EUROPEAN HEALTH AND DIGITAL EXECUTIVE AGENCY (HADEA)

HADEA.B – Digital, Industry and Space
B.3 – Industry

GRANT AGREEMENT

Project 101058522 — FutuRaM

PREAMBLE

This **Agreement** ('the Agreement') is **between** the following parties:

on the one part,

the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and

on the other part,

1. 'the coordinator':

WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM), PIC 997394353, established in BOULEVARD AUGUSTE REYERS 80, BRUXELLES 1030, Belgium,

and the following other beneficiaries, if they sign their 'accession form' (see Annex 3 and Article 40):

2. **UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH (UNITAR)**, PIC 997721825, established in AVENUE DE LA PAIX 7, GENEVA 1202, Switzerland,

3. **BUNDESANSTALT FUER GEOWISSENSCHAFTEN UND ROHSTOFFE (BGR)**, PIC 999429413, established in Stilleweg 2, HANNOVER 30655, Germany,

4. **BOLIDEN MINERAL AB (Boliden)**, PIC 998308869, established in ., SKELLEFTEHAMN 932 81, Sweden,

5. **BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES (BRGM)**, PIC 999993662, established in 3 AV CLAUDE GUILLEMIN, ORLEANS 45060, France,

6. **CHALMERS TEKNISKA HOGSKOLA AB (Chalmers)**, PIC 999980373, established in -, GOTEBORG 412 96, Sweden,

7. **GEOLOSKI ZAVOD SLOVENIJE (GeoZS)**, PIC 999466370, established in DIMICEVA 14, LJUBLJANA 1000, Slovenia,

8. **GEOLOGIAN TUTKIMUSKESKUS (GTK)**, PIC 999432614, established in VUORIMIEHENTIE 5, ESPOO 02151, Finland,

9. **KUSHNIR DUNCAN (Kushnir)**, PIC 889451589, established in OSTEN UNDENS GATA 180 LGH 1004, LUND 22762, Sweden,

10. **LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN (LMU)**, PIC 999978433, established in GESCHWISTER SCHOLL PLATZ 1, MUENCHEN 80539, Germany,

11. **LOVISAGRUVAN AB (Lovisagruvan)**, PIC 920322421, established in HAKANSBODA 1, STORA 71104, Sweden,

12. **RECHARGE (RECHARGE)**, PIC 948382969, established in AVENUE DE TERVUEREN 168 3, BRUXELLES 1150, Belgium,

13. **SVERIGES GEOLOGISKA UNDERSOKNING (SGU)**, PIC 995575991, established in VILLAVAEGEN 18, UPPSALA S-75128, Sweden,

14. **SOCIEDADE PORTUGUESA DE INOVACAO CONSULTADORIA EMPRESARIAL E FOMENTO DA INOVACAO SA (SPI)**, PIC 999479368, established in AV MARECHAL GOMES DA COSTA 1376 PORTO CONCELHO FOZ DO DOURO, PORTO 4150 356, Portugal,

15. **TECHNISCHE UNIVERSITAT BERLIN (TUB)**, PIC 999986678, established in STRASSE DES 17 JUNI 135, BERLIN 10623, Germany,

16. **UNIVERSITY OF BELGRADE - FACULTY OF MINING AND GEOLOGY (UB)**, PIC 999884343, established in Djusina 7, BELGRADE 11000, Serbia,

17. **UNIVERSITEIT LEIDEN (ULEI)**, PIC 999974553, established in RAPENBURG 70, LEIDEN 2311 EZ, Netherlands,

18. **VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V. (VITO)**, PIC 999645238, established in BOERETANG 200, MOL 2400, Belgium,

19. **WEEECYCLING (WEEECycling)**, PIC 889405126, established in 13 ROUTE DES IFS, TOURVILLE LES IFS 76400, France,

Unless otherwise specified, references to ‘beneficiary’ or ‘beneficiaries’ include the coordinator and affiliated entities (if any).

If only one beneficiary signs the grant agreement (‘mono-beneficiary grant’), all provisions referring to the ‘coordinator’ or the ‘beneficiaries’ will be considered — mutatis mutandis — as referring to the beneficiary.

The parties referred to above have agreed to enter into the Agreement.

By signing the Agreement and the accession forms, the beneficiaries accept the grant and agree to implement the action under their own responsibility and in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

The Agreement is composed of:

Preamble

Terms and Conditions (including Data Sheet)

[1] Template published on Portal Reference Documents.
[2] Template published on Portal Reference Documents.
[3] Template published on Portal Reference Documents.

TERMS AND CONDITIONS

TABLE OF CONTENTS

DATA SHEET

1. General data

Project summary:

Project summary
The Future Availability of Secondary Raw Materials (FutuRaM) project seeks to (1) develop knowledge on the availability and recoverability of secondary raw materials (SRMs) within the European Union (EU), with a special focus on critical raw materials (CRMs), to enable fact-based decision making for their exploitation in the EU and third countries, and (2) disseminate this information via a systematic and transparent Secondary Raw Materials Knowledge Base (SRM-KB). The FutuRaM project will establish a methodology, reporting structure, and guidance to improve the raw materials knowledge base up to 2050, and facilitate the exploitation of SRMs with a particular focus on CRMs. The project will integrate SRM and CRM data to model their current stocks and flows, and consider economic, technological, geopolitical, regulatory, social and environmental factors to further develop, demonstrate and align SRM recovery projects with the United Nations Framework Classification for Resources (UNFC). The project will address the following waste streams: Batteries; Waste Electrical and Electronic Equipment; End-of-Life Vehicles; Mining waste; Slags and Ashes; and Construction and Demolition Waste. FutuRaM will further develop and test the UNFC methodology through 18 case studies across the six FutuRaM waste streams. FutuRaM research into the future availability of raw materials is relevant to the specific aspects of the work plan. It will contribute to a transition to climate-neutral, circular and digitised economy; develop an understanding of anthropogenic resources; develop the necessary criteria to establish a resource classification approach; combine new & existing data and present it in a UNFC format; develop a proposal for EU statistics for SRMs; and contribute to raising awareness of raw materials supply challenges in the EU and the possible solutions.

Keywords:

- Waste management

Project number: 101058522

Project name: Future Availability of Secondary Raw Materials

Project acronym: FutuRaM

Call: HORIZON-CL4-2021-RESILIENCE-01

Topic: HORIZON-CL4-2021-RESILIENCE-01-03

Type of action: HORIZON Research and Innovation Actions

Granting authority: European Health and Digital Executive Agency

Grant managed through EU Funding & Tenders Portal: Yes (eGrants)

Project starting date: fixed date: 1 June 2022

Project end date: 31 May 2026

Project duration: 48 months

Consortium agreement: Yes

2. Participants

List of participants:

N°	Role	Short name	Legal name	Ctry	PIC	Total eligible costs (BEN and AE)	Max grant amount
1	COO	WEEE FORUM	WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL	BE	997394353	1 048 437.50	1 048 437.00
1.1	AE	ecosystem	ECOSYSTEM	FR	895993657	116 658.75	116 658.00
1.2	AE	Erion WEEE	ERION WEEE	IT	889809519	162 250.00	162 250.00

N°	Role	Short name	Legal name	Ctry	PIC	Total eligible costs (BEN and AE)	Max grant amount
2	BEN (IO)	UNITAR	UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH	CH	997721825	1 611 695.00	1 611 695.00
3	BEN	BGR	BUNDESANSTALT FUER GEOWISSENSCHAFTEN UND ROHSTOFFE	DE	999429413	176 775.00	176 775.00
4	BEN	Boliden	BOLIDEN MINERAL AB	SE	998308869	211 375.00	211 375.00
5	BEN	BRGM	BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES	FR	999993662	1 032 320.00	1 032 320.00
6	BEN	Chalmers	CHALMERS TEKNISKA HOGSKOLA AB	SE	999980373	406 601.25	406 601.00
7	BEN	GeoZS	GEOLOSKI ZAVOD SLOVENIJE	SI	999466370	229 875.00	229 875.00
8	BEN	GTK	GEOLOGIAN TUTKIMUSKESKUS	FI	999432614	456 100.00	456 100.00
9	BEN	Kushnir	KUSHNIR DUNCAN	SE	889451589	58 500.00	58 500.00
10	BEN	LMU	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	DE	999978433	1 103 375.00	1 103 375.00
11	BEN	Lovisagruvan	LOVISAGRUVAN AB	SE	920322421	187 125.00	187 125.00
12	BEN	RECHARGE	RECHARGE	BE	948382969	43 287.50	43 287.00
13	BEN	SGU	SVERIGES GEOLOGISKA UNDERSOKNING	SE	995575991	611 500.00	611 500.00
14	BEN	SPI	SOCIEDADE PORTUGUESA DE INOVACAO CONSULTADORIA EMPRESARIAL E FOMENTO DA INOVACAO SA	PT	999479368	365 875.00	365 875.00
15	BEN	TUB	TECHNISCHE UNIVERSITAT BERLIN	DE	999986678	1 405 218.75	1 405 218.00
16	BEN	UB	UNIVERSITY OF BELGRADE - FACULTY OF MINING AND GEOLOGY	RS	999884343	67 750.00	67 750.00
17	BEN	ULEI	UNIVERSITEIT LEIDEN	NL	999974553	1 311 625.00	1 311 625.00
18	BEN	VITO	VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V.	BE	999645238	818 375.00	818 375.00
19	BEN	WEEECycling	WEEECYCLING	FR	889405126	251 250.00	251 250.00
20	AP	Mace	Mace	UK	889341882	0.00	0.00
21	AP	Empa	EIDGENOSSISCHE MATERIALPRUFUNGS- UND FORSCHUNGSANSTALT	CH	999907138	0.00	0.00
22	AP	Otanmaki	Otanmäki Mine Oy	FI	889253709	0.00	0.00
23	AP	Stiftung GRS	Stiftung Gemeinsames Rücknahmesystem Batterien	DE	889270781	0.00	0.00
24	AP	EMR	EUROPEAN METAL RECYCLING LIMITED	UK	889528025	0.00	0.00
25	AP	REPIC	REPIC LIMITED	UK	936090353	0.00	0.00
26	AP	UCL	UNIVERSITY COLLEGE LONDON	UK	999975620	0.00	0.00
Total						11 675 968.75	11 675 966.00

Coordinator:

– WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM)

3. Grant

Maximum grant amount, total estimated eligible costs and contributions and funding rate:

Total eligible costs (BEN and AE)	Funding rate (%)	Maximum grant amount (Annex 2)	Maximum grant amount (award decision)
11 675 968.75	100	11 675 966.00	11 675 966.00

Grant form: Budget-based

Grant mode: Action grant

Budget categories/activity types:

- A. Personnel costs
  - A.1 Employees, A.2 Natural persons under direct contract, A.3 Seconded persons
  - A.4 SME owners and natural person beneficiaries
- B. Subcontracting costs
- C. Purchase costs
  - C.1 Travel and subsistence
  - C.2 Equipment
  - C.3 Other goods, works and services
- D. Other cost categories
  - D.2 Internally invoiced goods and services
- E. Indirect costs

Cost eligibility options:

- In-kind contributions eligible costs
- Parental leave
- Project-based supplementary payments
- Average personnel costs (unit cost according to usual cost accounting practices)
- Limitation for subcontracting
- Travel and subsistence:
  - Travel: Actual costs
  - Accommodation: Actual costs
  - Subsistence: Actual costs
- Equipment: depreciation only
- Indirect cost flat-rate: 25% of the eligible direct costs (categories A-D, except volunteers costs, subcontracting costs, financial support to third parties and exempted specific cost categories, if any)
- VAT: Yes
- Other ineligible costs

Budget flexibility: Yes (no flexibility cap)

4. Reporting, payments and recoveries

4.1 Continuous reporting (art 21)

Deliverables: see Funding & Tenders Portal Continuous Reporting tool

4.2 Periodic reporting and payments

Reporting and payment schedule (art 21, 22):

Reporting					Payments	
Reporting periods			Type	Deadline	Type	Deadline (time to pay)
RP No	Month from	Month to				
					Initial prefinancing	30 days from entry into force/10 days before starting date – whichever is the latest
1	1	18	Periodic report	60 days after end of reporting period	Interim payment	90 days from receiving periodic report
2	19	36	Periodic report	60 days after end of reporting period	Interim payment	90 days from receiving periodic report
3	37	48	Periodic report	60 days after end of reporting period	Final payment	90 days from receiving periodic report

Prefinancing payments and guarantees:

Prefinancing payment	
Type	Amount
Prefinancing 1 (initial)	6 227 181.87

Reporting and payment modalities (art 21, 22):

Mutual Insurance Mechanism (MIM): Yes

MIM contribution: 5% of the maximum grant amount (583 798.30), retained from the initial prefinancing

Restrictions on distribution of initial prefinancing: The prefinancing may be distributed only if the minimum number of beneficiaries set out in the call condititions (if any) have acceded to the Agreement and only to beneficiaries that have acceded.

Interim payment ceiling (if any): 90% of the maximum grant amount

Exception for revenues: Yes

No-profit rule: Yes

Late payment interest: ECB + 3.5%

Bank account for payments:

BE25363011935282

Conversion into euros: Double conversion

Reporting language: Language of the Agreement

4.3 Certificates (art 24):

Certificates on the financial statements (CFS):

Conditions:

Schedule: only at final payment, if threshold is reached

Standard threshold (beneficiary-level):

- financial statement: requested EU contribution to costs ≥ EUR 430 000.00

Special threshold for beneficiaries with a systems and process audit(see Article 24): financial statement: requested EU contribution to costs ≥ EUR 725 000.00

4.4 Recoveries (art 22)

First-line liability for recoveries:

Beneficiary termination: Beneficiary concerned

Final payment: Each beneficiary for their own debt

After final payment: Beneficiary concerned

Joint and several liability for enforced recoveries (in case of non-payment):

Individual financial responsibility: Each beneficiary is liable only for its own debts (and those of its affiliated entities, if any)

5. Consequences of non-compliance, applicable law & dispute settlement forum

Suspension and termination:

Additional suspension grounds (art 31)

Additional termination grounds (art 32)

Applicable law (art 43):

Standard applicable law regime: EU law + law of Belgium

Special applicable law regime:

– UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH (UNITAR): general principles governing the law of international organisations and the general rules of international law

Dispute settlement forum (art 43):

Standard dispute settlement forum:

EU beneficiaries: EU General Court + EU Court of Justice (on appeal)

Non-EU beneficiaries: Courts of Brussels, Belgium (unless an international agreement provides for the enforceability of EU court judgements)

Special dispute settlement forum:

– UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH (UNITAR): Arbitration

6. Other

Specific rules (Annex 5): Yes

Standard time-limits after project end:

Confidentiality (for X years after final payment): 5

Record-keeping (for X years after final payment): 5 (or 3 for grants of not more than EUR 60 000)

Reviews (up to X years after final payment): 2

Audits (up to X years after final payment): 2

Extension of findings from other grants to this grant (no later than X years after final payment): 2

Impact evaluation (up to X years after final payment): 5 (or 3 for grants of not more than EUR 60 000)

CHAPTER 1 GENERAL

ARTICLE 1 — SUBJECT OF THE AGREEMENT

This Agreement sets out the rights and obligations and terms and conditions applicable to the grant awarded for the implementation of the action set out in Chapter 2.

ARTICLE 2 — DEFINITIONS

For the purpose of this Agreement, the following definitions apply:

Actions — The project which is being funded in the context of this Agreement.

Grant — The grant awarded in the context of this Agreement.

EU grants — Grants awarded by EU institutions, bodies, offices or agencies (including EU executive agencies, EU regulatory agencies, EDA, joint undertakings, etc.).

Participants — Entities participating in the action as beneficiaries, affiliated entities, associated partners, third parties giving in-kind contributions, subcontractors or recipients of financial support to third parties.

Beneficiaries (BEN) — The signatories of this Agreement (either directly or through an accession form).

Affiliated entities (AE) — Entities affiliated to a beneficiary within the meaning of Article 187 of EU Financial Regulation 2018/1046[4] which participate in the action with similar rights and obligations as the beneficiaries (obligation to implement action tasks and right to charge costs and claim contributions).

Associated partners (AP) — Entities which participate in the action, but without the right to charge costs or claim contributions.

Purchases — Contracts for goods, works or services needed to carry out the action (e.g. equipment, consumables and supplies) but which are not part of the action tasks (see Annex 1).

Subcontracting — Contracts for goods, works or services that are part of the action tasks (see Annex 1).

In-kind contributions — In-kind contributions within the meaning of Article 2(36) of EU Financial

[4] For the definition, see Article 187 Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council of 18 July 2018 on the financial rules applicable to the general budget of the Union, amending Regulations (EU) No 1296/2013, (EU) No 1301/2013, (EU) No 1303/2013, (EU) No 1304/2013, (EU) No 1309/2013, (EU) No 1316/2013, (EU) No 223/2014, (EU) No 283/2014, and Decision No 541/2014/EU and repealing Regulation (EU, Euratom) No 966/2012 ('EU Financial Regulation') (OJ L 193, 30.7.2018, p. 1): "**affiliated entities** [are]:
(a) entities that form a sole beneficiary [(i.e. where an entity is formed of several entities that satisfy the criteria for being awarded a grant, including where the entity is specifically established for the purpose of implementing an action to be financed by a grant)];
(b) entities that satisfy the eligibility criteria and that do not fall within one of the situations referred to in Article 136(1) and 141(1) and that have a link with the beneficiary, in particular a legal or capital link, which is neither limited to the action nor established for the sole purpose of its implementation".

Regulation 2018/1046, i.e. non-financial resources made available free of charge by third parties.

Fraud — Fraud within the meaning of Article 3 of EU Directive 2017/1371[5] and Article 1 of the Convention on the protection of the European Communities' financial interests, drawn up by the Council Act of 26 July 1995[6], as well as any other wrongful or criminal deception intended to result in financial or personal gain.

Irregularities — Any type of breach (regulatory or contractual) which could impact the EU financial interests, including irregularities within the meaning of Article 1(2) of EU Regulation 2988/95[7].

Grave professional misconduct — Any type of unacceptable or improper behaviour in exercising one's profession, especially by employees, including grave professional misconduct within the meaning of Article 136(1)(c) of EU Financial Regulation 2018/1046.

Applicable EU, international and national law — Any legal acts or other (binding or non-binding) rules and guidance in the area concerned.

Portal — EU Funding & Tenders Portal; electronic portal and exchange system managed by the European Commission and used by itself and other EU institutions, bodies, offices or agencies for the management of their funding programmes (grants, procurements, prizes, etc.).

CHAPTER 2 ACTION

ARTICLE 3 — ACTION

The grant is awarded for the action **101058522** — **FutuRaM** ('action'), as described in Annex 1.

ARTICLE 4 — DURATION AND STARTING DATE

The duration and the starting date of the action are set out in the Data Sheet (see Point 1).

CHAPTER 3 GRANT

ARTICLE 5 — GRANT

5.1 Form of grant

The grant is an action grant[8] which takes the form of a budget-based mixed actual cost grant (i.e. a

[5] Directive (EU) 2017/1371 of the European Parliament and of the Council of 5 July 2017 on the fight against fraud to the Union's financial interests by means of criminal law (OJ L 198, 28.7.2017, p. 29).
[6] OJ C 316, 27.11.1995, p. 48.
[7] Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests (OJ L 312, 23.12.1995, p. 1).
[8] For the definition, see Article 180(2)(a) EU Financial Regulation 2018/1046: '**action grant**' means an EU grant to finance "an action intended to help achieve a Union policy objective".

grant based on actual costs incurred, but which may also include other forms of funding, such as unit costs or contributions, flat-rate costs or contributions, lump sum costs or contributions or financing not linked to costs).

5.2 Maximum grant amount

The maximum grant amount is set out in the Data Sheet (see Point 3) and in the estimated budget (Annex 2).

5.3 Funding rate

The funding rate for costs is 100% of the action's eligible costs.

Contributions are not subject to any funding rate.

5.4 Estimated budget, budget categories and forms of funding

The estimated budget for the action is set out in Annex 2.

It contains the estimated eligible costs and contributions for the action, broken down by participant and budget category.

Annex 2 also shows the types of costs and contributions (forms of funding)[9] to be used for each budget category.

If unit costs or contributions are used, the details on the calculation will be explained in Annex 2a.

5.5 Budget flexibility

The budget breakdown may be adjusted — without an amendment (see Article 39) — by transfers (between participants and budget categories), as long as this does not imply any substantive or important change to the description of the action in Annex 1.

However:

- changes to the budget category for volunteers (if used) always require an amendment
- changes to budget categories with lump sums costs or contributions (if used; including financing not linked to costs) always require an amendment
- changes to budget categories with higher funding rates or budget ceilings (if used) always require an amendment
- addition of amounts for subcontracts not provided for in Annex 1 either require an amendment or simplified approval in accordance with Article 6.2
- other changes require an amendment or simplified approval, if specifically provided for in Article 6.2
- flexibility caps: not applicable.

[9] See Article 125 EU Financial Regulation 2018/1046.

ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS AND CONTRIBUTIONS

In order to be eligible, costs and contributions must meet the **eligibility** conditions set out in this Article.

6.1 General eligibility conditions

The **general eligibility conditions** are the following:

(a) for actual costs:

(i) they must be actually incurred by the beneficiary

(ii) they must be incurred in the period set out in Article 4 (with the exception of costs relating to the submission of the final periodic report, which may be incurred afterwards; see Article 21)

(iii) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2

(iv) they must be incurred in connection with the action as described in Annex 1 and necessary for its implementation

(v) they must be identifiable and verifiable, in particular recorded in the beneficiary's accounts in accordance with the accounting standards applicable in the country where the beneficiary is established and with the beneficiary's usual cost accounting practices

(vi) they must comply with the applicable national law on taxes, labour and social security and

(vii) they must be reasonable, justified and must comply with the principle of sound financial management, in particular regarding economy and efficiency

(b) for unit costs or contributions (if any):

(i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2

(ii) the units must:

- be actually used or produced by the beneficiary in the period set out in Article 4 (with the exception of units relating to the submission of the final periodic report, which may be used or produced afterwards; see Article 21)

- be necessary for the implementation of the action and

(iii) the number of units must be identifiable and verifiable, in particular supported by records and documentation (see Article 20)

(c) for flat-rate costs or contributions (if any):

(i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2

(ii) the costs or contributions to which the flat-rate is applied must:

- be eligible
- relate to the period set out in Article 4 (with the exception of costs or contributions relating to the submission of the final periodic report, which may be incurred afterwards; see Article 21)

(d) for lump sum costs or contributions (if any):

(i) they must be declared under one of the budget categories set out in Article 6.2 and Annex 2

(ii) the work must be properly implemented by the beneficiary in accordance with Annex 1

(iii) the deliverables/outputs must be achieved in the period set out in Article 4 (with the exception of deliverables/outputs relating to the submission of the final periodic report, which may be achieved afterwards; see Article 21)

(e) for unit, flat-rate or lump sum costs or contributions according to usual cost accounting practices (if any):

(i) they must fulfil the general eligibility conditions for the type of cost concerned

(ii) the cost accounting practices must be applied in a consistent manner, based on objective criteria, regardless of the source of funding

(f) for financing not linked to costs (if any): the results must be achieved or the conditions must be fulfilled as described in Annex 1.

In addition, for direct cost categories (e.g. personnel, travel & subsistence, subcontracting and other direct costs) only costs that are directly linked to the action implementation and can therefore be attributed to it directly are eligible. They must not include any indirect costs (i.e. costs that are only indirectly linked to the action, e.g. via cost drivers).

In-kind contributions provided by third parties free of charge may be declared as eligible direct costs by the beneficiaries which use them (under the same conditions as if they were their own, provided that they concern only direct costs and that the third parties and their in-kind contributions are set out in Annex 1 (or approved ex post in the periodic report, if their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants; 'simplified approval procedure').

6.2 Specific eligibility conditions for each budget category

For each budget category, the **specific eligibility conditions** are as follows:

Direct costs

A. Personnel costs

A.1 Costs for employees (or equivalent) are eligible as personnel costs if they fulfil the general eligibility conditions and are related to personnel working for the beneficiary under an employment contract (or equivalent appointing act) and assigned to the action.

They must be limited to salaries (including net payments during parental leave), social security contributions, taxes and other costs linked to the remuneration, if they arise from national law or the employment contract (or equivalent appointing act) and be calculated on the basis of the costs actually incurred, in accordance with the following method:

{daily rate for the person

multiplied by

number of day-equivalents worked on the action (rounded up or down to the nearest half-day)}.

The daily rate must be calculated as:

{annual personnel costs for the person

divided by

215}.

The number of day-equivalents declared for a person must be identifiable and verifiable (see Article 20).

The actual time spent on parental leave by a person assigned to the action may be deducted from the 215 days indicated in the above formula.

The total number of day-equivalents declared in EU grants, for a person for a year, cannot be higher than 215, minus time spent on parental leave (if any).

For personnel which receives supplementary payments for work in projects (project-based remuneration), the personnel costs must be calculated at a rate which:

- corresponds to the actual remuneration costs paid by the beneficiary for the time worked by the person in the action over the reporting period
- does not exceed the remuneration costs paid by the beneficiary for work in similar projects funded by national schemes (‘national projects reference’)
- is defined based on objective criteria allowing to determine the amount to which the person is entitled

and

- reflects the usual practice of the beneficiary to pay consistently bonuses or supplementary payments for work in projects funded by national schemes.

The national projects reference is the remuneration defined in national law, collective labour agreement or written internal rules of the beneficiary applicable to work in projects funded by national schemes.

If there is no such national law, collective labour agreement or written internal rules or if the project-based remuneration is not based on objective criteria, the national project reference will be the average

remuneration of the person in the last full calendar year covered by the reporting period, excluding remuneration paid for work in EU actions.

If the beneficiary uses average personnel costs (unit cost according to usual cost accounting practices), the personnel costs must fulfil the general eligibility conditions for such unit costs and the daily rate must be calculated:

- using the actual personnel costs recorded in the beneficiary's accounts and excluding any costs which are ineligible or already included in other budget categories; the actual personnel costs may be adjusted on the basis of budgeted or estimated elements, if they are relevant for calculating the personnel costs, reasonable and correspond to objective and verifiable information

and

- according to usual cost accounting practices which are applied in a consistent manner, based on objective criteria, regardless of the source of funding.

A.2 and **A.3 Costs for natural persons working under a direct contract** other than an employment contract and costs for **seconded persons by a third party against payment** are also eligible as personnel costs, if they are assigned to the action, fulfil the general eligibility conditions and:

(a) work under conditions similar to those of an employee (in particular regarding the way the work is organised, the tasks that are performed and the premises where they are performed) and

(b) the result of the work belongs to the beneficiary (unless agreed otherwise).

They must be calculated on the basis of a rate which corresponds to the costs actually incurred for the direct contract or secondment and must not be significantly different from those for personnel performing similar tasks under an employment contract with the beneficiary.

