

<https://helda.helsinki.fi>

---

## eLTER RI Cost Book : PPP Deliverable D4.1

Alam, Syed Ashraf

European Long-Term Ecosystem, critical zone and socio-ecological Research Infrastructure  
Preparatory Phase Project (eLTER RI PPP)  
2021-03-09

---

Alam , S A , Bäck , J , Rasilo , T , Kaukolehto , M , Orenstein , D & Mirtl , M 2021 , eLTER RI  
Cost Book : PPP Deliverable D4.1 . European Long-Term Ecosystem, critical zone and  
socio-ecological Research Infrastructure Preparatory Phase Project (eLTER RI PPP) . <  
<https://www.elter-projects.org/storage/app/uploads/public/62c/ea1/8f3/62cea18f3f716875958298.pdf>  
>

---

<http://hdl.handle.net/10138/352527>

---

publishedVersion

---

*Downloaded from Helda, University of Helsinki institutional repository.*

*This is an electronic reprint of the original article.*

*This reprint may differ from the original in pagination and typographic detail.*

*Please cite the original version.*



**European Long-Term Ecosystem, critical zone and socio-ecological Research  
Infrastructure Preparatory Phase Project**

**eLTER RI Cost Book**

**PPP Deliverable D4.1**

09 March 2021

**Authors and affiliations:**

Syed Ashraful Alam (UH, FIN)  
Jaana Bäck (UH, FIN)  
Terhi Rasilo (UH, FIN)  
Marjut Kaukolehto (UFZ, Germany)  
Daniel Orenstein (IIT, Israel)  
Michael Mirtl (UFZ, Germany)

**Contributing authors and affiliations:**

Tanja Pipan (ZRC SAZU, Slovenia)  
Anne Turbé (IIT, Israel)  
Christine Schrive (CNRS, France)  
Herbert Haubold (EAA, Austria)  
Isabelle Braud (CNRS, France)  
Lubos Halada (ILE SAS, Slovakia)  
Mathilde Emery (CNRS, France)  
Philippe Choler (CNRS, France)  
Shayli Dor-Haim (BGU, Israel)



Prepared under contract from the European Commission  
 Grant agreement No. 871128 (eLTER PLUS)  
 Grant agreement No. 871126 (eLTER PPP)  
 EU Horizon 2020 Research and Innovation action

Project acronym: **eLTER PPP**  
 Project full title: European long-term ecosystem, critical zone and socio-ecological systems research infrastructure Preparatory Phase Project  
 Start of the project: Feb 2020  
 Duration: 60 months  
 Website (preliminary): <https://www.lter-europe.net/projects/elter-ppp>

Deliverable title: eLTER RI Cost Book  
 Deliverable no: eLTER PPP D4.1  
 Nature of the deliverable: Report  
 Dissemination level: Public

Citation: Alam, SA.; Bäck, J.; Rasilo, T.; Kaukolehto, M.; Orenstein, D.; Mirtl, M.; Pipan, T.; Turbé, A.; Schrive, C.; Haubold, H.; Braud, I.; Halada, L.; Emery, M.; Choler, P.; Dor-Haim, S. (2021). *eLTER RI Cost Book*. Deliverable D4.1. EU Horizon 2020 eLTER PPP Project, Grant agreement No. 871126.

#### Deliverable status:

Version	Status	Date	Author(s)
0.1	Draft	26 January 2021	Syed Ashraful Alam (UH, FIN), Jaana Bäck (UH, FIN) Terhi Rasilo (UH, FIN)
0.2	Draft (submitted for internal review)	02 March 2021	Syed Ashraful Alam (UH, FIN) Jaana Bäck (UH, FIN) Terhi Rasilo (UH, FIN) Marjut Kaukolehto (UFZ, Germany) Daniel Orenstein (IIT, Israel) Michael Mirtl (UFZ, Germany)
1.0	Final	09 March 2021	Mark Frenzel (UFZ-Germany, nominated as internal reviewer)- minor adaptations

The content of this deliverable does not necessarily reflect the official opinions of the European Commission or other institutions of the European Union.

## Table of Contents

1. Introduction.....	5
2. Objectives of the Cost Book.....	5
3. Scope of the Cost Book.....	5
4. Structure of the Cost Book.....	6
5. Rules and assumptions for the cost estimates.....	7
5.1 Basic assumptions.....	7
5.2 Costs to be estimated.....	7
5.3 Currency.....	8
5.4 Cost components excluded.....	8
5.5 Inflation.....	8
5.6 Contingency.....	8
5.7 Cost estimation methods.....	8
6. Cost Estimate Collecting Tool.....	10
7. Structure of Cost Estimate Collecting Tool.....	10
7.1 Introduction.....	10
7.2 General Information.....	10
7.3 Cost sections.....	11
7.4 Section 1: Implementation costs.....	11
7.5 Section 2: Operation costs.....	14
7.6 Section 3: Decommissioning costs.....	16
8. First estimates of eLTER RI Cost Book.....	18
8.1 eLTER Head Office's cost estimates.....	19
8.2 eLTER NRIs (Sites/Platforms) cost estimates.....	20
9. Caveats and challenges of eLTER RI cost estimates.....	23
10. Appendices.....	24

## Table of Figures

Figure 1. Cost Book chapters.....	6
Figure 2. Cost Book overall structure.....	7
Figure 3. Cost Book processing timeline (Phase 1).....	9
Figure 4. Site- and Central Services-specific cost estimates submission status (n = 88, by 17 countries).....	18
Figure 5. Country- and Site-specific cost estimates submission status (n = 87, excluding Head Office).....	18
Figure 6. Head Office's cost estimates (in K Euro) across RI life cycle.....	19
Figure 7. Site-specific cost estimates (in K Euro, provided by 17 countries) across RI life cycle.....	20
Figure 8. Country-specific costs estimates (in K Euro, including all the Site categories) across RI life cycle.....	21
Figure 9. Country- and Site-specific cost allocation (in percentage) across RI life cycle.....	22
Figure 10. Country-specific cost allocation (in percentage, including all the Site categories) across RI life cycle.....	23
Figure 11. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 1.....	27
Figure 12. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 2.....	28

Figure 13. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 3.....	29
Figure 14. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 4.....	30
Figure 15. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 5.....	31

## Tables

Table 1. Cost items description for the sheet “Section 1: Implementation Costs” of Cost Estimate Collecting Tool .....	12
Table 2. Cost items description for the sheet “Section 2: Operation Costs” of Cost Estimate Collecting Tool....	14
Table 3. Cost items description for the sheet “Section 3: Decommissioning Costs” of Cost Estimate Collecting Tool .....	17
Table 4. Country- and Site-specific cost estimates submission status (n = 87, excluding Head Office) .....	24
Table 5. Site- and Central Services-specific cost estimates (in K Euro, provided by 17 countries) across RI life cycle .....	24
Table 6. Country-specific cost estimates (in K Euro, including all the Site categories) across RI life cycle .....	25
Table 7. Country- and Site-specific cost estimates (in K Euro) across RI life cycle .....	25

## 1. Introduction

This document is intended to deliver the Cost Book for the eLTER RI (the integrated European Long-Term Ecosystem, critical zone and socio-ecological Research Infrastructure). It describes the mission of the Cost Book and provides details on the framework, principles and process adopted to collect cost data along the life cycle<sup>1</sup> of eLTER RI in a common and homogeneous way. The cost estimates, provided through dedicated Figures for National Research Infrastructures (NRIs i.e. the national eLTER Sites and eLTER Platforms) and Central Services (CS; now Head Office only), are those collected using the eLTER Cost Estimate Collecting Tool (Excel spreadsheet).

## 2. Objectives of the Cost Book

The mission of the Cost Book is to help in identification, definition, and realistic planning of the overall infrastructure costs for the entire eLTER RI lifetime. It serves to:

- Support the Shareholders' engagement by providing information on the value of the investment needed to realize the RI or one of its CS/NRIs,
- Assess the necessary information to evaluate the long-term sustainability of the eLTER RI in the Financial Plan (activity to be done within PPP Task 4.2 Funding model scenarios), and
- Provide comprehensive information for the future ESFRI monitoring and evaluation activities.

As such, the Cost Book is a reference document to be used also in the future. It is important to note that the Cost Book will need to be revised as the Technical Concepts are finalised and eLTER RI service offering consolidated (see section 5.7). The first edition of the Cost Book is needed to trigger concrete financial plans, to identify the key issues in financial planning, to organise training among the community to make realistic cost estimates for different life cycle phases, and to be able to start developing the Cost Benefit Analysis (D4.2) and Five Years Financial Plan (D4.4) in due time. The final version of the Cost Book is due in project M36 (Jan 2023).

## 3. Scope of the Cost Book

The scope of the Cost Book is defined according to the technical requirement outlined in the concepts of CS and NRIs, as resulting from the work of PPP WP5 (Design and piloting of central services) and WP6 (Operation and design: NRI). In particular, the concept work of Task 5.2 (Central services conceptualisation), Task 6.1 (Standardization and harmonization) and Task 6.2 (NRI requirements and concepts) provides direct input for the Cost Book. Outcomes of WP6 are reflected into the technical concepts of the Sites/ Platforms, and as such, they represent indirect input for the Cost Book.

The Technical Concepts of the NRIs (Sites/Platforms) will clearly and neatly define the Cost Book perimeter, demarcating what is in it and what is out of it. In the case of co-location (e.g. where and when, at National level, eLTER resources are co-located with other RIs and institutions), the costs must only refer to the eLTER activities, as resulting from the Concepts.

Shaped upon the Technical Concepts and following the eLTER RI life cycle, the Cost Book:

- Includes all costs to **construct** the CS and NRIs from the ground up and/or upgrading them to the level of eLTER standards, following the Concept that will be adopted for them (*Implementation Phase*),
- Includes all costs to **operate** the CS and NRIs providing the services planned in the Concepts (including physical, remote, and virtual access - *Operation Phase*),

---

<sup>1</sup> The Cost Book uses the life cycle concept of the ESFRI guidelines. The initial envisaged eLTER RI life cycle is about 25 years including Implementation phase (5 years, starting from 2020), Operation phase (ca. 20 years, starting from 2025) and Decommissioning phase (ca. 1 year, 2045).

- Includes costs for **dismantling** the CS and NRIs (*Decommissioning Phase*), and
- Excludes the costs for features and services that are not planned in the CS and NRIs concepts (e.g. costs for new services and/or major upgrades that can be devised during the RI operations).

