



**RIS-ALiCE: Al-rich industrial residues  
for mineral binders in ESEE region**

## **DELIVERABLE D4.2**

**Registry prototype blueprints**

**Lead beneficiary: Geological survey of Slovenia**



**Date: 25 February 2020**



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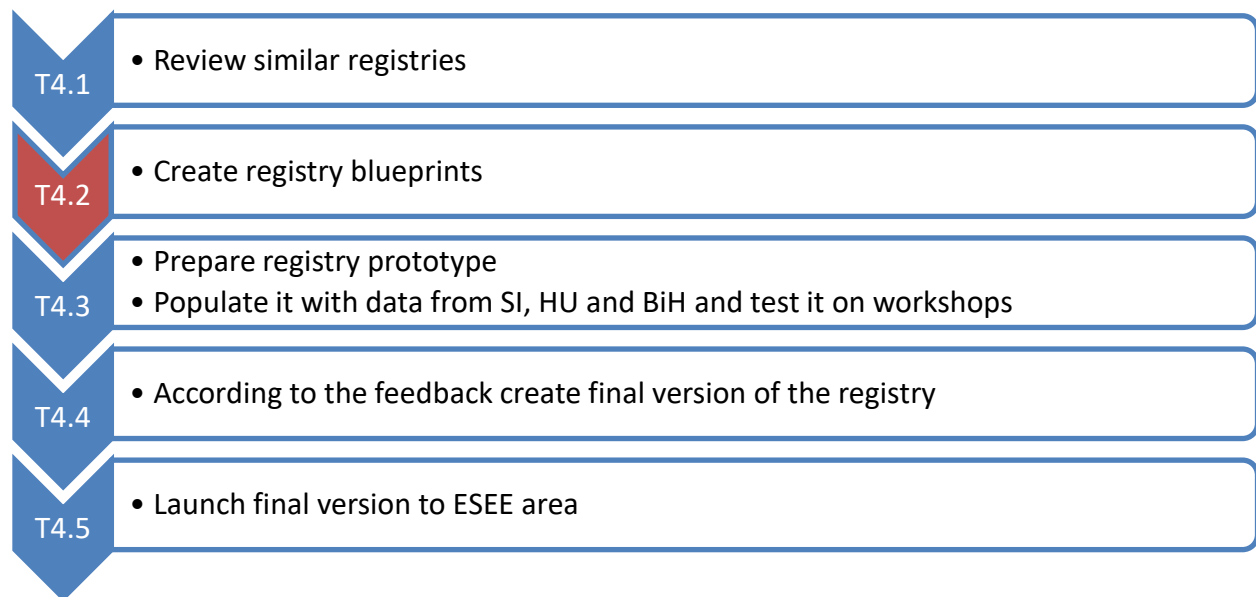
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# 1. INTRODUCTION

“RIS-ALiCE” project, funded by EIT RawMaterials, is aiming to create a network of relevant stakeholders, in the area of currently unused and landfilled Al-rich industrial residues, which can be used for low-energy and low-carbon cement production. By interlinking cement producers, waste producers/holders, research institutions and other stakeholders in the field, we aim to get one step closer towards the production and use of Al-rich cement clinkers, the production of which uses considerably less energy as types of cements that are produced today.

Work Package 4 in the RIS-ALiCE project aims to develop an on-line registry of Al-rich waste materials in the ESEE region, which can be used by cement plants and waste producers/holders, to better plan their future operations. The first step towards developing this registry is to review similar existing registries (T4.1). The output of T4.1 will serve as a basis for the registry blueprints (T4.2), which will allow the creation of an actual registry prototype (T4.3), which will be tested by partners and relevant stakeholders during workshops. Recorded feedback will allow the RIS-ALiCE consortium to improve the initial registry prototype to better suit the end-users’ needs (i.e. cement plants, waste producers/holders, etc., T4.4), and to launch the final version of the registry to ESEE area (T4.5).



**Figure 1:** The workflow diagram for WP4. Activity in the chain of events towards final registry, described in this report, is marked with red.

## 1.1 AIM AND PURPOSE OF THIS DOCUMENT

The aim of deliverable D4.2 “Registry prototype blueprint” is to describe RIS-ALiCE registry data structure, content, validation protocols, material valorisation methods, user rights and other Intellectual

Property Rights (IPR) issues, software platform, user interface, data searching and retrieving methods, and **to** plan to assure the sustainability of the registry after the end of the project and other relevant issues. This deliverable will set the foundations of the RIS-ALiCE registry of Al-rich residues in ESEE region.

The **scope** of this document is to set-up initial registry frame structure and functionalities as a starting point. Actual coding of the registry and its visual appearance will be defined by responsible partner LUCIS. This document does not define final appearance of the registry, because the first version (i.e. registry prototype) which will be built upon this document, will be populated with data from SI, HU and BA and then tested by potential end-users in a series of workshop. Therefore, the final version of the registry might differ from what is presented in this document, depending on the end-users feedbacks.

## 1.2 BACKGROUND, OBJECTIVES AND VISION OF THE RIS-ALiCE REGISTRY

The production of new types of innovative low-CO<sub>2</sub> cement clinkers, needed to prepare cements with lower environmental footprints, requires a huge amount of materials enriched with Al. But the bottleneck for mass production of such cements has been identified. Providing required amounts of such materials, suitable for cement production, is a challenge for cement plants. One option is to use bauxite ore as a source of Al, but this is an expensive natural raw material, therefore its use for cement production is limited. However, a lot of other industrial waste and by-products exist, which contain Al in larger quantities, and can be used as suitable ingredients for producing such new cements. Unfortunately, little or no data about such materials is currently available, and the information that is available is mostly scattered. Cement plant operators and managers need to know exactly the amount of available Al-rich waste and residues in their vicinity, before a decision regarding the production of new types of Al-rich cements (based on belite-sulfoaluminate clinkers) can be made.