A.4 The work of **SME owners** for the action (i.e. owners of beneficiaries that are small and medium-sized enterprises[10] not receiving a salary) or **natural person beneficiaries** (i.e. beneficiaries that are natural persons not receiving a salary) may be declared as personnel costs, if they fulfil the general eligibility conditions and are calculated as unit costs in accordance with the method set out in Annex 2a.

B. Subcontracting costs

Subcontracting costs for the action (including related duties, taxes and charges, such as non-deductible or non-refundable value added tax (VAT)) are eligible, if they are calculated on the basis of the costs actually incurred, fulfil the general eligibility conditions and are awarded using the

[10] For the definition, see Commission Recommendation 2003/361/EC: micro, small or medium-sized enterprise (SME) are enterprises

- engaged in an economic activity, irrespective of their legal form (including, in particular, self- employed persons and family businesses engaged in craft or other activities, and partnerships or associations regularly engaged in an economic activity) and

- employing fewer than 250 persons (expressed in 'annual working units' as defined in Article 5 of the Recommendation) and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.

beneficiary's usual purchasing practices — provided these ensure subcontracts with best value for money (or if appropriate the lowest price) and that there is no conflict of interests (see Article 12).

Beneficiaries that are 'contracting authorities/entities' within the meaning of the EU Directives on public procurement must also comply with the applicable national law on public procurement.

Subcontracting may cover only a limited part of the action.

The tasks to be subcontracted and the estimated cost for each subcontract must be set out in Annex 1 and the total estimated costs of subcontracting per beneficiary must be set out in Annex 2 (or may be approved ex post in the periodic report, if the use of subcontracting does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants; 'simplified approval procedure').

C. Purchase costs

Purchase costs for the action (including related duties, taxes and charges, such as non-deductible or non-refundable value added tax (VAT)) are eligible if they fulfil the general eligibility conditions and are bought using the beneficiary's usual purchasing practices — provided these ensure purchases with best value for money (or if appropriate the lowest price) and that there is no conflict of interests (see Article 12).

Beneficiaries that are 'contracting authorities/entities' within the meaning of the EU Directives on public procurement must also comply with the applicable national law on public procurement.

C.1 Travel and subsistence

Purchases for **travel, accommodation** and **subsistence** must be calculated as follows:

- travel: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel
- accommodation: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel
- subsistence: on the basis of the costs actually incurred and in line with the beneficiary's usual practices on travel .

C.2 Equipment

Purchases of **equipment, infrastructure or other assets** used for the action must be declared as depreciation costs, calculated on the basis of the costs actually incurred and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.

Only the portion of the costs that corresponds to the rate of actual use for the action during the action duration can be taken into account.

Costs for **renting or leasing** equipment, infrastructure or other assets are also eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets and do not include any financing fees.

C.3 Other goods, works and services

Purchases of **other goods, works and services** must be calculated on the basis of the costs actually incurred.

Such goods, works and services include, for instance, consumables and supplies, promotion, dissemination, protection of results, translations, publications, certificates and financial guarantees, if required under the Agreement.

D. Other cost categories

D.2 Internally invoiced goods and services

Costs for internally invoiced goods and services directly used for the action may be declared as unit cost according to usual cost accounting practices, if and as declared eligible in the call conditions, if they fulfil the general eligibility conditions for such unit costs and the amount per unit is calculated:

- using the actual costs for the good or service recorded in the beneficiary's accounts, attributed either by direct measurement or on the basis of cost drivers, and excluding any cost which are ineligible or already included in other budget categories; the actual costs may be adjusted on the basis of budgeted or estimated elements, if they are relevant for calculating the costs, reasonable and correspond to objective and verifiable information

and

- according to usual cost accounting practices which are applied in a consistent manner, based on objective criteria, regardless of the source of funding.

'Internally invoiced goods and services' means goods or services which are provided within the beneficiary's organisation directly for the action and which the beneficiary values on the basis of its usual cost accounting practices.

This cost will not be taken into account for the indirect cost flat-rate.

Indirect costs

E. Indirect costs

Indirect costs will be reimbursed at the flat-rate of 25% of the eligible direct costs (categories A-D, except volunteers costs, subcontracting costs, financial support to third parties and exempted specific cost categories, if any).

Contributions

Not applicable

6.3 Ineligible costs and contributions

The following costs or contributions are **ineligible**:

(a) costs or contributions that do not comply with the conditions set out above (Article 6.1 and 6.2), in particular:

(i) costs related to return on capital and dividends paid by a beneficiary

(ii) debt and debt service charges

(iii) provisions for future losses or debts

(iv) interest owed

(v) currency exchange losses

(vi) bank costs charged by the beneficiary's bank for transfers from the granting authority

(vii) excessive or reckless expenditure

(viii) deductible or refundable VAT (including VAT paid by public bodies acting as public authority)

(ix) costs incurred or contributions for activities implemented during grant agreement suspension (see Article 31)

(x) in-kind contributions by third parties: not applicable

(b) costs or contributions declared under other EU grants (or grants awarded by an EU Member State, non-EU country or other body implementing the EU budget), except for the following cases:

(i) Synergy actions: not applicable

(ii) if the action grant is combined with an operating grant[11] running during the same period and the beneficiary can demonstrate that the operating grant does not cover any (direct or indirect) costs of the action grant

(c) costs or contributions for staff of a national (or regional/local) administration, for activities that are part of the administration's normal activities (i.e. not undertaken only because of the grant)

(d) costs or contributions (especially travel and subsistence) for staff or representatives of EU institutions, bodies or agencies

(e) other :

(i) country restrictions for eligible costs: not applicable

(ii) costs or contributions declared specifically ineligible in the call conditions.

6.4 Consequences of non-compliance

If a beneficiary declares costs or contributions that are ineligible, they will be rejected (see Article 27).

This may also lead to other measures described in Chapter 5.

[11] For the definition, see Article 180(2)(b) of EU Financial Regulation 2018/1046: '**operating grant**' means an EU grant to finance "the functioning of a body which has an objective forming part of and supporting an EU policy".

CHAPTER 4 GRANT IMPLEMENTATION

SECTION 1 CONSORTIUM: BENEFICIARIES, AFFILIATED ENTITIES AND OTHER PARTICIPANTS

ARTICLE 7 — BENEFICIARIES

The beneficiaries, as signatories of the Agreement, are fully responsible towards the granting authority for implementing it and for complying with all its obligations.

They must implement the Agreement to their best abilities, in good faith and in accordance with all the obligations and terms and conditions it sets out.

They must have the appropriate resources to implement the action and implement the action under their own responsibility and in accordance with Article 11. If they rely on affiliated entities or other participants (see Articles 8 and 9), they retain sole responsibility towards the granting authority and the other beneficiaries.

They are jointly responsible for the *technical* implementation of the action. If one of the beneficiaries fails to implement their part of the action, the other beneficiaries must ensure that this part is implemented by someone else (without being entitled to an increase of the maximum grant amount and subject to an amendment; see Article 39). The *financial* responsibility of each beneficiary in case of recoveries is governed by Article 22.

The beneficiaries (and their action) must remain eligible under the EU programme funding the grant for the entire duration of the action. Costs and contributions will be eligible only as long as the beneficiary and the action are eligible.

The **internal roles and responsibilities** of the beneficiaries are divided as follows:

(a) Each beneficiary must:

(i) keep information stored in the Portal Participant Register up to date (see Article 19)

(ii) inform the granting authority (and the other beneficiaries) immediately of any events or circumstances likely to affect significantly or delay the implementation of the action (see Article 19)

(iii) submit to the coordinator in good time:

- the prefinancing guarantees (if required; see Article 23)
- the financial statements and certificates on the financial statements (CFS) (if required; see Articles 21 and 24.2 and Data Sheet, Point 4.3)
- the contribution to the deliverables and technical reports (see Article 21)
- any other documents or information required by the granting authority under the Agreement

(iv) submit via the Portal data and information related to the participation of their affiliated entities.

(b) The coordinator must:

(i) monitor that the action is implemented properly (see Article 11)

(ii) act as the intermediary for all communications between the consortium and the granting authority, unless the Agreement or granting authority specifies otherwise, and in particular:

- submit the prefinancing guarantees to the granting authority (if any)
- request and review any documents or information required and verify their quality and completeness before passing them on to the granting authority
- submit the deliverables and reports to the granting authority
- inform the granting authority about the payments made to the other beneficiaries (report on the distribution of payments; if required, see Articles 22 and 32)

(iii) distribute the payments received from the granting authority to the other beneficiaries without unjustified delay (see Article 22).

The coordinator may not delegate or subcontract the above-mentioned tasks to any other beneficiary or third party (including affiliated entities).

However, coordinators which are public bodies may delegate the tasks set out in Point (b)(ii) last indent and (iii) above to entities with 'authorisation to administer' which they have created or which are controlled by or affiliated to them. In this case, the coordinator retains sole responsibility for the payments and for compliance with the obligations under the Agreement.

Moreover, coordinators which are 'sole beneficiaries'[12] (or similar, such as European research infrastructure consortia (ERICs)) may delegate the tasks set out in Point (b)(i) to (iii) above to one of their members. The coordinator retains sole responsibility for compliance with the obligations under the Agreement.

The beneficiaries must have **internal arrangements** regarding their operation and co-ordination, to ensure that the action is implemented properly.

If required by the granting authority (see Data Sheet, Point 1), these arrangements must be set out in a written **consortium agreement** between the beneficiaries, covering for instance:

- the internal organisation of the consortium
- the management of access to the Portal
- different distribution keys for the payments and financial responsibilities in case of recoveries (if any)
- additional rules on rights and obligations related to background and results (see Article 16)

[12] For the definition, see Article 187(2) EU Financial Regulation 2018/1046: "Where several entities satisfy the criteria for being awarded a grant and together form one entity, that entity may be treated as the **sole beneficiary**, including where it is specifically established for the purpose of implementing the action financed by the grant."

- settlement of internal disputes
- liability, indemnification and confidentiality arrangements between the beneficiaries.

The internal arrangements must not contain any provision contrary to this Agreement.

ARTICLE 8 — AFFILIATED ENTITIES

The following entities which are linked to a beneficiary will participate in the action as 'affiliated entities':

- **ECOSYSTEM (ecosystem)**, PIC 895993657, linked to WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM)
- **ERION WEEE (Erion WEEE)**, PIC 889809519, linked to WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM)

Affiliated entities can charge costs and contributions to the action under the same conditions as the beneficiaries and must implement the action tasks attributed to them in Annex 1 in accordance with Article 11.

Their costs and contributions will be included in Annex 2 and will be taken into account for the calculation of the grant.

The beneficiaries must ensure that all their obligations under this Agreement also apply to their affiliated entities.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the affiliated entities.

Breaches by affiliated entities will be handled in the same manner as breaches by beneficiaries. Recovery of undue amounts will be handled through the beneficiaries.

If the granting authority requires joint and several liability of affiliated entities (see Data Sheet, Point 4.4), they must sign the declaration set out in Annex 3a and may be held liable in case of enforced recoveries against their beneficiaries (see Article 22.2 and 22.4).

ARTICLE 9 — OTHER PARTICIPANTS INVOLVED IN THE ACTION

9.1 Associated partners

The following entities which cooperate with a beneficiary will participate in the action as 'associated partners':

- **Mace (Mace)**, PIC 889341882, associated partner of WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM)
- **EIDGENOSSISCHE MATERIALPRUFUNGS- UND FORSCHUNGSANSTALT (Empa)**, PIC 999907138, associated partner of WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM)

- **Otanmäki Mine Oy (Otanmaki)**, PIC 889253709, associated partner of GEOLOGIAN TUTKIMUSKESKUS (GTK)

- **Stiftung Gemeinsames Rücknahmesystem Batterien (Stiftung GRS)**, PIC 889270781, associated partner of TECHNISCHE UNIVERSITAT BERLIN (TUB)

- **EUROPEAN METAL RECYCLING LIMITED (EMR)**, PIC 889528025, associated partner of WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM)

- **REPIC LIMITED (REPIC)**, PIC 936090353

- **UNIVERSITY COLLEGE LONDON (UCL)**, PIC 999975620, associated partner of WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM)

Associated partners must implement the action tasks attributed to them in Annex 1 in accordance with Article 11. They may not charge costs or contributions to the action and the costs for their tasks are not eligible.

The tasks must be set out in Annex 1.

The beneficiaries must ensure that their contractual obligations under Articles 11 (proper implementation), 12 (conflict of interests), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping) also apply to the associated partners.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the associated partners.

9.2 Third parties giving in-kind contributions to the action

Other third parties may give in-kind contributions to the action (i.e. personnel, equipment, other goods, works and services, etc. which are free-of-charge) if necessary for the implementation.

Third parties giving in-kind contributions do not implement any action tasks. They may not charge costs or contributions to the action, but the costs for the in-kind contributions are eligible and may be charged by the beneficiaries which use them, under the conditions set out in Article 6. The costs will be included in Annex 2 as part of the beneficiaries' costs.

The third parties and their in-kind contributions should be set out in Annex 1.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the third parties giving in-kind contributions.

9.3 Subcontractors

Subcontractors may participate in the action, if necessary for the implementation.

Subcontractors must implement their action tasks in accordance with Article 11. The costs for the subcontracted tasks (invoiced price from the subcontractor) are eligible and may be charged by the

beneficiaries, under the conditions set out in Article 6. The costs will be included in Annex 2 as part of the beneficiaries' costs.

The beneficiaries must ensure that their contractual obligations under Articles 11 (proper implementation), 12 (conflict of interest), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping) also apply to the subcontractors.

The beneficiaries must ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the subcontractors.

9.4 Recipients of financial support to third parties

If the action includes providing financial support to third parties (e.g. grants, prizes or similar forms of support), the beneficiaries must ensure that their contractual obligations under Articles 12 (conflict of interest), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping)also apply to the third parties receiving the support (recipients).

The beneficiaries must also ensure that the bodies mentioned in Article 25 (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.) can exercise their rights also towards the recipients.

ARTICLE 10 — PARTICIPANTS WITH SPECIAL STATUS

10.1 Non-EU participants

Participants which are established in a non-EU country (if any) undertake to comply with their obligations under the Agreement and:

- to respect general principles (including fundamental rights, values and ethical principles, environmental and labour standards, rules on classified information, intellectual property rights, visibility of funding and protection of personal data)
- for the submission of certificates under Article 24: to use qualified external auditors which are independent and comply with comparable standards as those set out in EU Directive 2006/43/EC[13]
- for the controls under Article 25: to allow for checks, reviews, audits and investigations (including on-the-spot checks, visits and inspections) by the bodies mentioned in that Article (e.g. granting authority, OLAF, Court of Auditors (ECA), etc.).

Special rules on dispute settlement apply (see Data Sheet, Point 5).

10.2 Participants which are international organisations

Participants which are international organisations (IOs; if any) undertake to comply with their obligations under the Agreement and:

[13] Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts or similar national regulations (OJ L 157, 9.6.2006, p. 87).

- to respect general principles (including fundamental rights, values and ethical principles, environmental and labour standards, rules on classified information, intellectual property rights, visibility of funding and protection of personal data)

- for the submission of certificates under Article 24: to use either independent public officers or external auditors which comply with comparable standards as those set out in EU Directive 2006/43/EC

- for the controls under Article 25: to allow for the checks, reviews, audits and investigations by the bodies mentioned in that Article, taking into account the specific agreements concluded by them and the EU (if any).

For such participants, nothing in the Agreement will be interpreted as a waiver of their privileges or immunities, as accorded by their constituent documents or international law.

Special rules on applicable law and dispute settlement apply (see Article 43 and Data Sheet, Point 5).

10.3 Pillar-assessed participants

Pillar-assessed participants (if any) may rely on their own systems, rules and procedures, in so far as they have been positively assessed and do not call into question the decision awarding the grant or breach the principle of equal treatment of applicants or beneficiaries.

'Pillar-assessment' means a review by the European Commission on the systems, rules and procedures which participants use for managing EU grants (in particular internal control system, accounting system, external audits, financing of third parties, rules on recovery and exclusion, information on recipients and protection of personal data; see Article 154 EU Financial Regulation 2018/1046).

Participants with a positive pillar assessment may rely on their own systems, rules and procedures, in particular for:

- record-keeping (Article 20): may be done in accordance with internal standards, rules and procedures

- currency conversion for financial statements (Article 21): may be done in accordance with usual accounting practices

- guarantees (Article 23): for public law bodies, prefinancing guarantees are not needed

- certificates (Article 24):

    - certificates on the financial statements (CFS): may be provided by their regular internal or external auditors and in accordance with their internal financial regulations and procedures

    - certificates on usual accounting practices (CoMUC): are not needed if those practices are covered by an ex-ante assessment

and use the following specific rules, for:

- recoveries (Article 22): in case of financial support to third parties, there will be no recovery if the participant has done everything possible to retrieve the undue amounts from the third party

receiving the support (including legal proceedings) and non-recovery is not due to an error or negligence on its part

- checks, reviews, audits and investigations by the EU (Article 25): will be conducted taking into account the rules and procedures specifically agreed between them and the framework agreement (if any)

- impact evaluation (Article 26): will be conducted in accordance with the participant's internal rules and procedures and the framework agreement (if any)

- grant agreement suspension (Article 31): certain costs incurred during grant suspension are eligible (notably, minimum costs necessary for a possible resumption of the action and costs relating to contracts which were entered into before the pre-information letter was received and which could not reasonably be suspended, reallocated or terminated on legal grounds)

- grant agreement termination (Article 32): the final grant amount and final payment will be calculated taking into account also costs relating to contracts due for execution only after termination takes effect, if the contract was entered into before the pre-information letter was received and could not reasonably be terminated on legal grounds

- liability for damages (Article 33.2): the granting authority must be compensated for damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement only if the damage is due to an infringement of the participant's internal rules and procedures or due to a violation of third parties' rights by the participant or one of its employees or individual for whom the employees are responsible.

Participants whose pillar assessment covers procurement and granting procedures may also do purchases, subcontracting and financial support to third parties (Article 6.2) in accordance with their internal rules and procedures for purchases, subcontracting and financial support.

Participants whose pillar assessment covers data protection rules may rely on their internal standards, rules and procedures for data protection (Article 15).

The participants may however not rely on provisions which would breach the principle of equal treatment of applicants or beneficiaries or call into question the decision awarding the grant, such as in particular:

- eligibility (Article 6)

- consortium roles and set-up (Articles 7-9)

- security and ethics (Articles 13, 14)

- IPR (including background and results, access rights and rights of use), communication, dissemination and visibility (Articles 16 and 17)

- information obligation (Article 19)

- payment, reporting and amendments (Articles 21, 22 and 39)

- rejections, reductions, suspensions and terminations (Articles 27, 28, 29-32)

If the pillar assessment was subject to remedial measures, reliance on the internal systems, rules and procedures is subject to compliance with those remedial measures.

Participants whose assessment has not yet been updated to cover (the new rules on) data protection may rely on their internal systems, rules and procedures, provided that they ensure that personal data is:

- processed lawfully, fairly and in a transparent manner in relation to the data subject
- collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes
- adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed
- accurate and, where necessary, kept up to date
- kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed and
- processed in a manner that ensures appropriate security of the personal data.

Participants must inform the coordinator without delay of any changes to the systems, rules and procedures that were part of the pillar assessment. The coordinator must immediately inform the granting authority.

Pillar-assessed participants that have also concluded a framework agreement with the EU, may moreover — under the same conditions as those above (i.e. not call into question the decision awarding the grant or breach the principle of equal treatment of applicants or beneficiaries) — rely on the provisions set out in that framework agreement.

SECTION 2 RULES FOR CARRYING OUT THE ACTION

ARTICLE 11 — PROPER IMPLEMENTATION OF THE ACTION

11.1 Obligation to properly implement the action

The beneficiaries must implement the action as described in Annex 1 and in compliance with the provisions of the Agreement, the call conditions and all legal obligations under applicable EU, international and national law.

11.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 12 — CONFLICT OF INTERESTS

12.1 Conflict of interests

The beneficiaries must take all measures to prevent any situation where the impartial and objective implementation of the Agreement could be compromised for reasons involving family, emotional life, political or national affinity, economic interest or any other direct or indirect interest ('conflict of interests').

They must formally notify the granting authority without delay of any situation constituting or likely to lead to a conflict of interests and immediately take all the necessary steps to rectify this situation.

The granting authority may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline.

12.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28) and the grant or the beneficiary may be terminated (see Article 32).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 13 — CONFIDENTIALITY AND SECURITY

13.1 Sensitive information

The parties must keep confidential any data, documents or other material (in any form) that is identified as sensitive in writing ('sensitive information') — during the implementation of the action and for at least until the time-limit set out in the Data Sheet (see Point 6).

If a beneficiary requests, the granting authority may agree to keep such information confidential for a longer period.

Unless otherwise agreed between the parties, they may use sensitive information only to implement the Agreement.

The beneficiaries may disclose sensitive information to their personnel or other participants involved in the action only if they:

(a) need to know it in order to implement the Agreement and

(b) are bound by an obligation of confidentiality.

The granting authority may disclose sensitive information to its staff and to other EU institutions and bodies.

It may moreover disclose sensitive information to third parties, if:

(a) this is necessary to implement the Agreement or safeguard the EU financial interests and

(b) the recipients of the information are bound by an obligation of confidentiality.

The confidentiality obligations no longer apply if:

(a) the disclosing party agrees to release the other party

(b) the information becomes publicly available, without breaching any confidentiality obligation

(c) the disclosure of the sensitive information is required by EU, international or national law.

Specific confidentiality rules (if any) are set out in Annex 5.

13.2 Classified information

The parties must handle classified information in accordance with the applicable EU, international or national law on classified information (in particular, Decision 2015/444[14] and its implementing rules).

Deliverables which contain classified information must be submitted according to special procedures agreed with the granting authority.

Action tasks involving classified information may be subcontracted only after explicit approval (in writing) from the granting authority.

Classified information may not be disclosed to any third party (including participants involved in the action implementation) without prior explicit written approval from the granting authority.

Specific security rules (if any) are set out in Annex 5.

13.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 14 — ETHICS AND VALUES

14.1 Ethics

The action must be carried out in line with the highest ethical standards and the applicable EU, international and national law on ethical principles.

Specific ethics rules (if any) are set out in Annex 5.

14.2 Values

The beneficiaries must commit to and ensure the respect of basic EU values (such as respect for human dignity, freedom, democracy, equality, the rule of law and human rights, including the rights of minorities).

Specific rules on values (if any) are set out in Annex 5.

14.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

[14] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 15 — DATA PROTECTION

15.1 Data processing by the granting authority

Any personal data under the Agreement will be processed under the responsibility of the data controller of the granting authority in accordance with and for the purposes set out in the Portal Privacy Statement.

For grants where the granting authority is the European Commission, an EU regulatory or executive agency, joint undertaking or other EU body, the processing will be subject to Regulation 2018/1725[15].

15.2 Data processing by the beneficiaries

The beneficiaries must process personal data under the Agreement in compliance with the applicable EU, international and national law on data protection (in particular, Regulation 2016/679[16]).

They must ensure that personal data is:

- processed lawfully, fairly and in a transparent manner in relation to the data subjects
- collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes
- adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed
- accurate and, where necessary, kept up to date
- kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed and
- processed in a manner that ensures appropriate security of the data.

The beneficiaries may grant their personnel access to personal data only if it is strictly necessary for implementing, managing and monitoring the Agreement. The beneficiaries must ensure that the personnel is under a confidentiality obligation.

The beneficiaries must inform the persons whose data are transferred to the granting authority and provide them with the Portal Privacy Statement.

15.3 Consequences of non-compliance

[15] Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data, and repealing Regulation (EC) No 45/2001 and Decision No 1247/2002/EC (OJ L 295, 21.11.2018, p. 39).

[16] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (‘GDPR’) (OJ L 119, 4.5.2016, p. 1).

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 16 — INTELLECTUAL PROPERTY RIGHTS (IPR) — BACKGROUND AND RESULTS —ACCESS RIGHTS AND RIGHTS OF USE

16.1 Background and access rights to background

The beneficiaries must give each other and the other participants access to the background identified as needed for implementing the action, subject to any specific rules in Annex 5.

'Background' means any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that is:

(a) held by the beneficiaries before they acceded to the Agreement and

(b) needed to implement the action or exploit the results.

If background is subject to rights of a third party, the beneficiary concerned must ensure that it is able to comply with its obligations under the Agreement.

16.2 Ownership of results

The granting authority does not obtain ownership of the results produced under the action.

'Results' means any tangible or intangible effect of the action, such as data, know-how or information, whatever its form or nature, whether or not it can be protected, as well as any rights attached to it, including intellectual property rights.

16.3 Rights of use of the granting authority on materials, documents and information received for policy, information, communication, dissemination and publicity purposes

The granting authority has the right to use non-sensitive information relating to the action and materials and documents received from the beneficiaries (notably summaries for publication, deliverables, as well as any other material, such as pictures or audio-visual material, in paper or electronic form) for policy, information, communication, dissemination and publicity purposes — during the action or afterwards.

The right to use the beneficiaries' materials, documents and information is granted in the form of a royalty-free, non-exclusive and irrevocable licence, which includes the following rights:

(a) **use for its own purposes** (in particular, making them available to persons working for the granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services)

(b) **distribution to the public** (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes)

(c) **editing or redrafting** (including shortening, summarising, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation)

(d) **translation**

(e) **storage** in paper, electronic or other form

(f) **archiving**, in line with applicable document-management rules

(g) the right to authorise **third parties** to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority

(h) **processing**, analysing, aggregating the materials, documents and information received and **producing derivative works**.

The rights of use are granted for the whole duration of the industrial or intellectual property rights concerned.

If materials or documents are subject to moral rights or third party rights (including intellectual property rights or rights of natural persons on their image and voice), the beneficiaries must ensure that they comply with their obligations under this Agreement (in particular, by obtaining the necessary licences and authorisations from the rights holders concerned).

Where applicable, the granting authority will insert the following information:

"© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the [name of granting authority] under conditions."

16.4 Specific rules on IPR, results and background

Specific rules regarding intellectual property rights, results and background (if any) are set out in Annex 5.

16.5 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such a breach may also lead to other measures described in Chapter 5.

ARTICLE 17 — COMMUNICATION, DISSEMINATION AND VISIBILITY

17.1 Communication — Dissemination — Promoting the action

Unless otherwise agreed with the granting authority, the beneficiaries must promote the action and its results by providing targeted information to multiple audiences (including the media and the public), in accordance with Annex 1 and in a strategic, coherent and effective manner.

Before engaging in a communication or dissemination activity expected to have a major media impact, the beneficiaries must inform the granting authority.

17.2 Visibility — European flag and funding statement

Unless otherwise agreed with the granting authority, communication activities of the beneficiaries related to the action (including media relations, conferences, seminars, information material, such as brochures, leaflets, posters, presentations, etc., in electronic form, via traditional or social media, etc.), dissemination activities and any infrastructure, equipment, vehicles, supplies or major result funded by the grant must acknowledge EU support and display the European flag (emblem) and funding statement (translated into local languages, where appropriate):

Funded by the
European Union

Co-funded by the
European Union

The emblem must remain distinct and separate and cannot be modified by adding other visual marks, brands or text.