The Cost Book summarizes the Capital Investments<sup>2</sup> for the RI, intended as the total assets of a RI or value of the investment to realize it. The value of the RI, i.e. what is worth for the users, is beyond the scope of the Cost Book, since this will be part of the evaluations of the Business and Sustainability Plan (D4.5). Considerations about the sources for funding are also out of the scope of the Cost Book, as they will be included in the Financial Plan.

#### 4. Structure of the Cost Book

The eLTER Cost Book scheme closely reflects the organizational structure of the eLTER RI. The final version of the Cost Book will feature specific chapters for the CS and NRIs (Fig. 1). Each NRI would include costs in each country for all their Sites and Platforms.

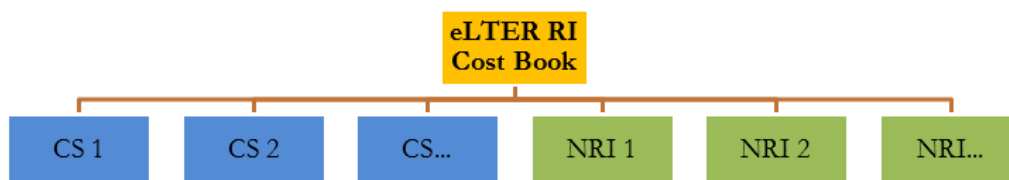


Figure 1. Cost Book chapters

Each CS/NRI chapter is structured in specific sections according to the phases of the eLTER RI lifecycle as resulting from the eLTER governance and management plan (WP2, D2.2). Following the ESFRI guide, the life cycle costing approach was applied to evaluate costs for each lifecycle phase of the RI (Fig. 2).

Each section of the Cost Book is structured with the same formal, comprehensive cost items (Fig. 2). The Cost Book sections are:

- **Implementation costs:** the total overall costs for the implementation phase (about 5 years for setting up of the CS/NRIs, 2020–2024). However, during the implementation phase, costs that were reported from the already existing Sites/Platforms for the year 2020 are considered as ‘**Capital Value**’.
- **Operation costs:** average annual operating costs for the operational phase starting from 2025 (20 years in which eLTER RI delivers advanced services for excellent science and maintenance and upgrades of instrumentations and methods, if needed).
- **Decommissioning costs:** the total overall costs for the termination phase (i.e. dismantling of CS/NRIs).

<sup>2</sup> The definition of Capital Investment as resulting in the Cost Book could not entirely match the definition of Capital Value from ESFRI Guide: “The Capital Value (CV) of a RI concerns the total assets of a RI or value of the investment for realizing it. Special cases exist for which the above definitions may not easily apply: surveys, data banks or sample collections for example are nevertheless representing a CV as soon as their results become assets available to users and can be defined by a Replacement Value according to their current worth”.

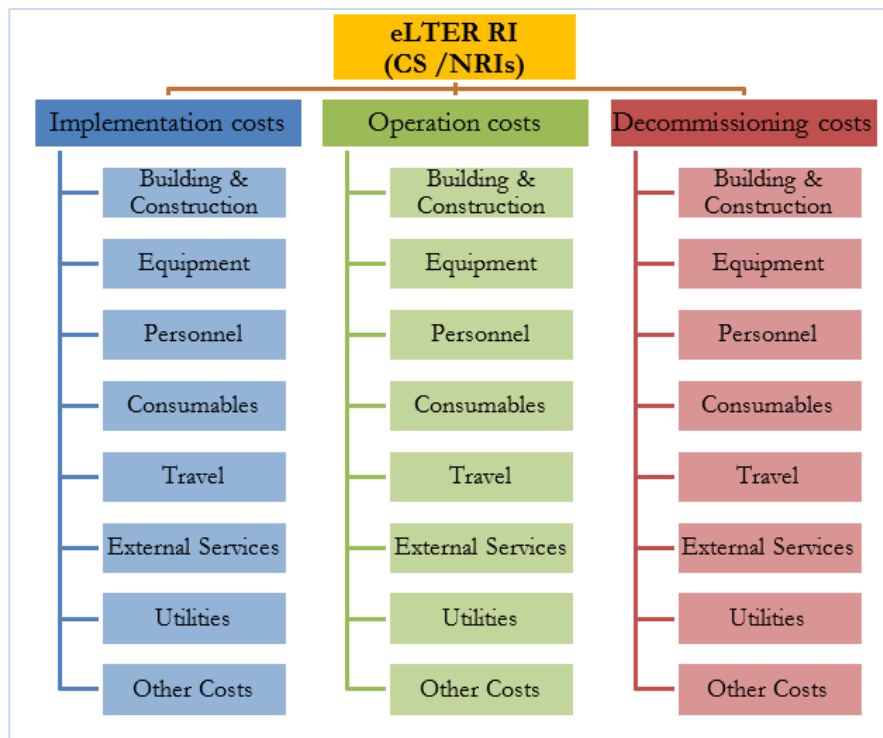


Figure 2. Cost Book overall structure

## 5. Rules and assumptions for the cost estimates

### 5.1 Basic assumptions

The entire Cost Book preparation process is based on the following assumptions:

- The Cost Book is not a Financial Plan:** it only reports the costs for the RI life cycle. No reference to contributions or revenues is included, as they will be identified in the Financial Plan,
- The Cost Book includes **all** the eLTER RI costs **starting from scratch**. This means that the existing and already available assets (buildings, equipment, etc.) were estimated according to their market value and included in the Cost Book, as they represent necessary resources to ensure the eLTER RI life and operations,
- Cost estimate is **standardized**. This means that, especially for some items, the main focus was on the required **units of resources** (and their standard market prices) more than on their monetary value in order to bypass significant differences from country to country, and
- All **assumptions regarding details and methods** for estimating the costs are reported **in the eLTER Cost Estimate Guide**, which was created to assist the persons filling the cost estimates and also integrated in this document. It supplements the eLTER Cost Estimate Collecting Tool (Excel spreadsheet, cf. Section 10. Appendices: Figs. 11–15). The Tool and the Guide follow the developments of the Technical Concepts and will be updated, if needed, as work on them proceeds.

### 5.2 Costs to be estimated

The costs to be included in the eLTER RI Cost Book comprise all the expenditures over the entire lifetime of the research infrastructure. All resources required for the construction/implementation and operation of the Sites and Platforms were estimated starting from scratch as defined under the relevant cost types. This means that the cost information on the existing and already available assets (buildings, equipment, etc.) were also provided in the estimation according to their market value. Such assets need to be included in the Cost Book as they represent necessary resources to ensure the eLTER RI life and operations. Estimates were required to reflect the real costs/prices without considering accounting methods like depreciation.



### 5.3 Currency

Cost estimates were provided in EURO. Countries with currencies other than the euro were asked to convert their estimates into euro, based on the Foreign Exchange Reference Rates published by the European Central Bank in Frankfurt/Main on the first day of the calendar year<sup>3</sup>.

### 5.4 Cost components excluded

**Non-operating expenses (financial transactions).** The components that were excluded from the cost estimates, include: Interests, Currency exchange losses, Provision of future losses or debts, Deductible VAT<sup>4</sup> and Bank costs.

### 5.5 Inflation

Inflation was disregarded when compilers (cf. Section 7.2 General Information) provided the cost information for the estimates. The budget for the eLTER RI has to take into account a certain level of inflation because it can seriously affect salaries, equipment, energy, etc. over time. To achieve reliable estimates, the effects of inflation over the anticipated time span of the eLTER RI will be considered in the *'final issues'* of the Cost Book (due in M36, Jan 2023) by adding a yearly deflator percent value to the final cost estimation. The WP4 Leader will perform this calculation once the final cost estimation is concluded, documenting the assumptions on which inflation index was applied<sup>5</sup>.

### 5.6 Contingency

Contingency, too, needed to be ignored by compilers when providing the cost information for the first stage of cost estimation.

However, the WP4 Leader will consider a contingency factor in the final version of the Cost Book in order to cover unanticipated expenditures. Contingency may be defined as “specific provisions for unforeseeable elements of cost within the defined scope”. As costs are generally calculated in the first instance based on standard conditions and mean efficiencies of activities, the contingency factor ensures that the estimate is realistic. Contingency should *not* be used to avoid making an accurate assessment of expected cost.

### 5.7 Cost estimation methods

Cost estimating involves collecting and analysing data to predict the future cost of the NRIs and CS based on either known historical data that are adjusted to reflect new materials, technology and needed personnel or on the estimates in the eLTER ESFRI application and other relevant and known European operative research infrastructures. In the first version of the Cost Book, the estimation of some cost items/categories (especially personnel and utilities) focuses more on the required units of resources than on their monetary value. For such items/categories, the expenditure in terms of monetary value may significantly differ from country to country, depending on different variables including, for example, local costs of the resources, local legislation, internal accounting principles<sup>6</sup>, time in which the estimation is made, and more.

During the eLTER PPP, the Cost Book is planned to be a living document (until M32, Sep 2022) and

---

<sup>3</sup>[https://www.ecb.europa.eu/stats/policy\\_and\\_exchange\\_rates/euro\\_reference\\_exchange\\_rates/html/index.en.html](https://www.ecb.europa.eu/stats/policy_and_exchange_rates/euro_reference_exchange_rates/html/index.en.html)

<sup>4</sup> Non-deductible VAT should be included in the estimation since it does represent a cost for the RI.

<sup>5</sup> For example, it could be considered as a fixed annual value of 2% (see “Business Plan” by the European Biobanking and Biomolecular Resources Research Infrastructure (BBMRI)), or the average of the inflation indexes amongst member states (see “Understanding and Monitoring the Cost-Determining Factors of Infrastructure Projects: a User's Guide” by European Commission Directorate General for Regional Policy and Cohesion).

<sup>6</sup> For instance, in some countries, personnel costs may include additional components such as, for instance, the “environmental cost” or a quota of the overheads. However, here only the salaries and the mandatory social costs were included.

the cost estimating process will be iterative as the work on the technical concepts of the CS and NRIs progresses in WPs 5–6. The Cost Book will be released at the end of a multiple stage process. At M36 (Jan 2023) of the PPP, the final version of the Cost Book will report all the costs of eLTER RI including both CS and NRIs.

