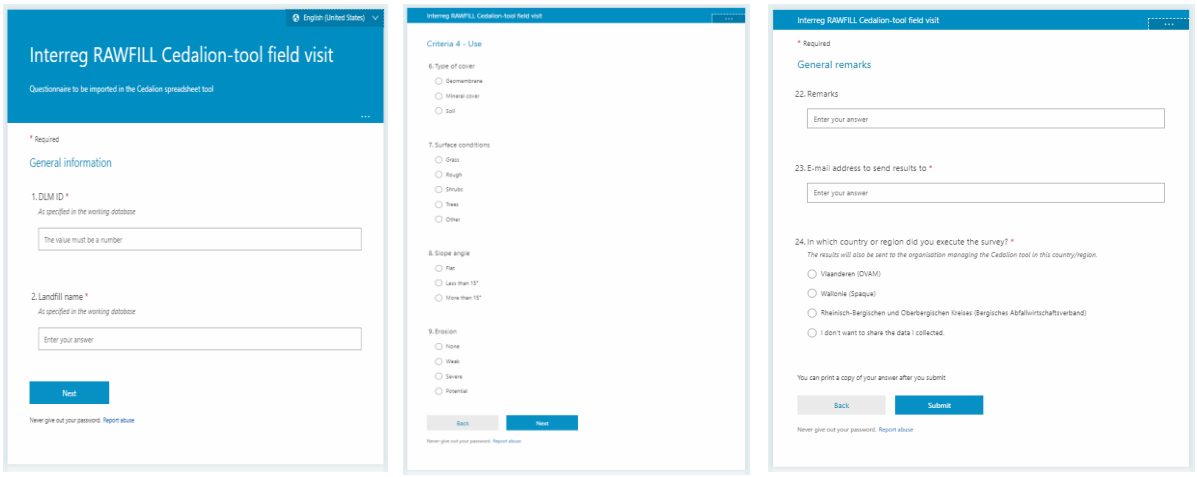

Figure 7: Some screenshots of the Cedalion field application survey.

2. Updating your database with the field data

After the submission, the user will receive an email with the observations made on site in the format of an Excel file which can be easily imported in the Cedalion tool. The email will be sent on behalf of microsoft@powerapps.com[4]. Some instructions on how to compare and import the data in the Cedalion tool are provided in the email.

To do that, open the attached spreadsheet and paste the single row from the specific landfill within the **Results_field_visit sheet** of the Cedalion tool (Figure 8). This sheet is created in the exact same format as the output from the field visit. In order to compare the field data with the data in the working database, go to the "**Compare_field_data" sheet** and press the button "Get data from field visit". If the user wants to investigate multiple landfills, he can repeat the field visit and complete the questionnaire for every landfill in the scope of his investigations. The data from the different site visits can all be copied in the tab 'results field visit'. And in the "Compare_field_data" sheet, the user will get an overview of the results of all field visits performed and a comparison with the data present in the working database.

To update your database with the new data, change the content of the pale green cells and press the button "change fields in working database". The button 'show validation circles' will help the user to check if the data, used to calculate the ranking is valid. The function aims at highlighting errors and select empty fields, which are used for the calculation of the ranking.

Figure 8: The different Excel sheets within the Cedalion DST1: Results of the field visit and comparison of the field data with the data in the working database.

[4] Check the spam box.

2.5. Description of the output and interpretation of the results

The main output of the Cedalion tool is a ranking score for each landfill on four different scenarios.' The scenarios are described in the following section and the selection, weighting and ranking of the indicators are explained in **Deliverable T2.1.1 Table of DST indicators** and **T2.1.2 Scheme with DST Weighting**.

1. The four scenarios

To determine the potential of a landfill, the following four objectives are taken into account:

- Objective 1: Waste-to-Materials, Materials management (**WtM**);
- Objective 2: Waste-to-Energy (**WtE**);
- Objective 3: Waste-to-Land, Space (**WtL**);
- Objective 4: Interim Use (**IU**).

Even though landfill mining still is quite a recent concept, various studies have already been carried out for objectives 1 and 2 (WtM and WtE). These studies are mainly based on the concepts of life-cycle assessment, Circle to Circle and Lansink's Ladder. Unlike for WtE and WtM, little attention has been given to objectives 3 (WtL) and 4 (IU) from a landfill mining perspective.

The following definitions have been established:

Waste-to-Energy (WtE): the production of energy in the form of electricity or heat from landfill gas resulting from the decomposition of organic material or from the dump material, where the waste is converted into fuel through heating.

Waste-to-Land (WtL): the creation of space at the location of the landfill site and the assigning of a new land use to the landfill site.

Waste-to-Material (WtM): the valorization of the waste streams that are released from a landfill and the reuse of the waste streams as materials.

Interim Use (IU): the valorization of the waste stream is postponed until a certain point in the future. Until that moment, the landfill body will support one or more temporary functions targeting an added value for its surroundings or society and at least will keep the future conditions for the landfill mining project stable.

2. The quick responses

Besides the ranking score, different management options or "quick responses" are included as output of Cedalion. A specific set of applied criteria (up to five) generates a quick response. A quick response occurs when direct action is needed or enough evidence

is present to develop a business case. Each option contains the desired action with a short description and the reason for that action.

The different quick responses will be discussed below.

Orion – Valuable content

When assessing the feasibility of a potential landfill mining project, mono landfills seem to be most promising. Here, we are talking about homogeneity on the level of the waste within the landfill. Currently, commodity prices and demand for recycled materials are relatively low, but mono landfills have a high grade content, are easy to process and have well-known characteristics. Therefore, they are currently the most promising landfills to mine. Landfills with one or multiple waste streams of metal production can already be purer than newly mined ore. A business case should be done in priority on these landfills. Metal slags and mining waste are currently the most profitable when looking at the market conditions (**Option 1 & 2, Table 2**).

If we are talking about landfills where only a share of the waste consists of metal slags or mining waste (so no mono landfill), landfill mining could be feasible as well, but only for smaller landfills because otherwise, the cost of transport, separation and treatment would be too high to be profitable. Here, only older landfills (< 1955)are considered as these are mainly the old municipal landfills that contain inert materials. Hence, the possibility of encountering hazardous waste is low and costs will be acceptable for waste treatment (**Option 3 & 4, Table 2**).

Therefore, the user can use the second decision support tool Orion to analyse these aspects more into detail and to find out if a business case or an ELFM project would be profitable.

Table 2: Options for the Quick response 'Orion - valuable content'

Quick response	**Orion**	
Option	**Indicator**	**Value**
1	Mono landfill?	Y
	Metal slags?	Y
2	Mono landfill?	Y
	Mining waste?	Y
3	Volume (m³)	Small (< 35,000 m³)
	Metal slags?	Y
	Period of main activities	< 1955
4	Volume (m³)	Small (< 35,000 m³)
	Mining waste?	Y
	Period of main activities	< 1955
Main driver	**Valuable content**	

Orion – high land value/pressure

The value of land in residential or industrial areas could be high enough to make small landfill mining projects profitable (**all options, Table 3**). For an average volume of a landfill (i.e. 35,000 – 350,000 m³), a landfill mining project can be profitable as long as the waste materials are not buried too deep. Excavation costs will increase significantly with depth, especially when a proportion of the landfilled waste is saturated with water. Therefore, the user can use the second decision support tool Orion to analyse these aspects more into detail and to find out if a business case or an ELFM project would be profitable.