The **objectives** of RIS-ALiCE registry, as they are set-up in the project proposal, is to serve as a user-friendly tool for linking different stakeholders, producers or holders of Al-rich waste or by-products on one side, and potential consumers of such waste on the other side. It is not meant to be a trade tool, but rather a place where cement plant operators and decision-makers can find relevant information needed for the production of new Al-rich cements.

The **long-term vision** of the RIS-ALiCE registry is to become a widely recognised tool by relevant stakeholders in Europe, who would like to trade (buy or sell) Al-rich waste and by-products, with increasing number of users and ever-growing content. Long term vision (by the year 2030) is that the registry has at least 20 different cement plants, which use its data for the basis of their decisions, and at least 100 different registered providers of Al-rich waste and by-products, and that at least 10 trades get established as a direct consequence of the registry.

## 2. METHODOLOGY

Several inputs have been considered for creating this registry blueprints, in the following order:

1. RIS-ALiCE kick-off meeting workshop (25.– 26. 3. 2019, Ljubljana)
2. D4.1 report: registries overview;
3. Inputs from T3.3 (Laboratory analyses of Al-rich residues);
4. M6 meeting (workshop) in September 2019, Szeged, where initial concept was presented and discussed;
5. Consultation with SA, Usje, ZAG, VINS, Lucis, SIJ;
6. Presentation of registry concepts to the whole consortium and discussion during the M12 meeting in Ljubljana (12. - 13. 2. 2020).

### RIS-ALiCE kick-off meeting workshop

As part of the kick-off meeting a 2-hour workshop was organised, with the aim to brainstorm with the kick-off meeting participants about the registry. Carousel method was selected, randomly splitting participants into 3 groups, each discussing three topics, each one representing one “station”: (1) who are the potential end-users, (2) which data shall be contained in the registry and (3) key expectations from the registry. After 20 minutes of discussions each group moved to another “station” and the process was repeated once again, so that each group visited all three stations. Key elements from brainstorming were recorded by the station moderator on a sheet of paper by writing short claims or statements. The final stage of the workshop was that participants casted votes to points raised during brainstorming, which they found the most relevant / interesting from their point of view, by placing the color-coded sticker next to the written statement (different colours representing the type of partner (waste holder, cement plant, educational, research, other).

Key results are presented below, detailed description of the methodology used and all of the results can be found in Annex 1 – Workshop report.

### What are your expectations from the registry portal?

- Easy access and user friendliness.
- Complex composite search, to enable to pin down the wanted information.
- Contains minerals’ exact chemical composition with variations.

### Who should be the main users of the registry?

- Cement plants - research departments.
- Waste transportation sector.
- Mining industry.

- Metallurgical industry (waste producer and consumer).
- Construction industry (as producer of waste and consumer of cement).
- Cement plants - production department.
- Research institutes – researchers.
- Policy makers on national level (environment).

#### What data should the registry provide?

- Quality (radiology, chemical, mineralogical, physical), Al- content, main elements, alkalis, heavy metals, TOC, XRD data, form of Al (silicates, metallic, oxides, melting points).
- Company name, contact details.
- Location.
- Amount.
- Legal status (hazardous, non-hazard, inert), acc. to which legal document/countries, documentation (proof).
- Type of waste / origin of raw material.
- Availability/ type of transport.

Between June and August 2019 several RIS-ALiCE partners (SA, GeoZS, LUCIS) reviewed existing registries with similar topics, with the intention to recognise their strengths, weaknesses and potential relevance to the RIS-ALiCE registry, as activity T4.1 - *Reviews of similar registries in Europe and in the world*. A report, titled D4.1 - *Registries and databases review report* was prepared and submitted. The key idea regarding this activity was to ensure, that RIS-ALiCE registry does not overlap with some similar registries, to obtain ideas about good practices and not to repeat flaws or mistakes from the past.

Within this task it has been decided for RIS-ALiCE registry to incorporate the following functionalities:

- Registry is user friendly (with simple, logical and transparent design, presentation of data in map and tabular format with global geographical coordinates).
- It must contain relevant and updated data to allow direct comparability.
- Advanced search and query option and ability to export the data.
- Instructions on how to use registry and to upload the data.
- Allows new users to provide their own data.
- It needs to have clear data protection policy (IPR).
- Allows user feedback.
- It shall use generally speaking language (English).

Following this task, taking into account the inputs from Task 3.3. and initial idea on how the registry should look, the initial structure of the database was created by GeoZS. This initial idea was sent to consortium by email (10. 9. 2019) 2 days before M6 project meeting in Szeged (12. and 13. 9. 2019). In this meeting the initial concept was presented and discussed by the consortium. Due to force majeure, there was no representative from cement plants, so the discussion unfortunately did not yield the relevant results related to the data structure, but the consortium was still able to discuss about registry functionalities and functionalities of the portal. It has been generally agreed that the following proposed components of the registry are not required:

- Users forum.
- Document repository.
- Multilingual user interface.

The following components have found to be useful:

- General information.
- Data viewer (table).
- Data viewer (map).
- Search & query.
- Data upload tool by users.
- Public level.
- Users level.
- User feedback (web portal).
- User feedback (data).
- Section for registered users.
- Creative Commons - based IPR solution.