The eLTER Site<sup>7</sup> and Platform Coordinators (SPCs) and Leaders of CS were asked to provide cost estimate data to the PPP Task 4.1 (Cost book and cost-benefit analysis) Leads using the Cost Estimate Collecting Tool. The early stage of the Cost Book focuses more on the NRIs than on the CS. This is because the work on the technical concepts for the CS (Task 5.2 scheduled in M36–48; Jan 2023–Jan 2024) produces deliverables later than that for the NRIs conceptualization (Task 6.2 scheduled in M22–48; Nov 2021–Jan 2024). Subsequent releases of the Cost Book will include more elaborated data for the CS. During the process, revisions/updating/integration of data in the Cost Estimate Collecting Tool will follow the development of CS and NRIs concepts. Since eLTER National Coordinators are well informed of the eLTER ESFRI process and are aware of their national network operations, they were asked to inform, remind, and lead the discussions of the national contributions to eLTER RI Cost Book.

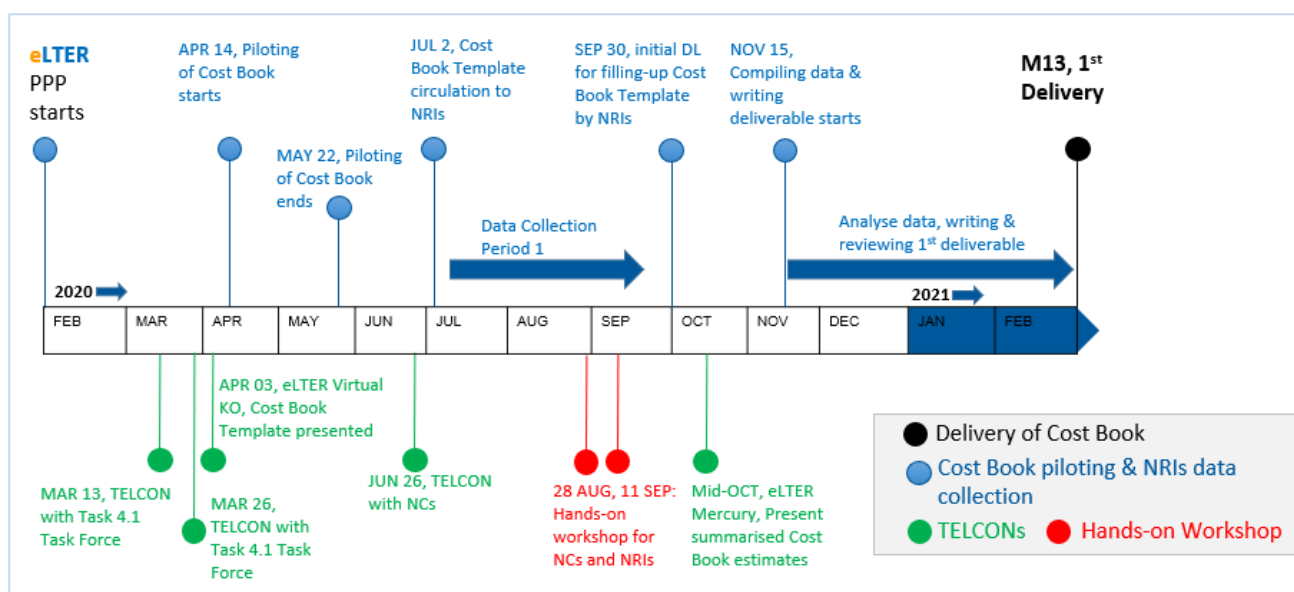


Figure 3. Cost Book processing timeline (Phase 1)

The eLTER RI Cost Book processing (Phase 1, Fig. 3) started in Feb 2020 (M1 of eLTER PPP) with the aim to deliver D4.1 eLTER RI Cost Book in the M13 (First Deliverable by Feb 2021). The WP4 made a call for all LTER Europe National coordinators and received initial interest from 149 Sites/Platforms (including the eLTER Head Office) to participate in eLTER RI Cost Book exercise. Throughout the period of Phase 1, several telecons (Mar 13, Mar 26, and Jun 26, 2020) were arranged among the task force members of PPP WP4 T4.1 to prepare the call documents. Piloting of Cost Book Excel Template run between Apr 14 and May 22, 2020 in collaboration with some SPCs. On 03 Apr 2020, during the eLTER virtual Kick Off Meeting, the Cost Book Excel Template was presented to the wider eLTER community. Collection of Cost Estimates of eLTER Sites and Platforms was initially set between Jul 02 and Sep 30, 2020 but later we extended the deadline until Nov 2020. By that date, we received cost data estimates from 87 Sites/Platforms and from the Head Office. During the collection of Cost Estimates, two hands-on training sessions on using the eLTER RI Cost Book Excel Template were provided (on 28

<sup>7</sup> eLTER Sites currently include three categories in the Cost Estimate Collecting Tool: Master, Regular and Undefined. The 'Undefined Site Category' implies that the site is currently not having firm decision of the site category.

More information of eLTER Sites and Platforms can be retrieved from: <https://www.lter-europe.net/lter-europe/infrastructure/sites-platforms/categories>

Aug and 11 Sep 2020) for SPCs. Summarized first Cost Estimates were presented to the eLTER community during the eLTER ‘Mercury’ meeting held on 13–16 Oct 2020. The period between mid-Nov 2020 and Feb 2021 was reserved for data analysis, writing, and reviewing the first deliverable.

## 6. Cost Estimate Collecting Tool

The Cost Estimate Collecting Tool (Excel spreadsheet, cf. Section 10. Appendices: Figs. 11–15) was meant to gather cost information of the NRIs and CS based on the technical features that were included in the Cost Book Concept (contents mainly integrated in this document), which will be further defined during the PPP. It is based on a template created early in the project that provides a standardized structure through which relevant cost data can be provided and further elaborated to deliver an accurate and comprehensive identification, definition, and realistic planning of the overall infrastructure costs in the Cost Book.

## 7. Structure of Cost Estimate Collecting Tool

The Cost Estimate Collecting Tool reflects the Cost Book structure that was discussed and agreed upon in the eLTER PPP WP4 working group. The tool itself is an Excel spreadsheet dedicated to each NRIs/CS (Chapters of the Cost Book) including five sheets (cf. Section 10. Appendices, Figs. 11–15):

1. Introduction
2. General Information
3. Section 1-Implementation costs
4. Section 2-Operation costs
5. Section 3-Decommissioning costs

### 7.1 Introduction

The first sheet contains a general presentation of the tool and its structure, its organization among the spreadsheets, and some general instructions to take into account when using it.

### 7.2 General Information

The second sheet concerns details about the NRIs/CS (type name and acronym, country, responsible organization, site categories, DEIMS ID, other RIs names for co-located sites, location) whose costs are collected in the subsequent sheets of the tool.

Information about the people involved in the cost estimation process for the NRIs /CS was provided, considering that the Cost Estimate Collecting Tool is filled in collaboratively by a team of compilers. Their information is needed for potential questions on cost estimates and if needs, for verification purposes.

**COMPILERS**, providing the data for the cost estimates based on the relevant Technical Concept include:

- Leaders of Central Services (now only HO)
- Site and Platform Coordinators (SPCs)

**OTHER PEOPLE SUPPORTING THE COST ESTIMATIONS:** to ensure the collection of relevant, sufficient, and reliable data on which to base the cost estimate, SPCs/CS Leaders were recommended to consult in the process:

- Staff with knowledge of the costs of supplies and the bookkeeping staff
- Those with knowledge of employment rules and regulations

**REVIEWER:** the WP4 Leads who are entitled to review the estimation to cross check the compliance with the Cost Book Concept (*Jaana Bäck* and *Syed Ashraf Al Alam* named as reviewers).

Possible updates and changes of the cost estimations should be reported in the specific version tracker table at the bottom of the sheet.

### 7.3 Cost sections

The sheets 3, 4 and 5 are intended to be filled in with the cost estimations for each phase (Implementation, Operation and Decommission) of the eLTER RI lifecycle. Each sheet contains the following fields:

- **Cost Item:** category of costs to be estimated. The same cost items are identified and already listed in each cost section. In *Section 1: Implementation Costs* compilers are required to list all the cost items needed.
- **Unit of Measure:** already filled in with the quantity in specified units to estimate (e.g. FTE<sup>8</sup>, Square meter, Cubic meter, Number, Piece).
- **Unit Price in Euro:** price in Euro of a single unit of cost item.
- **Quantity:** the sum of quantifiable or measurable cost items expressed as a numerical value.
- **Total Cost in Euro:** total cost amount calculates automatically when the cost item is required to estimate both quantity and unit price; otherwise it has to be filled in with the amount in Euro estimated for the cost item.
- **Operational Life (no. of years):** to be filled in only for equipment in the *Section 1: Implementation Costs*. This is the expected lifetime of use of the cost item in question, which is the number of years in which an equipment is expected to be in service. After this period, the equipment needs to be replaced.
- **Estimate method:** cost estimates can be derived directly or indirectly via several information sources. These include:
  - *Analogy:* costs are estimated on the basis of the cost of a similar item considering adjustments for differences.
  - *Historical data:* the costs are estimated on the basis of the cost of a same item (valid paid and dated invoicing statements) considering adjustments.
  - *Expert analysis:* estimation based on advice of experts in the field.
  - *Market price and vendor quotes:* estimation referring to updated price lists, catalogues, or available quotes.
  - *A combination of (some of) the previous methods:* if it better serves the purpose of reaching a more accurate estimate, several sources of estimates can be combined.
- **Notes:** compilers were encouraged to use this field for providing additional information, which is relevant with cost estimates. It can be used to explain the estimation method more in detail and to express its reliability level.

Each sheet is structured with the same formal, comprehensive cost items, although the meaning of each item differs slightly according to the lifecycle phase, objectives, and context.

The following sections describe each category for cost estimation and contain tables with detailed description of each cost item to be estimated.

### 7.4 Section 1: Implementation costs

This sheet is meant to be filled in with the costs over the 5 years envisaged for the implementation phase of the NRIs/CS (5 years for setting up starting from 2020). However, during the implementation phase, costs that are reported from the already existing Sites/Platforms for the year 2020 are considered as

---

<sup>8</sup> Full Time Equivalent. Unit to measure employed persons, where an FTE of 1 indicates a 1 full time year (by 1 employee or 2 employees working half-time or 3 working 33% of their time, etc.)

**‘Capital Value as of Year 2020’.**

If the annual allocation of costs is difficult or not possible to estimate for specific items, the total overall value for the implementation phase was reported in the first year (2020) and highlighted in the notes. The following Table 1 reports a detailed description for the cost items to be estimated.