Table 3: Options for the Quick response 'Orion – high land value/pressure'

Quick response	**Orion**	
Option	**Indicator**	**Value**
1	Volume (m³)	Small (< 35,000 m³)
	Present residential	Y
2	Volume (m³)	Average (35,000 – 350,000 m³)
	Present residential	Y
3	Volume (m³)	Small (< 35,000 m³)
	Present industrial	Y
4	Volume (m³)	Average (35,000 – 350,000 m³)
	Present industrial	Y
Main driver	**High land value/pressure**	

Urgent solution – might cause risks to human health and/or ecological damage

For all small landfills that are located in a critical drinking water protection zone (corresponding to a restricted area where contamination can reach the source of drinking water within 24 hours), landfill mining or another urgent solution should be taken as human health and environmental protection should be a priority over the cost of excavation (**Option 6, Table 4**).

Due to the change in precipitation patterns and the increase of sea water levels, (tidal) river valleys could be subject to prolonged periods of flooding in the future. In the past, these low-lying estuarine and coastal areas were often chosen to install landfill due to the low value of the land caused by the flood risks (Brant *et al*., 2017). Additionally, in some regions of Europe, landfills were implemented next to rivers to elevate them and create new dry lands. Therefore, this group of landfills should be treated in priority. RAWFILL advises using the flooding risk maps made by EU or regional authorities to fill the related field in Cedalion.

If a landfill containing toxic waste deposits and is located within a drinking water protection zone, immediate actions should be taken to avoid the groundwater and

surface water contamination. Surface water contamination could be enforced when the landfill is located in an area with a high flooding risk. Waste types that could contain toxic waste are MSW, industrial waste, metal slags, mining waste or asbestos (**Option 1 – 5, Table 4**).

For all small landfills that are located in a flooding area with high recurrence, landfill mining or another urgent solution should be taken as human health and environmental protection should be a priority over the cost of excavation (**Option 7, Table 4**).

Table 4: Options for the Quick response 'Urgent solution - Might cause risks to human health and/or ecological damage'

Quick response	**Urgent solution**	
Option	**Indicator**	**Value**
1	MSW	Y
	Drinking water protection area	Critical
	Flooding risk	High
2	Industrial	Y
	Drinking water protection area	Critical
	Flooding risk	High
3	Metal slags	Y
	Drinking water protection area	Critical
	Flooding risk	High
4	Mining waste	Y
	Drinking water protection area	Critical
	Flooding risk	High
5	Asbestos	Y
	Drinking water protection area	Critical
	Flooding risk	High
6	Volume (m³)	Small (< 35,000 m³)
	Drinking water protection area	Critical
7	Volume (m³)	Small (< 35,000 m³)
	Flooding risk	High
Main driver	**Might cause risks to human health and/or ecological damage**	

Urgent solution - Potential risk to human health and/or ecological damage (e.g. illegal dump site)

This combination of criteria is meant to detect recent illegal dump sites. Since these dump sites are not constructed following the legislation demands (not documented), its content is unsure and can be potentially dangerous. These landfills should be treated as high priority (**Table 5**).

Table 5: Options for the Quick response 'Urgent solution - Potential risk for human health and/or ecological damage (e.g. illegal dump site)'

Quick response	**Urgent solution**	
Option	**Indicator**	**Value**
1	Period of main activities	> 1999 not documented
	Harmful waste spotted?	Y
Main driver	**Potential risk for human health and/or ecological damage (e.g. illegal dump site)**	

Medium term IU – Potential ecological risk in the future (non-inert waste)

Protected areas are characterised by a high biodiversity, important ecosystem functions and services and natural/societal value. A protected natural area in the proximity of a landfill that is threatened by flooding, can form a potential risk for severe damage to the ecosystem (**Table 6**).

Table 6: Options for the Quick response 'Medium term interim use - Potential ecological risk in the future (non-inert waste)'

Quick response	**Medium term interim use**	
Option	**Indicator**	**Value**
1	Flooding risk	Low, Medium, High
	Nature area	Y
Main driver	**Potential ecological risk in the future (non-inert waste)**	

Medium term IU – Agricultural development

The oldest municipal solid waste landfill sites contain primarily inert materials. When the surrounding area is used for agriculture, the landfill owner could investigate whether the landfill can be incorporated into this area and regain a purpose. However, it should be ensured that there are no risks for contaminants to and up in the food chain while performing agricultural activities on site (**Table 7**).

Table 7: Options for the Quick response 'Medium term interim use – agricultural development'

Quick response	**Medium term interim use**	
Option	**Indicator**	**Value**
1	MSW	Y
	Period of main activities	< 1955
	Present agricultural area	Y
Main driver	**Agricultural development**	

Medium term IU – Agricultural development (e.g. energy crops)

When the future use of a landfill is determined to be agriculture according to spatial planning, one could consider an agricultural interim use. The safest crops can be energy crops as they can pose no potential harm within the food chain. When installing an agricultural function on the landfill, no paved roads should be present and preferably, the landfill is covered by a soil layer that is thick enough to allow the growth of vegetation and plowing without harming the landfill (**Table 8**).

Table 8: Options for the Quick response 'Medium term interim use – agricultural development (e.g. energy crops)'

Quick response	**Medium term interim use**	
Option	**Indicator**	**Value**
1	Future agricultural area	Y
	Paved roads?	N
	Type of cover	Soil
Main driver	**Agricultural development (e.g. energy crops)**	

Medium term IU – Nature development

The oldest municipal solid waste landfill sites contain primarily inert materials. When the surrounding area contains sites with considerable ecological value, the landfill owner could investigate whether the landfill can be incorporated into this area and therefore creating a green corridor or stepstone for the local ecological network (**Table 9**).

Table 9: Options for the Quick response 'Medium term interim use – nature development'

Quick response	**Medium term interim use**	
Option	**Indicator**	**Value**
1	MSW	Y
	Period of main activities	<1955
	Present nature area	Y
Main driver	**Nature development**	

Medium term IU – Currently only non-recyclable goods

These recent landfills (>1999 and documented) are designed based on the EU Landfill Directive of 1999. This directive states that landfills designed after the start of this directive can only contain non-recyclable materials. Therefore, these landfills are currently considered as low priority for landfill mining projects. Due to the nature of their cover (mainly impermeable geomembrane covered by top soil), many types of interim use can considered by the landfill owner. The interim use module present in the DST 2 – Orion could give some advice regarding the best option for the landfill under consideration (**Table 10**).

Table 10: Options for the Quick response 'Medium term interim use – currently only non-recyclable goods'

Quick response	**Medium term interim use**	
Option	**Indicator**	**Value**
1	MSW	Y
	Period of main activities	>1999 documented
Main driver	**Currently only non-recyclable goods**	

Medium term IU – Infrastructure development

Infrastructure development could also be a possible medium term interim use for some landfills. These landfills should be located in or in the proximity of industrial or residential areas. Also landfills located in areas that are planned to be industrial or residential areas in the future, can be suitable for this type op interim use (**Option 1 – 4, Table 11**). Option 3 and 4 (**Table 11**) are specifically designed to detect possibilities for solar panel parks on landfills. Then, consumers of the energy should be nearby to limit energy transport (e.g. residential or industrial activity). In this case, the surface conditions cannot be too complicated to install solar panels (e.g. cutting trees is not desirable).