Apart from the emblem, no other visual identity or logo may be used to highlight the EU support.

When displayed in association with other logos (e.g. of beneficiaries or sponsors), the emblem must be displayed at least as prominently and visibly as the other logos.

For the purposes of their obligations under this Article, the beneficiaries may use the emblem without first obtaining approval from the granting authority. This does not, however, give them the right to exclusive use. Moreover, they may not appropriate the emblem or any similar trademark or logo, either by registration or by any other means.

17.3 Quality of information — Disclaimer

Any communication or dissemination activity related to the action must use factually accurate information.

Moreover, it must indicate the following disclaimer (translated into local languages where appropriate):

> "Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or [name of the granting authority]. Neither the European Union nor the granting authority can be held responsible for them."

17.4 Specific communication, dissemination and visibility rules

Specific communication, dissemination and visibility rules (if any) are set out in Annex 5.

17.5 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 18 — SPECIFIC RULES FOR CARRYING OUT THE ACTION

18.1 Specific rules for carrying out the action

Specific rules for implementing the action (if any) are set out in Annex 5.

18.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such a breach may also lead to other measures described in Chapter 5.

SECTION 3 GRANT ADMINISTRATION

ARTICLE 19 — GENERAL INFORMATION OBLIGATIONS

19.1 Information requests

The beneficiaries must provide — during the action or afterwards and in accordance with Article 7 — any information requested in order to verify eligibility of the costs or contributions declared, proper implementation of the action and compliance with the other obligations under the Agreement.

The information provided must be accurate, precise and complete and in the format requested, including electronic format.

19.2 Participant Register data updates

The beneficiaries must keep — at all times, during the action or afterwards — their information stored in the Portal Participant Register up to date, in particular, their name, address, legal representatives, legal form and organisation type.

19.3 Information about events and circumstances which impact the action

The beneficiaries must immediately inform the granting authority (and the other beneficiaries) of any of the following:

(a) **events** which are likely to affect or delay the implementation of the action or affect the EU's financial interests, in particular:

(i) changes in their legal, financial, technical, organisational or ownership situation (including changes linked to one of the exclusion grounds listed in the declaration of honour signed before grant signature)

(ii) linked action information: not applicable

(b) **circumstances** affecting:

(i) the decision to award the grant or

(ii) compliance with requirements under the Agreement.

19.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 20 — RECORD-KEEPING

20.1 Keeping records and supporting documents

The beneficiaries must — at least until the time-limit set out in the Data Sheet (see Point 6) — keep records and other supporting documents to prove the proper implementation of the action in line with the accepted standards in the respective field (if any).

In addition, the beneficiaries must — for the same period — keep the following to justify the amounts declared:

(a) for actual costs: adequate records and supporting documents to prove the costs declared (such as contracts, subcontracts, invoices and accounting records); in addition, the beneficiaries' usual accounting and internal control procedures must enable direct reconciliation between the amounts declared, the amounts recorded in their accounts and the amounts stated in the supporting documents

(b) for flat-rate costs and contributions (if any): adequate records and supporting documents to prove the eligibility of the costs or contributions to which the flat-rate is applied

(c) for the following simplified costs and contributions: the beneficiaries do not need to keep specific records on the actual costs incurred, but must keep:

(i) for unit costs and contributions (if any): adequate records and supporting documents to prove the number of units declared

(ii) for lump sum costs and contributions (if any): adequate records and supporting documents to prove proper implementation of the work as described in Annex 1

(iii) for financing not linked to costs (if any): adequate records and supporting documents

to prove the achievement of the results or the fulfilment of the conditions as described in Annex 1

(d) for unit, flat-rate and lump sum costs and contributions according to usual cost accounting practices (if any): the beneficiaries must keep any adequate records and supporting documents to prove that their cost accounting practices have been applied in a consistent manner, based on objective criteria, regardless of the source of funding, and that they comply with the eligibility conditions set out in Articles 6.1 and 6.2.

Moreover, the following is needed for specific budget categories:

(e) for personnel costs: time worked for the beneficiary under the action must be supported by declarations signed monthly by the person and their supervisor, unless another reliable time-record system is in place; the granting authority may accept alternative evidence supporting the time worked for the action declared, if it considers that it offers an adequate level of assurance

(f) additional record-keeping rules: not applicable

The records and supporting documents must be made available upon request (see Article 19) or in the context of checks, reviews, audits or investigations (see Article 25).

If there are on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement (including the extension of findings; see Article 25), the beneficiaries must keep these records and other supporting documentation until the end of these procedures.

The beneficiaries must keep the original documents. Digital and digitalised documents are considered originals if they are authorised by the applicable national law. The granting authority may accept non-original documents if they offer a comparable level of assurance.

20.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs or contributions insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 27), and the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 21 — REPORTING

21.1 Continuous reporting

The beneficiaries must continuously report on the progress of the action (e.g. **deliverables, milestones, outputs/outcomes, critical risks, indicators,** etc; if any), in the Portal Continuous Reporting tool and in accordance with the timing and conditions it sets out (as agreed with the granting authority).

Standardised deliverables (e.g. progress reports not linked to payments, reports on cumulative expenditure, special reports, etc; if any) must be submitted using the templates published on the Portal.

21.2 Periodic reporting: Technical reports and financial statements

In addition, the beneficiaries must provide reports to request payments, in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2):

- for additional prefinancings (if any): an **additional prefinancing report**
- for interim payments (if any) and the final payment: a **periodic report**.

The prefinancing and periodic reports include a technical and financial part.

The technical part includes an overview of the action implementation. It must be prepared using the template available in the Portal Periodic Reporting tool.

The financial part of the additional prefinancing report includes a statement on the use of the previous prefinancing payment.

The financial part of the periodic report includes:

- the financial statements (individual and consolidated; for all beneficiaries/affiliated entities)
- the explanation on the use of resources (or detailed cost reporting table, if required)
- the certificates on the financial statements (CFS) (if required; see Article 24.2 and Data Sheet, Point 4.3).

The **financial statements** must detail the eligible costs and contributions for each budget category and, for the final payment, also the revenues for the action (see Articles 6 and 22).

All eligible costs and contributions incurred should be declared, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Amounts that are not declared in the individual financial statements will not be taken into account by the granting authority.

By signing the financial statements (directly in the Portal Periodic Reporting tool), the beneficiaries confirm that:

- the information provided is complete, reliable and true
- the costs and contributions declared are eligible (see Article 6)
- the costs and contributions can be substantiated by adequate records and supporting documents (see Article 20) that will be produced upon request (see Article 19) or in the context of checks, reviews, audits and investigations (see Article 25)
- for the final periodic report: all the revenues have been declared (if required; see Article 22).

Beneficiaries will have to submit also the financial statements of their affiliated entities (if any). In case of recoveries (see Article 22), beneficiaries will be held responsible also for the financial statements of their affiliated entities.

21.3 Currency for financial statements and conversion into euros

The financial statements must be drafted in euro.

Beneficiaries with general accounts established in a currency other than the euro must convert the

costs recorded in their accounts into euro, at the average of the daily exchange rates published in the C series of the *Official Journal of the European Union* (ECB website), calculated over the corresponding reporting period.

If no daily euro exchange rate is published in the *Official Journal* for the currency in question, they must be converted at the average of the monthly accounting exchange rates published on the European Commission website (InforEuro), calculated over the corresponding reporting period.

Beneficiaries with general accounts in euro must convert costs incurred in another currency into euro according to their usual accounting practices.

21.4 Reporting language

The reporting must be in the language of the Agreement, unless otherwise agreed with the granting authority (see Data Sheet, Point 4.2).

21.5 Consequences of non-compliance

If a report submitted does not comply with this Article, the granting authority may suspend the payment deadline (see Article 29) and apply other measures described in Chapter 5.

If the coordinator breaches its reporting obligations, the granting authority may terminate the grant or the coordinator's participation (see Article 32) or apply other measures described in Chapter 5.

ARTICLE 22 — PAYMENTS AND RECOVERIES — CALCULATION OF AMOUNTS DUE

22.1 Payments and payment arrangements

Payments will be made in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2).

They will be made in euro to the bank account indicated by the coordinator (see Data Sheet, Point 4.2) and must be distributed without unjustified delay (restrictions may apply to distribution of the initial prefinancing payment; see Data Sheet, Point 4.2).

Payments to this bank account will discharge the granting authority from its payment obligation.

The cost of payment transfers will be borne as follows:

- the granting authority bears the cost of transfers charged by its bank
- the beneficiary bears the cost of transfers charged by its bank
- the party causing a repetition of a transfer bears all costs of the repeated transfer.

Payments by the granting authority will be considered to have been carried out on the date when they are debited to its account.

22.2 Recoveries

Recoveries will be made, if — at beneficiary termination, final payment or afterwards — it turns out that the granting authority has paid too much and needs to recover the amounts undue.

Each beneficiary's financial responsibility in case of recovery is in principle limited to their own debt and undue amounts of their affiliated entities.

In case of enforced recoveries (see Article 22.4), affiliated entities will be held liable for repaying debts of their beneficiaries, if required by the granting authority (see Data Sheet, Point 4.4).

22.3 Amounts due

22.3.1 Prefinancing payments

The aim of the prefinancing is to provide the beneficiaries with a float.

It remains the property of the EU until the final payment.

For **initial prefinancings** (if any), the amount due, schedule and modalities are set out in the Data Sheet (see Point 4.2).

For **additional prefinancings** (if any), the amount due, schedule and modalities are also set out in the Data Sheet (see Point 4.2). However, if the statement on the use of the previous prefinancing payment shows that less than 70% was used, the amount set out in the Data Sheet will be reduced by the difference between the 70% threshold and the amount used.

The contribution to the Mutual Insurance Mechanism will be retained from the prefinancing payments (at the rate and in accordance with the modalities set out in the Data Sheet, see Point 4.2) and transferred to the Mechanism.

Prefinancing payments (or parts of them) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

22.3.2 Amount due at beneficiary termination — Recovery

In case of beneficiary termination, the granting authority will determine the provisional amount due for the beneficiary concerned. Payments (if any) will be made with the next interim or final payment.

The **amount due** will be calculated in the following step:

Step 1 — Calculation of the total accepted EU contribution

Step 1 — Calculation of the total accepted EU contribution

The granting authority will first calculate the 'accepted EU contribution' for the beneficiary for all reporting periods, by calculating the 'maximum EU contribution to costs' (applying the funding rate to the accepted costs of the beneficiary), taking into account requests for a lower contribution to costs

and CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions (if any). The resulting amount is the 'total accepted EU contribution' for the beneficiary.

The **balance** is then calculated by deducting the payments received (if any; see report on the distribution of payments in Article 32), from the total accepted EU contribution:

{total accepted EU contribution for the beneficiary

minus

{prefinancing and interim payments received (if any)}}.

If the balance is **positive**, the amount will be included in the next interim or final payment to the consortium.

If the balance is **negative**, it will be **recovered** in accordance with the following procedure:

The granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to recover, the amount due, the amount to be recovered and the reasons why and
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received), it will confirm the amount to be recovered and ask this amount to be paid to the coordinator (**confirmation letter**).

If payment is not made to the coordinator by the date specified in the confirmation letter, the granting authority may call on the Mutual Insurance Mechanism to intervene, if continuation of the action is guaranteed and the conditions set out in the rules governing the Mechanism are met.

In this case, it will send a **beneficiary recovery letter**, together with a **debit note** with the terms and date for payment.

The debit note for the beneficiary will include the amount calculated for the affiliated entities which also had to end their participation (if any).

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

The amounts will later on also be taken into account for the next interim or final payment.

22.3.3 Interim payments

Interim payments reimburse the eligible costs and contributions claimed for the implementation of the action during the reporting periods (if any).

Interim payments (if any) will be made in accordance with the schedule and modalities set out the Data Sheet (see Point 4.2).

Payment is subject to the approval of the periodic report. Its approval does not imply recognition of compliance, authenticity, completeness or correctness of its content.

The **interim payment** will be calculated by the granting authority in the following steps:

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the interim payment ceiling

Step 1 — Calculation of the total accepted EU contribution

The granting authority will calculate the 'accepted EU contribution' for the action for the reporting period, by first calculating the 'maximum EU contribution to costs' (applying the funding rate to the accepted costs of each beneficiary), taking into account requests for a lower contribution to costs, and CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions from beneficiary termination (if any). The resulting amount is the 'total accepted EU contribution'.

Step 2 — Limit to the interim payment ceiling

The resulting amount is then capped to ensure that the total amount of prefinancing and interim payments (if any) does not exceed the interim payment ceiling set out in the Data Sheet (see Point 4.2).

Interim payments (or parts of them) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

22.3.4 Final payment — Final grant amount — Revenues and Profit — Recovery

The final payment (payment of the balance) reimburses the remaining part of the eligible costs and contributions claimed for the implementation of the action (if any).

The final payment will be made in accordance with the schedule and modalities set out in the Data Sheet (see Point 4.2).

Payment is subject to the approval of the final periodic report. Its approval does not imply recognition of compliance, authenticity, completeness or correctness of its content.

The **final grant amount for the action** will be calculated in the following steps:

Step 1 — Calculation of the total accepted EU contribution

Step 2 — Limit to the maximum grant amount

Step 3 — Reduction due to the no-profit rule

Step 1 — Calculation of the total accepted EU contribution

The granting authority will first calculate the 'accepted EU contribution' for the action for all reporting periods, by calculating the 'maximum EU contribution to costs' (applying the funding rate to the total accepted costs of each beneficiary), taking into account requests for a lower contribution to costs, CFS threshold cappings (if any; see Article 24.5) and adding the contributions (accepted unit, flat-rate or lump sum contributions and financing not linked to costs, if any).

After that, the granting authority will take into account grant reductions (if any). The resulting amount is the 'total accepted EU contribution'.

Step 2 — Limit to the maximum grant amount

If the resulting amount is higher than the maximum grant amount set out in Article 5.2, it will be limited to the latter.

Step 3 — Reduction due to the no-profit rule

If the no-profit rule is provided for in the Data Sheet (see Point 4.2), the grant must not produce a profit (i.e. surplus of the amount obtained following Step 2 plus the action's revenues, over the eligible costs and contributions approved by the granting authority).

'Revenue' is all income generated by the action, during its duration (see Article 4), for beneficiaries that are profit legal entities (— with the exception of income generated by the exploitation of results, which are not considered as revenues).

If there is a profit, it will be deducted in proportion to the final rate of reimbursement of the eligible costs approved by the granting authority (as compared to the amount calculated following Steps 1 and 2 minus the contributions).

The **balance** (final payment) is then calculated by deducting the total amount of prefinancing and interim payments already made (if any), from the final grant amount:

{final grant amount

minus

{prefinancing and interim payments made (if any)}}.

If the balance is **positive**, it will be **paid** to the coordinator.

The amount retained for the Mutual Insurance Mechanism (see above) will be released and **paid** to the coordinator (in accordance with the rules governing the Mechanism).

The final payment (or part of it) may be offset (without the beneficiaries' consent) against amounts owed by a beneficiary to the granting authority — up to the amount due to that beneficiary.

For grants where the granting authority is the European Commission or an EU executive agency, offsetting may also be done against amounts owed to other Commission services or executive agencies.

Payments will not be made if the payment deadline or payments are suspended (see Articles 29 and 30).

If — despite the release of the Mutual Insurance Mechanism contribution — the balance is **negative**, it will be **recovered** in accordance with the following procedure:

The granting authority will send a **pre-information letter** to the coordinator:

- formally notifying the intention to recover, the final grant amount, the amount to be recovered and the reasons why
- requesting a report on the distribution of payments to the beneficiaries within 30 days of receiving notification and
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received) and the coordinator has submitted the report on the distribution of payments, it will calculate the **share of the debt per beneficiary**, by:

(a) identifying the beneficiaries for which the amount calculated as follows is negative:

{{{total accepted EU contribution for the beneficiary

divided by

total accepted EU contribution for the action}

multiplied by

final grant amount for the action},

minus

{prefinancing and interim payments received by the beneficiary (if any)}}

and

(b) dividing the debt:

{{amount calculated according to point (a) for the beneficiary concerned

divided by

the sum of the amounts calculated according to point (a) for all the beneficiaries identified according to point (a)}

multiplied by

the amount to be recovered}.

and confirm the amount to be recovered from each beneficiary concerned (**confirmation letter**), together with **debit notes** with the terms and date for payment.

The debit notes for beneficiaries will include the amounts calculated for their affiliated entities (if any).

If the coordinator has not submitted the report on the distribution of payments, the granting authority will **recover** the full amount from the coordinator (**confirmation letter** and **debit note** with the terms and date for payment).

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

22.3.5 Audit implementation after final payment — Revised final grant amount — Recovery

If — after the final payment (in particular, after checks, reviews, audits or investigations; see Article 25) — the granting authority rejects costs or contributions (see Article 27) or reduces the grant (see Article 28), it will calculate the **revised final grant amount** for the beneficiary concerned.

The **beneficiary revised final grant amount** will be calculated in the following step:

Step 1 — Calculation of the revised total accepted EU contribution

Step 1 — Calculation of the revised total accepted EU contribution

The granting authority will first calculate the 'revised accepted EU contribution' for the beneficiary, by calculating the 'revised accepted costs' and 'revised accepted contributions'.

After that, it will take into account grant reductions (if any). The resulting 'revised total accepted EU contribution' is the beneficiary revised final grant amount.

If the revised final grant amount is lower than the beneficiary's final grant amount (i.e. its share in the final grant amount for the action), it will be **recovered** in accordance with the following procedure:

The **beneficiary final grant amount** (i.e. share in the final grant amount for the action) is calculated as follows:

{{total accepted EU contribution for the beneficiary

divided by

total accepted EU contribution for the action}

multiplied by

final grant amount for the action}.

The granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to recover, the amount to be recovered and the reasons why and
- requesting observations within 30 days of receiving notification.

If no observations are submitted (or the granting authority decides to pursue recovery despite the observations it has received), it will confirm the amount to be recovered (**confirmation letter**), together with a **debit note** with the terms and the date for payment.

Recoveries against affiliated entities (if any) will be handled through their beneficiaries.

If payment is not made by the date specified in the debit note, the granting authority will **enforce recovery** in accordance with Article 22.4.

22.4 Enforced recovery

If payment is not made by the date specified in the debit note, the amount due will be recovered:

(a) by offsetting the amount — without the coordinator or beneficiary's consent — against any amounts owed to the coordinator or beneficiary by the granting authority.

In exceptional circumstances, to safeguard the EU financial interests, the amount may be offset before the payment date specified in the debit note.

For grants where the granting authority is the European Commission or an EU executive agency, debts may also be offset against amounts owed by other Commission services or executive agencies.

(b) financial guarantee(s): not applicable

(c) joint and several liability of beneficiaries: not applicable

(d) by holding affiliated entities jointly and severally liable (if any, see Data Sheet, Point 4.4)

(e) by taking legal action (see Article 43) or, provided that the granting authority is the European Commission or an EU executive agency, by adopting an enforceable decision under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 100(2) of EU Financial Regulation 2018/1046.

If the Mutual Insurance Mechanism was called on by the granting authority to intervene, recovery will be continued in the name of the Mutual Insurance Mechanism. If two debit notes were sent, the second one (in the name of the Mutual Insurance Mechanism) will be considered to replace the first one (in the name of the granting authority). Where the MIM intervened, offsetting, enforceable decisions or any other of the above-mentioned forms of enforced recovery may be used mutatis mutandis.

The amount to be recovered will be increased by **late-payment interest** at the rate set out in Article 22.5, from the day following the payment date in the debit note, up to and including the date the full payment is received.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2015/2366[17] applies.

For grants where the granting authority is an EU executive agency, enforced recovery by offsetting or enforceable decision will be done by the services of the European Commission (see also Article 43).

22.5 Consequences of non-compliance

22.5.1 If the granting authority does not pay within the payment deadlines (see above), the beneficiaries are entitled to **late-payment interest** at the rate applied by the European Central Bank (ECB) for its main refinancing operations in euros ('reference rate'), plus the rate specified in the Data Sheet (Point 4.2). The reference rate is the rate in force on the first day of the month in which the payment deadline expires, as published in the C series of the *Official Journal of the European Union*.

[17] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC (OJ L 337, 23.12.2015, p. 35).

If the late-payment interest is lower than or equal to EUR 200, it will be paid to the coordinator only on request submitted within two months of receiving the late payment.

Late-payment interest is not due if all beneficiaries are EU Member States (including regional and local government authorities or other public bodies acting on behalf of a Member State for the purpose of this Agreement).

If payments or the payment deadline are suspended (see Articles 29 and 30), payment will not be considered as late.

Late-payment interest covers the period running from the day following the due date for payment (see above), up to and including the date of payment.

Late-payment interest is not considered for the purposes of calculating the final grant amount.

22.5.2 If the coordinator breaches any of its obligations under this Article, the grant may be reduced (see Article 29) and the grant or the coordinator may be terminated (see Article 32).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 23 — GUARANTEES

Not applicable

ARTICLE 24 — CERTIFICATES

24.1 Operational verification report (OVR)

Not applicable

24.2 Certificate on the financial statements (CFS)

If required by the granting authority (see Data Sheet, Point 4.3), the beneficiaries must provide certificates on their financial statements (CFS), in accordance with the schedule, threshold and conditions set out in the Data Sheet.

The coordinator must submit them as part of the periodic report (see Article 21).

The certificates must be drawn up using the template published on the Portal, cover the costs declared on the basis of actual costs and costs according to usual cost accounting practices (if any), and fulfil the following conditions:

(a) be provided by a qualified approved external auditor which is independent and complies with Directive 2006/43/EC[18] (or for public bodies: by a competent independent public officer)

(b) the verification must be carried out according to the highest professional standards to ensure that the financial statements comply with the provisions under the Agreement and that the costs declared are eligible.

[18] Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts or similar national regulations (OJ L 157, 9.6.2006, p. 87).

The certificates will not affect the granting authority's right to carry out its own checks, reviews or audits, nor preclude the European Court of Auditors (ECA), the European Public Prosecutor's Office (EPPO) or the European Anti-Fraud Office (OLAF) from using their prerogatives for audits and investigations under the Agreement (see Article 25).

If the costs (or a part of them) were already audited by the granting authority, these costs do not need to be covered by the certificate and will not be counted for calculating the threshold (if any).

24.3 Certificate on the compliance of usual cost accounting practices (CoMUC)

Not applicable

24.4 Systems and process audit (SPA)

Beneficiaries which:

- use unit, flat rate or lump sum costs or contributions according to documented (i.e. formally approved and in writing) usual costs accounting practices (if any) or
- have formalised documentation on the systems and processes for calculating their costs and contributions (i.e. formally approved and in writing), have participated in at least 150 actions under Horizon 2020 or the Euratom Research and Training Programme (2014-2018 or 2019-2020) and participate in at least 3 ongoing actions under Horizon Europe or the Euratom Research and Training Programme (2021-2025 or 2026-2027)

may apply to the granting authority for a systems and process audit (SPA).

This audit will be carried out as follows:

Step 1 – Application by the beneficiary.

Step 2 – If the application is accepted, the granting authority will carry out the systems and process audit, complemented by an audit of transactions (on a sample of the beneficiary's Horizon Europe or the Euratom Research and Training Programme financial statements).

Step 3 – The audit result will take the form of a risk assessment classification for the beneficiary: low, medium or high.

Low-risk beneficiaries will benefit from less (or less in-depth) ex-post audits (see Article 25) and a higher threshold for submitting certificates on the financial statements (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3).

24.5 Consequences of non-compliance

If a beneficiary does not submit a certificate on the financial statements (CFS) or the certificate is rejected, the accepted EU contribution to costs will be capped to reflect the CFS threshold.

If a beneficiary breaches any of its other obligations under this Article, the granting authority may apply the measures described in Chapter 5.

ARTICLE 25 — CHECKS, REVIEWS, AUDITS AND INVESTIGATIONS — EXTENSION OF FINDINGS

25.1 Granting authority checks, reviews and audits

25.1.1 Internal checks

The granting authority may — during the action or afterwards — check the proper implementation of the action and compliance with the obligations under the Agreement, including assessing costs and contributions, deliverables and reports.

25.1.2 Project reviews

The granting authority may carry out reviews on the proper implementation of the action and compliance with the obligations under the Agreement (general project reviews or specific issues reviews).

Such project reviews may be started during the implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the coordinator or beneficiary concerned and will be considered to start on the date of the notification.

If needed, the granting authority may be assisted by independent, outside experts. If it uses outside experts, the coordinator or beneficiary concerned will be informed and have the right to object on grounds of commercial confidentiality or conflict of interest.

The coordinator or beneficiary concerned must cooperate diligently and provide — within the deadline requested — any information and data in addition to deliverables and reports already submitted (including information on the use of resources). The granting authority may request beneficiaries to provide such information to it directly. Sensitive information and documents will be treated in accordance with Article 13.

The coordinator or beneficiary concerned may be requested to participate in meetings, including with the outside experts.

For **on-the-spot visits**, the beneficiary concerned must allow access to sites and premises (including to the outside experts) and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the review findings, a **project review report** will be drawn up.

The granting authority will formally notify the project review report to the coordinator or beneficiary concerned, which has 30 days from receiving notification to make observations.

Project reviews (including project review reports) will be in the language of the Agreement.

25.1.3 Audits

The granting authority may carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement.

Such audits may be started during the implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the beneficiary concerned and will be considered to start on the date of the notification.

The granting authority may use its own audit service, delegate audits to a centralised service or use external audit firms. If it uses an external firm, the beneficiary concerned will be informed and have the right to object on grounds of commercial confidentiality or conflict of interest.

The beneficiary concerned must cooperate diligently and provide — within the deadline requested — any information (including complete accounts, individual salary statements or other personal data) to verify compliance with the Agreement. Sensitive information and documents will be treated in accordance with Article 13.

For **on-the-spot** visits, the beneficiary concerned must allow access to sites and premises (including for the external audit firm) and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the audit findings, a **draft audit report** will be drawn up.

The auditors will formally notify the draft audit report to the beneficiary concerned, which has 30 days from receiving notification to make observations (contradictory audit procedure).

The **final audit report** will take into account observations by the beneficiary concerned and will be formally notified to them.

Audits (including audit reports) will be in the language of the Agreement.

25.2 European Commission checks, reviews and audits in grants of other granting authorities

Where the granting authority is not the European Commission, the latter has the same rights of checks, reviews and audits as the granting authority.

25.3 Access to records for assessing simplified forms of funding

The beneficiaries must give the European Commission access to their statutory records for the periodic assessment of simplified forms of funding which are used in EU programmes.

25.4 OLAF, EPPO and ECA audits and investigations

The following bodies may also carry out checks, reviews, audits and investigations — during the action or afterwards:

- the European Anti-Fraud Office (OLAF) under Regulations No 883/2013[19] and No 2185/96[20]

- the European Public Prosecutor's Office (EPPO) under Regulation 2017/1939

[19] Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18/09/2013, p. 1).