*Table 1. Cost items description for the sheet “Section 1: Implementation Costs” of Cost Estimate Collecting Tool*

COST ITEMS	-DESCRIPTION OF THE IMPLEMENTATION COSTS- <b>TOTAL OVERALL COSTS FOR SETUP OF THE NRIs &amp; CS <u>OVER 5 YEARS</u></b>
<b>Building &amp; Construction /Space Rental</b>	<p>Costs for land purchase, construction of offices and laboratories, rental of space, repair, and maintenance during the implementation/construction phase.</p> <p>The estimate has to be provided in terms of:</p> <ul style="list-style-type: none"> <li>● Areas (m<sup>2</sup>) or volume (m<sup>3</sup>) of room-laboratories to construct/purchase</li> <li>● Cost per unit (m<sup>2</sup> or m<sup>3</sup>) to construct/purchase such premises</li> <li>● Areas (m<sup>2</sup>) and total annual cost for space rental</li> </ul> <p><b>In case of premises already available in Sites/Platforms, their total costs considered as capital value should be preferably allocated in the first year (2020). For the remaining years (2021–2024), if applicable, you may provide rental cost unless there is no new construction over these years.</b></p> <p>EXAMPLES:</p> <ul style="list-style-type: none"> <li>● Purchase of land, with or without a building structure.</li> <li>● Construction of a new building or addition to existing buildings.</li> <li>● Site restoration that is restoring the site on which the infrastructure is located and/or dismantling and removing previous items.</li> <li>● Rental space (offices, laboratories, outdoor, etc.)</li> <li>● Replacement expenditure to replace substantially all of an existing asset. For example, gutting an existing building and replacing electrical, plumbing, heating, ventilation, air-conditioning systems and other major components, to improve its useful life.</li> <li>● Replacement of parts of an asset during the setup of the Sites/Platforms.</li> </ul>
<b>Equipment</b>	<p>All costs related to the purchase of scientific equipment in the implementation phase.</p> <p>Compiler must list each item of major scientific equipment needed for the Sites/Platforms, indicate the cost per item and the expected operational life (EOL) of each.</p> <p><b>In case of equipment already available in Sites/Platforms, their total costs should preferably be allocated in the first year (2020).</b></p> <p>Advanced ICT systems (e.g. server, mainframe, etc.) should be listed in detail; basic ICT systems (e.g. router, switch, personal computer, etc.) should be included as a single invoice.</p>
<b>Personnel -</b>	All the staff in terms of Full Time Equivalent (FTE), dedicated to the NRIs/CS

<b>Management / Administration</b>	<p>Management and Administration activities during the implementation phase, employed according to national legislation, trade union's agreements, etc.</p> <p>Namely:</p> <ul style="list-style-type: none"> <li>● L1 Expert Manager (e.g. Site Manager)</li> <li>● L2 Qualified Officer</li> <li>● L3 Administrative assistant</li> </ul> <p>EXAMPLES:</p> <p>The staff working on:</p> <ul style="list-style-type: none"> <li>● Setting-up and running the NRIs/CS administration and management (Sites/Platforms manager, finance and accounting department, purchasing department, legal department, administrative / management, logistic, etc.)</li> <li>● Setting-up and coordinate users' communities</li> <li>● Planning the outreach and dissemination, promotion of innovation, activities to foster the use of research infrastructures by industrial researchers, promotion of long-term sustainability, etc.</li> </ul> <p><b>NOTE. Salary costs for personnel only include social security costs, such as pension funds and health insurance. Overhead cost must be excluded!</b></p>
<b>Personnel - Scientific / Technical</b>	<p>All the staff in terms of Full Time Equivalent (FTE), dedicated to the NRIs and or CS Scientific /Technical activities for the setup of the Sites/Platforms, employed according to national legislation, trade union's agreements, etc.</p> <p>Namely:</p> <ul style="list-style-type: none"> <li>● L1 Expert Scientist (e.g. Coordinators, Senior Scientist)</li> <li>● L2 Qualified Operator</li> <li>● L3 Technician</li> </ul> <p>The staff working on:</p> <ul style="list-style-type: none"> <li>● Designing, planning, setting up and testing the services</li> <li>● Planning the access services</li> <li>● Support equipment installation and setup</li> <li>● Setting-up and coordinate users' communities (scientific related)</li> <li>● Coordination of scientific activities with national or international related initiatives</li> <li>● Education and training</li> <li>● Planning the local scale outreach and dissemination, promotion of innovation, activities to foster the use of research infrastructures by industrial researchers, promotion of long-term sustainability, etc. (scientific related)</li> </ul> <p><b>NOTE. Salary costs for personnel only include social security costs, such as pension funds and health insurance. Overhead cost must be excluded!</b></p>
<b>Consumables</b>	<p>All costs related to the purchase of consumables, materials and spare parts specifically used for the laboratory set up and functioning in the implementation phase</p>
<b>Travel</b>	<p>Travel and subsistence costs needed for the Sites/Platforms setup in the implementation phase.</p> <p>Compilers should provide a gross estimate and indicate the number and average cost of travels required for eLTER RI activities in the implementation phase. A brief</p>

	description of the travel should be included in the note box (e.g. to attend governance meetings, stakeholder committees, scientific training, etc.).
<b>External Services</b>	All costs for equipment maintenance, engineering services, scientific and technical services, legal and audit services provided by professionals with a high level of expertise during the setup phase.
<b>Utilities</b>	Electricity, water and gas used for the NRIs/CS functioning. Utilities costs could be estimated through different methods: <ul style="list-style-type: none"> <li>• Average cost per m<sup>2</sup> of office/lab space supplied by the utilities</li> <li>• By referring to analogue/historical data</li> <li>• By calculating utilities average annual consumption for running the premises, based on technical specification of equipment and buildings</li> <li>• As a fixed percent value of the total annual operation costs</li> </ul>
<b>Other costs</b>	Residual category including all costs that cannot fall into previous ones. Other costs could be estimated through different methods: <ul style="list-style-type: none"> <li>• By referring to analogue/historical data</li> <li>• As a fixed percent value of the total annual operation costs</li> </ul> <p>For instance, costs for general services (cleaning, medical, library, publication, communication, printing, postage, dues and subscriptions, clothing, literature, transport, catering, office supplies and equipment, etc.)</p>

## 7.5 Section 2: Operation costs

This sheet was to be filled in with the average annual operating costs for the operational phase of the NRIs/CS (20 years in which the NRIs/CS delivers advanced services for excellent science upgrading its instrumentation and methods). The following Table 2 reports a detailed description for the cost items to be estimated.

*Table 2. Cost items description for the sheet “Section 2: Operation Costs” of Cost Estimate Collecting Tool*

<b>COST ITEMS</b>	<b>-DESCRIPTION OF THE OPERATION COSTS- <u>AVERAGE ANNUAL OPERATING COSTS OF THE NRIs/CS</u></b>
<b>Building &amp; Construction</b>	<ul style="list-style-type: none"> <li>• Building maintenance: the average annual cost for repair and maintenance, to be estimated referring to historical data, or considering a fixed 1.5% value of the overall construction costs</li> <li>• Areas (m<sup>2</sup>) and average annual cost for rental space</li> </ul> <p>EXAMPLES:</p> <ul style="list-style-type: none"> <li>• Replacement expenditure to replace substantially all of an asset. For example, gutting an existing building and replacing electrical, plumbing, heating, ventilation, air-conditioning systems and other major components, to improve its useful life.</li> <li>• Replacement of parts of an asset during the operation of the Sites/Platforms.</li> </ul>
<b>Equipment</b>	In this section, the list includes single headings of estimates instead of the detailed equipment list.

<b>Equipment major upgrade</b>	<p>Average annual operating costs for equipment major upgrade, i.e. technology foresight.</p> <p>This is the average annual cost for technology changes, to be estimated considering historical data and/or frequency of changes.</p>
<b>Equipment replacement (for substantial damages)</b>	<p>Average annual operating costs for replacement of equipment due to substantial damages.</p> <p>This should be estimated considering historical data on average number and costs for damage events and/or their probability.</p>
<b>Personnel - Management / Administration</b>	<p>All the staff in terms of Full Time Equivalent (FTE), dedicated to the NRIs/CS Management and Administration activities in the operation phase, employed according to national legislation, trade union's agreements, etc.</p> <p>Namely:</p> <ul style="list-style-type: none"> <li>● L1 Expert Manager (e.g. Site Manager)</li> <li>● L2 Qualified Officer</li> <li>● L3 Administrative assistant</li> </ul> <p><b>NOTE that part of the personnel salaries should consider EEVs (Essential Ecosystem Variables) and data management. Salary costs for personnel only include social security costs, such as pension funds and health insurance. Overhead cost must be excluded!</b></p> <p>EXAMPLES:</p> <p>The staff (principal investigator, scientist, administrative, etc.) working on:</p> <ul style="list-style-type: none"> <li>● Management and administration of the NRIs/CS (Sites/Platforms manager, finance and accounting department, purchasing department, legal department, administrative / management, logistic, etc.)</li> <li>● Coordination of users' communities</li> <li>● Grant access services</li> <li>● Outreach and dissemination, promotion of innovation; activities to foster the use of research infrastructures by industrial researchers, promotion of long-term sustainability, etc.</li> </ul>
<b>Personnel - Scientific / Technical</b>	<p>All the staff dedicated to Sites and or Platforms Scientific / Technical activities during the operation phase, in terms of Full Time Equivalent (FTE), employed according to national legislation, trade union's agreements, etc.</p> <p>Namely:</p> <ul style="list-style-type: none"> <li>● L1 Expert Scientist (e.g. Coordinators, Senior Scientist)</li> <li>● L2 Qualified Operator</li> <li>● L3 Technician</li> </ul> <p><b>NOTE that part of the personnel salaries should consider EEVs (Essential Ecosystem Variables) and data management. Salary costs for personnel only include social security costs, such as pension funds and health insurance. Overhead cost must be excluded!</b></p> <p>EXAMPLES:</p> <p>In the operation phase, the staff working on:</p>