Table 11: Options for the Quick response 'Medium term interim use - infrastructure development'

Quick response	**Medium term IU**	
Option	**Indicator**	**Value**
1	Paved roads?	N
	Accessible with heavy equipment?	N
	Present industrial area?	Y
2	Paved roads?	N
	Accessible with heavy equipment?	N
	Present residential area?	Y
3	Paved roads?	Y
	Future industrial area?	Y
	Surface conditions	Rough, grass
4	Paved roads?	Y
	Future residential area?	Y
	Surface conditions	Rough, grass
Main driver	**Infrastructure development**	

Long term IU – Nature development

A landfill completely covered with trees requires a lot of effort and money to clear the terrain, before an actual landfill mining project can be started. Furthermore, deforesting a landfill for landfill mining can result in a negative public opinion. On the condition the that the landfill does not pose any risk for the environment, it can act as a stepstone within a regional ecological network (**Table 12**).

Table 12: Options for the Quick response 'Long-term interim use – nature development'

Quick response	Long-term interim use	
Option	**Indicator**	**Value**
1	Surface conditions	Trees
	Future natural area	Y
Main driver	**Nature development**	

Long term IU – Nature development and conservation

When the landfill is located in a protected natural area, the best option could be to leave the situation as it is, as long as the landfill content does not pose serious risks for the environment. This can be confirmed via a minor site investigation. If no risk is detected, long-term interim use of leaving the site to a nature conservation society is an option. However, environmental monitoring (water, air, soil) should be done regularly to ensure the safety of the landfill site (**Table 13**)

Table 13: Options for the Quick response 'Long-term interim use – nature development and conservation'

Quick response	Long-term interim use	
Option	**Indicator**	**Value**
1	Nature area	Y
	Present natural area	Y
Main driver	**Nature development and conservation**	

Long-term IU – Agricultural development (e.g. agroforestry)

When a landfill is located in an area that is planned to be a natural area in the future, but the present use is an agricultural function, one could think about developing a sustainable type of agriculture, like agroforestry. When performing sustainable agriculture, the cover type of the landfill should be soil that is thick enough to allow the growth of vegetation/trees and plowing without harming the landfill structure (**Table 14**).

Table 14: Options for the Quick response 'Long-term interim use – agricultural development (e.g. agroforestry)

Quick response	Medium term interim use	
Option	**Indicator**	**Value**
1	Future Natural area	Y
	Present Agricultural area	Y
	Type of cover	Soil
Main driver	**Agricultural development (e.g. agroforestry)**	

3. DST 2 - Orion manual

3.1. Purpose and structure of the tool

Starting a landfill rehabilitation project requires answers to a large set of questions on the content of the landfill, the context of the landfill, economic conditions, financing, stakeholder involvement, etc. Orion is the second step in the Decision Support Tool (after DST 1 - Cedalion) which enables the user to pose and answer the right questions before entering the final stage of setting up a business model.
Orion is developed from the idea that there are already many interesting models and tools available for landfill analysis (often EU funded). With Orion, we want to assemble all these models into one specific dashboard. Orion is a guidance through all these models, indicating which model should be used when, in function of the most suitable valorisation or rehabilitation strategy for a landfill.

For the development of the Orion model, we were inspired by a quote from Gerd Gigerenzer, a famous German psychologist:

"More information and more time and more sophisticated models do not necessarily lead to better decisions.

In general, if you are in an uncertain world, make it simple."

Orion is developed in the format of an interactive web application, integrating a dynamic dashboard with a flowchart/roadmap in the form of an interactive survey. The dashboard and the roadmap are interconnected and in a way also interdependent.

Orion can be used for a landfill when there is an interest in the development of a landfill mining project or when already a certain potential was detected with the DST 1 - Cedalion. In order to use the Orion application, some data should be available on the structure and content of the landfill in order to answer the questions of the Orion Roadmap. If a Resource Distribution Model of the landfill is available, it will be quite easy to answer all the questions within the Roadmap.

3.2. The Orion Dashboard Homepage

The Dashboard gives an overview of relevant models that can help the user to assess the feasibility of a landfill mining or rehabilitation project. The tool is open access and with a focus on applications developed within other EU-funded projects. The selected models explain their own strengths and deal with a specific item of the valorization and/or rehabilitation of the landfill site. The models that are included, will be discussed later on in this manual. In the 'homepage' of the Orion Dashboard (**Figure 9**), three different buttons are highlighted: the manual, the Cedalion Rearview mirror and the Start button.

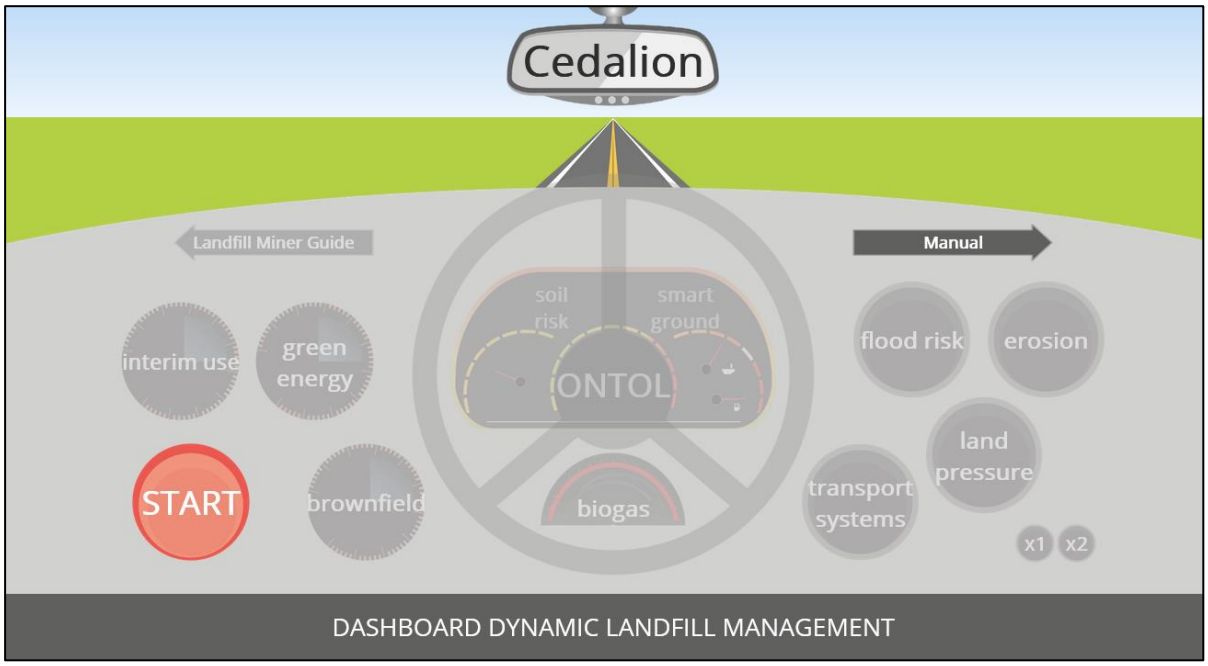

Figure 9: Homepage of the Orion Dashboard.

Before you start driving, you will need to look in the rearview mirror. There, Cedalion gives you the results of the first evaluation, more specifically the ranking score and the valorization potential. If these results indicate a promising project for one of the user's landfills, the user can press the 'start' button on the Dashboard. However, if you want to know more about the Orion Roadmap before you start, you can consult the Manual first (this document will be included behind the Manual button).

1. The Orion Roadmap

The goal of the Orion Roadmap is to guide the user towards the most suitable endpoint for a certain landfill. At such endpoint, the user will have a go/no go answer for setting up a business model for the valorisation or rehabilitation of a landfill. Specific models or tools will be suggested by Orion for further assessment and planning process of landfill mining or rehabilitation activities.