[20] Council Regulation (Euratom, EC) No 2185/1996 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities (OJ L 292, 15/11/1996, p. 2).

- the European Court of Auditors (ECA) under Article 287 of the Treaty on the Functioning of the EU (TFEU) and Article 257 of EU Financial Regulation 2018/1046.

If requested by these bodies, the beneficiary concerned must provide full, accurate and complete information in the format requested (including complete accounts, individual salary statements or other personal data, including in electronic format) and allow access to sites and premises for on-the-spot visits or inspections — as provided for under these Regulations.

To this end, the beneficiary concerned must keep all relevant information relating to the action, at least until the time-limit set out in the Data Sheet (Point 6) and, in any case, until any ongoing checks, reviews, audits, investigations, litigation or other pursuits of claims have been concluded.

25.5 Consequences of checks, reviews, audits and investigations — Extension of results of reviews, audits or investigations

25.5.1 Consequences of checks, reviews, audits and investigations in this grant

Findings in checks, reviews, audits or investigations carried out in the context of this grant may lead to rejections (see Article 27), grant reduction (see Article 28) or other measures described in Chapter 5.

Rejections or grant reductions after the final payment will lead to a revised final grant amount (see Article 22).

Findings in checks, reviews, audits or investigations during the action implementation may lead to a request for amendment (see Article 39), to change the description of the action set out in Annex 1.

Checks, reviews, audits or investigations that find systemic or recurrent errors, irregularities, fraud or breach of obligations in any EU grant may also lead to consequences in other EU grants awarded under similar conditions (‘extension to other grants’).

Moreover, findings arising from an OLAF or EPPO investigation may lead to criminal prosecution under national law.

25.5.2 Extension from other grants

Results of checks, reviews, audits or investigations in other grants may be extended to this grant, if:

(a) the beneficiary concerned is found, in other EU grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and

(b) those findings are formally notified to the beneficiary concerned — together with the list of grants affected by the findings — within the time-limit for audits set out in the Data Sheet (see Point 6).

The granting authority will formally notify the beneficiary concerned of the intention to extend the findings and the list of grants affected.

If the extension concerns **rejections of costs or contributions**: the notification will include:

(a) an invitation to submit observations on the list of grants affected by the findings

(b) the request to submit revised financial statements for all grants affected

(c) the correction rate for extrapolation, established on the basis of the systemic or recurrent errors, to calculate the amounts to be rejected, if the beneficiary concerned:

(i) considers that the submission of revised financial statements is not possible or practicable or

(ii) does not submit revised financial statements.

If the extension concerns **grant reductions**: the notification will include:

(a) an invitation to submit observations on the list of grants affected by the findings and

(b) the **correction rate for extrapolation**, established on the basis of the systemic or recurrent errors and the principle of proportionality.

The beneficiary concerned has **60 days** from receiving notification to submit observations, revised financial statements or to propose a duly substantiated **alternative correction method/rate**.

On the basis of this, the granting authority will analyse the impact and decide on the implementation (i.e. start rejection or grant reduction procedures, either on the basis of the revised financial statements or the announced/alternative method/rate or a mix of those; see Articles 27 and 28).

25.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs or contributions insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 27), and the grant may be reduced (see Article 28).

Such breaches may also lead to other measures described in Chapter 5.

ARTICLE 26 — IMPACT EVALUATIONS

26.1 Impact evaluation

The granting authority may carry out impact evaluations of the action, measured against the objectives and indicators of the EU programme funding the grant.

Such evaluations may be started during implementation of the action and until the time-limit set out in the Data Sheet (see Point 6). They will be formally notified to the coordinator or beneficiaries and will be considered to start on the date of the notification.

If needed, the granting authority may be assisted by independent outside experts.

The coordinator or beneficiaries must provide any information relevant to evaluate the impact of the action, including information in electronic format.

26.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the granting authority may apply the measures described in Chapter 5.

CHAPTER 5 CONSEQUENCES OF NON-COMPLIANCE

SECTION 1 REJECTIONS AND GRANT REDUCTION

ARTICLE 27 — REJECTION OF COSTS AND CONTRIBUTIONS

27.1 Conditions

The granting authority will — at beneficiary termination, interim payment, final payment or afterwards — reject any costs or contributions which are ineligible (see Article 6), in particular following checks, reviews, audits or investigations (see Article 25).

The rejection may also be based on the extension of findings from other grants to this grant (see Article 25).

Ineligible costs or contributions will be rejected.

27.2 Procedure

If the rejection does not lead to a recovery, the granting authority will formally notify the coordinator or beneficiary concerned of the rejection, the amounts and the reasons why. The coordinator or beneficiary concerned may — within 30 days of receiving notification — submit observations if it disagrees with the rejection (payment review procedure).

If the rejection leads to a recovery, the granting authority will follow the contradictory procedure with pre-information letter set out in Article 22.

27.3 Effects

If the granting authority rejects costs or contributions, it will deduct them from the costs or contributions declared and then calculate the amount due (and, if needed, make a recovery; see Article 22).

ARTICLE 28 — GRANT REDUCTION

28.1 Conditions

The granting authority may — at beneficiary termination, final payment or afterwards — reduce the grant for a beneficiary, if:

(a) the beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed:

(i) substantial errors, irregularities or fraud or

(ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or

(b) the beneficiary (or a person having powers of representation, decision-making or control, or

person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (see Article 25).

The amount of the reduction will be calculated for each beneficiary concerned and proportionate to the seriousness and the duration of the errors, irregularities or fraud or breach of obligations, by applying an individual reduction rate to their accepted EU contribution.

28.2 Procedure

If the grant reduction does not lead to a recovery, the granting authority will formally notify the coordinator or beneficiary concerned of the reduction, the amount to be reduced and the reasons why. The coordinator or beneficiary concerned may — within 30 days of receiving notification — submit observations if it disagrees with the reduction (payment review procedure).

If the grant reduction leads to a recovery, the granting authority will follow the contradictory procedure with pre-information letter set out in Article 22.

28.3 Effects

If the granting authority reduces the grant, it will deduct the reduction and then calculate the amount due (and, if needed, make a recovery; see Article 22).

SECTION 2 SUSPENSION AND TERMINATION

ARTICLE 29 — PAYMENT DEADLINE SUSPENSION

29.1 Conditions

The granting authority may — at any moment — suspend the payment deadline if a payment cannot be processed because:

(a) the required report (see Article 21) has not been submitted or is not complete or additional information is needed

(b) there are doubts about the amount to be paid (e.g. ongoing audit extension procedure, queries about eligibility, need for a grant reduction, etc.) and additional checks, reviews, audits or investigations are necessary, or

(c) there are other issues affecting the EU financial interests.

29.2 Procedure

The granting authority will formally notify the coordinator of the suspension and the reasons why.

The suspension will **take effect** the day the notification is sent.

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted** — and the remaining time to pay (see Data Sheet, Point 4.2) will resume.

If the suspension exceeds two months, the coordinator may request the granting authority to confirm if the suspension will continue.

If the payment deadline has been suspended due to the non-compliance of the report and the revised report is not submitted (or was submitted but is also rejected), the granting authority may also terminate the grant or the participation of the coordinator (see Article 32).

ARTICLE 30 — PAYMENT SUSPENSION

30.1 Conditions

The granting authority may — at any moment — suspend payments, in whole or in part for one or more beneficiaries, if:

(a) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed or is suspected of having committed:

  (i) substantial errors, irregularities or fraud or

  (ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or

(b) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant.

If payments are suspended for one or more beneficiaries, the granting authority will make partial payment(s) for the part(s) not suspended. If suspension concerns the final payment, the payment (or recovery) of the remaining amount after suspension is lifted will be considered to be the payment that closes the action.

30.2 Procedure

Before suspending payments, the granting authority will send a **pre-information letter** to the beneficiary concerned:

- formally notifying the intention to suspend payments and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the suspension (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

At the end of the suspension procedure, the granting authority will also inform the coordinator.

The suspension will **take effect** the day after the confirmation notification is sent.

If the conditions for resuming payments are met, the suspension will be **lifted**. The granting authority will formally notify the beneficiary concerned (and the coordinator) and set the suspension end date.

During the suspension, no prefinancing will be paid to the beneficiaries concerned. For interim payments, the periodic reports for all reporting periods except the last one (see Article 21) must not contain any financial statements from the beneficiary concerned (or its affiliated entities). The coordinator must include them in the next periodic report after the suspension is lifted or — if suspension is not lifted before the end of the action — in the last periodic report.

ARTICLE 31 — GRANT AGREEMENT SUSPENSION

31.1 Consortium-requested GA suspension

31.1.1 Conditions and procedure

The beneficiaries may request the suspension of the grant or any part of it, if exceptional circumstances — in particular *force majeure* (see Article 35) — make implementation impossible or excessively difficult.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the date the suspension takes effect; this date may be before the date of the submission of the amendment request and
- the expected date of resumption.

The suspension will **take effect** on the day specified in the amendment.

Once circumstances allow for implementation to resume, the coordinator must immediately request another **amendment** of the Agreement to set the suspension end date, the resumption date (one day after suspension end date), extend the duration and make other changes necessary to adapt the action to the new situation (see Article 39) — unless the grant has been terminated (see Article 32). The suspension will be **lifted** with effect from the suspension end date set out in the amendment. This date may be before the date of the submission of the amendment request.

During the suspension, no prefinancing will be paid. Costs incurred or contributions for activities implemented during grant suspension are not eligible (see Article 6.3).

31.2 EU-initiated GA suspension

31.2.1 Conditions

The granting authority may suspend the grant or any part of it, if:

(a) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed or is suspected of having committed:

(i) substantial errors, irregularities or fraud or

(ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.), or

(b) a beneficiary (or a person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant

(c) other:

(i) linked action issues: not applicable

(ii) the action has lost its scientific or technological relevance, for EIC Accelerator actions: the action has lost its economic relevance, for challenge-based EIC Pathfinder actions and Horizon Europe Missions: the action has lost its relevance as part of the Portfolio for which it has been initially selected

31.2.2 Procedure

Before suspending the grant, the granting authority will send a **pre-information letter** to the coordinator:

- formally notifying the intention to suspend the grant and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the suspension (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

The suspension will **take effect** the day after the confirmation notification is sent (or on a later date specified in the notification).

Once the conditions for resuming implementation of the action are met, the granting authority will formally notify the coordinator a **lifting of suspension letter**, in which it will set the suspension end date and invite the coordinator to request an amendment of the Agreement to set the resumption date (one day after suspension end date), extend the duration and make other changes necessary to adapt the action to the new situation (see Article 39) — unless the grant has been terminated (see Article 32). The suspension will be **lifted** with effect from the suspension end date set out in the lifting of suspension letter. This date may be before the date on which the letter is sent.

During the suspension, no prefinancing will be paid. Costs incurred or contributions for activities implemented during suspension are not eligible (see Article 6.3).

The beneficiaries may not claim damages due to suspension by the granting authority (see Article 33).

Grant suspension does not affect the granting authority's right to terminate the grant or a beneficiary (see Article 32) or reduce the grant (see Article 28).

ARTICLE 32 — GRANT AGREEMENT OR BENEFICIARY TERMINATION

32.1 Consortium-requested GA termination

32.1.1 Conditions and procedure

The beneficiaries may request the termination of the grant.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why
- the date the consortium ends work on the action ('end of work date') and
- the date the termination takes effect ('termination date'); this date must be after the date of the submission of the amendment request.

The termination will **take effect** on the termination date specified in the amendment.

If no reasons are given or if the granting authority considers the reasons do not justify termination, it may consider the grant terminated improperly.

32.1.2 Effects

The coordinator must — within 60 days from when termination takes effect — submit a **periodic report** (for the open reporting period until termination).

The granting authority will calculate the final grant amount and final payment on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before the end of work date (see Article 22). Costs relating to contracts due for execution only after the end of work are not eligible.

If the granting authority does not receive the report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

Improper termination may lead to a grant reduction (see Article 28).

After termination, the beneficiaries' obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

32.2 Consortium-requested beneficiary termination

32.2.1 Conditions and procedure

The coordinator may request the termination of the participation of one or more beneficiaries, on request of the beneficiary concerned or on behalf of the other beneficiaries.

The coordinator must submit a request for **amendment** (see Article 39), with:

- the reasons why

- the opinion of the beneficiary concerned (or proof that this opinion has been requested in writing)

- the date the beneficiary ends work on the action ('end of work date')

- the date the termination takes effect ('termination date'); this date must be after the date of the submission of the amendment request.

If the termination concerns the coordinator and is done without its agreement, the amendment request must be submitted by another beneficiary (acting on behalf of the consortium).

The termination will **take effect** on the termination date specified in the amendment.

If no information is given or if the granting authority considers that the reasons do not justify termination, it may consider the beneficiary to have been terminated improperly.

32.2.2 Effects

The coordinator must — within 60 days from when termination takes effect — submit:

(i) a **report on the distribution of payments** to the beneficiary concerned

(ii) a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, the financial statement, the explanation on the use of resources, and, if applicable, the certificate on the financial statement (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3)

(iii) a second **request for amendment** (see Article 39) with other amendments needed (e.g. reallocation of the tasks and the estimated budget of the terminated beneficiary; addition of a new beneficiary to replace the terminated beneficiary; change of coordinator, etc.).

The granting authority will calculate the amount due to the beneficiary on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before the end of work date (see Article 22). Costs relating to contracts due for execution only after the end of work are not eligible.

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 21).

If the granting authority does not receive the termination report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/ contributions if no periodic report was ever approved).

If the granting authority does not receive the report on the distribution of payments within the deadline, it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that

- the beneficiary concerned must not repay any amount to the coordinator.

If the second request for amendment is accepted by the granting authority, the Agreement is **amended** to introduce the necessary changes (see Article 39).

If the second request for amendment is rejected by the granting authority (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the grant may be terminated (see Article 32).

Improper termination may lead to a reduction of the grant (see Article 31) or grant termination (see Article 32).

After termination, the concerned beneficiary's obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

32.3 EU-initiated GA or beneficiary termination

32.3.1 Conditions

The granting authority may terminate the grant or the participation of one or more beneficiaries, if:

(a) one or more beneficiaries do not accede to the Agreement (see Article 40)

(b) a change to the action or the legal, financial, technical, organisational or ownership situation of a beneficiary is likely to substantially affect the implementation of the action or calls into question the decision to award the grant (including changes linked to one of the exclusion grounds listed in the declaration of honour)

(c) following termination of one or more beneficiaries, the necessary changes to the Agreement (and their impact on the action) would call into question the decision awarding the grant or breach the principle of equal treatment of applicants

(d) implementation of the action has become impossible or the changes necessary for its continuation would call into question the decision awarding the grant or breach the principle of equal treatment of applicants

(e) a beneficiary (or person with unlimited liability for its debts) is subject to bankruptcy proceedings or similar (including insolvency, winding-up, administration by a liquidator or court, arrangement with creditors, suspension of business activities, etc.)

(f) a beneficiary (or person with unlimited liability for its debts) is in breach of social security or tax obligations

(g) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has been found guilty of grave professional misconduct

(h) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed fraud, corruption, or is involved in a criminal organisation, money laundering, terrorism-related crimes (including terrorism financing), child labour or human trafficking

(i) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) was created under a different jurisdiction

with the intent to circumvent fiscal, social or other legal obligations in the country of origin (or created another entity with this purpose)

(j) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed:

(i) substantial errors, irregularities or fraud or

(ii) serious breach of obligations under this Agreement or during its award (including improper implementation of the action, non-compliance with the call conditions, submission of false information, failure to provide required information, breach of ethics or security rules (if applicable), etc.)

(k) a beneficiary (or person having powers of representation, decision-making or control, or person essential for the award/implementation of the grant) has committed — in other EU grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (extension of findings from other grants to this grant; see Article 25)

(l) despite a specific request by the granting authority, a beneficiary does not request — through the coordinator — an amendment to the Agreement to end the participation of one of its affiliated entities or associated partners that is in one of the situations under points (d), (f), (e), (g), (h), (i) or (j) and to reallocate its tasks, or

(m) other:

(i) linked action issues: not applicable

(ii) the action has lost its scientific or technological relevance, for EIC Accelerator actions: the action has lost its economic relevance, for challenge-based EIC Pathfinder actions and Horizon Europe Missions: the action has lost its relevance as part of the Portfolio for which it has been initially selected

32.3.2 Procedure

Before terminating the grant or participation of one or more beneficiaries, the granting authority will send **a pre-information letter** to the coordinator or beneficiary concerned:

- formally notifying the intention to terminate and the reasons why and
- requesting observations within 30 days of receiving notification.

If the granting authority does not receive observations or decides to pursue the procedure despite the observations it has received, it will confirm the termination and the date it will take effect (**confirmation letter**). Otherwise, it will formally notify that the procedure is discontinued.

For beneficiary terminations, the granting authority will — at the end of the procedure — also inform the coordinator.

The termination will **take effect** the day after the confirmation notification is sent (or on a later date specified in the notification; ‘termination date’).

32.3.3 Effects

(a) for **GA termination**:

The coordinator must — within 60 days from when termination takes effect — submit a **periodic report** (for the last open reporting period until termination).

The granting authority will calculate the final grant amount and final payment on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before termination takes effect (see Article 22). Costs relating to contracts due for execution only after termination are not eligible.

If the grant is terminated for breach of the obligation to submit reports, the coordinator may not submit any report after termination.

If the granting authority does not receive the report within the deadline, only costs and contributions which are included in an approved periodic report will be taken into account (no costs/contributions if no periodic report was ever approved).

Termination does not affect the granting authority's right to reduce the grant (see Article 28) or to impose administrative sanctions (see Article 34).

The beneficiaries may not claim damages due to termination by the granting authority (see Article 33).

After termination, the beneficiaries' obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

(b) for **beneficiary termination**:

The coordinator must — within 60 days from when termination takes effect — submit:

(i) a **report on the distribution of payments** to the beneficiary concerned

(ii) a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, the financial statement, the explanation on the use of resources, and, if applicable, the certificate on the financial statement (CFS; see Articles 21 and 24.2 and Data Sheet, Point 4.3)

(iii) a **request for amendment** (see Article 39) with any amendments needed (e.g. reallocation of the tasks and the estimated budget of the terminated beneficiary; addition of a new beneficiary to replace the terminated beneficiary; change of coordinator, etc.).

The granting authority will calculate the amount due to the beneficiary on the basis of the report submitted and taking into account the costs incurred and contributions for activities implemented before termination takes effect (see Article 22). Costs relating to contracts due for execution only after termination are not eligible.

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 21).

If the granting authority does not receive the termination report within the deadline, only costs and contributions included in an approved periodic report will be taken into account (no costs/ contributions if no periodic report was ever approved).

If the granting authority does not receive the report on the distribution of payments within the deadline, it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

If the request for amendment is accepted by the granting authority, the Agreement is **amended** to introduce the necessary changes (see Article 39).

If the request for amendment is rejected by the granting authority (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the grant may be terminated (see Article 32).

After termination, the concerned beneficiary's obligations (in particular Articles 13 (confidentiality and security), 16 (IPR), 17 (communication, dissemination and visibility), 21 (reporting), 25 (checks, reviews, audits and investigations), 26 (impact evaluation), 27 (rejections), 28 (grant reduction) and 42 (assignment of claims)) continue to apply.

SECTION 3 OTHER CONSEQUENCES: DAMAGES AND ADMINISTRATIVE SANCTIONS

ARTICLE 33 — DAMAGES

33.1 Liability of the granting authority

The granting authority cannot be held liable for any damage caused to the beneficiaries or to third parties as a consequence of the implementation of the Agreement, including for gross negligence.

The granting authority cannot be held liable for any damage caused by any of the beneficiaries or other participants involved in the action, as a consequence of the implementation of the Agreement.

33.2 Liability of the beneficiaries

The beneficiaries must compensate the granting authority for any damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement, provided that it was caused by gross negligence or wilful act.

The liability does not extend to indirect or consequential losses or similar damage (such as loss of profit, loss of revenue or loss of contracts), provided such damage was not caused by wilful act or by a breach of confidentiality.

ARTICLE 34 — ADMINISTRATIVE SANCTIONS AND OTHER MEASURES

Nothing in this Agreement may be construed as preventing the adoption of administrative sanctions (i.e. exclusion from EU award procedures and/or financial penalties) or other public law measures,

in addition or as an alternative to the contractual measures provided under this Agreement (see, for instance, Articles 135 to 145 EU Financial Regulation 2018/1046 and Articles 4 and 7 of Regulation 2988/95[21]).

SECTION 4 FORCE MAJEURE

ARTICLE 35 — FORCE MAJEURE

A party prevented by force majeure from fulfilling its obligations under the Agreement cannot be considered in breach of them.

'Force majeure' means any situation or event that:

- prevents either party from fulfilling their obligations under the Agreement,
- was unforeseeable, exceptional situation and beyond the parties' control,
- was not due to error or negligence on their part (or on the part of other participants involved in the action), and
- proves to be inevitable in spite of exercising all due diligence.

Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects.

The parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible.

CHAPTER 6 FINAL PROVISIONS

ARTICLE 36 — COMMUNICATION BETWEEN THE PARTIES

36.1 Forms and means of communication — Electronic management

EU grants are managed fully electronically through the EU Funding & Tenders Portal ('Portal').

All communications must be made electronically through the Portal, in accordance with the Portal Terms and Conditions and using the forms and templates provided there (except if explicitly instructed otherwise by the granting authority).

Communications must be made in writing and clearly identify the grant agreement (project number and acronym).

Communications must be made by persons authorised according to the Portal Terms and Conditions. For naming the authorised persons, each beneficiary must have designated — before the signature of this Agreement — a 'legal entity appointed representative (LEAR)'. The role and tasks of the LEAR are stipulated in their appointment letter (see Portal Terms and Conditions).

[21] Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests (OJ L 312, 23.12.1995, p. 1).

If the electronic exchange system is temporarily unavailable, instructions will be given on the Portal.

36.2 Date of communication

The sending date for communications made through the Portal will be the date and time of sending, as indicated by the time logs.

The receiving date for communications made through the Portal will be the date and time the communication is accessed, as indicated by the time logs. Formal notifications that have not been accessed within 10 days after sending, will be considered to have been accessed (see Portal Terms and Conditions).

If a communication is exceptionally made on paper (by e-mail or postal service), general principles apply (i.e. date of sending/receipt). Formal notifications by registered post with proof of delivery will be considered to have been received either on the delivery date registered by the postal service or the deadline for collection at the post office.

If the electronic exchange system is temporarily unavailable, the sending party cannot be considered in breach of its obligation to send a communication within a specified deadline.

36.3 Addresses for communication

The Portal can be accessed via the Europa website.

The address for paper communications to the granting authority (if exceptionally allowed) is the official mailing address indicated on its website.

For beneficiaries, it is the legal address specified in the Portal Participant Register.

ARTICLE 37 — INTERPRETATION OF THE AGREEMENT

The provisions in the Data Sheet take precedence over the rest of the Terms and Conditions of the Agreement.

Annex 5 takes precedence over the Terms and Conditions; the Terms and Conditions take precedence over the Annexes other than Annex 5.

Annex 2 takes precedence over Annex 1.

ARTICLE 38 — CALCULATION OF PERIODS AND DEADLINES

In accordance with Regulation No 1182/71[22], periods expressed in days, months or years are calculated from the moment the triggering event occurs.

The day during which that event occurs is not considered as falling within the period.

'Days' means calendar days, not working days.

ARTICLE 39 — AMENDMENTS

[22] Regulation (EEC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time-limits (OJ L 124, 8/6/1971, p. 1).

39.1 Conditions

The Agreement may be amended, unless the amendment entails changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

Amendments may be requested by any of the parties.

39.2 Procedure

The party requesting an amendment must submit a request for amendment signed directly in the Portal Amendment tool.

The coordinator submits and receives requests for amendment on behalf of the beneficiaries (see Annex 3). If a change of coordinator is requested without its agreement, the submission must be done by another beneficiary (acting on behalf of the other beneficiaries).

The request for amendment must include:

- the reasons why
- the appropriate supporting documents and
- for a change of coordinator without its agreement: the opinion of the coordinator (or proof that this opinion has been requested in writing).

The granting authority may request additional information.

If the party receiving the request agrees, it must sign the amendment in the tool within 45 days of receiving notification (or any additional information the granting authority has requested). If it does not agree, it must formally notify its disagreement within the same deadline. The deadline may be extended, if necessary for the assessment of the request. If no notification is received within the deadline, the request is considered to have been rejected.

An amendment **enters into force** on the day of the signature of the receiving party.

An amendment **takes effect** on the date of entry into force or other date specified in the amendment.

ARTICLE 40 — ACCESSION AND ADDITION OF NEW BENEFICIARIES

40.1 Accession of the beneficiaries mentioned in the Preamble

The beneficiaries which are not coordinator must accede to the grant by signing the accession form (see Annex 3) directly in the Portal Grant Preparation tool, within 30 days after the entry into force of the Agreement (see Article 44).

They will assume the rights and obligations under the Agreement with effect from the date of its entry into force (see Article 44).

If a beneficiary does not accede to the grant within the above deadline, the coordinator must — within 30 days — request an amendment (see Article 39) to terminate the beneficiary and make any changes

necessary to ensure proper implementation of the action. This does not affect the granting authority's right to terminate the grant (see Article 32).

40.2 Addition of new beneficiaries

In justified cases, the beneficiaries may request the addition of a new beneficiary.

For this purpose, the coordinator must submit a request for amendment in accordance with Article 39. It must include an accession form (see Annex 3) signed by the new beneficiary directly in the Portal Amendment tool.

New beneficiaries will assume the rights and obligations under the Agreement with effect from the date of their accession specified in the accession form (see Annex 3).

Additions are also possible in mono-beneficiary grants.

ARTICLE 41 — TRANSFER OF THE AGREEMENT

In justified cases, the beneficiary of a mono-beneficiary grant may request the transfer of the grant to a new beneficiary, provided that this would not call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiary must submit a request for **amendment** (see Article 39), with

- the reasons why
- the accession form (see Annex 3) signed by the new beneficiary directly in the Portal Amendment tool and
- additional supporting documents (if required by the granting authority).

The new beneficiary will assume the rights and obligations under the Agreement with effect from the date of accession specified in the accession form (see Annex 3).

ARTICLE 42 — ASSIGNMENTS OF CLAIMS FOR PAYMENT AGAINST THE GRANTING AUTHORITY

The beneficiaries may not assign any of their claims for payment against the granting authority to any third party, except if expressly approved in writing by the granting authority on the basis of a reasoned, written request by the coordinator (on behalf of the beneficiary concerned).

If the granting authority has not accepted the assignment or if the terms of it are not observed, the assignment will have no effect on it.

In no circumstances will an assignment release the beneficiaries from their obligations towards the granting authority.