	<ul style="list-style-type: none"> <li>● Coordination of scientific activities with national or international related initiatives</li> <li>● Coordination of users' communities (scientific related)</li> <li>● Operating the services</li> <li>● Education and training</li> <li>● Grant access services (scientific related)</li> <li>● Outreach and dissemination, promotion of innovation; activities to foster the use of research infrastructures by industrial researchers, promotion of long-term sustainability, etc. (scientific related)</li> </ul>
<b>Consumables</b>	Average annual costs related to the purchase of consumables, materials and spare parts specifically used for the laboratory operations
<b>Travel</b>	<p>Average annual costs related to travel required during the operation phase (for instance, for CS to operation support/services), including accommodation.</p> <p>Compilers have to indicate the number and average cost of travels required for the eLTER RI activities in the operation phase. A brief description of the travel should be included in the note box (e.g. to provide services and scientific training, to attend governance meetings, to perform access services, etc.).</p>
<b>External Services</b>	Average annual costs for equipment maintenance, engineering services, scientific and technical services, legal and audit services provided by professionals with a high level of expertise during the operation phase.
<b>Utilities</b>	<p>Average annual costs for electricity, water and gas used for the NRIs/CS functioning in the operation phase.</p> <p>Utilities costs could be estimated through different methods:</p> <ul style="list-style-type: none"> <li>● Average cost per unit (m<sup>2</sup> or m<sup>3</sup>) of office/lab space supplied by the utilities</li> <li>● By referring to analogue/historical data</li> <li>● By calculating utilities average annual consumption for running the premises, based on technical specification of equipment and buildings</li> <li>● As a fixed percent value of the total annual operation costs.</li> </ul>
<b>Other costs</b>	<p>Residual category including average annual value for costs that cannot fall into previous categories.</p> <p>Other costs could be estimated through different methods:</p> <ul style="list-style-type: none"> <li>● By referring to analogue/historical data</li> <li>● As a fixed percent value of the total annual operation costs</li> </ul> <p>EXAMPLES:</p> <ul style="list-style-type: none"> <li>● Costs for general services needed in the operation phase, e.g. to ensure service provision by the CS or functioning of the NRIs (cleaning, medical, library, publication, communication, printing, postage, dues and subscriptions, clothing, literature, transport, catering, office supplies and equipment, etc.)</li> </ul>

### 7.6 Section 3: Decommissioning costs

This sheet was to be filled in with the total overall costs for the termination phase (i.e. for the dissolution

of the organization, dismantling of NRIs/CS). The following Table 3 reports a detailed description for the cost items to be estimated.

*Table 3. Cost items description for the sheet “Section 3: Decommissioning Costs” of Cost Estimate Collecting Tool*

COST ITEMS	DESCRIPTION
<b><u>TOTAL OVERALL COSTS FOR DISMANTLING OF THE NRIs/CS</u></b>	
<b>Building &amp; Construction</b>	Costs per unit (m <sup>2</sup> or m <sup>3</sup> ) for the site restoration and dismantling, or total overall cost for space rentals during the decommissioning phase.
<b>Equipment</b>	Total over cost for equipment, if needed for this phase of eLTER RI.
<b>Personnel - Management / Administration</b>	<p>All the staff in terms of Full Time Equivalent (FTE), dedicated to the Management /Administration activities for the NRIs/CS dismantling, employed according to national legislation, trade union’s agreements, etc.</p> <p>Namely:</p> <ul style="list-style-type: none"> <li>● L1 Expert Manager (e.g. Site Manager)</li> <li>● L2 Qualified Officer</li> <li>● L3 Administrative assistant</li> </ul> <p><b>NOTE. Salary cost for personnel only include social security cost that is pension and health insurance. Overhead cost must be excluded!</b></p>
<b>Personnel - Scientific / Technical</b>	<p>All the staff needed to support the Scientific and or Technical activities for the NRIs/CS dismantling in terms of Full Time Equivalent (FTE), employed according to national legislation, trade union’s agreements, etc.</p> <p>Namely:</p> <ul style="list-style-type: none"> <li>● L1 Expert Scientist (e.g. Coordinators, Senior Scientist)</li> <li>● L2 Qualified Operator</li> <li>● L3 Technician</li> </ul> <p><b>NOTE. Salary cost for personnel only include social security cost that is pension and health insurance. Overhead cost must be excluded!</b></p>
<b>Consumables</b>	All costs related to the purchase of consumables, materials, and spare parts to supply provisions for the laboratories during the decommissioning phase.
<b>Travel</b>	<p>Travel and subsistence costs needed for the Sites/Platforms dismantling in the decommissioning phase.</p> <p>Compilers have to indicate the number and average cost of travels required for the eLTER RI activities in the decommissioning phase. A brief description of the travel should be included in the note box (e.g. to attend meeting for planning, to dispose equipment, etc.).</p>
<b>External Services</b>	All costs items for technical services ( <b>obsolete equipment disposal/recycling, waste disposal, waste treatment ...</b> ), engineering services, legal and audit services for the Sites/Platforms dismantling provided by professionals with a high level of expertise during the decommissioning phase.

<p><b>Utilities</b></p>	<p>Electricity, water and gas used for the Sites/Platforms dismantling in the decommissioning phase.</p> <p>Utilities costs could be estimated through different methods:</p> <ul style="list-style-type: none"> <li>● Average cost per unit (m<sup>2</sup> or m<sup>3</sup>) of office/lab space supplied by the utilities</li> <li>● By referring to analogue/historical data</li> <li>● By calculating utilities average annual consumption for running the premises, based on technical specification of equipment and buildings</li> <li>● As a fixed percent value of the total annual operation costs</li> </ul>
<p><b>Other costs</b></p>	<p>Residual category including all costs that cannot fall into previous ones. For Instance: costs for general services</p>

### 8. First estimates of eLTER RI Cost Book

Altogether 149 Sites/Platforms (including Head Office) were listed as potential Sites/Platforms by the NCs for eLTER RI Cost Book exercise in spring 2020. Among those that submitted their cost estimates within the first-round cost estimates submission deadline, were the Head Office and 87 Sites/Platforms (ca. 59% submission) from 17 countries. Even though so far, we received cost estimates from 17 countries but in eLTER PPP and LTER Europe there are 25 and 26 countries, respectively, that have the potential to join in eLTER RI.

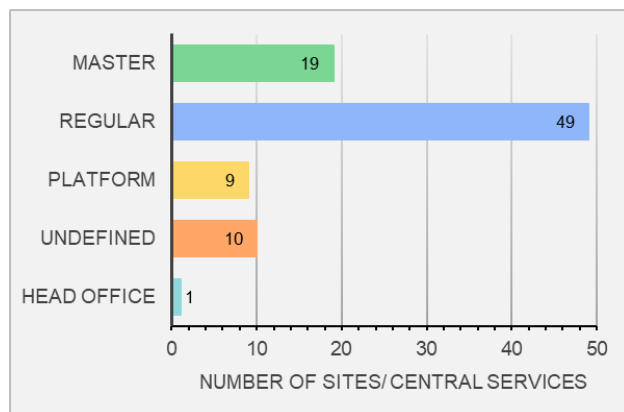


Figure 4. Site- and Central Services-specific cost estimates submission status (n = 88, by 17 countries)

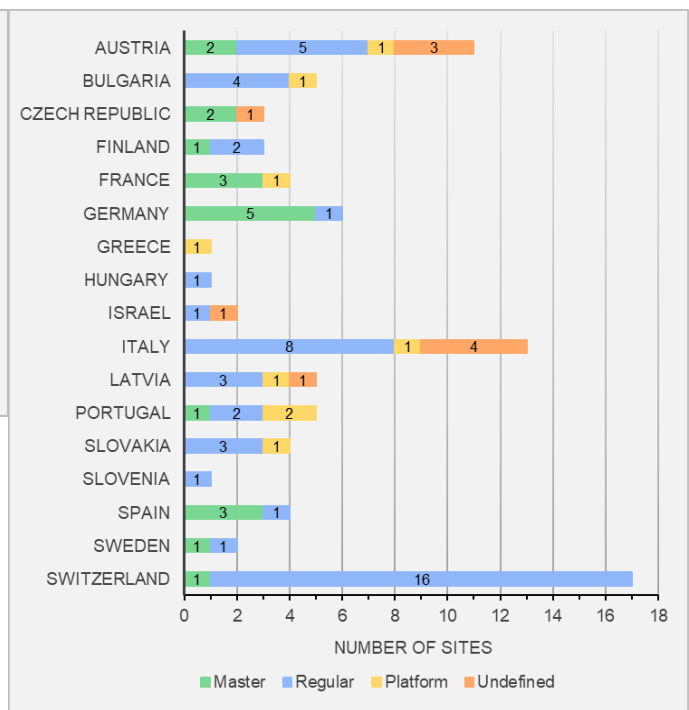


Figure 5. Country- and Site-specific cost estimates submission status (n = 87, excluding Head Office)

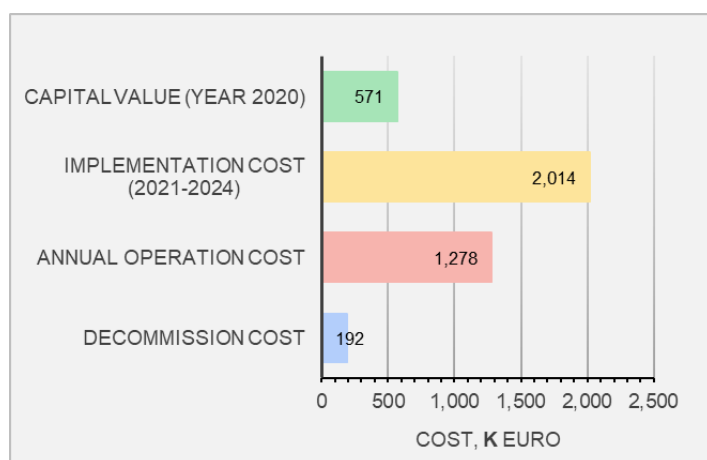
As expected and evident from Fig. 4, the Regular Site category has the major share of cost estimates submission (n = 49), followed by Master Sites (n = 19). Platform and Undefined Sites have similar submission status, 9 and 10 respectively. Figure 5 depicts country- and site-specific cost estimates submission status. Within the submission deadline, highest numbers of the cost estimates were submitted by Switzerland (20%), Italy (15%), and Austria (13%). Other countries' submission proportion of the total varied between 1% and 7%.

## 8.1 eLTER Head Office's cost estimates

At this point, the eLTER Head Office stands alone in the Central Services category, because the technical concepts of the other Central Services, Topical Centres, are not yet defined to be able to make their cost estimations. For the basic functions of the Head Office, the needs are much better known and therefore, it is possible already at this point to show the preliminary cost estimates (except for the Service Portal).