Behind the START button, a short introduction is given on the roadmap and a visual (**Figure 10**) informs the user about the extent and content of the roadmap. This road map is guiding the user not only towards the most appropriate models but also through models that can be used during the trip itself. The Orion Roadmap consists of one main flowchart, two subroutines, including questions about the content and context of the landfill. All the questions are formed in a way that the answer will be either yes or no. The function of the main flowchart is to lead the user towards an endpoint that indicates the most suitable rehabilitation or valorisation option for the landfill. The subroutines mainly serve to fill in knowledge gaps of the user by posing questions as well (e.g. regarding the complexity of a possible excavation). Also explanation windows are included to provide the user with extra information regarding the posed questions. Depending on the

answers to the different questions, the user will be automatically directed to the following question, until he or she reaches a certain endpoint (green in **Figure 10**).

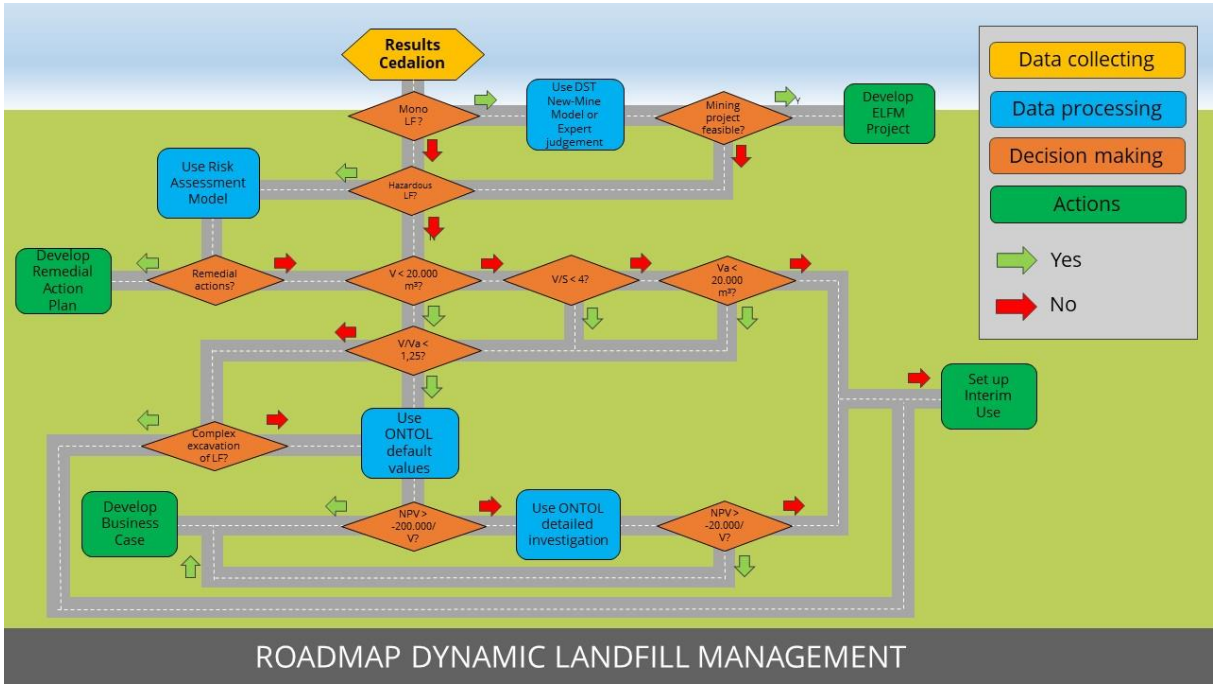

Figure 10: Visual of the Orion Roadmap.

When arriving at one of these endpoints, Orion will redirect the user back to the dashboard and the tools which can assist the user in the further progress, will be lightened up. From there on, the user can discover and explore the different tools that are indicated for further use. Based on recent experiences, a straightforward decision-making is introduced in the roadmap to indicate the high potentials as soon as possible. Due to low commodity prices and demand, the recycling of waste is only put forward if we are talking of monolandfills: high homogeneity, well-known characteristics, easy to process. In all other cases, waste recycling is only considered as a valuable option if the volume is limited, easy to excavate and process, and the land value is the financial driver. More information on these DST 2 indicators can be found in Deliverable T2.1.1. Table of DST indicators.

2. How to use the Orion Roadmap: some practicalities

The reference of the landfill

After clicking the 'Drive' button on the end of the introduction page of the Orion Roadmap, Orion will ask the user to select a landfill having high scores in Cedalion (**Figure 11**). The user can enter either the reference or name of the chosen landfill in the text box. In the view of consistency, it is important to include the same DLM ID and landfill name as in the Cedalion Database. The DLM ID or reference are mentioned in the summary received by email order to link the right landfill with the right Orion results. After filling in the reference, press 'Next'.

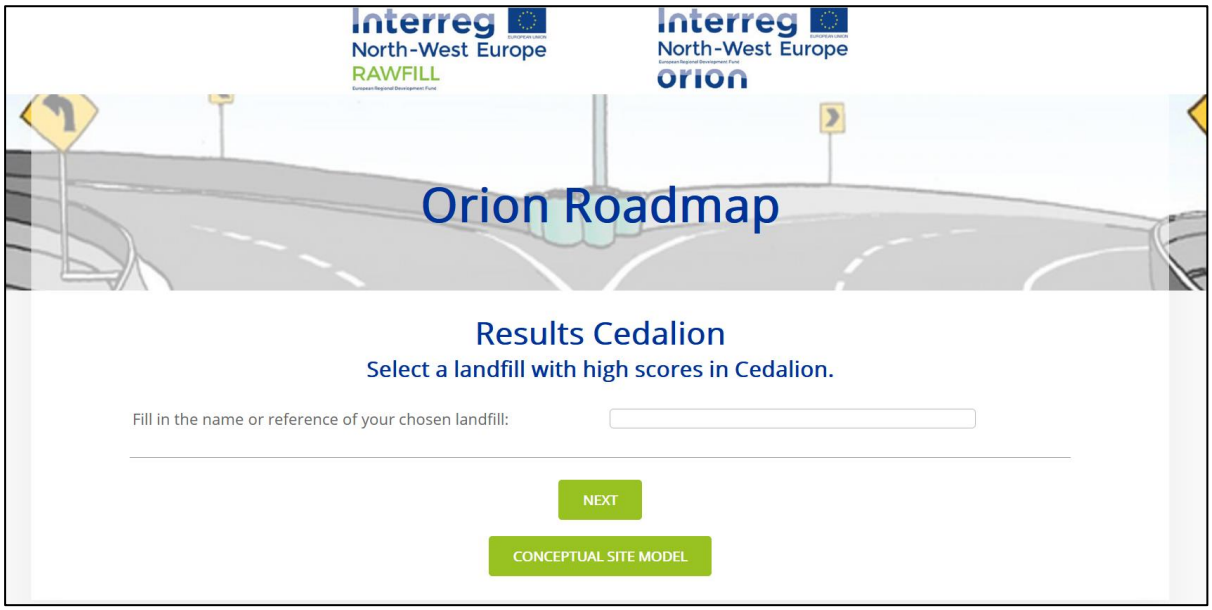

Figure 3: Screenshot (1) of the Orion Roadmap.

More information needed

Along the user's journey on the Orion Roadmap, the user may want more information or additional information on some of the questions that appear. This is possible in two different ways. First, there are the "More Informatio"n buttons on the right side of the survey. An example is displayed in **Figure 12 & 13**. When clicking on the '+', the additional information will appear in a box underneath the question. It is important to take time to read it. To close the box, click again the '-'.