After Szeged meeting, an initial concept of registry data structure was further defined following consultations with Saloniit Anhovo (SA) and Cementarnica Usje cement plants. Representatives from cement plants gave their vision of what data shall the registry contains, and the joint concept was created. This concept was then further refined with several key RIS-ALiCE partners: ZAG, SIJ Acroni, BZN, Lucis and the VINS in many interactions by email. This activity took place in October 2019.

The final concept (registry functionalities outline and data structure) was sent once again to the whole consortium for a possible last-minute check-up and comments on 8. 11. 2019. Only several replies, concerning additional clarification was obtained, but no major or minor requests for modifications. This allowed GeoZS to start preparing the final version of the deliverable D4.2 - *Registry prototype blueprints*.



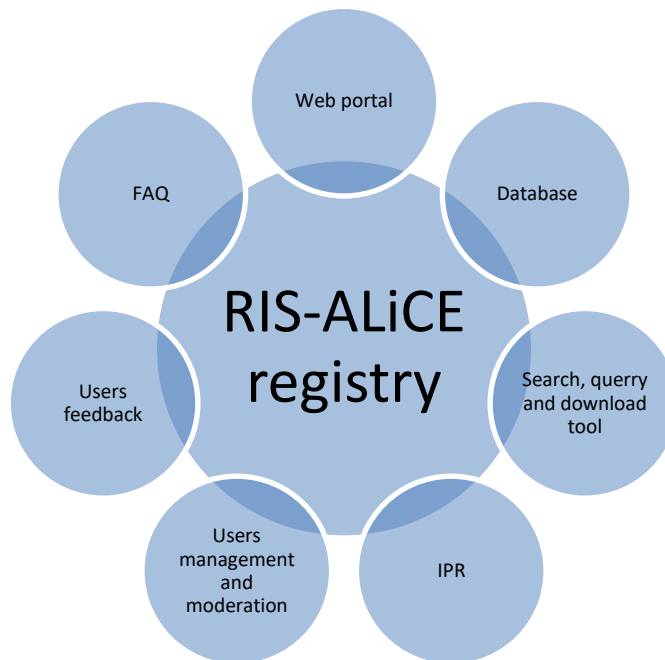
### 3. RIS-ALICE REGISTRY BLUEPRINTS

Registry blueprints provide general rules for the creation and coding of the registry. Which actual solutions are going to be used will be decided by the software company (Lucis), not the registry blueprints. Moreover, the registry blueprints provide a general frame for the registry, describing its key components, including IPR issues, sustainability issues, etc.

The main components of the RIS-ALiCE's registry have been identified as follows:

- Web portal.
- Database.
- Search, Query and data download (table and individual reports).
- IPR.
- Upload tool (web form).
- User management (for moderator).
- Feedback (on portal, on specific datasets) section.
- Help & FAQ.

The main components of the registry are presented in Figure 2. Each of the components is described in greater details in the following text.



**Figure 2:** *RIS-ALiCE registry main components.*

### 3.1. WEB PORTAL

Web portal must be **user-friendly**. That means that the registry design is simple, transparent, logical, and features are easy to find. This is also the reason why the consortium decided to keep features of the registry at minimum and to start only with the basic ones. Data shall be presented in a **clickable map** and a **tabular** form, with options to **export** the tables in a commonly known format (i.e. pdf, xlsx, csv). The **core functionalities**, which the user can choose from on the home page, are:

- Browse the data
- Search the data
- Upload data

**Other features**, which must be easily identified on the home page are:

- IPR and rules of data use
- Help and FAQ section
- Users feedback
- Log-in and registration for new users

Recommended **fonts** are “Arial”, “Calibri” and submissive “Cambria”. Dominant **colours** shall be dark green (R159 G192 B91), light green (R240 G247 B227) and grey (R151 G152 B157). All pages and sub-pages must comply with the **graphical rules** of the project and EIT-RawMaterials, and must contain:

- RIS-ALiCE logo
- EU logo + text “This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation.”
- 2 x EIT logos
- Full name of the project and project number: “EIT RM RIS-ALiCE: Al-rich industrial residues for mineral binders in ESEE region, no. 18258”
- Acknowledgment “This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation.”