Research infrastructures must respond to the diverse requirements and needs posed by researchers, national stakeholders, governments, and funding agencies; and European bodies, such as ESFRI (the European Strategy Forum on Research Infrastructures), the European Commission and the European Union. For example, RIs should respond to the long-term needs of the research community, link new scientific knowledge and innovation, and collaborate with industry. In addition, RIs are expected to have an impact on society, employment, and welfare. This requires that the eLTER Head Office is well organised and sufficiently resourced with skilled staff, and it can answer the coordination and integration needs necessary for eLTER to become a coherent European research infrastructure providing its services efficiently and to meet the expectations.

The cost structure of the Head Office reflects the need for a skilled workforce. During the implementation and operation phases the needed workforce consist of: qualified senior management specialists and officers with background in RI, administration & management, organizational skills and experience in programme/project monitoring; qualified specialists in system engineering and data management; expertise in communications and PR, in outreach and dissemination, and liaisons and partnership portfolio management. Additionally, a financial professional is needed for budgetary issues and account management, and a senior lawyer with knowledge on constitutional, employment and tax issues of the ERIC seat country laws, regulations, and rules. The operational phase includes the director general of eLTER ERIC, who should be a qualified and merited senior scientist in the field of eLTER in an executive role, responsible for eLTER development, strategy, relations, and partnerships, and experienced in leading organizations and/or distributed networks or RIs.



*Figure 6. Head Office's cost estimates (in K Euro) across RI life cycle*

The eLTER Head Office showed funding requirements of 2,014 K and 1,278 K Euro during implementation and operation phases, respectively (Fig. 6). During the implementation phase, a major part of the costs of the Head Office are of personnel costs. The implementation of the Service Portal, which is part of the Head Office, is not yet included in the cost estimates. In the operative phase when the legal entity is established, about half of the Head Office costs consist of the personnel costs fully dedicated to operate, develop and manage the eLTER RI services.

## 8.2 eLTER NRIs (Sites/Platforms) cost estimates

Site-specific cost estimates across eLTER RI life cycle (Fig. 7) indicate that among the site categories, Master Sites have more capital value (average 1,858 K Euro) as they are highly instrumented and require more funding across the RI life cycle (average implementation cost = 1,381 K Euro, average Operation cost = 400 K Euro and average Decommission cost = 59 K Euro). Undefined Sites ranked 2<sup>nd</sup> in terms of having capital value and estimated required funding across RI life cycle. This is perhaps due to the fact that most of the Undefined Sites might be categorised as Master Sites once the classification of sites is completed by the SPCs. Regular Sites and Platforms have similar funding requirements, which is substantially lower than Master and Undefined Sites categories.

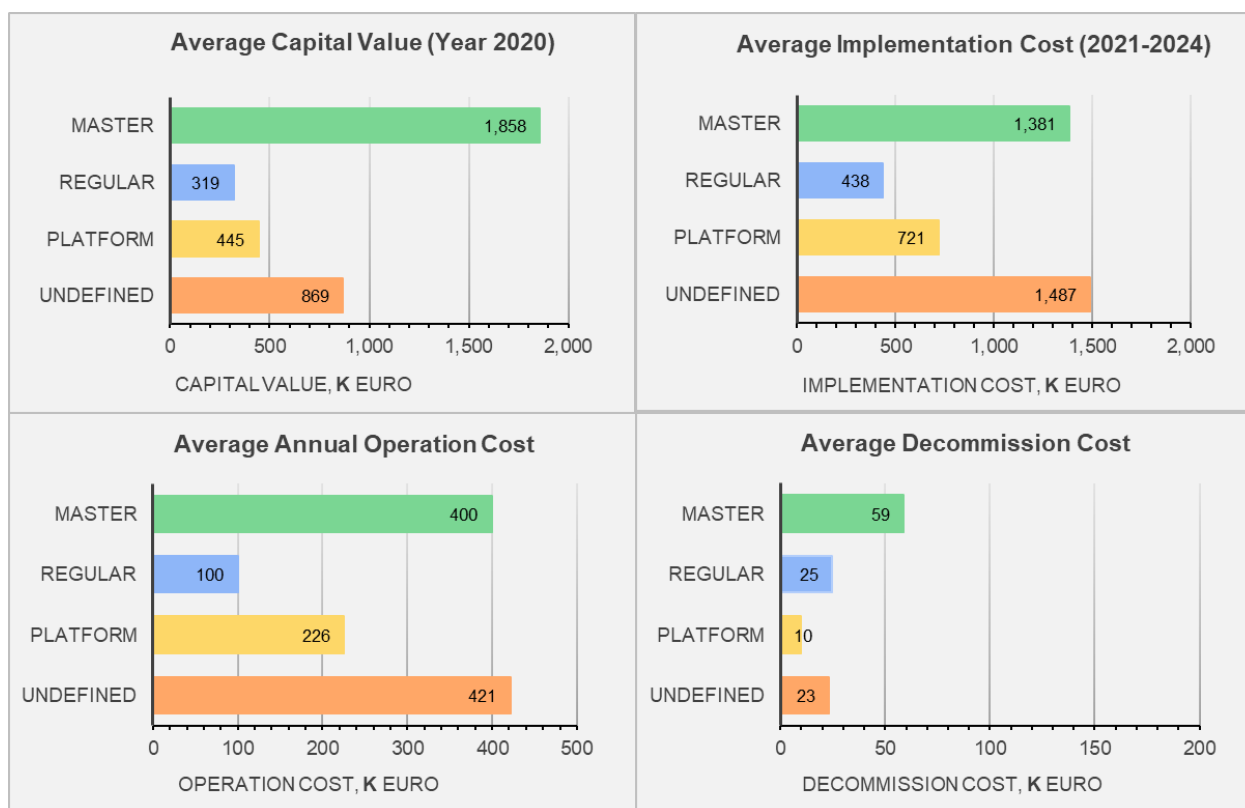


Figure 7. Site-specific cost estimates (in K Euro, provided by 17 countries) across RI life cycle

Country-specific cost estimates across RI life are indicative only and are shown in Fig. 8. The reason for these indicative results is the unbalanced number of Master Sites in a given country. For example, Germany reported more Master Sites ( $n = 5$ , cf. Fig. 5), and they have relatively more capital value. Additionally, salary requirements of personnel at the sites varies greatly among the countries, and plays a significant role in the variation of country-specific cost estimates.

Figure 9 shows country- and site-specific cost allocation in percentages across RI life cycle. It is evident that Master Sites have already invested significant sums, and thus their allocation of costs reflected in the capital value, which is higher (from 30% to almost 80%) than that in the other site categories when considered over the full life cycle of the Sites. In general, Regular Sites and Platforms need more funding for the implementation phase. During the operation phase, all site categories need a rather similar relative amount of funding. Once again, it is important to mention that results are indicative only and underlying reasons behind these indicative results not only include higher number of reported Master Sites by a few countries but also remarkably variable personnel salary structure among the countries.

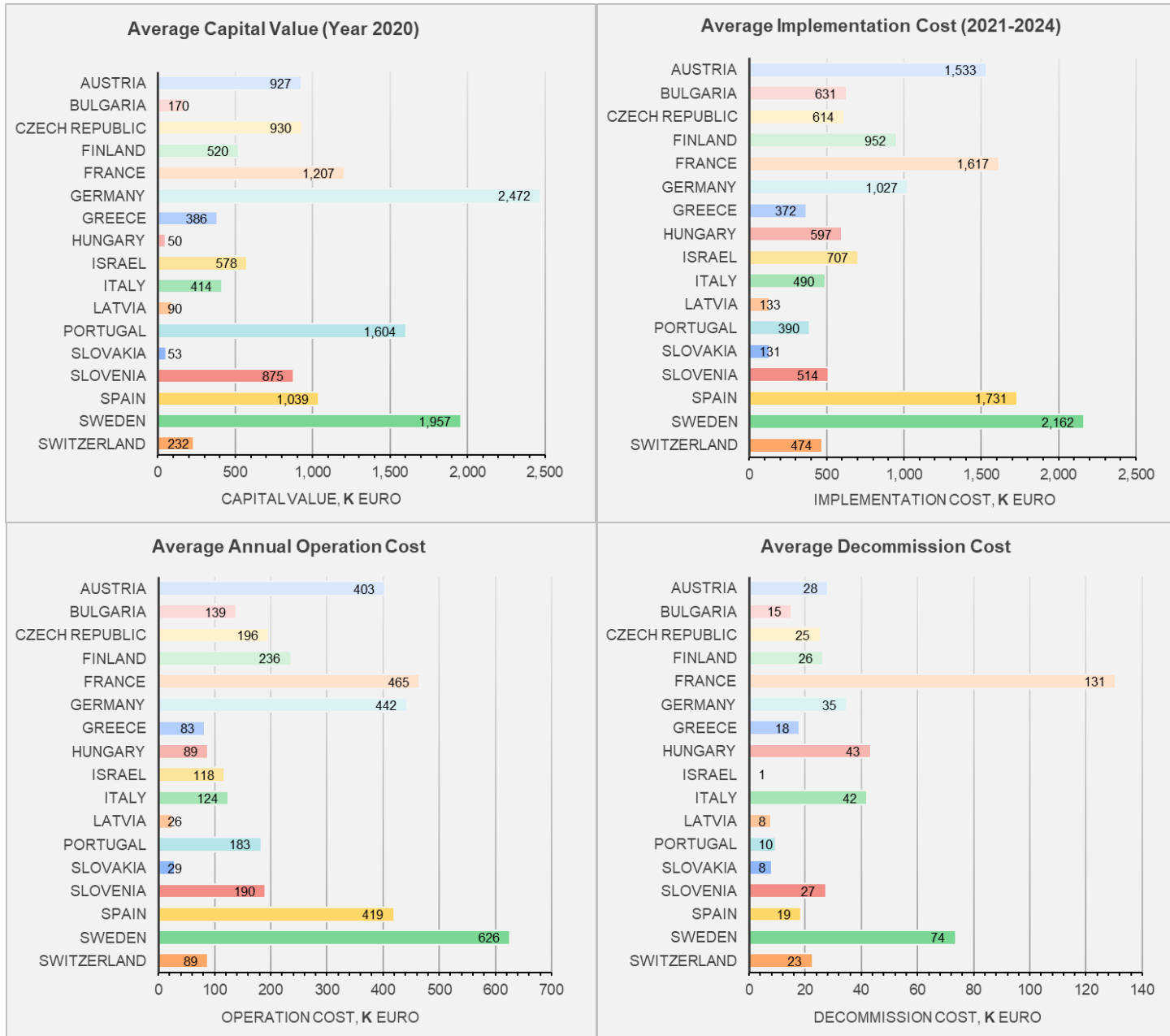


Figure 8. Country-specific costs estimates (in K Euro, including all the Site categories) across RI life cycle



Figure 9. Country- and Site-specific cost allocation (in percentage) across RI life cycle

Almost all participating countries in the eLTER RI costs estimate show a similar trend in country-specific cost allocation (in percentage) across the RI life cycle (Fig. 10), differences mostly reflecting the number of submitted cost estimates per Site category. Though capital values and implementation costs vary among the countries, operation and decommission costs are more or less similar. While Portugal reported one Master Site, Hungary submitted cost estimates solely for a Regular Site (cf. Fig. 5). This played a greater role in their asymmetric capital values and implementation cost in comparison to other countries cost allocation.