Figure 5: Screenshot (2) of the Orion Roadmap.

Figure 4: Screenshot (3) of the Orion Roadmap.

In some cases, more information is included behind a question mark symbol that appears after a certain question. The information will appear when the cursor is in front of the question mark, by means of a Hoover effect. An example is given in **Figure 14**.

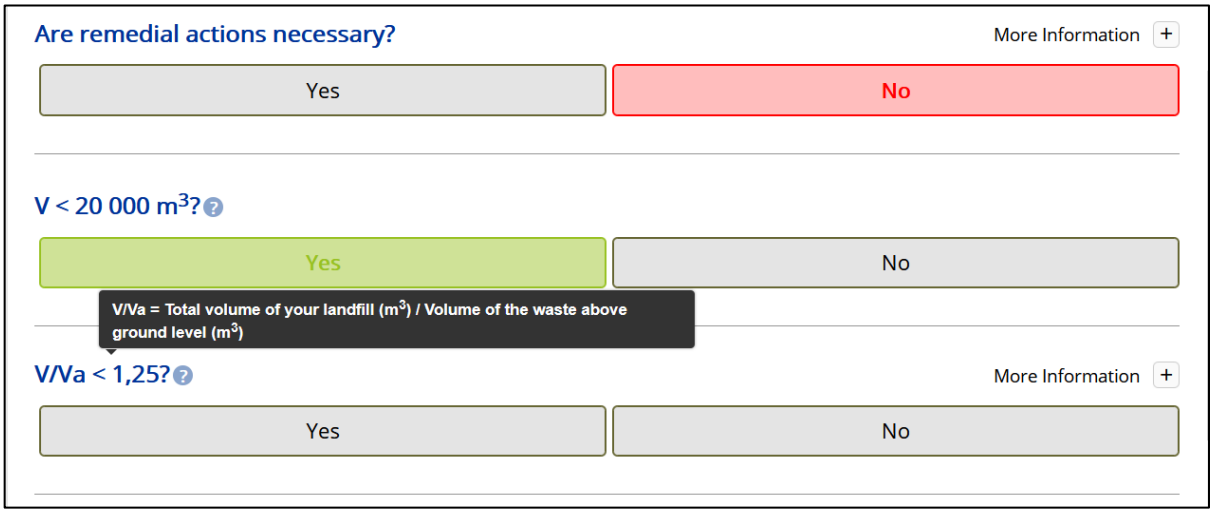

Figure 6: Screenshot (4) of the Orion Roadmap.

Subroutines

The subroutines mainly serve to fill in knowledge gaps of the user by posing specific questions to answer the knowledge gaps. These subroutines are activated when the user chooses the 'I don't know' option for a specific question.

Subroutine 1 determines if the landfill under consideration is a monolandfill or a mixed one. The outcome is determined based on the answers of the user regarding the type of waste inside the landfill and the homogeneity of the landfill.

Subroutine 2 determines if a possible excavation will be either feasible or too complex. The outcome is determined based on the answers to questions regarding the structure of the landfill, where the most important aspect concerns the share of the landfill that is situated in the saturated zone of the soil.

After going through one of these subroutines, Orion will communicate the answer to the initial question once it received enough information. An example is given in **Figure 15**. There, the user is not sure if an excavation of the landfilled waste would be complex or not. After the user answers a few easy questions, Orion determines that the excavation would be feasible by showing a small text frame.

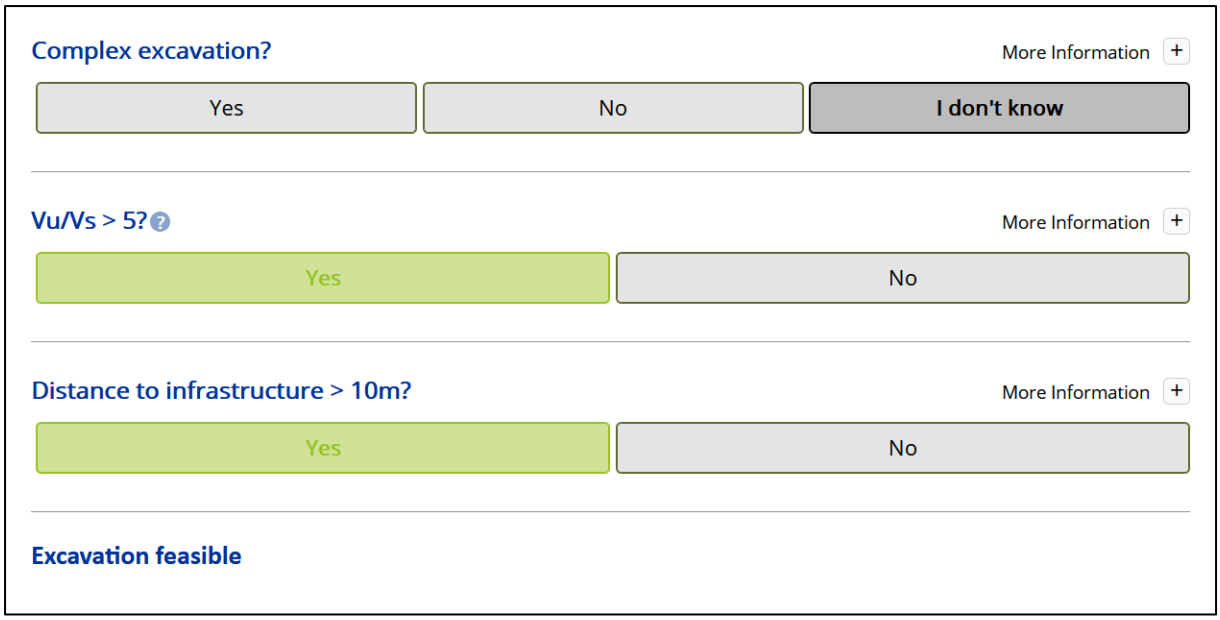

Figure 15: Screenshot (5) of the Orion Roadmap.

Consulting the conceptual site model

The Orion roadmap is mainly based on the conceptual site model of a landfill. The relative distribution of the landfill over the different soil layers (i.e. above ground, in the unsaturated zone, in the saturated zone), the surface and volume of the landfill and the type, characteristics and heterogeneity of the waste within the landfill, are all important parameters that should be taken into account when assessing the rehabilitation and valorization potential of a landfill, in terms of budget and time management. More information on these indicators can be found in Deliverable T2.1.1. Table of DST indicators.