ARTICLE 43 — APPLICABLE LAW AND SETTLEMENT OF DISPUTES

43.1 Applicable law

The Agreement is governed by the applicable EU law, supplemented if necessary by the law of Belgium.

Special rules may apply for beneficiaries which are international organisations (if any; see Data Sheet, Point 5).

43.2 Dispute settlement

If a dispute concerns the interpretation, application or validity of the Agreement, the parties must bring action before the EU General Court — or, on appeal, the EU Court of Justice — under Article 272 of the Treaty on the Functioning of the EU (TFEU).

For non-EU beneficiaries (if any), such disputes must be brought before the courts of Brussels, Belgium — unless an international agreement provides for the enforceability of EU court judgements.

For beneficiaries with arbitration as special dispute settlement forum (if any; see Data Sheet, Point 5), the dispute will — in the absence of an amicable settlement — be settled in accordance with the Rules for Arbitration published on the Portal.

If a dispute concerns administrative sanctions, offsetting or an enforceable decision under Article 299 TFEU (see Articles 22 and 34), the beneficiaries must bring action before the General Court — or, on appeal, the Court of Justice — under Article 263 TFEU.

For grants where the granting authority is an EU executive agency (see Preamble), actions against offsetting and enforceable decisions must be brought against the European Commission (not against the granting authority; see also Article 22).

ARTICLE 44 — ENTRY INTO FORCE

The Agreement will enter into force on the day of signature by the granting authority or the coordinator, depending on which is later.

SIGNATURES

For the coordinator

Pascal LEROY with ECAS id nlerpasc signed in the Participant Portal on 23/05/2022 at 14:35:05 (transaction id SigId-3036-pTpfaQcdCNP2bvrZazzQmZrI86bzYV5WQaMnJkY2aNy4zHgorsG2JhRxWckacRf9XeWu2vhbovdO9swJ6wJ9MU8-yntOf97TTHqJo3zH5nuzQa0-Xa5F3rrFJbJo8DIPE5OZUJFX8MYiuOjo1Jdzag7xj6dFXB0Jb4KssFZcuRR4o4nkOD80q2J24pAaupA7LxAYnu). Timestamp by third party at 2022.05.23 15:35:13 CEST

For the granting authority

Signed by Achilleas STALIOS with ECAS id staliac as an authorised representative on 24-05-2022 10:59:38 (transaction id SigId-9878-iR5pbKOlSNiF5zHVznezq5zVQeX0eYBZfpTIiQvgfr3XNVRFhYbYU9MIS0iXG7WgMdV0ZzrmzszfmGBoIjxcGIiK-rS0vSrmBGYCaOdCqTjRT1e-09cn13yvWFeGfUnLdJigFZwVBCS4YW8erFH7Kzc0HifzyONcFQazpWRtgOgr8ztRltTVOp3juj0IPYVoFLQZZ8S) 2022.05.24 10:59:43 CEST

ANNEX 1

Horizon Europe (HORIZON)

Description of the action (DoA)

Part A

Part B

Associated with document Ref. Ares(2022)3832156 - 20/05/2022

DESCRIPTION OF THE ACTION (PART A)

COVER PAGE

Part A of the Description of the Action (DoA) must be completed directly on the Portal Grant Preparation screens.

PROJECT *Grant Preparation (General Information screen) — Enter the info.*	
Project number:	101058522
Project name:	Future Availability of Secondary Raw Materials
Project acronym:	FutuRaM
Call:	HORIZON-CL4-2021-RESILIENCE-01
Topic:	HORIZON-CL4-2021-RESILIENCE-01-03
Type of action:	HORIZON-RIA
Service:	HADEA/B/03
Project starting date:	fixed date: 1 June 2022
Project duration:	48 months

TABLE OF CONTENTS

PROJECT SUMMARY

Project summary

Grant Preparation (General Information screen) — Provide an overall description of your project (including context and overall objectives, planned activities and main achievements, and expected results and impacts (on target groups, change procedures, capacities, innovation etc)). This summary should give readers a clear idea of what your project is about.

Use the project summary from your proposal.

The Future Availability of Secondary Raw Materials (FutuRaM) project seeks to (1) develop knowledge on the availability and recoverability of secondary raw materials (SRMs) within the European Union (EU), with a special focus on critical raw materials (CRMs), to enable fact-based decision making for their exploitation in the EU and third countries, and (2) disseminate this information via a systematic and transparent Secondary Raw Materials Knowledge Base (SRM-KB).

The FutuRaM project will establish a methodology, reporting structure, and guidance to improve the raw materials knowledge base up to 2050, and facilitate the exploitation of SRMs with a particular focus on CRMs. The project will integrate SRM and CRM data to model their current stocks and flows, and consider economic, technological, geopolitical, regulatory, social and environmental factors to further develop, demonstrate and align SRM recovery projects with the United Nations Framework Classification for Resources (UNFC).

The project will address the following waste streams: Batteries; Waste Electrical and Electronic Equipment; End-of-Life Vehicles;
Mining waste; Slags and Ashes; and Construction and Demolition Waste. FutuRaM will further develop and test the UNFC methodology through 18 case studies across the six FutuRaM waste streams.

FutuRaM research into the future availability of raw materials is relevant to the specific aspects of the work plan. It will contribute to a
transition to climate-neutral, circular and digitised economy; develop an understanding of anthropogenic resources; develop the
necessary criteria to establish a resource classification approach; combine new & existing data and present it in a UNFC format;
develop a proposal for EU statistics for SRMs; and contribute to raising awareness of raw materials supply challenges in the EU and
the possible solutions.

LIST OF PARTICIPANTS

PARTICIPANTS

Grant Preparation (Beneficiaries screen) — Enter the info.

Number	Role	Short name	Legal name	Country	PIC
1	COO	WEEE FORUM	WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL	BE	997394353
1.1	AE	ecosystem	ECOSYSTEM	FR	895993657
1.2	AE	Erion WEEE	ERION WEEE	IT	889809519
2	BEN	UNITAR	UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH	CH	997721825
3	BEN	BGR	BUNDESANSTALT FUER GEOWISSENSCHAFTEN UND ROHSTOFFE	DE	999429413
4	BEN	Boliden	BOLIDEN MINERAL AB	SE	998308869

PARTICIPANTS

Grant Preparation (Beneficiaries screen) — Enter the info.

Number	Role	Short name	Legal name	Country	PIC
5	BEN	BRGM	BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES	FR	999993662
6	BEN	Chalmers	CHALMERS TEKNISKA HOGSKOLA AB	SE	999980373
7	BEN	GeoZS	GEOLOSKI ZAVOD SLOVENIJE	SI	999466370
8	BEN	GTK	GEOLOGIAN TUTKIMUSKESKUS	FI	999432614
9	BEN	Kushnir	KUSHNIR DUNCAN	SE	889451589
10	BEN	LMU	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	DE	999978433
11	BEN	Lovisagruvan	LOVISAGRUVAN AB	SE	920322421
12	BEN	RECHARGE	RECHARGE	BE	948382969
13	BEN	SGU	SVERIGES GEOLOGISKA UNDERSOKNING	SE	995575991
14	BEN	SPI	SOCIEDADE PORTUGUESA DE INOVACAO CONSULTADORIA EMPRESARIAL E FOMENTO DA INOVACAO SA	PT	999479368
15	BEN	TUB	TECHNISCHE UNIVERSITAT BERLIN	DE	999986678
16	BEN	UB	UNIVERSITY OF BELGRADE - FACULTY OF MINING AND GEOLOGY	RS	999884343
17	BEN	ULEI	UNIVERSITEIT LEIDEN	NL	999974553
18	BEN	VITO	VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V.	BE	999645238
19	BEN	WEEECycling	WEEECYCLING	FR	889405126
20	AP	Mace	Mace	UK	889341882
21	AP	Empa	EIDGENOSSISCHE MATERIALPRUFUNGS- UND FORSCHUNGSANSTALT	CH	999907138
22	AP	Otanmaki	Otanmäki Mine Oy	FI	889253709
23	AP	Stiftung GRS	Stiftung Gemeinsames Rücknahmesystem Batterien	DE	889270781
24	AP	EMR	EUROPEAN METAL RECYCLING LIMITED	UK	889528025
25	AP	REPIC	REPIC LIMITED	UK	936090353
26	AP	UCL	UNIVERSITY COLLEGE LONDON	UK	999975620

LIST OF WORK PACKAGES

Work packages

Grant Preparation (Work Packages screen) — Enter the info.

Work Package No	Work Package name	Lead Beneficiary	Effort (Person-Months)	Start Month	End Month	Deliverable No(s)
WP1	Conceptual and Methodological Development	21 - Empa	151.50	1	45	D1.3, D1.1, D1.2
WP2	Foresight for Future Secondary Raw Materials	17 - ULEI	151.00	1	47	D2.1
WP3	Secondary Raw Material Composition	15 - TUB	201.00	1	36	D3.1
WP4	Stock and Waste Flow Characterisation	2 - UNITAR	184.50	1	36	D4.1
WP5	SRMs availability assessment in line with the UNFC	10 - LMU	253.50	3	36	D5.1
WP6	Development of data information system for EU	5 - BRGM	60.00	3	47	D6.1
WP7	Communication, Dissemination & Exploitation	14 - SPI	148.50	1	48	D7.4, D7.5, D7.3, D7.2, D7.1
WP8	Project Management	1 - WEEE FORUM	93.50	1	48	D8.1, D8.2, D8.3

Associated with document Ref. Ares(2022)3832156 - 20/05/2022

Work package WP1 – Conceptual and Methodological Development

Work Package Number	WP1	Lead Beneficiary	21. Empa
Work Package Name	Conceptual and Methodological Development		
Start Month	1	End Month	45

Objectives
The overall objective of WP1 is to support the development, harmonisation and integration of the concepts, methods, models and procedures required to reach the goals of the FutuRaM project.

Description
T1.1 Develop, harmonise and integrate concepts, methods, models and procedures (Empa, ULEI, TUB, LMU, UNITAR, BRGM, SPI, Chalmers, SGU, UCL, VITO, GTK, BGR, WEEE Forum) (M1-M42) Considering the goals and scope of the FutuRaM project and the needs of key stakeholders identified in WP7, T1.1 will consist in discussing, further developing, harmonising, integrating and consolidating the concepts, methods, models and procedures proposed by WP 2-6, the waste stream coordinators and the project's topical experts for cross-cutting issues such as data management and stakeholder involvement. As an early milestone in M12 (Milestone 6) a first draft of consolidated FutuRaM concepts, methods, models and procedures will be provided, which will be further consolidated in the second phase of Task 1.1, under consideration of (i) insights from their application in the respective WPs, including the case studies in WP5, (ii) the specificities of the waste streams addressed in FutuRaM, and (iii) the stakeholder perspectives. Based on this, waste stream- and stakeholder-specific guidelines and recommendations regarding FutuRaM's key methodological elements will be provided and, alongside the consolidated FutuRaM concepts, methods, models and procedures, presented, amongst others, in D1.1. T1.2 Develop a proposal for EU statistics on SRMs (UNITAR, TUB, Empa, ULEI, UCL, SGU, VITO) (M36- M45) Based on the methods developed in the FutuRaM project and building on existing official statistics such as waste statistics, PRODCOM, Economy Wide Material Flow Accounts and trade statistics, T1.2 will draft one proposal for EU statistics on SRMs to Eurostat (D1.2). The practicability and usability will be tested through consultations in WP7 with official statistics stakeholders such as National Statistical Offices, and Eurostat (in advisory board), and ensure consistency with global SDGs and UNECE Circular Economy Statistics and UNECE Waste Statistics taskforces. T1.3 Develop a draft reporting standard in line with the UNFC (Empa, VITO, LMU, UCL, SGU, GTK, GeoZS, BGR) (M36-M45) Based on the outcomes of T1.1 and WP5, a methodological standard to report the viability of material recovery projects in line with the UNFC and under consideration of waste stream - specificities and stakeholder perspectives will be drafted for the attention of the UNECE EGRM (D1.3).

Work package WP2 – Foresight for Future Secondary Raw Materials

Work Package Number	WP2	Lead Beneficiary	17. ULEI
Work Package Name	Foresight for Future Secondary Raw Materials		
Start Month	1	End Month	47

Objectives
WP2 will conduct foresight studies for materials critical to the EU economy, or materials that have significant impacts on EU sustainability because of their large volumes. WP2 will develop a set of coherent scenarios for material use and waste/recovery over time in various sectors in the EU:WEEE,ELV, BAT, CDW, MINW, SLASH.

Description
T2.1 Develop scenario storyline (ULEI, TUB, Empa, Chalmers, WEEE Forum, BRGM, UNITAR, SGU) (M01-M18). This task involves scanning, mapping, and assessing scenarios used in the grey, scientific, policy, and industry literature/

reporting for the different waste streams, (e.g. the Shared Socioeconomic Pathways, the International Resource Panel Scenarios, the International Energy Agency Scenarios, etc) to develop cogent storylines for the three planned scenarios. These will cut across sectors and will be used for the Stock-Flow models (WP4) and will include the translation of general concepts such as stated policies, sustainable development, circular economy, to each sector. FutuRaM will develop at minimum three scenarios (1. Sustainability, 2. Recoverability, and 3. Business-as-usual).

T2.2 Integrate future technologies into the scenarios (Chalmers, ULEI, TUB, Empa, WEEE Forum, BRGM, UNITAR, UCL, LMU, SGU, VITO) (M03-M20)
This task will review current and emerging technologies used in the various sectors for product manufacturing and end-of-life handling, with a special emphasis on material production, use, and recycling. Together with the storylines developed in Task 2.1, it will adapt the market share of these technologies for each sector to determine the future development of each sector.

T2.3 Forecast material composition and products for each scenario (TUB, ULEI, UNITAR, Chalmers, BRGM, Empa, VITO) (M7-M20)
Following the scenarios from T2.1, the material compositions and future products for each sector will be determined based on the product and commodity demand and technology realisation (T2.2). This task will be coupled to the data collection in WP3 and WP4.

T2.4 Quantify environmental and socioeconomic impacts of SRM recovery under each scenario (ULEI, TUB, Empa, UNITAR, WEEE Forum, BRGM, UCL, LMU) (M18-M36)
This task will use the information generated in Tasks 2.1-2.3, together with the material flow analysis from WP4, to quantify the future environmental and socioeconomic feedbacks for each waste sector and scenario according to future recovery technology.

T2.5 Assess the environmental and socioeconomic impacts and bottlenecks of future SRM recovery (ULEI, TUB, Empa, UNITAR, Chalmers, UNITAR. WEEECycling) (M37-M47)
This task will develop a report based on an assessment on the pressures and bottlenecks associated with environmental and socioeconomic issues related to each waste sector, including the associated changes and impacts on imports and of primary raw materials production (D2.1).

Work package WP3 – Secondary Raw Material Composition

Work Package Number	WP3	**Lead Beneficiary**	15. TUB
Work Package Name	Secondary Raw Material Composition		
Start Month	1	**End Month**	36

Objectives
The central objective of WP3 is to provide harmonised and consolidated data sets on current and future product and waste compositions of WEEE, BAT, ELV, CDW, MINW, SLASH, and to suggest a framework for future product and waste composition forecast and monitoring to be harmonised and extended with the requirements of UNFC.

Description
T3.1 Agree composition data templates for SRM potential assessment for each waste stream (TUB, Empa, Chalmers, WEEE Forum, ecosystem, Erion, REPIC, BRGM, UNITAR, ULEI, UCL, VITO, BGR) (M01-M12) This task involves adapting the existing ProSUM data templates for waste composition assessment for the different waste streams and developing per waste stream a consistent approach to update and further develop datasets on composition of products and waste generated. This task includes the definition of the data demand on composition for the UNFC assessment and its dimensions (T5.1). T3.2 Collect, update, and consolidate composition data for SRM potential assessment (TUB, Empa, Chalmers, WEEE Forum, BRGM, UNITAR, ULEI, UCL, VITO, GTK, ecosystem, REPIC, Erion, BGR, GRS) (M01-M18) This task involves collecting, updating, and consolidating data on composition and material intensity based on existing data published in the grey, scientific, policy, and industry literature/reporting for the different waste streams. Generated data sets will be consolidated based on stakeholder interactions (Delphi technique) and provided to T2.3 and T4.3. Furthermore, the consolidated and unconsolidated data sets will be assessed in depth and complemented in T3.3.

T3.3 Extend waste stream composition assessment to enable assessment of SRM recoverability (TUB, Empa, Chalmers, WEEE Forum, BRGM, UNITAR, UCL, SGU, GeoZS, GTK, VITO, LMU, ecosystem, REPIC, Erion, BGR) (M19-M36)
The task will develop and establish a framework for composition analyses, to enable the future exploitation of SRMs. Through statistical data analysis, literature research, waste stream specific recovery trials and extended batch tests and stakeholder workshops, the composition aspects that affect technical recoverability, environmental and economic impacts of SRMs, will be identified. This task will extend the assessment of T3.2 by including information on grades and their variability, and SRMs associations and hazardous substances. In addition, this task will analyse upcoming product-centric reporting (e.g. digital product passport, digital logbooks for buildings and harmonised recyclability assessment). The outcomes (D3.1) are used in T2.5 and T1.2 and T1.3.

Work package WP4 – Stock and Waste Flow Characterisation

Work Package Number	WP4	**Lead Beneficiary**	2. UNITAR
Work Package Name	Stock and Waste Flow Characterisation		
Start Month	1	**End Month**	36

Objectives
WP4 will create a consistent dataset of stocks and flows of SRMs with an attention to CRMs found in the WEEE, BAT, ELV, CDW, MINW, SLASH at MS level for the EU, and other countries.

Description
All datasets will cover 2010 until 2050, consistent with current official statistics, relevant studies, industry data, national registries, sorting analysis, etc. Where possible, georeferenced data (obtained through satellite-based earth observation), detailed statistics, or using sensible proxies (such as demographic data) to create sub-national datasets, preferably at NUTS 2 or 3 level depending on user needs from WP7. It will be followed by creating a gap filling, data imputation and consistency between the various stocks and flows. The methodology will depend on data availability and characteristics of that waste type (see more in the methodology section), and it will be ensured that stocks and flows are mathematically consistent and harmonised. T4.1 Quantify stocks and flows of ProSUM streams (UNITAR, TUB, Empa, Chalmers, WEEE Forum, RECHARGE, Kushnir) (M01-M24) Quantifies the stocks for WEEE, BAT, ELV following the ProSUM methodology including the expanded scope of WEEE embedded in ELV. It will harvest, clean, harmonise the data, and apply relevant modelling and gap filling methods. The flows will be researched for waste generation, separate (formal) collection, collection in mixed waste streams (for instance in municipal solid waste, or metal scrap), exports of used items, transboundary movement of waste, and undocumented waste flows. T4.2 Quantify stocks and flows of CDW, MINW, SLASH (ULEI, TUB, BRGM, GeoZS, GTK, SGU, UCL) (M01-M24) Further develops the methodology and collect data for CDW, MINW, SLASH. Data on MINW based on mine waste data collection strategy based on 4 strategies, and SLASH using official statistics data and also data from industry associations reports, based on the production to which they relate (e.g. steel production) (see 1.2.1.4). CDW waste using satellite data and material intensities. T4.3 Quantify SRM stocks and flows (UNITAR, TUB, Empa, Chalmers, BRGM, WEEE Forum, ULEI, GeoZS, GTK, SGU, ecosystem, Erion, REPIC, LMU, Kushnir) (M18-M36) Characterises and quantifies the SRMs for all six waste streams by combining information from T4.1 and T4.2 on the product stocks and flows with the compositional assessment of T3.2, and integrate this with additional data, e.g. from industry reporting on WEEE on recovery of SRMs and uncertainty analysis using Monte Carlo simulation. The outcomes (D4.1) will be used in T2.5.

Work package WP5 – SRMs availability assessment in line with the UNFC

Work Package Number	WP5	**Lead Beneficiary**	10. LMU

Work Package Name	SRMs availability assessment in line with the UNFC		
Start Month	3	End Month	36

Objectives
Development of a methodology to assess the recoverability of SRMs and demonstrate its application to the six waste streams at different scales (e.g. project or regional).

Description
T5.1 Map current practice, gaps and future needs for SRM availability assessments (LMU, UCL, SGU, VITO, Empa, GTK) (M03-M18) The communication of recovery project viability according to the UNFC requires a comprehensive resource availability assessment. This task will use internal workshops, stakeholder consultations (from WP7), and literature reviews to determine current practice for resource availability assessments, and identify the gaps and future needs in the context of a sustainable circular economy. In detail, this task covers the following steps: (1) Definition of the key factors (e.g., economic, environmental, social, policy/legal, technological) that impact the viability of recovery projects and are represented on the UNFC E-, and F- axes, and methods to assess the degree of confidence of future quantities to be produced by a recovery project (UNFC G-Axis); (2) Identification of methods to assess the key factors; (3) Development of a multi-criteria assessment method to integrate the resource availability assessment results into the UNFC. The outcome will be a draft methodology to assess the viability of recovery projects in alignment with the UNFC. T5.2 Use case studies to test, further develop, validate and demonstrate the new concept in line with the UNFC (LMU, BRGM, Boliden, Empa, GTK, Lovisagruvan, UCL, UNITAR, SGU, TUB, VITO, WEEECycling, ULEI, UB, GeoZS, Erion, REPIC, ecosystem, Otanmaki, Mace, EMR, Siftung GRS) (M14-M36) The draft methodology from T5.1 will be used to test and further develop UNFC case studies (A) at site-specific (project) and (B) national level, and the results will be used to develop a guideline for resource assessment. In a first phase, the draft methodology, including factors, methods, and scoring against the three E-, F- and G-axes of the UNFC will be tested for the six waste streams; and then iteratively improved and validated in a second phase, by their application to additional case studies (see 1.2.1 for list of case studies). Development of case studies will take place in interaction with the industry partners and other stakeholders, to enable feedback and improvement, for development of efficient user-friendly protocols, and also ensure their practicability for identification of the drivers and bottlenecks for SRM recovery. The outcomes (D5.1) and experiences will be further used in T1.3 to draft a reporting standard in line with the UNFC.

Work package WP6 – Development of data information system for EU

Work Package Number	WP6	Lead Beneficiary	5. BRGM
Work Package Name	Development of data information system for EU		
Start Month	3	End Month	47

Objectives
The main objectives are to structure, ensure the consistency (EarthRessourceML compliance) of datasets in other WP2-5 and build an API to disseminate final datasets of the project using INSPIRE-compliant web-services.

Description
T6.1. Data model, registries and harvesting for SRM-KB dissemination portal (BRGM, GeoZS, GTK, Empa, LMU, ULEI, UNITAR, TUB, SGU, VITO), (M3-M12) In ProSUM a data model was developed for ELV, WEEE, MINW and BAT. In EGDI there is a specific data model for MINW. However, new waste streams will be covered in FutuRaM and new data models would be required. Additionally, UNFC classification would need probably the addition of new items in data models based on WP4 of Mintell4EU project. This task will build a data model for SRM-KB which is EarthResourceML-compliant. A catalogue of metadata will also be built and implemented in this task, and the harvesting of catalogue and existing data will also be made. A particular focus will be given on the consistency of all data generated and produced in the project. Finally, the series of structured

and standardised files containing the data sets to be further harmonised and integrated in SRM-KB will be injected in the database. Technical WP leaders will be implicated in order to give specifications.

T6.2. API: Injection web services and diffusion web services (BRGM, GeoZS) (M12-M36)
FutuRaM aims to produce a web site that is not 'dead-end', but to settle the basement of a digital twin for secondary resource in the EU. Once the model, data and catalogue will be settled in T6.1, this task will handle the requirements specifications and the development of INSPIRE-compliant web services to be able to inject data and registries, and to diffuse data. The compliance of these services will make the use of SRM-KB possible for external diffusion platforms (such as EGDI), and will let third parties use these data. FutuRaM aims to deliver data and services to be re-used by stakeholders, citizens or companies to create extra-value services. Moreover, the architecture of web-services will allow the ecosystem of FutuRaM to be alive after the project: any stakeholder will be technically able to update catalogue and data. A protocol for database updating will be included in the deliverable and will feed the more global reflection on FutuRaM updates done in WP1.

T6.3. Web site: developing the SRM-KB in EU (BRGM, SPI, WEEE Forum, UNITAR, ULEI, LMU). (M12-M47)
This task will be related to T7.2 from WP7 and will identify the needs for FutuRaM dissemination portal coming from different stakeholders' categories. These needs will be converted into specifications for the architecture of FutuRaM portal. The website will be a stand-alone application, but it will be also an example of the use of injection and diffusion web-services designed in T6.2 (D6.1).

Work package WP7 – Communication, Dissemination & Exploitation

Work Package Number	WP7	**Lead Beneficiary**	14. SPI
Work Package Name	Communication, Dissemination & Exploitation		
Start Month	1	**End Month**	48

Objectives
To ensure that FutuRaM activities and results are widely known by stakeholders, to secure and build interest in the research and results, and develop a plan to ensure the longevity of the outputs.

Description
T7.1: Communication, dissemination and exploitation (CDE) plan (SPI, all) (M1-M48) A CDE plan (D7.2) will be developed early in the project (M6) and will build on the draft plan in Section 2.2. The task will also develop dissemination and exploitation measures to ensure FutuRaM legacy and ongoing exploration of the KERs. Stakeholders identified in T7.2 will be central to the plan. T7.2: Stakeholder mapping, consultation and engagement (WEEE Forum, all) (M1-M48) This will focus on mapping, recruiting and coordinating thought leaders, experts and other FutuRaM stakeholders and consulting and engaging with them to support all other WPs. A formal FutuRaM Stakeholder Network will be established. A report (D7.1) relating to the identification of stakeholders will be developed by M3 and updated every 12 months. As well as specific data gathering sessions, consultation will take the form of: Co-creation workshops; Business modelling sessions; Capacity building sessions; Policy meetings specific to the case studies; UNFC workshops and Statistics meetings (see Table 4 for further details). In addition, a Policy Working Group of partners and stakeholders will be established that will provide steer and recommendations on the exploitability of the results from a policy perspective. An Advocacy Report (D7.4) will be developed to reflect the outcomes of these meetings. Task 7.3: FutuRaM business plan (SPI, WEEE Forum, BRGM, UNITAR, ULEI) (M1-M48) This task will use the outputs of Tasks 7.1 & 7.2 to develop a detailed business plan which will identify go-to-market strategies, based upon the unique market structures and characteristics per potential user base. Business and financial planning will be supported by methods outlined in Section 2.2 (D7.3). This task will be closely tied to T7.2 using the ongoing consultation sessions to develop the business plan and strategy. T7.4 Communication & dissemination tools and activities (WF, all), (M1-M48) Here the project will develop the digital and hard copy communication and dissemination materials that will be used by all partners and other organisations associated with FutuRaM. These tools and activities are outlined in Table 4. Promotion, distribution and use of these

materials will be coordinated by WF, utilising consortium networks and tools. A record will be kept of the audiences reached through the communication materials.