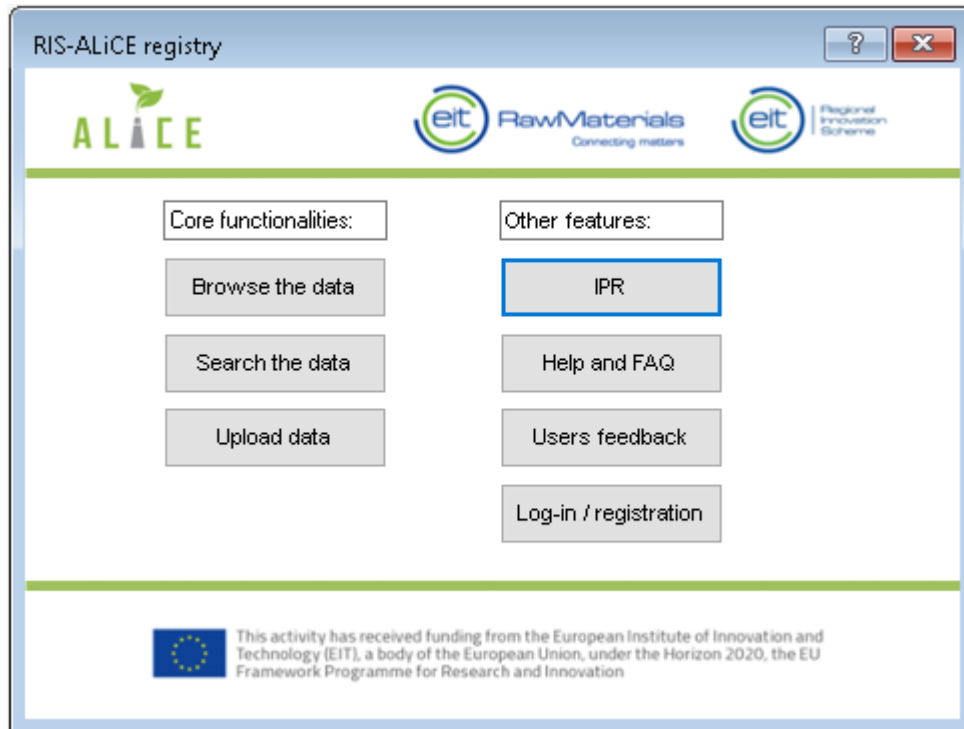
The language of the registry is **English**.

Figure 3 graphically presents one example of the registry’s main screen, showing the main components of the registry’s web portal, which needs to be easily identified, and all of the required graphical elements. Of course, software company LUCIS who has experience in registry building will decide about actual graphical design, according to best practices.

It is advised to use commonly used programming tools, which produce results that can be transferred to different servers (i.e. Windows, Linux), allow fast loading and do not consume a lot of processing time. Basic editing (i.e. text, figures, user management, etc.) must be made easy to use for a “averagely

literate” computer user. The use of plug-ins shall be limited to the necessary ones only. Therefore, it is advised that the map is loaded only if the user wants to browse the data or to geographically present search results.

However, after the test procedure of RIS-ALiCE registry, new features could be added, if the users find them useful or necessary, including dashboard, a user forum, document repository, valorization tool or similar.



**Figure 3:** A possible example of RIS-ALiCE registry home screen, showing main components and required graphical elements.

### 3.2. INTELLECTUAL PROPERTY RIGHTS

Proper management of the intellectual property rights is a very important aspect of such a portal. It is crucial that users are aware of what can be done with the data contained in the registry and what cannot be done. Without clear IPR rules, larger industrial companies might not want to cooperate, or the cooperation would be very limited. Therefore, the consortium agreed that it is crucial to maintain several **different levels of data**, according to what can be done with such data and what cannot be done. After this is agreed, user management can follow RIS-ALiCE registry data use policy. 3 levels of data have been defined, and they follow license according to Creative Commons model (<https://creativecommons.org/>):

- 1) **Public level:** data uploaded as “public” can be freely browsed, viewed, downloaded, used, shared and adapted by everyone, no restrictions of their use. Data can be copied, distributed, displayed and make further derivate works out of it by anybody. Commercial use is allowed. Such license is represented by the symbol presented in Figure 4a.
- 2) **Restricted level:** data uploaded as restricted can be copied, distributed, displayed or be used for work, but it could not be used to prepare derivate works based on such data. Commercial use is allowed. Data can be viewed or downloaded only by the RIS-ALiCE registered users. Such license is represented by the symbol presented in Figure 4b.
- 3) **Confidential level:** Data provider can place notification, that specific data is available, and where and how can be obtained, but actual data won't be uploaded on the registry, or be part of it. Actual data exchange will be conducted solely on a bi-lateral agreement between the data provider and a person who request the data, not through the registry, but by other means of data exchange. There is no need for a special license, since RIS-ALiCE registry will not store, archive or serve such data, but only information, that data is available from the data provider.



**Figure 4:** RIS-ALiCE data licenses for (a) public and (b) restricted level.

Additionally, a disclaimer shall be placed on a visible spot on the registry, that registry operator is not liable for any misuse of data, or any damages occurred as the consequences of data use.

### 3.3 USER MANAGEMENT

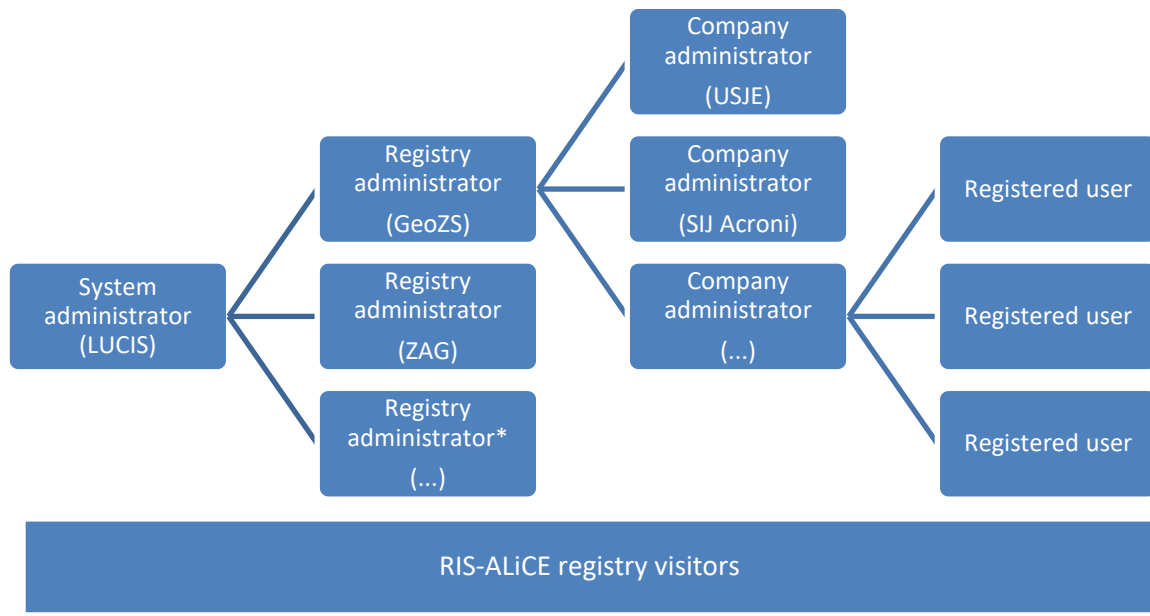
To follow the data IPR policy, several user levels are defined. Each user level has his/her own permissions and responsibilities. 4 user levels are foreseen:

- 1) **System administrator:** the system administrator is the company/person which made the code and has a direct access to the database and the portal. The system administrator is also in charge of backups, server uptime, and security. It assigns **Registry administrators**. During the RIS-ALiCE project the system administrator will be appointed by LUCIS.
- 2) **Registry administrator:** the main role of the registry administrator will be to assign company administrators. The key role of the registry administrator is to validate whether a request for (new) registration arrives from an actual company. This will be done either by checking the company by phone, email or by some other means of validation. One component of validation is to make the company administrator aware of the data use policy of the registry. If the validation process is successful, he/she assigns an individual **company administrator**. The registry administrator also has the possibility to moderate comments and user's feedbacks. During the RIS-ALiCE project, 1 person from GeoZS and 1 person from ZAG will be assigned as registry administrator, with the option to add new administrators from other countries in the future.
- 3) **Company administrator:** each company, which is going to be user of the RIS-ALiCE registry (whether as a data provider or data user), will have one company administrator, who can add or remove **Registered users**. The main idea behind this is that each company has complete control

over who can add or modify data about AI-rich residues or wastes, associated with their company. Each company administrator is responsible for the data contained in the registry, associated with this specific company.

- 4) **Registered user:** registered end-user can access the data of public and restricted level, can provide comments on the web portal as well as for the comments on the specific registry entries, can add new data, which is linked to the company he/she is representing, and can modify or remove data, which has been submitted on behalf of this company in the past. Registered user also assigns access level for each entry or for a specific data, that has been provided by their own company.
- 5) **Visitor:** visitor is a random visitor or a stakeholder of the RIS-ALiCE project, who can access the data in public level, can provide comments on the web portal, and can apply for the registration.

Figure 5 presents different user levels in RIS-ALiCE project.



**Figure 5:** A schematic representation of RIS-ALiCE registry user management. \* - this can be arranged also in a way that each country has its own registry administrator.

### 3.4 REGISTRY SUSTAINABILITY AFTER THE END OF RIS-ALICE PROJECT

There are many ways to assure the sustainability of the registry once the RIS-ALICE project ends. Assuring sustainability of the registry means its constant moderation, constant upgrade, maintenance of server space and domain registration, taking care of security and other possible tasks.

At the end of the project, the system administrator (LUCIS) will assure that the registry's' content, the source code, passwords and the registration of a domain is transferred to the party which will become in-charge of maintenance of registry after the RIS-ALiCE project ends. The transfer must be made within a 12-month period after the official closure of the project, otherwise LUCIS will transfer dynamic and static version of the page to the coordinating institution ZAG.

According to the project agreement a professional association will be established at the final stage of the project (mainly addressing industry, but coordinated within knowledge triangle networking activities by lead partner), which will consist of AI-waste producers, end-users and other interested parties and will present sustainable result of the project. This association could also be responsible for the registry maintenance after the RIS-ALiCE project finish. However, other options could also be viable, so the project consortium discussed many other scenarios, which are presented in this chapter, including:

- Managed by RIS-ALiCE profit organisation,
- Managed by one non-profit RIS-ALiCE partner,
- Collective management by several interested RIS-ALiCE parties (i.e. ALiCE professional, association),
- Make the registry static and put it on the ZAG servers,
- Establish a commercial company which manages the registry,
- Registry is managed by interesting third party or by interesting association.

A short SWOT analysis is made for each of the possibilities and is presented in the following tables. These SWOT analyses have been refined by the RIS-ALiCE project consortium during the M12 meeting in Ljubljana, 12. 2. 2020.

<b>Managed by RIS-ALiCE profit organization</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>- dedication, increased focus</li> <li>- strong knowledge of potential providers/users in the local area</li> <li>- strong knowledge of potential users in their core business</li> <li>- competitive advantage for the company</li> </ul>	<ul style="list-style-type: none"> <li>- if more than one partner is interested it could be hard to reach a consensus</li> <li>- a partner might not be interested in registry maintenance after a certain amount of time</li> <li>- a company might make the registry not available for public</li> <li>- limited knowledge about potential registry users outside their core business</li> <li>- quick shift of the focus to another commodity</li> <li>- can manipulate the data</li> </ul>
<b>OPPURTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>- good for business and promotion</li> <li>- can more easily adapt to possible changes in waste policies or IPR rules</li> <li>- can bring new business</li> <li>- registry can be commercialised</li> </ul>	<ul style="list-style-type: none"> <li>- decreased trust of stakeholders because the registry operator could be their competition</li> <li>- registry relevance is decreased</li> <li>- can be against the rules</li> </ul>