For some of the questions, specific parameters from the conceptual site model are included. Therefore, it is always possible to consult the conceptual site model of a landfill with the 'conceptual site model' button on the bottom of the survey. The image of the site

model will appear, together with the explanations of all the abbreviations that are used

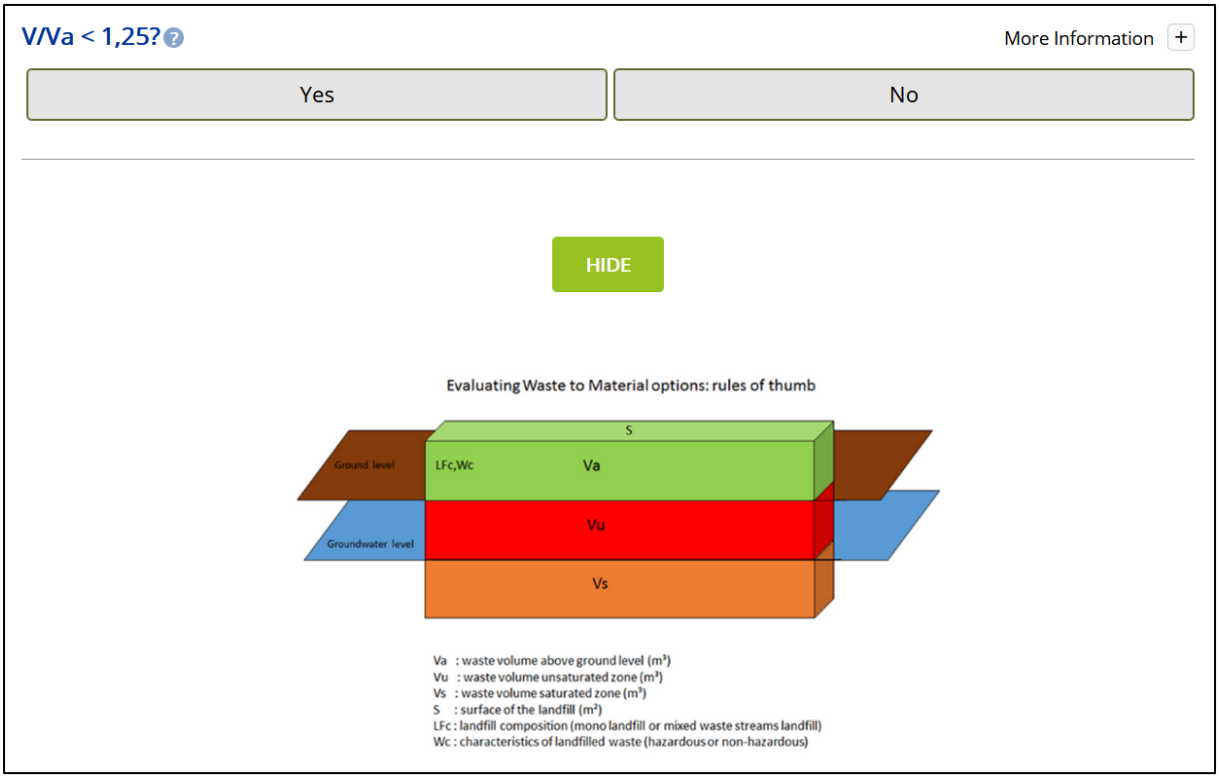

Figure 16: Screenshot (6) of the Orion Roadmap.

within the image (**Figure 16**). The picture can be hidden again by clicking the 'Hide' button.

Mid-points

Mid-points are locations within the roadmap at which the user should consult a model from the dashboard to continue the roadmap. Subsequently, Orion will redirect the user back to the dashboard and the relevant tool will be lightened up.

The different mid-points that are included in the roadmap, are the following:

- Use DST New-Mine model or expert judgement;
- Use Risk Assessment Model;
- Use ONTOL with default values; and
- Use ONTOL for detailed investigation (replace default values).

Explanations on the tools can be found on the web pages behind the dashboard buttons. Only for New-Mine, a short explanation will be given within the form, as the tool is not included in the dashboard.

This stepwise approach of the road map in order to invest in more detailed data collection and analysis, only if the previous step was proven successful. For example, OnToL (Online Tool for the Evaluation of Landfill Mining Projects) is a very powerful model and provides several default values in order to make it work with limited datasets. This implies a higher

uncertainty but in case of a good result, it is worthwhile to invest in better data and replace these defaults. That is the reason why OnToL is included in two steps.

Endpoints

The endpoints of the roadmap are the final locations at which the user can arrive. These endpoints indicate the most suitable future for the landfill under consideration. When arriving at these endpoints (indicated by a yellow STOP sign, see **Figure 17),** Orion will redirect the user back to the dashboard and the tools which can assist the user in the further progress will be lightened up. More information regarding the different endpoints can be found within the manual on the dashboard. The different endpoints of the roadmap are the following:

- Develop ELFM project;
- Develop remedial action plan;
- Set up interim use; and
- Develop business case.

These endpoints will be explained in **section 4 of this chapter**, together with the selection of Dashboard Buttons that will be highlighted at this point.

Back to the Orion Dashboard

It is also good to know that at each moment, the user can return back to the dashboard. This can be done by clicking the "Back to Orion Dashboard" button on the top left of the survey (see **Figure 13**). Attention: if the user decides to return to the dashboard, the path that the user has already traveled will be lost. There is no possibility to return to the same point that was reached within the user's first attempt.

After reaching an end-point for a certain landfill, the user will be redirected to the dashboard automatically. At this point, the user should provide his or her email address in order to receive the results of the roadmap (**Figure 17**).

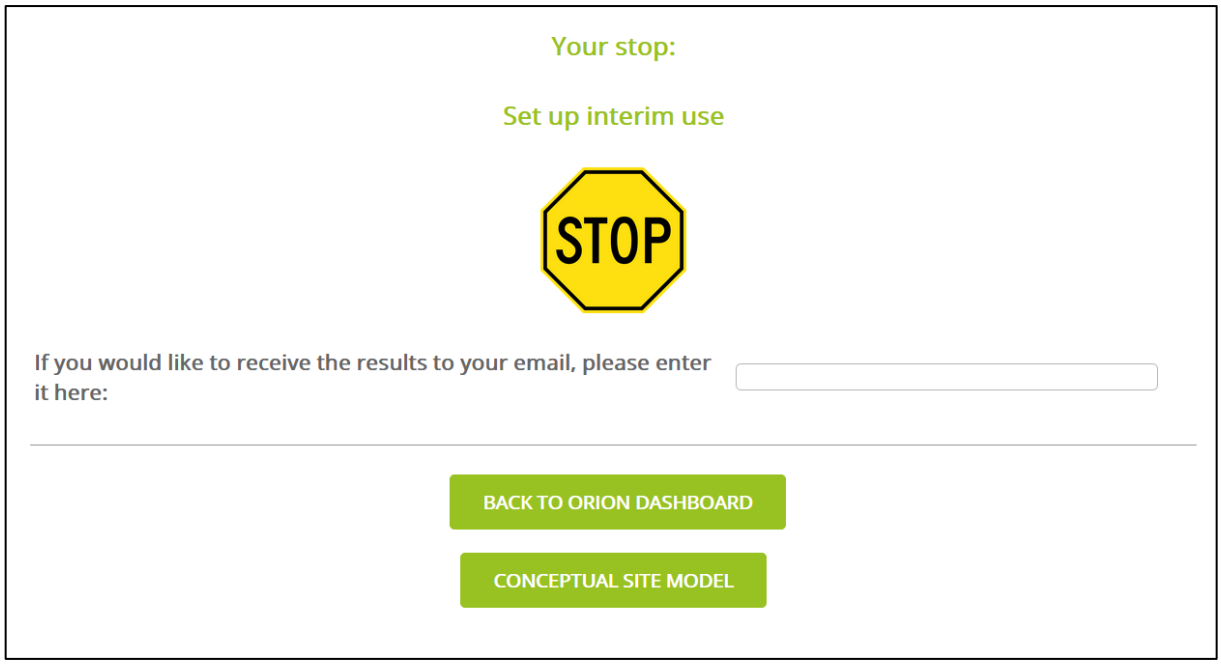

Figure 17: Screenshot (4) of the Orion Roadmap.