T7.5 Dissemination (SPI, all) (M1-M48)
The task will ensure dissemination opportunities are taken with regards to distributing FutuRaM results at key stages using the most effective channels from those outlined in Table 4. As well as producing items such as deliverable reports and the project final report and event, FutuRaM will target presentations at relevant conferences and produce articles for scientific/peer reviewed journals. FutuRaM will organise four project events for disseminating results, communicating next steps and engaging with stakeholders.

T7.6 Clustering activities (WEEE Forum, All), (M1-M48)
The primary objective here is to engage with other relevant projects and initiatives identified in T7.2. As well as former and existing projects, there are those that will be funded under Horizon Europe e.g. under CL4-2021-RESILIENCE-01-06 and CL5-2021-D3-01-16. FutuRaM will explore the opportunities for cooperation and joint activities on cross-cutting issues, as well as sharing of results. Examples of projects and initiatives form part of Section 1.2.2 The consortium will contribute to the EC's assessment of the feasibility of establishing a market observatory for key SRMs, as required by the 2020 Circular Economy Action Plan.

Work package WP8 – Project Management

Work Package Number	WP8	**Lead Beneficiary**	1. WEEE FORUM
Work Package Name	Project Management		
Start Month	1	**End Month**	48

Objectives
WP8 ensures effective management and co-ordination of the project to achieve the aims defined in the project Grant Agreement through coordination of actions, monitoring of the research progress, accurate reporting, risk and quality management, and knowledge and IPR management.

Description
T8.1 Consortium & Admin Management, and Governance (WEEE Forum, REPIC, ecosystem, Erion, UNITAR, BGR, Boliden, BRGM, Chalmers, GeoZS, GTK, Kushnir, LMU, Lovisagruvan, RECHARGE, SGU, SPI, TUB, UB, UCL, VITO, WEEECycling, Empa) (M01-48) This task will oversee the management of all aspects of the project including internal project communication between partners and between the parts of the management structure Consortium (General Assembly), Project Management Team (PMT) and Project Office (WEEE Forum & UNITAR)). It includes administering and chairing biannual meetings of the Consortium and of the PMT. Consortium meetings will include addressing research and administrative topics covering project progress, resource use, exploitation and any issues that may arise. The PMT (monthly online meetings) will comprise the WP Leaders and ensure integration of research efforts, report regularly on progress and action on issues. Administrative management will include overseeing the project filing system and contact management system. Governance will determine the mechanisms for engagement and decision making are adhered to and the management structure of the project is maintained. A project management plan will be developed by M03 (Milestone 1). T8.2 Scientific Management (UNITAR) (M01-48) The scientific management of the project will be undertaken by UNITAR in its role as Scientific Coordinator. UNITAR will ensure that deliverables, milestones and tasks are completed effectively and on-time and that the overall research objectives of the project are being effectively coordinated and met. UNITAR will also deal with any disputes with regards to the scientific and research direction of the project. T8.3 Reporting and Legal & Financial Management (WEEE Forum, REPIC, ecosystem, Erion, UNITAR, BGR, Boliden, BRGM, Chalmers, GeoZS, GTK, Kushnir, LMU, Lovisagruvan, RECHARGE, SGU, SPI, TUB, UB, UCL, VITO, WEEECycling, Empa) (M01-48) A six-monthly internal reporting system will be established to gather and monitor financial and effort information from all partners and Affiliated Entities. The formal periodic technical and financial reports will be delivered to the European Commission for the periods M01-18, M19-36 and M37-48. WEEE Forum will be the single point of contact for the EC,

responsible for the preparation and submission of all documentation, enquiries and discussions as well as maintaining and updating the Grant and Consortium Agreements.

T8.4 Risk Management. (UNITAR, Empa, ULEI, TUB, LMU, SPI, WEEE Forum) (M1-48)
UNITAR will be responsible for managing the Risk Register for the project. This will be created and submitted in M03 and based on the critical risks and mitigation measures identified in Table 11. The Risk Register will be discussed at meetings of the PMT and Consortium and updated and submitted to the EC as part of each periodic report. WP leaders will contribute to updating the Risk Register.

T8.5 Data Management Plan (DMP). (Empa, BRGM, ULEI, TUB, LMU, SPI, WEEE Forum, UNITAR) (M01-M48)
A DMP will be developed for the project and delivered in M05. This will also cover IPR and will be updated and re-submitted to the EC as part of each periodic report. Data management is discussed earlier in Section 1.2.6.

T8.6 Advisory Board (WEEE Forum, UNITAR) (M01-48)
Is administered by WF and chaired by UNITAR. The FutuRaM Advisory Board (see 3.2.3 for further details on its members) is a further insurance to our scientific and technical quality and soundness. The AB will guarantee that a wide network of allies and change agents provides important input, other relevant actors are identified, and the network is extended. The AB will meet two times per annum, once online and once face to face. Face to face meetings will be combined with in-person FutuRaM events. At other times contact will be made when input is required to a specific task of the project. The mechanism for AB engagement will be outlined in the Terms of Reference drawn up, agreed and signed by M3 (Milestone 2).

T8.7 Ethics requirements (WEEE Forum, UNITAR) (M01-48)
Will define the ethics requirements that the project must comply with in accordance with the EC. This task concerns the ethical issues arising from any research involving the processing of personal data (POPD) regardless of the method used (e.g. interviews, questionnaires, direct online retrieval, etc.) and, specifically, the POPD - Requirement No. 2 (corresponding to providing detailed information on the procedures that will be implemented for data collection, storage, protection) of which procedures will be implemented complying with national and EU legislation (e.g. General Data Protection Regulation). This relates in particular to the consultation work in WP7, establishing the stakeholder network, also in WP7, and the case studies in WP5. Furthermore, the batch tests undertaken in WP3 and case studies in WP5 will involve field work. This means that the project will need to establish and follow a set of safety checks and procedures (or a more in-depth risk assessment) to ensure the safety of the project teams and staff involved in these activities. With regards to activities carried out in non-EU countries, which will occur for case studies conducted in Serbia, Switzerland and UK, particular attention will be paid to ensuring there is no exploitation of participants and resources, risks to teams and staff are minimised and no activities are undertaken that are prohibited in the EU. This will be reflected in D8.3.

STAFF EFFORT

Staff effort per participant

Grant Preparation (Work packages - Effort screen) — Enter the info.

Participant	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	Total Person-Months
1 - WEEE FORUM	3.00	3.00	1.50	4.00		2.00	26.00	26.00	65.50
1.1 - ecosystem			3.00	3.00	4.00		1.50	1.50	13.00
1.2 - Erion WEEE			3.00	3.00	4.00		2.00	2.00	14.00
2 - UNITAR	12.00	19.00	18.00	36.00	19.00	4.00	10.00	16.00	134.00
3 - BGR	6.00		5.00				2.00	1.00	14.00
4 - Boliden			1.00		7.00		3.00	2.00	13.00
5 - BRGM	10.00	8.00	15.00	17.50	13.00	20.00	7.00	4.00	94.50
6 - Chalmers	3.00	10.00	9.00	12.00			3.00	2.00	39.00
7 - GeoZS	1.00		8.00	10.00	6.00	12.00	4.00	2.00	43.00
8 - GTK	3.00	2.00	6.00	6.00	10.00	3.00	4.00	2.00	36.00
9 - Kushnir				4.00			1.00	1.00	6.00
10 - LMU	20.00	21.00	4.00	2.00	60.00	6.00	9.00	4.00	126.00
11 - Lovisagruvan			1.00		7.00		3.00	2.00	13.00
12 - RECHARGE		1.00	1.00	1.00			1.00	1.00	5.00
13 - SGU	8.00	1.00	9.00	6.00	24.00	2.00	4.00	2.00	56.00
14 - SPI	3.00					2.00	36.00	4.00	45.00
15 - TUB	20.00	21.00	53.00	14.00	15.00	2.00	6.00	4.00	135.00
16 - UB					6.00		3.00	1.00	10.00
17 - ULEI	11.00	46.00	8.00	32.00	9.00	3.00	6.00	4.00	119.00

Staff effort per participant

Grant Preparation (Work packages - Effort screen) — Enter the info.

Participant	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	Total Person-Months
18 - VITO	15.00	4.00	20.00		11.00	2.00	3.00	2.00	57.00
19 - WEEECycling					10.00		2.00	1.00	13.00
20 - Mace					1.00		0.50		1.50
21 - Empa	28.00	8.00	14.00	12.00	10.00	2.00	5.00	5.00	84.00
22 - Otanmaki					1.00		0.50		1.50
23 - Stiftung GRS			1.50		1.50		0.50		3.50
24 - EMR					1.00		0.50		1.50
25 - REPIC			3.00	3.00	4.00		2.00	2.00	14.00
26 - UCL	8.50	7.00	17.00	19.00	30.00		3.00	2.00	86.50
Total Person-Months	151.50	151.00	201.00	184.50	253.50	60.00	148.50	93.50	1243.50

LIST OF DELIVERABLES

Deliverables

Grant Preparation (Deliverables screen) — Enter the info.

The labels used mean:

Public — fully open (⚠ automatically posted online)
Sensitive — limited under the conditions of the Grant Agreement
EU classified —RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision 2015/444

Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D1.1	Consolidated and harmonised FutuRaM concepts, methods, models, procedures and recommendations	WP1	21 - Empa	R — Document, report	PU - Public	42
D1.2	Proposal on SRMs statistics to the EC	WP1	2 - UNITAR	R — Document, report	PU - Public	45
D1.3	Draft reporting standard in line with the UNFC	WP1	21 - Empa	R — Document, report	PU - Public	45
D2.1	Report on environmental and socio-economic barriers to SRM recovery	WP2	17 - ULEI	R — Document, report	PU - Public	47
D3.1	Extended waste stream composition assessment to enable SRM assessment	WP3	15 - TUB	R — Document, report	PU - Public	34
D4.1	Future trends of SRMs and CRMs	WP4	2 - UNITAR	R — Document, report	PU - Public	36
D5.1	Reports of the case studies for SRM availability assessment in alignment with the UNFC	WP5	10 - LMU	R — Document, report	PU - Public	36
D6.1	SRM-KB dissemination portal	WP6	5 - BRGM	OTHER	PU - Public	47
D7.1	Report on stakeholder groups and relevant initiatives and projects identified	WP7	1 - WEEE FORUM	R — Document, report	PU - Public	3

Deliverables

Grant Preparation (Deliverables screen) — Enter the info.

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Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D7.2	Communication, dissemination & exploitation plan	WP7	14 - SPI	R — Document, report	PU - Public	6
D7.3	Business plan to ensure sustainability in the long-term	WP7	14 - SPI	R — Document, report	PU - Public	47
D7.4	Advocacy Report	WP7	14 - SPI	R — Document, report	PU - Public	47
D7.5	Final Project Report	WP7	2 - UNITAR	R — Document, report	PU - Public	48
D8.1	Risk Register	WP8	1 - WEEE FORUM	R — Document, report	PU - Public	3
D8.2	Data Management Plan	WP8	21 - Empa	R — Document, report	PU - Public	5
D8.3	Procedures on Ethics Requirements	WP8	1 - WEEE FORUM	R — Document, report	PU - Public	3

Associated with document Ref. Ares(2022)3832156 - 20/05/2022

Deliverable – Consolidated and harmonised FutuRaM concepts, methods, models, procedures and recommendations

Deliverable Number	D1.1	**Lead Beneficiary**	21. Empa
Deliverable Name	Consolidated and harmonised FutuRaM concepts, methods, models, procedures and recommendations		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	42	**Work Package No**	WP1

Description
Report on consolidated and harmonised concepts, methods, models and procedures, including recommendations and guidelines regarding FutuRaM's methodological key elements.

Deliverable – Proposal on SRMs statistics to the EC

Deliverable Number	D1.2	**Lead Beneficiary**	2. UNITAR
Deliverable Name	Proposal on SRMs statistics to the EC		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP1

Description
Proposal for EU statistics on SRMs to Eurostat.

Deliverable – Draft reporting standard in line with the UNFC

Deliverable Number	D1.3	**Lead Beneficiary**	21. Empa
Deliverable Name	Draft reporting standard in line with the UNFC		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP1

Description
Draft reporting standard to report the viability of material recovery projects in line with the UNFC for the attention of the UNECE EGRM.

Deliverable – Report on environmental and socio-economic barriers to SRM recovery

Deliverable Number	D2.1	**Lead Beneficiary**	17. ULEI
Deliverable Name	Report on environmental and socio-economic barriers to SRM recovery		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	47	**Work Package No**	WP2

Description

Will present and discuss the results of the Stock-Flow model for the various future scenarios, with a special emphasis on the end-of-life material availability and recoverability, environmental and social impacts from the various sectors.

Deliverable – Extended waste stream composition assessment to enable SRM assessment

Deliverable Number	D3.1	**Lead Beneficiary**	15. TUB
Deliverable Name	Extended waste stream composition assessment to enable SRM assessment		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	34	**Work Package No**	WP3

Description
Will summarise per waste stream how composition influences factors of recoverability (technical, economic, environmental, legal) and how specification can be extended to enable SRM assessment and suggest methodologies for consistent waste characterisation and product composition reporting.

Deliverable – Future trends of SRMs and CRMs

Deliverable Number	D4.1	**Lead Beneficiary**	2. UNITAR
Deliverable Name	Future trends of SRMs and CRMs		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	36	**Work Package No**	WP4

Description
Report and dataset on the quantities, data sources of SRMs supply from stocks and flows.

Deliverable – Reports of the case studies for SRM availability assessment in alignment with the UNFC

Deliverable Number	D5.1	**Lead Beneficiary**	10. LMU
Deliverable Name	Reports of the case studies for SRM availability assessment in alignment with the UNFC		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	36	**Work Package No**	WP5

Description
Each of the case studies will be described in a separate report section, according to an agreed format on how to present method and outcomes of the case study. M27 will cover 7 case studies, and, by M36, 19 will have been performed.

Deliverable – SRM-KB dissemination portal

Deliverable Number	D6.1	**Lead Beneficiary**	5. BRGM
Deliverable Name	SRM-KB dissemination portal		
Type	OTHER	**Dissemination Level**	PU - Public

Due Date (month)	47	Work Package No	WP6

Description
The portal will permit access to full data sets produced in FutuRaM based on APIs developed in WP6. Tools and architecture will be constructed considering feedback from waste stream and WP leaders, stakeholders, and end users. Additionally, links with RMIS and EGDI are expected.

Deliverable – Report on stakeholder groups and relevant initiatives and projects identified

Deliverable Number	D7.1	Lead Beneficiary	1. WEEE FORUM
Deliverable Name	Report on stakeholder groups and relevant initiatives and projects identified		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	3	Work Package No	WP7

Description
Will outline the key stakeholder groups, initiatives and projects with which FutuRaM can exchange information in a structured fashion.

Deliverable – Communication, dissemination & exploitation plan

Deliverable Number	D7.2	Lead Beneficiary	14. SPI
Deliverable Name	Communication, dissemination & exploitation plan		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	6	Work Package No	WP7

Description
Will outline the project's CDE strategy i.e. objectives, KPIs, tools, methods and activities to engage with stakeholders throughout the project duration.

Deliverable – Business plan to ensure sustainability in the long-term

Deliverable Number	D7.3	Lead Beneficiary	14. SPI
Deliverable Name	Business plan to ensure sustainability in the long-term		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	47	Work Package No	WP7

Description
Will support the financial sustainability of the project's KERs, describing the most suitable business, financial, governance, legal and operational models, target markets, early adopters, communication channels and tools.

Deliverable – Advocacy Report

Deliverable Number	D7.4	Lead Beneficiary	14. SPI

Deliverable Name	Advocacy Report		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	47	Work Package No	WP7

Description
Will highlight parameters necessary to ensure the sustainability of good practices, also containing a set of recommendations for policymakers that would support the institutional uptake of the project's KERs.

Deliverable – Final Project Report

Deliverable Number	D7.5	Lead Beneficiary	2. UNITAR
Deliverable Name	Final Project Report		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	48	Work Package No	WP7

Description
Will report the results of the whole project.

Deliverable – Risk Register

Deliverable Number	D8.1	Lead Beneficiary	1. WEEE FORUM
Deliverable Name	Risk Register		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	3	Work Package No	WP8

Description
Will detail the risks to the delivery of the project, their likelihood and severity plus mitigation measures. It will be formally updated as part of the Periodic Technical Reports.

Deliverable – Data Management Plan

Deliverable Number	D8.2	Lead Beneficiary	21. Empa
Deliverable Name	Data Management Plan		
Type	R — Document, report	Dissemination Level	PU - Public
Due Date (month)	5	Work Package No	WP8

Description
Will describe the data management lifecycle for the data to be collected, processed and generated by FutuRaM, as well as an outline of IPR for the project. It will be formally updated as part of the Periodic Technical Reports.

Deliverable – Procedures on Ethics Requirements

Deliverable Number	D8.3	**Lead Beneficiary**	1. WEEE FORUM
Deliverable Name	Procedures on Ethics Requirements		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	3	**Work Package No**	WP8

Description
A description of the technical and organisational measures that will be implemented to safeguard the rights and freedoms of the research participants and researchers. This Deliverable will be a result of action taken in T8.7.

Associated with document Ref. Ares(2022)3832156 - 20/05/2022

LIST OF MILESTONES

Milestones

Grant Preparation (Milestones screen) — Enter the info.

Milestone No	Milestone Name	Work Package No	Lead Beneficiary	Means of Verification	Due Date (month)
1	Project Management Plan	WP8	1-WEEE FORUM	Project Management Plan circulated to the Consortium.	3
2	Advisory Board Terms of Reference signed	WP8	1-WEEE FORUM	Signed AB Terms of Reference available	3
3	Public Website	WP7	1-WEEE FORUM	Public website live.	4
4	Co-creation workshops for the identification of end-user needs	WP7	14-SPI	Workshops are organised and held. WP5 (M5, M18 and M30. Capacity building (M40). Business modelling (M24, M44). 3 Co-creation workshops around M18, one Internal M5.	5
5	Scientific management meetings held	WP8	2-UNITAR	Meetings held and minutes produced in months: 6,12,18,24,30,36,42.	6
6	FutuRaM conceptual and methodological framework	WP1	1-WEEE FORUM	Internal report is available	12
7	Composition data templates for SRMs assessment for each waste stream	WP3	15-TUB	Templates on material composition WP3 are available for Project partners	12
8	Database modelling and harvesting implementation	WP6	5-BRGM	Report is available that covers SRM-KB data model for all the waste streams.	12
9	Policy Working Group meetings held	WP7	14-SPI	Policy meeting held and minutes produced in months: 12,18,24,30,36,42,40	12
10	FutuRaM events including final event	WP7	1-WEEE FORUM	Events held and agendas, delegate lists, reports and photographs available. To be held in months: 12, 24, 36, 48	12
11	Mapping of published scenarios and Storyline/scenario description	WP2	17-ULEI	Dataset on available scenarios is fed into D1.1	18

Milestones

Grant Preparation (Milestones screen) — Enter the info.

Milestone No	Milestone Name	Work Package No	Lead Beneficiary	Means of Verification	Due Date (month)
				and qualitative descriptions of 3 futures for the six waste streams are circulated.	
12	Consolidated dataset on composition data for SRMs	WP4	2-UNITAR	Datasets on consolidated composition data for SRMs potential assessment ready for T4.3.	18
13	Concept of UNFC methodology	WP5	10-LMU	Report that covers literature review, stakeholder consultation and concept for methodology.	18
14	Periodic Technical Report	WP8	1-WEEE FORUM	Formal report to the EC for each project period: M18, 36, 48	18
15	Updated version of the Communication, Dissemination & Exploitation Plan	WP7	14-SPI	Revised versions of the CDE plan produced and circulated to consortium at M18, 30 & 42	18
16	Updated stakeholder mapping	WP7	1-WEEE FORUM	Revised versions of stakeholder mapping report produced and circulated to consortium at M18, M30 & M42.	18
17	Mapping of future technologies for each sector	WP2	17-ULEI	Dataset covering sector-specific current and emerging technologies in both the production of products and their end-of-life treatment made available to WP1 Lead and consortium members, including quantitative descriptions of future product market shares related to 6 waste streams	20
18	Consolidated dataset on stocks and flows	WP4	2-UNITAR	Dataset on stocks and flows for all six waste streams ready for the T4.3.	18
19	Roadmap for the market introduction of Key Exploitable Results	WP7	14-SPI	Roadmap document produced and provided to the Consortium.	30
20	Integration of social, environmental, and economic assessments	WP2	17-ULEI	Social, environmental, and economic impacts of SRM recovery have been quantified for each scenario and waste stream. Information delivered to the consortium.	36

Milestones

Grant Preparation (Milestones screen) — Enter the info.

Milestone No	Milestone Name	Work Package No	Lead Beneficiary	Means of Verification	Due Date (month)
21	API and web-services specifications and protocol for database updating	WP6	5-BRGM	API and web services are ready to be used in the task 6.3. Technical guidelines are revised.	36
22	Guidelines for utilising the SRM-KB platform	WP6	5-BRGM	Guidelines document available.	42

LIST OF CRITICAL RISKS

Critical risks & risk management strategy

Grant Preparation (Critical Risks screen) — Enter the info.

Risk number	Description	Work Package No(s)	Proposed Mitigation Measures
1	Partner leaving the consortium	WP6, WP4, WP2, WP3, WP8, WP7, WP5, WP1	Tasks assigned to the leaving participant will be reallocated among the consortium or new participant could be invited and integrated to the consortium.
2	Underperforming participants, deliverables not on schedule	WP4, WP6, WP2, WP3, WP8, WP7, WP5, WP1	Regular follow-up of progress and work packages; possible deviations and discrepancies will be taken to MC for resolution; realised risks will be handled by the GA.
3	Key persons leaving or not available	WP4, WP6, WP2, WP3, WP8, WP7, WP5, WP1	Nomination of reserve person for WP leaders and other key persons during the project.
4	Inadequate funding	WP4, WP6, WP2, WP3, WP8, WP7, WP5, WP1	Mitigated by regularly comparing the work plan to the actual progress. PMT will prioritise work to achieve the deliverables even when the budget is stretched.

Critical risks & risk management strategy

Grant Preparation (Critical Risks screen) — Enter the info.

Risk number	Description	Work Package No(s)	Proposed Mitigation Measures
5	Bankruptcy (or other force major) of a partner	WP8	Possible needs for reallocation of budget between different WPs and/or participants may be considered, also the possibility to involve a new partner will be considered.
6	Insufficient communication among partners and WPs may cause delays in deliverables and make fulfilment of objectives challenging	WP4, WP6, WP2, WP3, WP8, WP7, WP5, WP1	Roles and responsibilities between participants will be clearly defined in project meetings. Up-to-date communication is ensured by organising meetings and tele-meetings at regular intervals within WPs. Coordinator will monitor needs for cross-WP meetings and organise these meetings when necessary.
7	New COVID-19 wave after project begins	WP4, WP6, WP2, WP3, WP8, WP7, WP5, WP1	All participants have experience in working digitally. At the start of the project as part of the project management plan a COVID-19 risk management plan will be integrated to assess what-if impacts on on-site physical in-person activities.
8	Target audience not reached	WP7	Updates to the CDE plan & stakeholder mapping; use of optimum tools and channels; relevant materials (content based on audience/target group, visual aspects and interactive means).
9	Conflicts in ownership and user rights of results	WP7	Defined in the CA; transparent and efficient Exploitation Plan. Timely identification of new results and agreement of ownership and user rights between contributing partners.
10	Results fall in the area in which IPR is not owned by the consortium	WP4, WP6, WP2, WP3, WP8, WP7, WP5, WP1	If results fall in the area in which IPR is not owned by the consortium, licensing possibilities are investigated or research is redirected.
11	Discrepancies in method, data quality, uncertainty analysis and gap filling	WP4, WP2, WP3, WP5, WP1	The methodology is harmonised in WP1, and will follow the similar approaches.
12	Lack of scenarios, emerging technologies and data for a specific sector in the academic and/or grey literature	WP2	FutuRaM will work with industry experts to establish realistic scenarios for the sector in question.
13	Data may fall under confidentiality restrictions	WP3	Confidential dataset will be handled under NDAs and only be made available in aggregated or anonymised formats.
14	Insufficient data on lifespans, waste product flows, primarily in the unreported, mixed and informal collection streams	WP4	The consortium has key partners that cover expertise which will allow the project to have better insights in order to fulfill this task, and to also find academically sound statistical models and already proven statistical gap filling methodologies.

Critical risks & risk management strategy

Grant Preparation (Critical Risks screen) — Enter the info.

Risk number	Description	Work Package No(s)	Proposed Mitigation Measures
15	Complexity of the case studies to draw a general methodological approach	WP5	The consortium has key partners and industry partners that cover expertise to develop efficient data reporting frameworks, despite methodology complexities, which will limit the risk.
16	Required data does not exist or is not accessible.	WP4, WP2, WP3, WP5	Mathematical models used in the project will be, in some cases, adapted to suit the data available i.e. so that the output takes into account the level of data at input stage. In other cases, mathematical models will be used to fill data gaps and have already been used in the ProSUM project for some of the waste streams. The UNFC process adapts itself to the data available and any gaps are reflected in the code leading to the UNFC class. If more data becomes available as a UNFC case is progressing, there is a mechanism to add this. A full description of this risk and mitigation is available in Part B of Annex I of the Grant Agreement.

PROJECT REVIEWS

Project Reviews

Grant Preparation (Reviews screen) — Enter the info.

Review No	Timing (month)	Location	Comments
RV1	12	To be confirmed	within the reporting period
RV2	18	To be confirmed	within the reporting period
RV3	18	To be confirmed	within the reporting period

HISTORY OF CHANGES			
Version	**Publication Date**	**Change**	**Reason**
1.0	06.01.2022	Initial version	Preparation of Grant Agreement
2.0	14.02.2022	Further information on how the engagement of industry, end-users and citizens will be a project goal. Updated the Exploitation Plan in following areas: ● Short-term mitigation measures ● Exploitation strategy ● Financial sustainability ● IPR Described in greater detail: ● Open science management ● Risk/s related to data availability Added text: ● UNITAR: justification of exceptional funding ● Justify the role of those with low (1.5) person months in project. Renumbering and amendment of short names of Beneficiaries, Affiliated Entities and Associated Partners for consistency across whole of the GA. Movement of all budget and cost items from Subcontracting to Purchase Costs for 8. GTK; and 15. TUB. Further detail provided for items under Purchase Cost, where this exceeds 15% of Personnel Costs for: 1. WEEE Forum; 3. BGR; 7. GeoZS; 8. GTK; 12. RECHARGE; 13. SGU; 14. SPI and 16. UB. Added details on Purchase Costs exceeding 15% of Personnel Costs for 4. BOLIDEN.	To provide modifications to Part B based on the Evaluation Summary Report and comments from the Project Officer and Finance Officer.
3.0	01.04.2022	Re-formulated reference to the CSA for developing a European geological survey. Table 2 Changed the entry in the right hand column to bring rare earth metals into focus for ELV Table 7 clarified why it is 75 countries noted in row 1 column 2 Increased the number of references to the project contributing to facilitating and accelerating	Changes requested by the EC. Actions related to Associated Partners: need to change UK Beneficiaries to Associated Partners due to UK not yet signing Association Agreement for Horizon Europe.

		commercial exploitation development of EU secondary resource recovery projects in the EU. Inter alia in: Impact section, Objectives and Key summary. Section 2.1.2 Included stronger references to supporting the EU industrial strategy of 2020 and its update of 2021. Business Plan, removed reference to assessing the feasibility of establishing a market observatory for key SRMs as formulated in the new CEAP COM(2020) 98 final. Included references to future regulation and regulation revisions when referencing relevant Directives etc. Key Summary: clarified what the proportions of the six waste streams are of. Section 2,1,3: Clarified what is meant by 5 and 20 percentage points. Associated Partners: updated the text to reflect the movement of UCL and REPIC to Associated Partners. Added table of costs for Associated Partners.	
4.0	19.04.2022	Removed figure for total project budget and adjusted Maximum EC Contribution to match the budget table. Changed row headings on Table 9 for Boliden. Added details for Erion and Erion Compliance Organisation to Table 12 *In-kind contributions provided by third parties*	Changes requested by EC and change in circumstance at Affiliated Entity.
5.0	21.04.2022	Corrections to figures in Table 9	Changes requested by EC.