<b>Managed by non-profit RIS-ALiCE partner</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>- dedication</li> <li>- strong local knowledge</li> <li>- independent non-profit, service for all</li> <li>- registry can be used as a reference for future projects</li> </ul>	<ul style="list-style-type: none"> <li>- if more than one partner is interested it could be hard to reach a consensus</li> <li>- a partner might not be interested in registry maintenance after a certain amount of time</li> <li>- lack of funding and human resources</li> </ul>
<b>OPPURTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>- good for the promotion of the institute</li> <li>- improving connection with the industry</li> <li>- improved trust because registry operator is a non-profit organisation</li> <li>- increased relevancy of the registry</li> <li>- data can be more easily used for research, education and outreach activities and policy-making and decision-making</li> </ul>	<ul style="list-style-type: none"> <li>- a single partner might have limited geographic coverage</li> <li>- lack of funding of non-profit organisation could shut down the registry</li> </ul>

<b>Collective management by several interested RIS-ALiCE parties (i.e. ALiCE professional association)</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>- dedication</li> <li>- good geographical coverage can be obtained</li> <li>- multilingual approach can be used</li> <li>- more robust in case one partner decides to leave</li> <li>- registry can be promoted more easily</li> <li>- registry can be more easily extended to other types of waste</li> <li>- several task bodies addressing various aspects of AI-rich and also other residues and recycling practices could be established, extending the scope of the association</li> </ul>	<ul style="list-style-type: none"> <li>- decision-making can be harder</li> <li>- funding of the registry is dispersed among many parties</li> <li>- higher total investments of time, efforts and costs to maintain the registry</li> <li>- hard to maintain standard validation protocols, in time the registry might become flooded with irrelevant or obsolete data</li> <li>- possible lack of human resources or not active participants</li> </ul>
<b>OPPORTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>- can be good to attract many new users</li> <li>- possible to add new partners and to expand geographical and coverage of materials (wastes)</li> <li>- can attract larger pool of new users and can attract new data</li> </ul>	<ul style="list-style-type: none"> <li>- changes in waste policies and IPR rules in different countries could make managing of registry difficult</li> </ul>

<b>Make the registry static and put it on the ZAG / GeoZS server</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>- data collected within RIS-ALiCE project is stored and available</li> <li>- easy to implement</li> <li>- insignificant cost</li> </ul>	<ul style="list-style-type: none"> <li>- data cannot be updated and becomes out of date and not relevant through time</li> <li>- registry cannot be maintained</li> </ul>
<b>OPPORTUNITIES</b>	<b>THREATS</b>
	<ul style="list-style-type: none"> <li>- hackers</li> </ul>



<b>Establish a commercial company which manages the registry</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>- single entity, dedication for the growth of the registry</li> </ul>	<ul style="list-style-type: none"> <li>- complex procedure</li> <li>- initial investment</li> <li>- funding needed, low risk of success</li> </ul>
<b>OPPURTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>- potentially large registry growth (geographically and by the means of materials and uses)</li> <li>- business model can be made, and registry can be commercialised (i.e. companies might be willing to pay a fee to use the registry)</li> </ul>	<ul style="list-style-type: none"> <li>- might not be 100% compatible with EIT-RM rules</li> <li>- hard to gain enough revenues</li> </ul>

<b>Registry is managed by interesting third party or interested association</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>- interest</li> <li>- can be commercialised</li> </ul>	<ul style="list-style-type: none"> <li>- only a registry core can be used and adapted to other needs outside the RIS-ALICE registry purpose</li> <li>- can be commercialised</li> <li>- hard to find interested company</li> </ul>
<b>OPPURTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>- registry growth</li> <li>- can attract investors</li> <li>- can attract several organisations (i.e. IAEA, ENA etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- might not be 100% compatible with EIT-RM rules</li> </ul>

### 3.5 DATABASE STRUCTURE ON AL-RICH MATERIALS

This file describes a complete dataset about Al-rich material. Specific instructions for the code writers are in italics. If a company has more types of waste, a separate entry is needed for each of the waste types. The RIS-ALiCE database's nine main components are presented in Figure 6. Field <Click or tap here to enter text.> indicates that the user needs to insert text or numeric value in the textbox and <\*> indicates required fields.

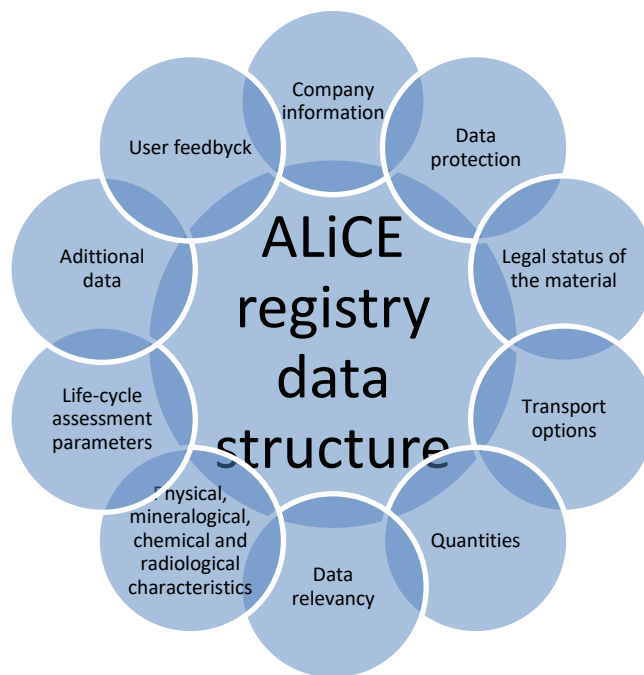


Figure 6: RIS-ALiCE registry main components of data.