3. The Orion Dashboard Buttons

Now that the options on the roadmap have been presented, let's go back to the dashboard to illustrate what's behind the buttons. The central part of the steering wheel is symbolizing the landfill. The features inside are useful to evaluate the characteristics and the fate of the landfilled waste. The Biogas button links to a model designed to predict landfill gas production. The Soil risk button has no link because each region or country has his own specific tools. SMART GROUND offers a tool to choose the best available techniques to process the landfilled waste. OnToL was given a central position because of its relation with the United Nations Framework Classification for Anthropogenic Resources.

Out of the inner circle of the steering wheel, the instruments are more related to effects and impacts coming from the outside. Flood risks and erosion are typical phenomena, which could cause harmful situations and damage to the landfill. Land pressure is often a driver to undertake action on landfill redevelopment and specific models such as RuimteModel from VITO provide prognosis on future land use. The period between the present and the rehabilitation might be relatively long e.g. sometimes decades. Interim use can be considered and green energy production might be an option in the meantime. For the latter, the US EPA model on renewable energy might support the user's choices. The redevelopment of the landfill is comparable with the process of brownfield revitalization. The Brownfield opportunity matrix is therefore also a relevant tool. When the redevelopment starts, quite often large quantities of waste or recycled materials must be transported to treatment facilities. Many countries have specific tools to choose the most sustainable option.

Behind the Dashboard Buttons, each tool or model is described in detail, answering three different questions:

- What is the model?
- How can the model be used?
- Why is the model included in the Orion tool?

For each of the models or tools, a link to the corresponding website is included.

4. The endpoints of the Orion Roadmap

Develop ELFM project

Landfills that reach the endpoint 'Develop ELFM project' are high potentials at which an Enhanced Landfill Mining project would be profitable. Enhanced Landfill Mining (ELFM) is a concept that performs the valorisation of materials and energy from landfill sites as sustainably as possible through a maximization of materials recycling and optimal energy production. The ELFM concept aims at a sustainable use of landfill sites whereby four basic targets are set: determining the needs for materials, energy, space and drinking water. This can be formulated as R³P: Recycling of Materials, Recovery of Energy, Reclaiming of Land, and Preserving Drinking Water Supplies.

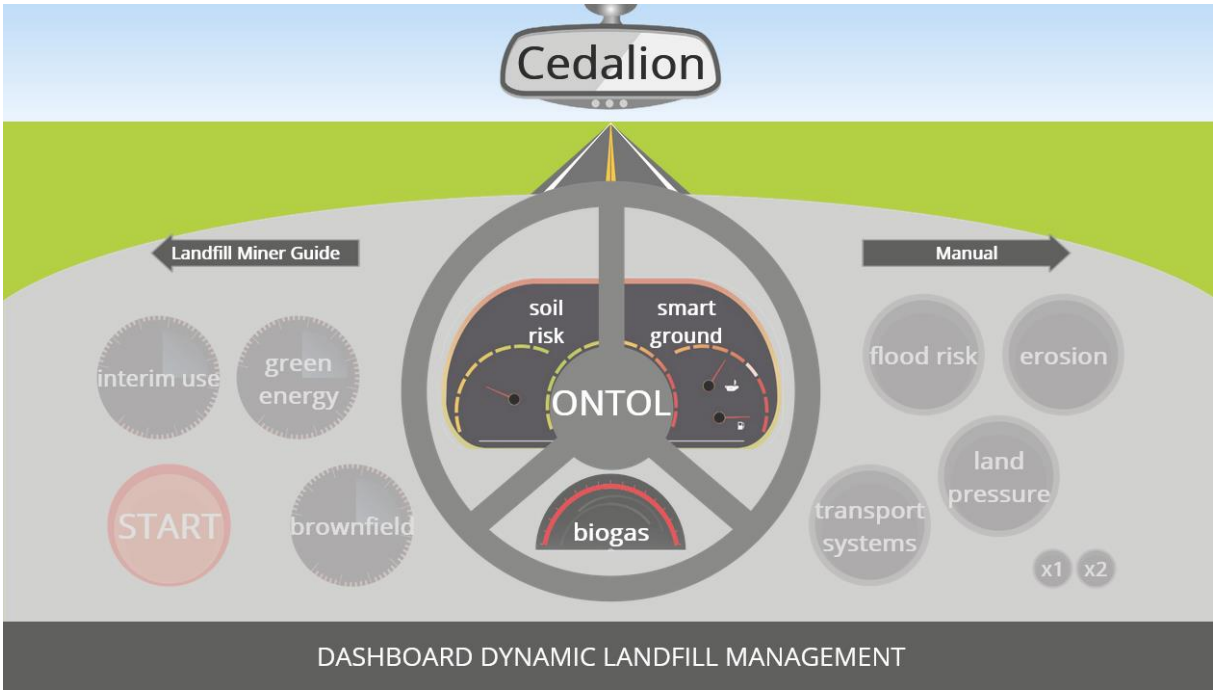

Figure 7: Dashboard output for the end-point 'Develop ELFM project'

The majority of the landfills for which an ELFM scenario is possible, are mono landfills. Due to low commodity prices and demand, the recycling of waste is only put forward if we are talking of monolandfills as they have a high homogeneity, well-known characteristics and are easy to process.

The configuration of the Dashboard buttons that will be highlighted at this endpoint, is visualised in **Figure 18**.

Develop remedial action plan

The 'Develop remedial action plan' end-point will be reached for landfills that can pose a specific threat to the environment of human health. This risk needs to be assessed by means of a risk assessment model. Within the Orion Dashboard, we propose to use the S-risk model (**Figure 19**). Based on the output of the model, specific remedial actions could be proposed and in that case, it is important to remediate the landfill site in order to prevent any harm to the ecological system or to human health. Remedial actions could also be integrated in a broader rehabilitation or landfill mining project.

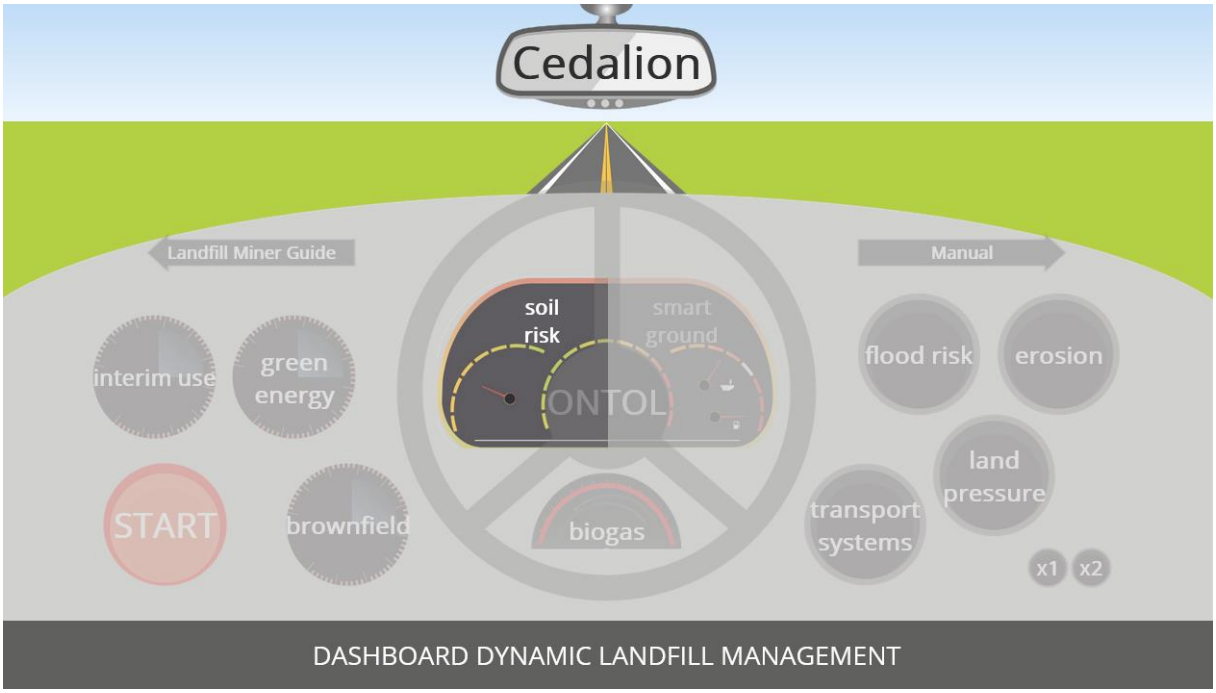

Figure 19: Dashboard output for the end-point 'Develop Remedial Action Plan'