CONTENTS

1. EXCELLENCE

1.1 Objectives and ambition

1.1.1 Main objectives and relation to the work programme

Main aim

The **Futu**re Availability of Secondary **Ra**w **M**aterials (FutuRaM) project seeks to (1) develop knowledge on the availability and recoverability of secondary raw materials (SRMs) within the European Union (EU), with a special focus on critical raw materials (CRMs), to enable fact-based decision making for their exploitation in the EU and third countries, and (2) disseminate this information via a systematic and transparent Secondary Raw Materials Knowledge Base (SRM-KB).

Key summary

Access to raw materials drives the global economy. It thus determines the competitive position and resilience of industry, and our ability to transition toward a decarbonised world. CRMs are economically and strategically important for the European economy but have a high-risk associated with their supply. In many instances, CRM primary extraction is limited to few locations outside of Europe, and there are no viable substitutes for these materials with current technologies. To achieve a transition toward a decarbonised world, SRMs need to play an increasing role, which not only diversifies supply sources of CRMs, but also enables a move towards a circular economy.

The effective management of raw material supply and demand requires reliable, coherent, and complete information and foresight on SRM stocks and flows regarding products through their lifecycles. Furthermore, the feasibility of SRM recovery also depends on economic, technical and technological, geopolitical, regulatory, social, and environmental factors. Much of the data required to understand these factors is available, but scattered amongst a variety of institutions, including government agencies, universities, think tanks, and industry, and need to be harmonised to be fit for use in SRM availability assessment.

The **FutuRaM** project will establish a methodology, reporting structure, and guidance to improve the raw materials knowledge base up to 2050 and facilitate the exploitation of SRMs with a particular focus on CRMs. Various research projects and national statistical institutes in the EU are working to fill this gap, and FutuRaM aims to build on these previous accomplishments through collaboration with the relevant experts. For instance, state-of-the-art methodologies and harmonised datasets were created in the H2020 project Prospecting Secondary raw materials in the Urban mine and Mining wastes (ProSUM), and improvements in reporting practices have been identified in the H2020 project, Optimising data collection for Primary and Secondary Raw Materials (ORAMA). Furthermore, the Anthropogenic Resources Working Group of the United Nations Economic Commission for Europe (UNECE) Expert Group on Resource Management (EGRM) has developed specifications to communicate the viability of SRM recovery projects based on the United Nations Framework Classification for Resources (UNFC). The first test cases that applied UNFC to primary resources based on ORAMA findings were provided by the GeoERA[1] project Material intelligence for Europe (Mintell4EU). FutuRaM will integrate SRM and CRM data to model their current stocks and flows, and consider economic, technological, geopolitical, regulatory, social and environmental factors to further develop, demonstrate and align SRM recovery projects with the UNFC. Foresight models of future SRM supply and demand based on coherent scenarios will expand these assessments to the year 2050. FutuRaM will facilitate the commercial exploitation of SRMs and CRMs by manufacturers, recyclers, and investors, and support policy makers and governmental authorities through the development of an SRM-KB and ensuring that the key results of the project are communicated and disseminated widely. Importantly, the project includes for extensive exploitation and business planning to ensure the key outcomes are financially sustainable and can be utilised in the long-term. FutuRaM will also contribute to facilitating and accelerating the commercial exploitation and development of secondary resource recovery projects in the EU.

FutuRaM will focus on supply and demand of primary and secondary raw materials in six waste streams: Waste batteries (BAT); Waste Electrical and Electronic Equipment (WEEE); End-of-Life Vehicles (ELV); Mining waste (MINW); Slags and Ashes (SLASH); and Construction and Demolition Waste (CDW). The demand for CRMs for use in manufacturing electronic equipment (EEE), vehicles and batteries is significant. For instance, 60% of global demand (from primary and secondary sources) for gallium comes from its use in the production of optoelectronics and integrated circuits, 56% of indium from production of flat panel displays, 36% of tantalum from production of

[1] Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe (GeoERA)

capacitors, 46% of cobalt, 32% of lithium and 8% of nickel from production of batteries, and 30% of rare earth elements from production of magnets.[2] Consequently, the waste streams represent an important source of CRMs.

CRM demand is expected to significantly increase in the transition towards a low carbon society. For instance, technologies for future vehicles will rely on Li-ion batteries, fuel cells, and electric traction motors, and electricity generation will rely on more wind energy and photovoltaic technologies. MINW and CDW are hugely significant as they are by far the largest post-production and post-consumption SRM flows, respectively.

This ambitious project will be delivered by a consortium of 28 outstanding partners, representing the key partners of the ProSUM and ORAMA projects as well as key members of the UNECE EGRM Anthropogenic Resources Working Group involved in the development of the UNFC Specifications for Anthropogenic Resources, including its current chair, and vice chair. This will be done in close collaboration with industry players involved in collection, manufacturing and end-of-life processing of key technological applications for the transition to a low-carbon economy, as well as policy makers and governmental authorities.

Objectives

Table 1 How FutuRaM will achieve the specific objectives in relation to the work programme

Relation to the scope of the work programme	FutuRaM will…
A successful transition to a climate-neutral, circular and digitised EU economy relies heavily on a secure supply of raw materials. In order to strengthen EU autonomy and reduce over-dependency, we must boost domestic sourcing, both for primary and SRMs	… quantify the future availability of SRMs for three future scenarios for the EU material economy, from following current consumption trends, to moderate or rapid transitioning toward a climate-neutral, circular, and digitised EU economy (WP2). The material demand and the SRMs supply for each scenario and raw material imports to evaluate EU material autonomy.
Based on a common understanding of relevant terms and codes, develop an understanding of anthropogenic resources and derive the needed aspects for classification of recovery projects, and develop criteria for a transparent, consistent and objective classification, needed to establish a comprehensive resource classification approach.	… develop a consistent methodology throughout the project, including new guidelines for a more comprehensive assessment of the three axes addressed by the UNFC Specifications for Anthropogenic Resources, i.e. socio-economic viability (E-axis), project feasibility (F-axis) and degree of confidence of future quantities to be produced by recovery projects (G-axis), in consultation with the UNECE EGRM. (WP1, 5 & 7)
Acquire new data on SRMs via in situ sampling, collect existing data and present in a harmonised UNFC format. The action should build on and advance further the work of UNECE – UNFC Expert Group on Anthropogenic Resources regarding the classification of SRMs and the work of H2020 project ProSUM regarding collection of data and information on SRMs.	… through collaboration between key partners of the ProSUM project and the UNECE EGRM Anthropogenic Resources Working Group, develop a consistent classification methodology to assess the degree of confidence in recoverable quantities (G-axis of the UNFC Specifications for Anthropogenic Resources) of SRMs (WP1&5), with a particular focus on CRMs, using the ProSUM methodology as a consistent material and waste stream perspective (WP3-4).
Focus on the following streams of SRMs, with particular attention to critical raw materials: waste batteries, WEEE, mining waste, slags and ashes, and construction and demolition waste.	… apply and expand the methodology WEEE, (including WEEE-Directive, future products, and embedded WEEE), BAT (including industrial, portable and transportation), ELV, MINW, SLASH and CDW (WP 1-5).
Develop a proposal for EU statistics for SRMs.	… develop a practical proposal for collection of EU Statistics for SRMs in close consultation with National Statistical Offices and Eurostat (WP1).
All the data and information generated through these actions should be shared in open formats on a free of charge basis	… develop an open and free for anyone information system SRM-KB to query the final database. Final data sets will be shared with the Commission and with public authorities through the project

[2] https://rmis.jrc.ec.europa.eu/apps/rmp2/#/

Relation to the scope of the work programme	FutuRaM will…
with the European Commission, for its own use and for publication.	dissemination data portal, via APIs and transferring data to e.g. Raw Materials Information System (RMIS) and Europe-geology.eu (EGDI). INSPIRE Directive obligations in terms of interoperability, metadata and accessibility to data will be respected. (WP6)
Facilitate and accelerate commercial exploitation development of EU secondary resource recovery projects.	... will develop a concept for application of the UNFC to all wastes covered in the project and demonstrate the methodology in the UNFC cases studies, while further refining it. The analysis of the 19 different case studies with varying degrees of complexity will show the range of possible applications for practitioners and the conclusions they can draw from them. Methodological development and demonstration will focus on inclusion of multiple stakeholder perspectives in the evaluation of the aspects in the UNFC's E-axis (socio-economics, environmental impact, social impact, policy/law), which are currently neglected, as well as the F-axis (feasibility) and G-axis (degree of confidence). Recovery project classification based on the UNFC will reveal the drivers and barriers to their development, and enable the comparison of different options and projects. A key finding is the extent to which the method can be applied equally to all SRMs and where a differentiated approach is required with respect to the waste streams. These actions will pave the way for the development of secondary resource recovery projects within the EU, having practically demonstrated the relevant application of the UNFC methodology.
Contribute to improving the awareness of relevant external stakeholders and the general public across the EU and in non-EU countries of project's partners about the importance of raw materials for society, the challenges related to their supply within the EU and about proposed solutions which could help to improve society's acceptance of and trust in sustainable raw materials production in the EU.	...will undertake this through its communication and dissemination activities that will be a mixture of scene-setting and presenting the results of the research. When scene-setting, the project will discuss raw materials use as it currently stands, the challenges presented by the supply of these and how there are opportunities for obtaining raw materials through resources embedded in the objects and infrastructure of our societies. The methods FutuRaM develops for addressing these challenges will be communicated as one of the building blocks of a solution to these issues (WP7). The project will use the global networks and communication channels of its partners, particularly WEEE Forum and UNITAR with their worldwide connections, to ensure that the messages are spread within and outside the EU. Tailoring communication to the intended target audience with engagement with industry, end users and citizens a specific target of the project, as further outlined in 2.2.

1.1.2 Going beyond the state-of-the-art

FutuRaM will deliver foresight content for the SRM-KB and set the basis for reporting standards in alignment with the UNFC for Anthropogenic Resources to facilitate the increased recovery of SRMs and CRMs.

State-of-the-art: Future Scenarios for raw material markets

The ProSUM project was the first of its kind to provide consistent and detailed waste flow datasets on SRMs, (including CRMs), with detailed coverage of products and components for ELV, WEEE and BAT, and short-term projections to 2022. Presently, several socioeconomic scenarios have been developed at national, EU, and/or global scales to assess the energy and mobility transition.[3] While some of these studies have partially included CRMs

[3] https://www.iea.org/reports/world-energy-model/sustainable-development-scenario
https://www.sciencedirect.com/science/article/pii/S0959378016301790?via%3Dihub

demand and focused on the potential supply risks for achieving climate targets, these prospective scenarios have not been effectively harmonised across industrial sectors, and generally lack information on SRMs and the recovery industry in general. Transitions toward sustainable societies are likely to involve major changes and increased complexity in the material economy. Further research into current and future SRMs and CRMs present in the urban mine is thus urgent to prepare industry for their eventual recovery. In addition, scenarios that include other Circular goals such as lifetime extension need to be better assessed in terms of material cycles.

Going beyond state-of-the-art: FutuRaM will develop stock-flow models for six waste streams based on holistic scenarios to map current and future material use in the economy of the EU-27 plus Iceland, Norway, Switzerland and United Kingdom (EU27+4) and quantify their eventual end-of-life fate. FutuRaM will extend existing model approaches by a set of distinct scenarios which cover circular economy (e.g. lifetime extension through repair and remanufacturing), high SRMs recoverability, and business as usual. These scenarios will incorporate emerging recycling technologies in line with stakeholder dialogues that consider normative boundary conditions such as carbon neutrality by 2050.

State-of- the- art: Methodology for secondary raw material assessment in alignment with the UNFC

Classification has traditionally been applied to primary resources, with a focus on investors' needs. The UNFC (see also 1.1.1) is a principle-based classification system for the transparent communication of the availability of mineral and energy resources, which forms the basis of the United Nations Resource Management System (UNRMS). It aims to take a holistic view of resource availability, with classification of recovery projects on three axes: socio-economic-environmental viability, technical feasibility, and the degree of confidence in estimates of recoverable quantities. In recent years, several case studies have been developed to demonstrate the applicability of the UNFC to SRMs. However, the implementation of the UNFC by practitioners is currently hindered by a lack of guidance regarding the detailed methodology to be applied, especially with respect to social and environmental sustainability, and an absence of reporting standards and case studies that demonstrate the assessment and reporting.

Going beyond state-of-the-art: FutuRaM responds to the current gaps for using the UNFC by developing a consistent and transparent methodology to be fit-for-purpose in the context of a transition to a sustainable circular economy. The three axes of the UNFC will be further specified by identifying and developing SRMs assessment factors, methods and criteria, with regard to SRMs resource estimates, technological feasibility; economic viability; environmental impacts, social impacts and policy/regulation. Those will be applied and tested in classification of case studies for SRMs and, in particular, CRMs recovery from the six FutuRaM waste streams, in alignment with the UNFC.

State-of-the-art: Commercial exploitation of EU secondary resource recovery projects

Currently, mining projects for primary raw materials within the EU use reporting codes and guidelines developed by the Committee for Mineral Reserves International Reporting Standards (CRIRSCO), as specified by the Pan-European Reserves & Resources Reporting Committee (PERC). CRIRSCO is used to report reliable information about exploration results, mineral resources and reserves to investors. No such standardised common tool exists that is directed at environmental authorities, or other government, inter-governmental and non-governmental bodies, for permitting and planning.

Going beyond state of the art: By providing guidance and case studies for the classification of SRMs in alignment with the UNFC, FutuRaM will provide a tool that can be used to communicate SRMs availability for exploitation, to all stakeholders, including industry, their investors and governing authorities, and also consultants, insurers, policy-makers, and NGOs, etc., providing transparent and consistent information that extends the three axes of the UNFC.

1.1.3. R&I maturity and TRL levels

FutuRaM will cover advances in knowledge, technologies, reporting structures and guidelines, and prediction models to help address the circularity challenges related to SRMs. The project builds on existing data and protocols from relevant previous H2020 projects and the work of the UNECE EGRM to support its methodological approach. This foundation will expand on the current knowledge base, which will support future reporting, regulations, policies and best practice, and facilitate the future recovery of SRMs. The FutuRaM consortium is composed of partners managing large data sets tested in research projects (TRL 3-5) and, as an EU Research and Innovation Action (RIA), it will inherit several existing methodologies developed in the projects outlined in Section 1.2.2 and expand them with technology assets mapped and analysed in WP2. It is expected that the overall FutuRaM system will reach TRL5 since the SRM-KB and the UNFC-aligned demonstrations of the enhanced SRMs recovery assessment will be

https://www.iea.org/reports/global-ev-outlook-2021/prospects-for-electric-vehicle-deployment

validated in the relevant environment (WP5-7), along with the development of a proposal for EU-statistics on SRMs. Data models that estimate the SRM recovery potential will be designed, followed by recommendations on future reporting of product and waste flow composition**.** Once completed, the outcomes will be at the experimental proof of concept stage (TRL 3). In WP5, a new methodology for SRMs availability assessment in an EU circular economy in alignment with the UNFC will be developed and demonstrated in case studies, with the proposal of a reporting standard (TRL4). As a result, in the context of building an SRMs Intelligence system for EU, the SRM-KB platform will aggregate, combine, and balance all the information and data flows together with UNFC assessment following the newly defined methodology, and will be tested and validated in a relevant scale (TRL 5).

1.2 Methodology

1.2.1 Overall methodology

FutuRaM project scope

Table 2 provides an overview of the FutuRaM project scope including the waste streams, geographical areas and political entities covered and materials addressed.

Table 2 Overview of FutuRaM project scope

Waste stream	Waste stream scope	Geographical scope & resolution	SRMs / CRMs scope
BAT	BAT in the ProSUM project + TUB's 2018 batteries data update for the JRC: (portable, stationary and transport)	EU27+4 and global, national level	Metals and natural graphite, CRMs with particular focus on Co, Li and natural graphite
	Embedded batteries (e.g. in vehicles)		
WEEE	WEEE according to WEEE Directive 2012/19/EU (incl PV)	EU27+4, global, national or NUTS2/3	Bulk metals, relevant plastic fractions, CRMs with particular focus on very high, high and moderate supply risk (LREE, HREE, Mg, Nb, Ge, B, Sc, Sr, Co, PGM, nat. graphite)
	Embedded WEEE (e.g. in vehicles) not in the scope of WEEE Directive 2012/19/EU	EU27+4 national level	
ELV	ELV components addressed in ProSUM and Empa's/Chalmers' 2021 vehicles dataset update for the JRC	ELV addressed in ProSUM and the JRC vehicles data update	Bulk metals Fe, Al, Cu, precious metals Au and Ag, CRMs with particular focus on LREE, HREE, Mg, Mn, Nb and PGM, relevant plastic fractions
MINW	Fresh and stockpiled residues from primary mineral extraction, including tailings and waste rock according to the Extractive Waste Directive 2006/21/EC	EU27+4 and Western Balkans, site specific where data is available, national level	Metals and minerals, CRMs with particular focus on those available in EU27+4 and Balkan mining sites (Sb, Ba, Be, Bi, Co, Ga, Ge, Hf, REEs, In, Nb, PGMs, Sc, Ta, W, V, Sr)
SLASH	Slags (fresh and old) from metal production	EU27+4, national level	Metals and minerals, CRMs with focus on V, Nb, Ga, Sc, Mg, P, Mo
	Bottom ash and fly ash from combustion of coal, sewage sludge other fossil fuels, biomass (e.g. wood, waste wood, energy crops, agricultural by-products, animal bedding), and/or Municipal Solid Waste (MSW))		Au, Cr, Cu, Pb, Zn, construction minerals, CRMs with particular focus on B, Ba, Ga, Ge, P, REE, Sc, Sr, V
CDW	Mineral- and metal-based materials used in buildings	EU27+4, national level and spatially explicit, resolution based on remote sensing tools	Concrete (cement, aggregate), steel, Al, Cu, timber, gypsum, CRMs with particular focus on alloying elements
	Electrical and electronic components in fixed installations (e.g. smart building infrastructure, fixed heating and cooling installations, wind turbines, tidal power plants, etc.)		Bulk metals, relevant plastic fractions, CRMs (e.g. LREE, HREE, Mg, Nb, Ge, B, Sc, Sr, Co, PGM, nat. graphite)

a) Waste streams addressed

As noted in Section 1.1.1, FutuRaM will focus on (i) BAT), (ii) WEEE, (iii) ELV (iv) MINW (v) SLASH and (vi) CDW, each selected for their current, and potential future, content of SRMs and, in particular, CRMs.

b) SRMs scope Bringing SRMs into commercial manufacturing is urgently needed for the EU27+4 to truly achieve circular economy. However, different waste streams account for different material compositions, and thus require specific approaches to assess and quantify the materials reaching their end-of-life. For BAT, ELV and WEEE the SRMs scope will include and extend the SRMs and broad CRMs scope defined in the ProSUM project and for the subsequent dataset updates undertaken for the JRC (BAT, ELV). For MINW, SLASH and CDW, both CRMs and bulk materials will be explored.

c) Geographical scope The geographical scope for mapping domestic supply of SRMs (including CRMs) from existing and future recovery projects is the EU27+4. For some end-of-life products and waste streams with current or expected future global waste or SRMs trade data expected to be available, such as BAT, ELV and WEEE, the project will expand the scope to national datasets of third countries (e.g. Balkan countries for MINW). This geographical range captures major European waste streams to be valorised for SRMs.

c) Temporal scope

The temporal scope of the project is methodologically split into three parts. First, annual datasets will be created from the past until today in close alignment with official statistical datasets. In case longer time series into the past are needed, and harmonised statistical datasets are incomplete or unavailable (for instance for international trade and PRODCOM statistics, datasets are available from 1996 onwards, but harmonised datasets before are missing), academically sound backcasting techniques will be applied, which have been tested and validated already in the ProSUM project and other projects members of the FutuRaM consortium were involved. The projections into the future will be made along three scenarios with annual datasets to 2050. These scenarios will evaluate three future socioeconomic storylines centred on EU27+4 approaches to the future economy with a special focus on the sectors governing the 6 waste categories. In essence, FutuRaM will cover 3 time periods addressed through: i) backcasting (1990 – 1995); ii) inclusion of effectively available data (1996 – 2020); and iii) scenario analysis (2021-2050).

FutuRaM's conceptual and methodological framework

Taking a resource life cycle perspective, the FutuRaM project architecture covers a) the description of product and waste composition to quantify SRM potential, b) stock and flow modelling of products and resources, c) foresights and scenarios to assess future demand and supply in a low carbon society under consideration of recoverability, d) a case study-tested framework enabling application of the UNFC to SRMs recovery, and e) the provision of an SRM-KB, which is compatible with and can feed into existing raw materials information systems such as RMIS and EGDI, to facilitate and accelerate commercial exploitation and development of EU SRMs recovery projects.

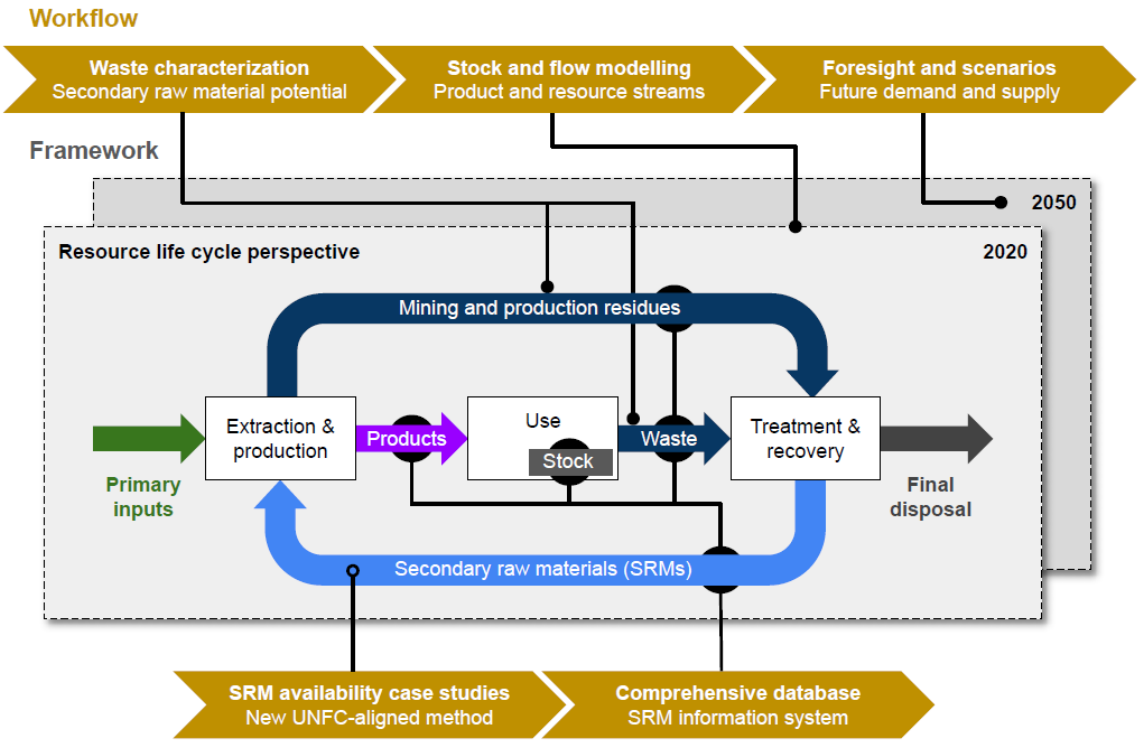

Figure 1 Conceptual framework including key methodological elements addressed by FutuRaM

a) Foresight on future SRMs demand and supply (WP 2)

The foresight on future SRMs demand and supply in FutuRaM will build upon three scenarios covering annual data to 2050, which will be based on qualitative narratives cutting across all economic sectors affecting the 6 waste streams. This will include the assessment and discussion of narratives from established scenarios (e.g. the Shared Socioeconomic Pathways, the International Resource Panel Scenarios, the International Energy Agency Scenarios) with expert panels from each of the waste streams, complemented by sector-specific Delphi surveys, and mathematical modelling to steer and jointly develop quantitative data for the three scenarios. This data will be contextualised and matched with stated economic and sustainability policies and goals for each of the states assessed in the project (EU27+4). The foresight for generation and recovery of the 6 waste streams is hugely dependent on future and strategic technologies and systems in the transition towards a low carbon (e.g. PV panels, Li-ion batteries), circular (e.g. reuse, refurbish, remanufacture) economy. Novel circular business models (such as sharing, etc) and novel products will be inventoried, scaled on likelihood, and mathematically expressed in terms of stock levels and consumption changing material usage. Recycling technologies will be inventoried and mathematically described. Following this, FutuRaM will incorporate three possible futures, which vary in the speed of adoption of sustainable measures and policies: **Scenario 1 (Circularity)** envisages an ambitious sustainable future that includes a climate neutral, circular and digitised scenario, with energy transition, design for circularity, increased product lifetimes and high material recoverability from end-of-life production. This scenario would not only achieve the sustainability targets of each EU27+4 nation, it would also showcase an economy that puts reuse and repair at its core. **Scenario 2 (Recoverability)** follows the rapid implementation of the best current and foreseeable technologies for material recovery across the 6 waste streams. In this scenario, sustainability targets are met under the current economic system without a specific focus on waste prevention. **Scenario 3 (Business-as-usual)** assumes continuation of current trends that build on the historical stocks and flows from WP4, but that are still in line with the current goals of the EU27+4.