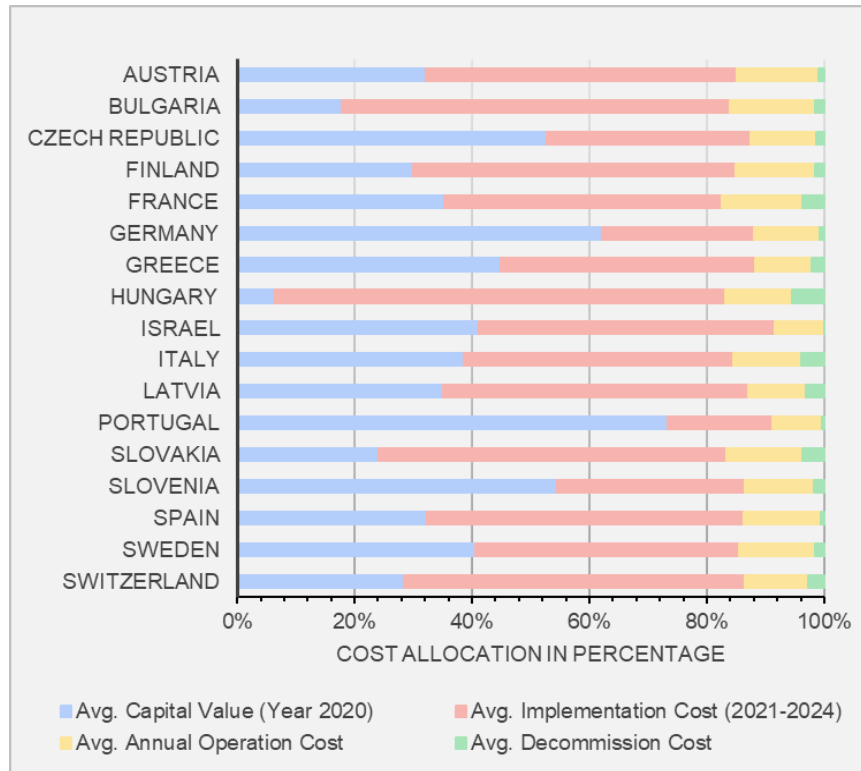


Figure 10. Country-specific cost allocation (in percentage, including all the Site categories) across RI life cycle

## 9. Caveats and challenges of eLTER RI cost estimates

The submission of 87 cost estimates by the Sites and Platforms from 17 countries may be considered as an early success of eLTER PPP. However, there are several caveats and challenges for the next stages of the eLTER RI Cost Book. First, the number of potential Sites and Platforms ( $n = 149$ ) that were listed to participate in the Cost Book exercise in 2020 is not final yet, and is entirely dependent on the country-level decisions and specific national funding situations. Second, the early deadline (M13, Feb 2021) for the first delivery of eLTER RI Cost Book (D 4.1) was important for the development of the approach, but it did not allow to properly account for the emerging and yet not final eLTER RI Standard Observations scheme (PLUS WP3: Interoperability of eLTER Standard Observation variables - The User Perspective, PPP WP6), which has significant consequences on the actual costs for the implementation and operation of eLTER RI.

Since the concepts of the Central Services (i.e. Head Office, Service Portal and Topical Service Areas) of eLTER RI have not yet been finalized, this deliverable ONLY includes cost estimates from the Head Office, excluding the Service Portal. Other caveats and problems of eLTER RI cost estimation mostly relate to the Cost Estimate Collecting Tool (Excel spreadsheet), which include e.g., (i) difficulties to estimate costs for the required staffing for labour-intensive work, such as biodiversity observations; (ii) the complexity of the questionnaire and its demand for details proved challenging for site managers; (iii) unclarity in existing investments e.g. rents for premises. Some sites have existed for a long time, more than decades, so it is difficult to value the existing assets; and (iv) some did not account for decommissioning costs.



## 10. Appendices

Table 4. Country- and Site-specific cost estimates submission status ( $n = 87$ , excluding Head Office)

Country	Site Categories				Grand Total
	Master	Regular	Platform	Undefined	
Austria	2	5	1	3	<b>11</b>
Bulgaria		4	1		<b>5</b>
Czech Republic	2			1	<b>3</b>
Finland	1	2			<b>3</b>
France	3		1		<b>4</b>
Germany	5	1			<b>6</b>
Greece			1		<b>1</b>
Hungary		1			<b>1</b>
Israel		1		1	<b>2</b>
Italy		8	1	4	<b>13</b>
Latvia		3	1	1	<b>5</b>
Portugal	1	2	2		<b>5</b>
Slovakia		3	1		<b>4</b>
Slovenia		1			<b>1</b>
Spain	3	1			<b>4</b>
Sweden	1	1			<b>2</b>
Switzerland	1	16			<b>17</b>
<b>Grand Total</b>	<b>19</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>87</b>

Table 5. Site- and Central Services-specific cost estimates (in K Euro, provided by 17 countries) across RI life cycle

Site Categories / Central Services	Number of Sites / Central Services	Capital Value, K Euro			Implementation Cost, K Euro			Operation Cost, K Euro			Decommission Cost, K Euro		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
Master	19	1858	121	7203	1381	0	4324	400	67	1185	59	0	450
Regular	49	319	46	1756	438	0	1698	100	10	374	25	0	370
Platform	9	445	67	912	721	0	1707	226	17	777	10	0	30
Undefined	10	869	42	2995	1487	112	6284	421	30	1265	23	0	56
Head Office	1	571	571	571	2014	2014	2014	1278	1278	1278	192	192	192

Table 6. Country-specific cost estimates (in K Euro, including all the Site categories) across RI life cycle

Country	Capital Value, K Euro			Implementation Cost, K Euro			Operation Cost, K Euro			Decommission Cost, K Euro		
	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
Austria	927	121	2995	1533	27	6284	403	20	1265	28	0	67
Bulgaria	170	132	203	631	269	940	139	72	218	15	8	18
Czech Republic	930	295	2121	614	442	728	196	67	395	25	24	26
Finland	520	282	706	952	527	1698	236	148	374	26	0	61
France	1207	658	2078	1617	284	4150	465	241	777	131	0	450
Germany	2472	419	7203	1027	0	3326	442	186	742	35	0	53
Greece	386	386	386	372	372	372	83	83	83	18	18	18
Hungary	50	50	50	597	597	597	89	89	89	43	43	43
Israel	578	97	1059	707	366	1048	118	76	160	1	0	2
Italy	414	93	1236	490	36	1707	124	21	376	42	0	370
Latvia	90	42	153	133	56	267	26	10	47	8	7	8
Portugal	1604	499	4220	390	0	1116	183	89	397	10	0	22
Slovakia	53	46	67	131	92	151	29	17	44	8	5	14
Slovenia	875	875	875	514	514	514	190	190	190	27	27	27
Spain	1039	472	1945	1731	958	2784	419	180	745	19	13	27
Sweden	1957	175	3740	2162	0	4324	626	68	1185	74	14	134
Switzerland	232	177	485	474	426	850	89	84	157	23	21	43

Table 7. Country- and Site-specific cost estimates (in K Euro) across RI life cycle

Site Categories	Country	Capital Value, K Euro			Implementation Cost, K Euro			Operation Cost, K Euro			Decommission Cost, K Euro		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
Master	Austria	1144	121	2166	900	520	1281	218	156	279	55	43	67
	Czech Republic	1248	375	2121	585	442	728	97	67	126	25	24	26
	Finland	573	573	573	632	632	632	185	185	185	18	18	18
	France	1315	658	2078	1733	284	4150	362	241	560	174	34	450
	Germany	2774	419	7203	1111	0	3326	491	186	742	35	0	53
	Portugal	4220	4220	4220	750	750	750	397	397	397	0	0	0
	Spain	1228	755	1945	1989	1479	2784	499	297	745	20	15	27
	Sweden	3740	3740	3740	4324	4324	4324	1185	1185	1185	134	134	134
	Switzerland	485	485	485	850	850	850	157	157	157	43	43	43

<b>Regular</b>	Austria	323	217	407	397	27	1234	73	20	197	12	0	39
	Bulgaria	170	132	203	599	269	940	136	72	218	15	8	18
	Finland	494	282	706	1112	527	1698	261	148	374	31	0	61
	Germany	962	962	962	608	608	608	199	199	199	33	33	33
	Hungary	50	50	50	597	597	597	89	89	89	43	43	43
	Israel	97	97	97	366	366	366	76	76	76	2	2	2
	Italy	402	93	1236	464	36	1164	125	21	348	58	0	370
	Latvia	87	54	153	127	56	267	17	10	31	8	7	8
	Portugal	1310	864	1756	41	0	83	92	89	95	20	18	22
	Slovakia	49	46	51	144	134	151	33	25	44	9	7	14
	Slovenia	875	875	875	514	514	514	190	190	190	27	27	27
	Spain	472	472	472	958	958	958	180	180	180	13	13	13
	Sweden	175	175	175	0	0	0	68	68	68	14	14	14
	Switzerland	216	177	279	450	426	475	84	84	84	21	21	21
<b>Platform</b>	Austria	255	255	255	995	995	995	249	249	249	0	0	0
	Bulgaria	171	171	171	760	760	760	150	150	150	18	18	18
	France	884	884	884	1271	1271	1271	777	777	777	0	0	0
	Greece	386	386	386	372	372	372	83	83	83	18	18	18
	Italy	912	912	912	1707	1707	1707	376	376	376	30	30	30
	Latvia	148	148	148	175	175	175	47	47	47	8	8	8
	Portugal	590	499	681	558	0	1116	166	116	216	4	0	8
	Slovakia	67	67	67	92	92	92	17	17	17	5	5	5
<b>Undefined</b>	Austria	2012	647	2995	4029	2161	6284	1128	1000	1265	47	38	56
	Czech Republic	295	295	295	671	671	671	395	395	395	26	26	26
	Israel	1059	1059	1059	1048	1048	1048	160	160	160	0	0	0
	Italy	314	221	560	238	152	462	61	57	64	14	0	55
	Latvia	42	42	42	112	112	112	30	30	30	8	8	8

### Introduction on eLTER Cost Estimate Collecting Tool

This spreadsheet is a tool for collecting costs information of each eLTER NRI and CS. It is intended for internal use only.