Develop business case

In all other cases where the landfill is heterogenous (no mono landfill), waste recycling is only considered as a valuable option if the volume is limited, easy to excavate and process, and the land value is the financial driver. In these cases, the main goal is not only to excavate and recycle the waste, but also to rehabilitate the whole landfill area in order to make the project financially feasible. Therefore, a high land value is essential. Furthermore, the rehabilitation of the landfill site should be in correspondence with the context and surroundings of the landfill. That is why all models will be highlighted by Orion at this endpoint (**Figure 20**).

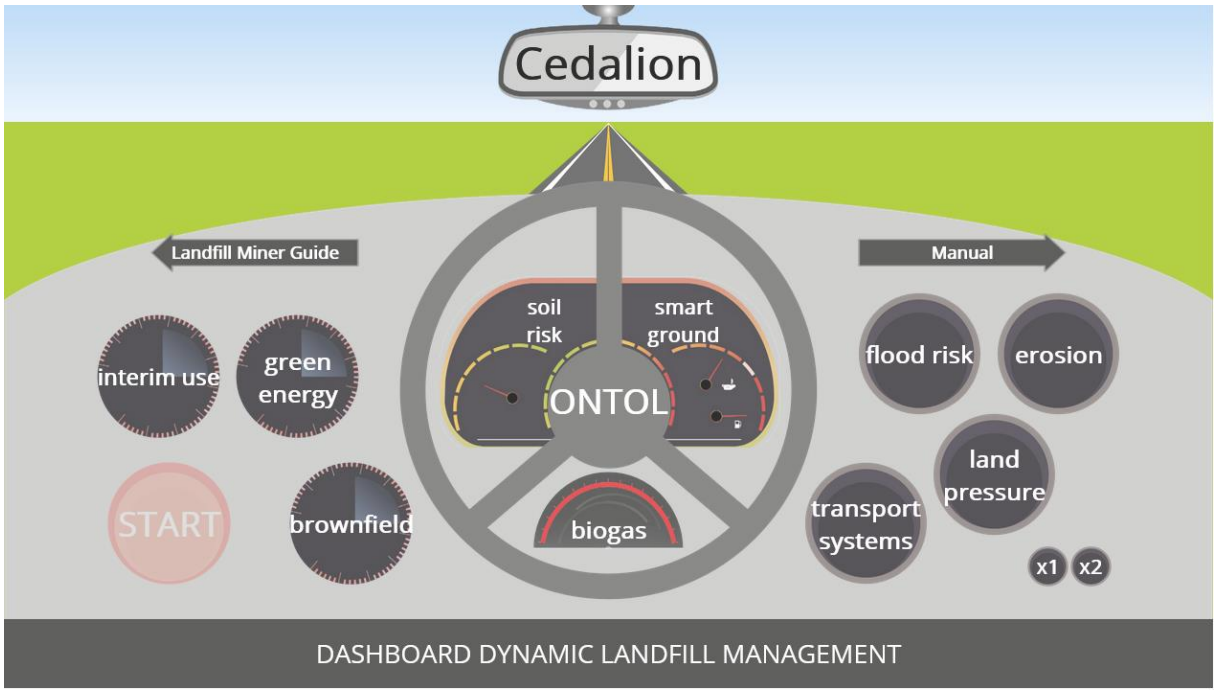

Figure 20: Dashboard output for the end-point 'Develop Business Case'

Set up interim use

When landfill mining or rehabilitation of the landfill site is not feasible in the short term (e.g. low commodity prices and low land value), it is best to set up a sustainable interim use on the site (e.g. nature development, energy crops, solar panels) while awaiting for landfill mining to become a viable option in the future. To determine a suitable interim use for a certain landfill, different tools are available behind the Dashboard buttons highlighted in **Figure 21**.

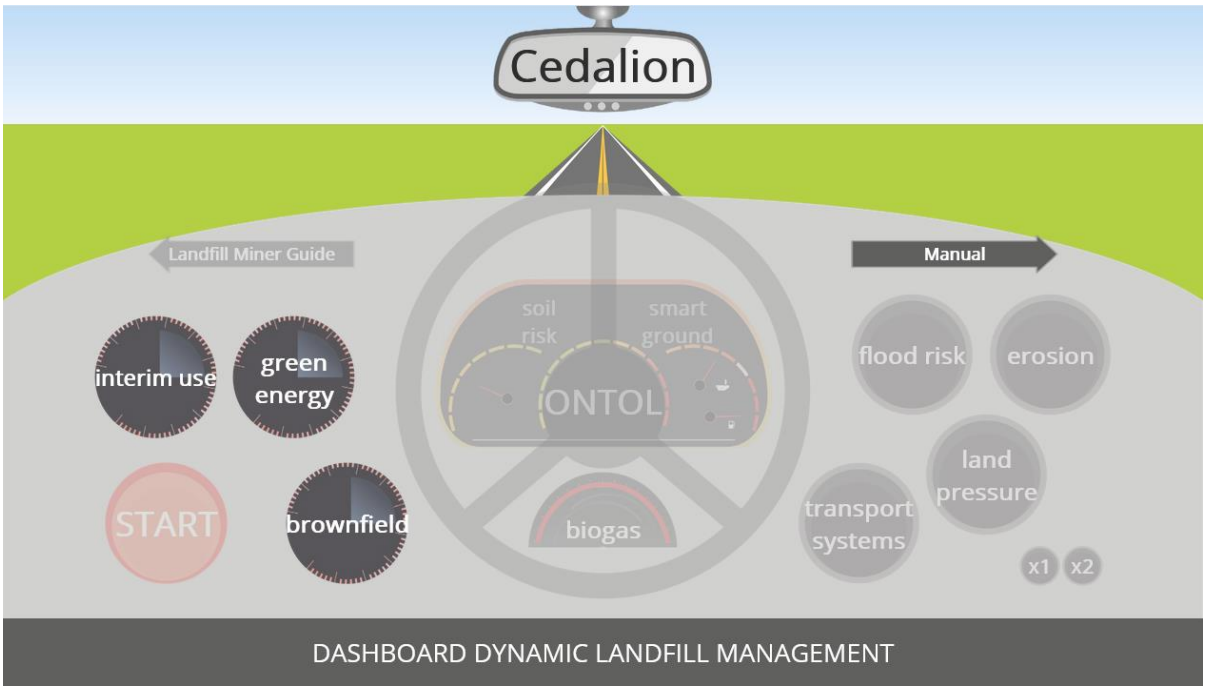

Figure 21: Dashboard output for the end-point 'Set up interim use'

Contact

Feel free to contact us.

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