## COMPANY INFORMATION

**1.1 Basic information about the company** *(some information will be filled-in automatically from the data obtained at registration, however, user will have an option to correct specific information):*

- name of the company\*
- web page
- short description\*
- contact person (name, surname)\*
- contact person (email)\*
- contact person (phone)\*
- location of the waste (WGS coordinates, lon/lat)\*
- logo (jpg, link)


**1.2 Type of the company\*** *(user will select one or more from the list):*

- waste producer
- by-product producer
- waste holder
- recycling
- waste collection
- waste storage
- waste transport
- other (please specify)

## DATA PROTECTION

2 **Data protection\***: please define the access level for the dataset (*The user will select the default setting for the data placed in the registry by choosing one option from the two*):

Free to use by everybody (CC license )

Free to use by ALiCE registered users only (restricted CC licence )

However, the user will have an option, to change the default data protection level for each of the entry separately, with an additional option, indicating that data is available but is not placed in the registry, as indicated below:

**Data is not part of the registry**, certain data is available from the data provider and can be obtained from the data provider upon request (by bi-lateral agreement (not part of the registry))

## LEGAL STATUS OF THE MATERIAL

3.1 **Type of the material\*** (*user will select one from the list*):

- Steel slag
- Fly ash (coal)
- Bottom ash (coal)
- Other type of ash
- Red mud
- Construction and demolition waste
- Mine tailings
- Mine spoils
- Mineral raw material
- Other (please specify)

**3.2 The legal status of the material according to the EC Waste Framework Directive\*** (*user will select one from the list*):

- Mineral raw material
- Inert waste
- Non-hazardous waste
- Hazardous waste
- By-product
- Other (please specify)

**3.2.a. In the case of hazardous waste please specify hazards** (*user will select one or more from the list*):

- Explosive
- Oxidising
- Flammable
- Irritant (skin irritation or eye damage)
- Specific target organ toxicity/aspiration toxicity
- Acute Toxicity
- Carcinogenic
- Corrosive
- Infectious
- Toxic for reproduction
- Mutagenic
- Release of an acute toxic gas
- Sensitising
- Ecotoxic
- Waste capable of exhibiting a hazardous property listed above not directly displayed by the original waste

### 3.3 Material classification code:

User will place a code in a textbox (i.e. "20 03 01"). For waste, a 6-digit waste classification code is used (EC decision 2000D0532), for by-products an ECHA number or CAS number can be applied (text string). A drop-down menu will appear after the textbox, where the user will indicate which classification code is placed.

### 3.4 Ownership of the material (please describe)\* (user will describe the ownership in the textbox provided):

Click or tap here to enter text.

## TRANSPORT OPTIONS

### 4.1 Waste loading options at the source for the AI-containing material (user will select one or more from the list):

Truck

Rail

Ship

Other (please specify): Click or tap here to enter text.

### 4.2 Conveying options/possibilities of material (user will select one or more from the list):

Pneumatic transport

Conveyor belt

Other (please specify): Click or tap here to enter text.

## QUANTITIES

### 5 Quantities of material\*

- Annual production: Click or tap here to enter text. t/y
- Current stockpile: Click or tap here to enter text. t, date: Click or tap here to enter text.
- unknown

## DATA RELEVANCY

### 6 Data relevancy\*:

- Date of the data entry (*automatically filled by the system by using the date of entry, but users can modify it*)
- Date of last data upgrade (*automatically filled by the system by using the date of entry, but a user can modify it*)
- Data entered by (*automatically filled by the system*)

#### 6.1 Sampling procedure and representativeness of analytical results, temporal and spatial variability of the material (please describe)\* (*user will describe the sampling procedure in the textbox provided*):

Click or tap here to enter text.

## PHYSICAL, MINERALOGICAL, CHEMICAL AND RADIOLOGICAL CHARACTERISTICS OF THE MATERIAL

### 7 Chemical composition of the material:

- Content of Al<sub>2</sub>O<sub>3</sub>\*: Click or tap here to enter text. wt% (if not XRF method please specify)
- Content of SiO<sub>2</sub>\*: Click or tap here to enter text. wt% (if not XRF method please specify)
- Content of Fe<sub>2</sub>O<sub>3</sub>\*: Click or tap here to enter text. wt% (if not XRF method please specify)
- Content of CaO\*: Click or tap here to enter text. wt% (if not XRF method please specify)
- Content of MgO: Click or tap here to enter text. wt% (if not XRF method please specify)
- Content of Cr<sub>2</sub>O<sub>3</sub>: Click or tap here to enter text. wt% (if not XRF method please specify)
- Content of P<sub>2</sub>O<sub>5</sub>: Click or tap here to enter text. wt% (if not XRF method please specify)
- Content of F: Click or tap here to enter text. wt% (ion-selective method)
- Content of Cl: Click or tap here to enter text. wt% (wet chemistry)
- Content of SO<sub>3</sub>: Click or tap here to enter text. wt%
- Content of K<sub>2</sub>O: Click or tap here to enter text. wt%
- Content of Na<sub>2</sub>O: Click or tap here to enter text. wt%
- Total organic substance: Click or tap here to enter text. wt%
- Presence of important organic substances (i.e. PCB, PAH, etc., *user can provide text description*): Click or tap here to enter text.
- Presence of other elements, like potentially toxic elements, metals. and metalloids, not listed above and if are typical for individual material type with corresponding elemental levels in mg/kg):