- Please be sure to read the Cost Book Concept before starting using this tool so to have a precise idea of what it is for.
- Refer to the Cost Estimate Guide for detailed instructions and descriptions for each Cost item to be estimated using this tool.
- NRIs stands for National Research Infrastructures, and CS for Central Services.
- CS information will be collected later except HO.

#### How to fill-in the spreadsheet

This spreadsheet requires the compiler to fill-in data only into specific fields. When filling in the tool remember the following rules:



White cells require input from the user entry.

Grey cells are already populated or are the outcome of an applied formula. Do not change the content of these cells.

#### Structure of this spreadsheet

##### General Information

This tab (in blue) has to be filled-in with the key information about the NRIs/CS and its costs compilers.

##### Costs sections

The file contains 3 tabs (in green) where the compilers must report the NRIs /CS costs estimation.

In particular, each tab relates to a phase of the NRIs /CS lifetime and lists the costs items to be estimated for that phase: Implementation Costs, Operation Costs, Decommissioning Costs.

Useful link

The currency to be used for the costs estimation is Euro. To convert other currencies to Euro refer to the Foreign Exchange Reference Rates published by the European Central Bank in Frankfurt/Main on the first day of the calendar year.

[https://www.ecb.europa.eu/stats/policy\\_and\\_exchange\\_rates/euro\\_reference\\_exchange\\_rates/html/index.en.html](https://www.ecb.europa.eu/stats/policy_and_exchange_rates/euro_reference_exchange_rates/html/index.en.html)

(Scroll the page to the bottom to find the Historical reference rates)

Figure 11. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 1

GENERAL INFORMATION on eLTER NRIs and CS (for now only HO)			
TYPE			
NRIs /CS NAME (Also acronym, If applicable)			
Country			
Responsible Organization			
Site Categories			
DEIMS.iD (If applicable)			
Other RIs Names (For co-located sites, if applicable)			
Location (Lat., Long.; In decimal)	<a href="#">LatLong Converter</a>		
COMPILER			
Name			
Phone (Including country code)			
Email			
OTHER PEOPLE SUPPORTING THE COSTS ESTIMATION (Name 1, Name 2, ..., Name N)			
REVIEWER			
COSTS ESTIMATION SUBMISSION/UPDATE DATE (YYYY-MM-DD)			
FOR CS ONLY (for now only HO)			
Indicate the average annual quantity of Operation Support/Services units covered by the costs here estimated	Activity type	Average quantity per year	
	Operation Support (eLTER Community)		
	Services/External Access (eLTER external users)		
VERSION TRACKER			
File Name	Submission DATE (YYYY-MM-DD)	Reason for change	Technical concept reference version
(Add lines if required)			

Figure 12. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 2

SECTION 1/3 : IMPLEMENTATION COSTS (TOTAL OVERALL VALUE OVER 5 YEARS)																				
		Regular Site (X = Required, 0 = Not Required)		Master Site (X = Required, 0 = Not Required)		2020 (Capital Value)		2021		2022		2023		2024		2020-2024		Useful Life (nr. years)	Estimate method	Notes
Cost Item	Itemized Observations	Unit Of Measure	Unit Price € (Pre-filled, Indicative)	Quantity	Total Cost €	Quantity	Total Cost €	Quantity	Total Cost €	Quantity	Total Cost €	Quantity	Total Cost €	Grand Total Quantity	Grand Total Cost €					
<b>Building &amp; Construction (If applicable)</b>																				
Rooms		Square meter (m²)			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
Laboratories		Square meter (m²)			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
Land Purchase		Square meter (m²)			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
<b>Space Rental (If applicable)</b>																				
Rooms		Square meter (m²)														0	€ 0			
Laboratories		Square meter (m²)														0	€ 0			
Land		Square meter (m²)														0	€ 0			
<b>Personnel</b>																				
<i>Management / Administration</i>																				
L1 Expert Manager		FTE			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
L2 Qualified Officer		FTE			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
L3 Administrative assistant		FTE			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
<i>Scientific / Technical</i>																				
L1 Expert Scientist		FTE			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
L2 Qualified Operator		FTE			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
L3 Technician		FTE			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
<b>Consumables</b>																				
Travel		NR			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
External Services		€			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
Utilities		€			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
Other costs		€			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
<b>Equipment</b>																				
<b>BASIC INFRASTRUCTURE</b>																				
BASIC INFRASTRUCTURE	Measuring tower	Piece	50000		€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
BASIC INFRASTRUCTURE	Roads	Piece	20000		€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
BASIC INFRASTRUCTURE	Data transmission system	Piece	25000		€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
BASIC INFRASTRUCTURE	Containers	Piece	60000		€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
BASIC INFRASTRUCTURE	Power supply	Piece	25000		€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
BASIC INFRASTRUCTURE	Board walks	Piece	20000		€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
BASIC INFRASTRUCTURE	Other, specify in 'Notes'	Piece			€ 0		€ 0		€ 0		€ 0		€ 0		€ 0	0	€ 0			
<b>PRE-DETERMINED STANDARD OBSERVATION SCHEME</b>																				
Abiotic Heterogeneity - Habitat	Habitat Mapping	x	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Abiotic Heterogeneity - Soil	Soil Inventory (Texture, Structure)	x	x	Piece	20000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Abiotic Heterogeneity - Soil	Soil Moisture/Soil Temperature	x	x	Piece	50000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Abiotic Heterogeneity - Air	Weather station	x	x	Piece	20000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Water Budget - Runoff	Hydrological Runoff/Water tem	0	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Water Budget - Groundwater	Elevation, temperature, specific	x	x	Piece	5000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Water Budget - Snow	Snow depth	0	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Water Budget - Throughfall	Throughfall	0	x	Piece	500	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Water Budget - Transpiration	Transpiration (e.g. Sapflow)	0	x	Piece	5000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Energy Budget	LAI	0	x	Piece	15000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Energy Budget - Biomass (Tree height, diameter, litterfall)		x	x	Piece	1000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Energy Budget - Biomass (Biomass aboveground)		0	x	Piece	30000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Energy Budget - Biomass	Biomass aboveground -EXTENSIVE	x	0	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Energy Budget - Carbon/CO2	CO2/H2O concentration, albedo	0	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Energy Budget - Carbon/CO3	Energy balance -EXTENSIVE	x	0	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Matter Budget	Wet/dry deposition - Equipmen	0	x	Piece	5000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Matter Budget	Wet/dry deposition - Analysis	0	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Matter Budget	Soil water chemistry - Equipme	x	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Matter Budget	Soil water analysis - Lab	x	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Matter Budget	Surface Water - Spectral Absorp	0	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Matter Budget	Surface Water - Nutrients, Major	0	x	Piece	10000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Biotic Diversity	eDNA	0	x	Piece	30000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Biotic Diversity	Malaise trap	0	x	Piece	3000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Biotic Diversity	Voice recording	x	x	Piece	500	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Biotic Diversity	Game camera	x	x	Piece	500	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Biotic Diversity	Soil sampling (microbiology)	0	x	Piece	2000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
Biotic Diversity	Cyclone sampler (pollen, spore	x	x	Piece	5000	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	0	€ 0		€ 0			
-- copy this line to insert more items, which are not listed but might be of relevance --																				

Figure 13. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 3

SECTION 2/3 : OPERATION COSTS (AVERAGE ANNUAL VALUE)						
Cost Item	Unit Of Measure	Quantity	Unit Price €	Total Cost €	Estimate method	Note
<b>Building &amp; Construction</b>						
Bulding maintenance	€			€0		
Space rental	Square meter (m <sup>2</sup> )	<input type="text"/>		€0		
<b>Equipment</b>						
Equipment major upgrade	€			€0		
Equipment replacement (for substantial damages)	€			€0		
<b>Personnel</b>						
<i>Management / Administration</i>						
L1 Expert Manager	FTE	<input type="text"/>	<input type="text"/>	€0		
L2 Qualified Officer	FTE	<input type="text"/>	<input type="text"/>	€0		
L3 Administrative assistant	FTE	<input type="text"/>	<input type="text"/>	€0		
<i>Scientific / Technical</i>						
L1 Expert Scientist	FTE	<input type="text"/>	<input type="text"/>	€0		
L2 Qualified Operator	FTE	<input type="text"/>	<input type="text"/>	€0		
L3 Technician	FTE	<input type="text"/>	<input type="text"/>	€0		
Consumables	€			€0		
Travel	NR	<input type="text"/>	<input type="text"/>	€0		
External Services	€			€0		
Utilities	€			€0		
Other costs	€			€0		

Figure 14. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 4

SECTION 3/3 : DECOMMISSIONING COSTS (TOTAL OVERALL VALUE)						
Cost Item	Unit Of Measure	Quantity	Unit Price €	Total Cost €	Estimate method	Note
<b>Building &amp; Construction</b>						
Site space to be restored	Square meter (m <sup>2</sup> )			€ 0		
Space rental	Square meter (m <sup>2</sup> )			€ 0		
<b>Equipment</b>	€			€ 0		
<b>Personnel</b>						
<i>Management / Administration</i>						
L1 Expert Manager	FTE			€ 0		
L2 Qualified Officer	FTE			€ 0		
L3 Administrative assistant	FTE			€ 0		
<i>Scientific / Technical</i>						
L1 Expert Scientist	FTE			€ 0		
L2 Qualified Operator	FTE			€ 0		
L3 Technician	FTE			€ 0		
<b>Consumables</b>	€			€ 0		
<b>Travel</b>	NR			€ 0		
<b>External Services</b>	€			€ 0		
<b>Utilities</b>	€			€ 0		
<b>Other costs</b>	€			€ 0		

Figure 15. Cost Estimate Collecting Tool (Excel spreadsheet): Screenshot of TAB 5