*At this last bullet point, user will have an “add” button and can insert new measurement with the following information: element, level, unit (usually mg/kg) and measurement method.*

## 8 Mineralogical composition of the material:

- Content of crystalline phases present in the amounts higher than 5% (XRD)

*At this bullet point, the user will have an “add” button and can insert new measurement with the following information: name of crystalline phase and chemical formula and the amount (usually expressed as wt%).*

- Content of amorphous silica: Click or tap here to enter text. wt%
- Content of respirable crystalline SiO<sub>2</sub>: Click or tap here to enter text. wt%
- Content of amorphous phase: Click or tap here to enter text. wt% (XRD)

## 9 Physical characteristics of the material:

- Particle density: Click or tap here to enter text. kg/m<sup>3</sup> (EN 1097-7)
- Bulk density: Click or tap here to enter text. kg/m<sup>3</sup>
- Moisture content: Click or tap here to enter text. %
- Homogeneity (please, describe) (*user will have an option to qualitatively describe homogeneity*): Click or tap here to enter text.
- Particle size distribution – the method used (*user will select one of the measuring methods from the list*):
  - Sieve analysis (EN 933-1)
  - Laser diffraction
  - Other (please specify)

⇒ *If sieve analysis is selected, the user is diverted to the following section, where an arbitrary amount of sieve used in sieve analysis can be entered by placing <add sieve> button:*

- Content of Click or tap here to enter text. mm fraction: Click or tap here to enter text. wt%

⇒ *If the laser diffraction method is selected, then the user is diverted to the following section:*

- Value of D<sub>10</sub> (10% of a particle smaller than D<sub>10</sub>): Click or tap here to enter text. μm
- Value of D<sub>50</sub> (50% of a particle smaller than D<sub>50</sub>): Click or tap here to enter text. μm
- Value of D<sub>90</sub> (90% of a particle smaller than D<sub>90</sub>): Click or tap here to enter text. μm
- Specific particle surface: Click or tap here to enter text. cm<sup>2</sup>/g



Particle size distribution analysis results are available (please, attach pdf or jpg) (*this section is designated to upload the results of particle size analysis - by ticking this box an upload tool shall appear and user can upload one or more documents*)

#### 10 Radiological characteristics of the material:

- Specific activity of <sup>40</sup>K: Click or tap here to enter text. Bq/kg
- Specific activity of <sup>137</sup>Cs: Click or tap here to enter text. Bq/kg
- Specific activity of <sup>210</sup>Pb: Click or tap here to enter text. Bq/kg
- Specific activity of <sup>226</sup>Ra: Click or tap here to enter text. Bq/kg
- Specific activity of <sup>232</sup>Th: Click or tap here to enter text. Bq/kg
- Specific activity of <sup>235</sup>U: Click or tap here to enter text. Bq/kg
- Specific activity of <sup>238</sup>U: Click or tap here to enter text. Bq/kg

#### LIFE-CYCLE ASSESSMENT PARAMETERS

- Climate change – total (GWP-total): Click or tap here to enter text. Kg CO<sub>2</sub> eq.
- Ozone depletion (ODP): Click or tap here to enter text. Kg CFC 11 eq.
- Acidification (AP): Click or tap here to enter text. Mol H<sup>+</sup> eq.
- Eutrophication potential – freshwater (EP-freshwater): Click or tap here to enter text. Kg PO<sub>4</sub> eq.
- Photochemical ozone formation (POCP): Click or tap here to enter text. Kg NMVOC eq.
- Water use (water): Click or tap here to enter text. m world eq. deprived.

LCA report: description / attachment pdf, jpg

#### ADDITIONAL DATA

#### 11 Additional data (*in this section the user can upload additional documents or photos*):

- Certificates** (i.e. safety data sheet, technical specifications, waste assessment reports etc.): description / attachment pdf, jpg
- Laboratory analyses**: description / attachment pdf, jpg
- Photograph(s)**: description / attachment jpg
- Other documents**: description / attachment pdf, jpg

## USER FEEDBACK

*In this section, user can report problems with the data (i.e. potential errors) comment about the dataset.  
This is a moderated section.*

### 12 Report potential error and comments:

<user> <date> Click or tap here to enter text.

## 4. FUTURE STEPS

This document is the baseline for creating the registry prototype (T4.3) by LUCIS until M15. The prototype will be tested by RIS-ALiCE partners, first by inserting the data obtained from WP3, and will be promoted on various workshops and events in the HU, SI and BA to attract stakeholders (M15 – M21). At the same time, user feedback will be recorded.

Based on the recorded feedback, LUCIS will prepare the final version of the registry (M24), which will be launched to the whole ESEE area by VINS, with the help of all RIS-ALiCE partners.

## 5. CONCLUSIONS

This document presents the RIS-ALiCE registry blueprint. Registry blueprints were created in a chain of events and consultations with individual RIS-ALiCE partners, as well as with the consultations with the entire consortium at RIS-ALiCE project meetings. It describes the main registry components, user management, IPR and data protection policy, registry data structure and other important features. It will be used as a set of instructions for the RIS-ALiCE partner LUCIS, who will produce an on-line version (shell) of the registry, ready to be tested in SI, BA, and HU. This document does not describe the final version of the registry since it will be modified according to the user feedback until M24.