Future compositions, technologies and products will be assessed based on technology outlooks and stakeholder interviews and will include sector-specific Delphi surveys. Information needs and availability for composition data as well as the type of relevant recoverable embodied SRMs varies across the waste streams. Thus, specific data collection strategies will be developed and used for each waste stream.

b) Secondary Raw Material composition (WP 3)

The characterisation of waste streams enables the estimation of their SRMs and, in particular, CRMs content, and further assessment of their recovery potential. It also provides relevant information on composition-influenced factors that affect SRM/CRM recoverability, such as grade, associations of elements, compositional variability, as well as the presence of hazardous substances. The composition of future SRMs from WEEE, BAT, ELV and CDW depends on that of the relevant products put on the market over time, and their rate of release from stocks. WP3 will therefore quantify product compositions from different times and regions, which provides a powerful tool to forecast SRMs composition. On the other hand, by-products from industrial processes such as MINW and SLASH depend on raw material properties and processing technologies, and frequently show systematic composition patterns. In the compositional characterisation, FutuRaM will follow a harmonised classification approach for products and waste streams, such as the UNU-KEYs 54 product categorisation, which is linked to material composition (elements, materials and components) and can be linked into six WEEE categories, that allows the stock and flow models to be linked to the composition data for estimation of the SRM and, in particular, CRM potential (see above). The project will produce harmonised composition datasets for each of the six FutuRaM waste streams for a wide set of SRMs and, in particular, CRMs, based on literature data, published datasets, and previously undisclosed in-situ datasets provided by FutuRaM partners and collaborators. Information needs and availability for composition data, including the relevant recoverable embodied SRMs, varies across the waste streams. Thus, specific data collection strategies will be developed and used for each waste stream assuring alignment with present and futures practices for monitoring composition and quality of waste streams and SRMs at industrial scale.

c) Stock and flow modelling (Material flow analysis) (related to WP 4)

The stock and flow modelling in WP4 will produce consistent physical accounts per MS in the EU27+4 for SRMs with a particular focus on CRMs. Having access to the unpublished microdata data and protocols of the ProSUM project, FutuRaM will guarantee full consistency with the current available ProSUM datasets and the updates for BAT and ELV provided to the JRC after the ProSUM project completion. FutuRaM will furthermore extend time series via three scenarios up to 2050 (WP2). WEEE, BAT, and ELV will follow an expanded version of the model developed in the ProSUM project. For materials that have relatively short lifespans, such as WEEE and BAT, a sales-lifespan model will be implemented. It starts with mathematically relating products placed on the market (POM), stocks and waste generation, through lifespans in a product-oriented classification, such as the UNU-KEYs and the

BATT-KEYs. For ELV, a method based on the stock of vehicles is used. The scope of the product groups will be extended to also fit future products, and embedded WEEE and BAT in other waste streams (such as ELV, or CDW, etc), considering the focus on EU strategic technologies. The resulting flows will be traced, focusing on separate collection of the respective waste type, collection of the respective waste type mixed with other waste (for instance, WEEE mixed with metal scrap waste, or disposal in waste bin), and exports. This will ensure a link to official statistics such as domestic production, international trade, reporting of WEEE and Batteries under WEEE legislation and proposed Batteries Regulation , as well as published reports, literature and industry surveys. In addition, further treatment data on SRMs and, in particular, CRMs recovery will be assessed using reported data, e.g. in RepTool from WEEE Forum members, and literature research and stakeholder interviews. Data will be harvested, harmonised, and gap-filled using best available proxies. Where feasible and when it fits user requirements, data collected at different scales (NUTS2/3, country, EU) will be harvested, integrated and harmonised. For some datasets, national data can be disaggregated top-down into regional datasets using demographic data. Links with material composition data sets will be provided from WP3 at product level (WEEE, BAT, ELV), or at waste stream level (for MINW and SLASH). For CDW, both product level (material intensities in the built environment) and waste stream level (Eurostat microdata for the 6-digit European List of Waste codes) will be collected, compared and harmonised.

d) Secondary Raw Material availability assessment in alignment with the UNFC (WP 5)

The UNFC enables presentation of the maturity level of a recovery project from the initial exploration phase to final commercial exploitation on three axes and communicated to stakeholders. The classification categories show the benefits of a project, but also the barriers to its exploitation. This not only enables identification of the drivers and barriers for an SRMs recovery project, but also provides guidance for strategic decisions. FutuRaM will develop a general approach, based on the six FutuRaM waste streams, to assess SRMs and classify their availability in alignment with the UNFC. To promote transparency, the consideration of technological feasibility, economic viability, environmental impacts, social impacts and regulatory aspects is essential to the approach.

With regard to the sustainable and circular use of post-production and post-consumer material flows, a wide range of factors will be considered, project evaluation methods selected and classification criteria developed. Literature reviews, internal consortium assessments and wider external stakeholder consultation will be used to systematically consider different stakeholder perspectives. In parallel, a site-specific MINW case study will be used as a pilot study to test the applicability of the draft UNFC methodology approach (Figure 2). The outcomes will be compared with existing approaches to applying UNFC for primary resource classification. The applicability of the concept will then be tested and validated using examples from the six waste streams with different SRMs and, in particular, CRMs. In view of mapping the results with the UNFC axes, a multi-criteria assessment approach will be used.

The selected case studies cover a variety of scales (site-specific, regional or cross-country scope) and recovery project maturity levels. They will be developed using existing data previously generated by research groups, or using new results collected in cooperation with FutuRaM partners. Continuous exchange with the other working groups, waste stream groups, industry partners and other stakeholders (in WP1) will be used to provide advice and feedback during execution of the case studies. Solving the methodological challenges encountered will guide development of practical solutions and will help to validate the approach. The focus is always on keeping the concept as simple and practical as possible, enabling consideration of stakeholder perspectives, and with user-friendly and pragmatic guidance. A guideline for use by practitioners in assessing and classifying projects will be developed, considering the particularities of different waste streams. In collaboration with industry partners and stakeholders, a draft reporting standard will be developed to communicate the information requirements on the feasibility of SRMs recovery projects in line with stakeholders' perspectives (WP1, WP7). This will be communicated to the UNECE Expert Group on Resource Management / the UNECE Committee on Sustainable Energy Committee.

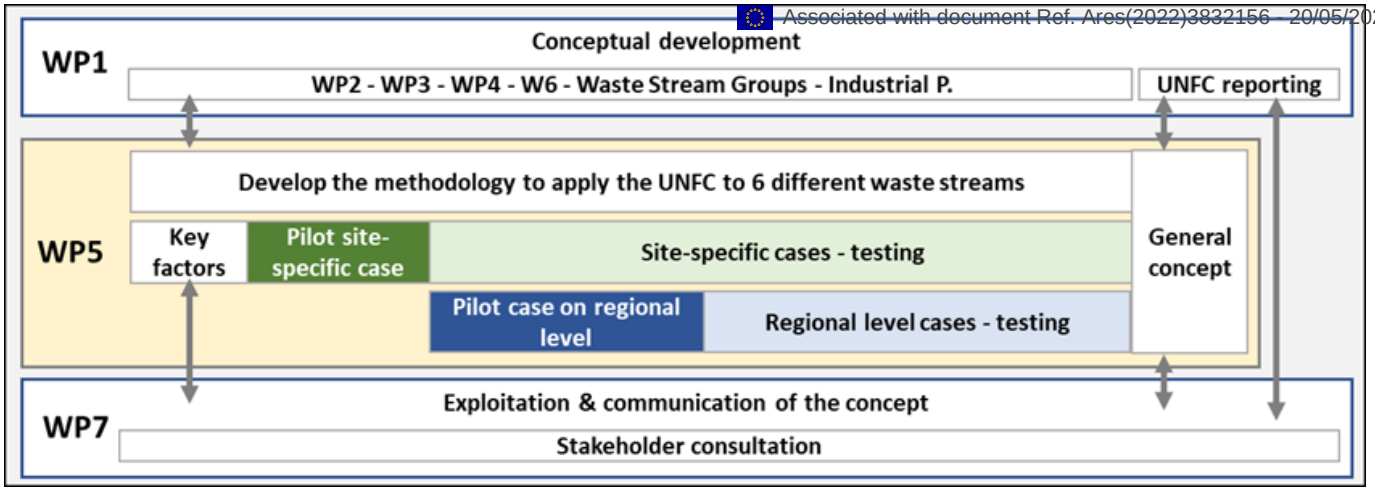

Figure 2 Process to develop the methodology for using the UNFC at site-specific or regional level

e) Development of Secondary Raw Material-Knowledge Base (SRM-KB) for EU (WP 6)

The Urban Mine Platform (UMP) website is presently the main portal disseminating ProSUM results for BAT, WEEE and ELV. Some ProSUM results are also available in the RMIS (BAT https://rmis.jrc.ec.europa.eu/apps/bvc/#/). The MINW inventory is accessible through EGDI. The future European geological survey (expected to be created in response to a CSA call for beginning 2022), including as partners all the EU geological surveys, will integrate a task about mineral resources and a specific subtask it is expected for mining waste data collection. For mining wastes, both projects (FutuRaM and CSA) should be connected and share developments. In FutuRaM, the UMP website will migrate to a new portal, update its previous results, cover new assets (CDW and SLASH), integrate prospective foresight and deliver the national resource account based with UNFC classification. This new site will be more user-friendly, with data visualisation options including maps that are compatible with mobile devices; will have the possibility to access the data directly (by downloading data sets); will allow the public to access data via Application Programming Interfaces (APIs); and will develop user adaptable online tools like the estimation of SRMs present in an area delimited by users (e.g. amounts of Ni in batteries in a region based on per capita ratios, or user adaptable future scenarios). This system is expected to be more modular than the UMP and will seek to reduce the maintenance problems this type of portal usually encounters. FutuRaM partners and also stakeholders will be consulted regarding requirements in the design of these tools. Transparency of data acquisition, calculations, hypotheses, and methods used, will be prioritised. INSPIRE requirements will be respected for interoperability, accessibility to data and metadata catalogue. Likewise, consideration will be given to the process of updating the data once the project is closed. Thus, documents and guides will be drafted for any update of the website and data.

In FutuRaM, data collection and data mining will mostly be done in technical tasks (WP2-5), in accordance with the Data Management Plan established in WP8. WP6 is dedicated to integration of all IT and information system developments, across WPs and waste streams. Data models for each waste stream will be developed based on previous ones (ProSUM, Min4EU, ORAMA, Mintell4EU) and taking into account specific needs such as including UNFC assessment. Consequently, WP6 will aggregate, combine, and balance information and data flows generated in WP2-WP4 together with the UNFC assessment performed in WP5, following the methodology defined in WP1, which also will establish a data quality and uncertainty assessment framework for FutuRaM. WP6 will thus generate a public database (SRM-KB) that can provide background information in circular business model analyses, through a dissemination portal that provides direct access to data sets or via user friendly and data visualisation tools.

Waste stream specific approaches

a) Waste batteries (BAT)

FutuRaM will focus on reviewing the available data sources on historic sales and current stocks of in-use and end-of-life batteries in the EU27+4, including geographic, economic and demographic meta-data where possible. This will include reviewing publicly available data in published literature, funded studies, national registries, consumer surveys and statistical databases indicating stock levels for products present in households and businesses. In addition, the recent update of the ProSUM data to 2020, undertaken for JRC/Ispra, will be utilised. FutuRaM will review the data supporting the trends, sales and lifespan of products, and introduce new aspects such as a method and criteria to assess the effect of the potential development of second life application for batteries. The classification of the batteries by their chemistries, but also by their applications, will be updated to enable a better tracking of waste batteries embedded in other waste categories. The collection and recycling rates of embedded batteries are strongly

dependent on the type of product they are embedded in, which necessitates using different models, depending of the type of product. This is particularly relevant to consolidate and harmonise the BAT data with WEEE and ELV data. In addition, the data will be extended to a world-wide assessment when possible. The number of chemistries used in the major applications is limited, and the materials used for each chemistry can be quite precisely characterised. Therefore, material (and CRMs) stocks and flows follow from the description of the chemistries. FutuRaM will update the description of battery compositions to reflect technical progress since the ProSUM project. This is very relevant for the ELV application, where the cathode composition of the "NMC type" Li-batteries is evolving on a yearly basis.

b) Waste Electrical and Electronic Equipment (WEEE)

FutuRaM will focus on reviewing available data sources on EEE placed on the market (EEE POM), current stocks of in-use EEE, and lifespans of EEE. Consistent with the common methodology developed for article 7 of the WEEE Directive (from UNITAR's 'apparent consumption methodology'), WEEE generated will be calculated based on the time series of EEE POM and lifespans. ProSUM datasets will be extended to new products likely to enter the market post 2022 and phase out existing products in the various scenarios. The WEEE flows will be assessed to cover compliant recycling flows, and WEEE mixed in other waste flows consistent with the ProSUM method. To do so FutuRaM will use official statistics and detailed datasets from ecosystem, ERION and Repic, supplemented with detailed datasets from the latest WEEE flows studies. The UNU-KEY classification and interlinkages with WEEE Directive categories will be updated and expanded to include embedded WEEE. Global harmonised datasets will be produced by applying established UNITAR calculation routines. Within the datasets EEE POM, EEE in-use, WEEE generated and the WEEE flows will all be mathematically interrelated in such a way that they easily can be adjusted with regard to the future scenarios addressed in FutuRaM. In addition, new aspects will be introduced, such as the method and criteria to assess the effect of the potential development of several circular economy options, such as second life application for EEE, sharing, etc. The ProSUM microdata for product composition is further enriched with novel composition data, waste SRMs/CRMs data in WEEE from RepTool and updated to cover recent product changes, future products, and to the expanded scope. For WEEE, global datasets are foreseen, utilising UNITAR's methods and data from the Global E-waste Statistics Partnership.

c) End of life Vehicles (ELV)

FutuRaM will focus on reviewing available data sources for vehicle sales, in-use in-fleet and recycled ELV as well as the material composition of the vehicles. The main coverage is vehicles below 3.5 tonnes (as per the current ELV directive, which is expected to be revised in 2022) at country level in the EU27+4. The coverage can be expanded to heavy duty vehicles and other regions when possible. Vehicle keys are used to group vehicles in terms of drivetrain, curb weight and cylinder volume. For each vehicle key and cohort, a set of composition data is defined. The data to be reviewed includes publicly available data in official and industry statistics and other published literature. Vehicles will mainly be analysed in terms of embedded components such as batteries and EEE, with the data from the ProSUM project as the basis. In addition, the recent update of the ProSUM data to 2020, undertaken for JRC/Ispra, will be used. Datasets will be created on vehicles POM, Stock, Leaving the stock, Exported for reuse, ELV and Unknown whereabouts, which are all mathematically interrelated, and can be easily adjusted with regard to future scenarios. Similar to WEEE, new aspects can be introduced, such as a method to assess the effect of the potential development of several circular economy options, e.g. reuse of parts and remanufacturing. Consolidation with BAT datasets will be performed.

d) Mining waste (MINW)

Data on mining waste (MINW) (locations, compositions) on the territory of EU27+4+Balkans arise from mining of primary raw materials such as mineralised waste rock and tailings. Composition of MINW may differ from the original ore due to change of chemical composition e.g. due to ore processing (for example flotation or leaching), weathering or chemical reactions after deposition. There are also large variations in material compositions of the waste rock between the different extractive sites due to different geological environments and commodities. Hence, it is necessary to determine not only the amount of the commodity, but also to characterise the waste. The data collection process done in WP3 and WP 4 will include:

- collecting already available data review from literature and past projects (incl. data on mine wastes from 13 European countries already available on European Geological Data Infrastructure (EGDI) and data from national mine waste registries)
- organising four regional, one EU-wide, workshops covering EU27+4+Balkans to add data into the EGDI infrastructure, which will ensure sustainability of the FutuRaM mining waste data base.
- a potential extension of the data by covering data gaps by using Copernicus geospatial data.

The following regional workshops are planned: (1) Western Europe - SGU (Sweden, Norway, Denmark, UK, Ireland, Netherlands, Slovakia, Romania, Czech); (2) Baltic - GTK (Poland, Lithuania, Latvia, Estonia, Finland, Germany); (3) Southern Europe – BRGM (France, Spain, Italy, Portugal, Belgium, Austria, Malta); (4) Balkans & Cyprus – GeoZS (Slovenia, Croatia, Serbia, Montenegro, Bosnia, Northern M, Albania, Bulgaria, Cyprus and Greece). (5) a pan-European follow up workshop for final data assessments in Brussels, piggyback with ongoing Eurogeosurvey activities.

Six different mine waste projects will be assessed with UNFC (WP5), whereof one on national. Each case will highlight different CRMs. Using knowledge from primary assessments of UNFC and CRIRSCO the cases will address all axes of the UNFC. In order to achieve resource estimations, the cases will also highlight exploration methods considering homogeneity and heterogeneity of the waste. A waste site sometimes contains waste from different mines or a change of resource property from different periods of extraction as well as change in recovery technology.

e) Slags & ashes (SLASH)

SLASH arise from a variety of thermal processes such as incineration of coal, biomass, waste or smelting iron, steel and other metals. They contain various elements, both toxic and valuable, including some that are currently considered critical, such as P, Nb, V and REE. To date there is no comprehensive overview of the quantities of SLASH available in Europe that has a particular focus on recoverable CRMs.

FutuRaM will collect data on the quantities and composition of SLASH in the EU27+4, by reviewing publicly available data in published literature, funded studies, national registers and statistical databases. It is expected that the data will be very heterogeneous depending on the country and data such as volume and composition will often be absent. Based on a desktop study on their composition with a focus on CRMs, only the most promising sources will be selected for more detailed investigation. Factors that influence CRMs content in a specific slag/ash (e.g. type of waste incinerated, scrap used in the steel production) will be investigated and available recovery methods for CRMs will be screened. In particular, data from new streams will be examined in terms of both composition and quantities of SLASH, e.g. trends in steel production or waste treatment. Knowledge of historical stocks is currently limited to highly dispersed and unsystematic local knowledge, e.g. with information on permits distributed among local authorities and some EU Member States having inventories with information on the location and approximate quantities of slag disposal sites. In addition, information on current disposal practices in different legal contexts will be collected (WP2). Based on the ProSUM approach, a generic composition for specific types of SLASH across all EU member states will be proposed and validated by experts (WP3). For the selected SLASH the consolidated data will be provided to elaborate the stock and flows model (WP4).

f) Construction & Demolition Waste (CDW)

The building sector is characterized by long product lifespans, thus the in-use building stocks will be modelled primarily by remote sensing approaches (e.g. satellite and aerial-based data, prioritising Copernicus-derived products, as well as VIIRS night time lights, and lidar). This estimation will be followed by assessment using geographical information systems (built-up surfaces, building typologies, ages of construction) and using statistical data on material intensities. C&D stock composition will be estimated using the International Material Intensity Database Project (IMID)[4], which comprehensively compiles material intensities (in kg/m^2 GFA) in the built environment as reported in the literature for different areas/regions. Compositional estimates will focus on bulk structural materials, (e.g aggregate, cement, steel, and timber), which can to some extent substitute for each other, and on other important relevant materials for this sector (e.g. gypsum, Al and Cu). Furthermore, material intensities from surveys of in-use building stocks will be compared with CDW surveys, and data provided by FutuRaM industrial and government collaborators regarding materials procurement and CDW management, to produce harmonised estimates of CDW composition as a function of time, and considering regional differences, including variability estimations. In parallel, embedded energy infrastructure (e.g. photovoltaics, stationary batteries, smart building infrastructure, heating and cooling, wind turbines, tidal power plants, etc.), which are expected to play an increasing role in sourcing of CRMs, will be considered, insofar as they are not already covered by the WEEE and BAT streams. For these technologies, FutuRaM will collect material intensities specific to Europe (e.g. at city-scale) in a format suitable for integration with the IMID.

[4] Heeren & Fishman (2019) https://www.nature.com/articles/s41597-019-0021-x

SRMs and, in particular, CRM flows calculated based on compositions and published estimates for building demolition rates and stock age will be compared with CDW flows determined by collation of Eurostat microdata, which reports waste generation by the 6-digit code in the European List of Wastes (2000/532/EC), considering not only materials reported under Chapter 17 (CDW), but the many subcategories from other chapters that may be used to describe the same materials, with potential usefulness as SRMs.

Foresight scenarios will need to consider improvements in CDW recovery systems and technologies, changes in supply and demand due to strategies such as off-site construction, adaptability for re-use, and design-for-deconstruction. Embedded energy infrastructure will also be particularly important in the foresight scenarios, along with decarbonisation and dematerialisation of new construction through material substitutions and new technologies, smartization, and variations in regional growth/shrinkage of the built environment as a function of e.g. regional differences, changing lifestyles and urbanisation, including both housing and infrastructure.

UNFC Case studies

FutuRaM will further develop and test the UNFC methodology for 19 case studies across the six FutuRaM waste streams in partnership with industry stakeholders and through consultation/engagement with other relevant stakeholders. The case studies will test and further develop the UNFC method and gather data for its applicability to each of them. There will be two phases in the case studies, in which the method is iteratively tested on the extended three axes for recovery projects and national assessments for SRMs and CRMs. The case studies have been selected to provide a representative overview in relation to the SRMs content, and technological, socio-economic, environmental, and regulatory aspects of the six waste streams; for site specific cases, and regional / national case studies, and to cover aspects relevant to CRMs recovery and data from FutuRaM project or industry partners. The case studies differ in terms of the scope of SRMs and, in particular, CRMs, the maturity stage of the recovery project (e.g. prospective or commercial) and the challenges to be expected when testing and further developing the draft methodology to assess SRMs availability developed in WP5. In addition to new results developed in collaboration with industry partners, existing project results from within the consortium will be used. Developing a general methodology for applying the UNFC to SRMs is challenging because, even within a waste stream, there are many different possible settings of the different aspects. WP5 will first come up with a "long list" of potential factors affecting recoverability, which will be narrowed down to a smaller set of key indicators that are measurable, readily available, and conceptually not overlapping, followed by development of a ranking and weighting system. To achieve a common, transparent approach that is applicable to all of the case studies (and the six FutuRaM waste streams, as well as, ideally, others) will require a significant effort to understand the impact of each factor. Clustering analysis of all the case study results will help to reveal the common trends and identify and justify the key factors for the UNFC methodology, and to turn it into a pragmatic approach that can be implemented with less administrative burden by future practitioners.

- **MINW:** 6 case studies: *Site specific:* 1) Lovisagruvan (Co, Cu, …) by SGU, Lovisagruvan, 2) Lece tailings (In, Ag…) by GeoZS, UB, 3) Otamäki (Ti) by GTK, Otanmaki, 4) Salau tailings (W) by BRGM: *National*: 5) CRMs (Co, Ree) MINW in Sweden by SGU, GTK, Lovisagruvan, Boliden, 6) Large tailings in Sweden by SGU, Boliden.
- **SLASH:** 4 case studies: *Site specific*: 7) Sewage ashes (P) for City of Vienna, by LMU, 8) CRMs in steel slags (data from Industeel, HYPASS Project) by BRGM, VITO. *National/Regional*: 9) Sewage sludge ashes (P) in Austria by LMU, 10) CRMs in steel slags in EU by VITO.
- **ELV/BAT/WEEE**: 3 case studies: *National:* 11) Li-ion-batteries in ELV and 12) WEEE in ELV in Switzerland by Empa. 13) Low-grade portable Li-ion- batteries (Co, Ni) by TUB, Siftung GRS
- **WEEE**: 2 case studies: *Site specific:* 14) CRMs recycling (various CRMs) by WEEECycling, UNITAR, *National and benchmark*: 15) WEEE management AT, UK, FR, IT (focus: CRMs) by UNITAR, ecosystem, Erion, REPIC.
- **CDW**: 4 case studies: *Site specific:* 16) Mace high speed rail building site (bulk materials) by UCL, Mace, 17) City of Leiden (bulk materials) by ULEI, *National/Regional:* 18) waste timber recovery for high value engineered timber (e.g. glulam and cross-laminated-(secondary)-timber) production in the UK by UCL. *Cross cutting:* 19) Permanent magnets in wind farms by BRGM, ULEI.

a) Critical discussion, harmonisation and integration

Considering the multidisciplinary character of FutuRaM and its aim to provide consistent and robust data, procedures, models, and methods, a critical discussion, harmonisation and integration of the concepts, perspectives and is crucial for the success of the project. WP1 will therefore provide a platform to critically discuss, harmonise, integrate and consolidate concepts methods, models, procedures and data proposed by WPs 2-6, the waste stream leads and topical experts for cross-cutting aspects within the consortium (*i.a.* data models, data quality and uncertainty assessment and stakeholder integration) in a structured and systematic way, all along the conceptual and methodological development process. In the first phase of FutuRaM it is planned to have WP focused meetings enabling cross-project understanding of the underlying concepts, methods, models, procedures and data needs, and the identification of the interlinkages to the other WPs as well as to the waste stream-specific perspectives and approaches. These will then be continuously developed, harmonised and integrated into FutuRaM frameworks, methods, models and procedures and translated into recommendations, guidelines, proposals and draft standards to the attention of the FutuRaM stakeholders.

b) Data management

Data classification / models

Data for the 6 waste streams will use existing classification systems to be interoperable with other information systems on product, commodity and waste flows. SRMs will be modelled according to the product – component – material (– element) approach of the ProSUM project to allow comparisons across waste flows. The existing ProSUM data model does not consider recoverability of SRMs in a waste flow and, in fact, characterisation of waste flows was poorer than for POM products. FutuRaM must overcome this ProSUM difficulty and propose a model capable of representing SRMs in waste streams. Further details on classifications and relevant materials tackled in each waste stream are outlined in Table 2. Data will be processed and assessed using open-source software, or in house software based on open-source programming languages (i.e., R, Python, Brightspace LCA).

Data collection

Data collection will consist mostly of manual work undertaken by the different data collection teams. Data acquired throughout the project will be initially stored at the local institution that collected the data and then made available to the consortium. Remote sensing and earth observation data will be obtained primarily from Copernicus and other EU data sources. Data subject to non-disclosure agreements (NDAs) will remain at the local institution and only provided to the consortium at an aggregated level or according to the stipulations of the NDA. Once the data has been included in the stock flow model, then the harmonised and balanced datasets will be hosted within the SRM-KB and be made available via APIs according to FAIR principles of open data[5]: Findability, Accessibility, Interoperability, and Reuse of digital assets (see section 1.2.5).

Data harmonisation framework and procedures, data interoperability

To enable a consistent approach to harmonising data and addressing data gaps in the FutuRaM project, *i.a.* in relation to mapping product and waste flow compositions or stocks and flows, a data harmonisation framework will be developed, including procedures to close data gaps. The development of the framework and procedures will take the data model developed in the ProSUM project for WEEE, vehicles, batteries and MINW as a starting point and, amongst other things, consider recent developments made in the Mintell4EU (UNFC classification for primary resources), RESEERVE and ORAMA projects. For new waste streams that were not covered in ProSUM (SLASH, CDW) a new data model will be developed. The harmonised data formats will be also linked to several statistical data sources at Eurostat (Prodcom, International Trade, WEEE Directive, ELV Directive (and proposed revision of ELV Directive), proposed Battery Regulation and Waste Statistics Regulation).

Through the creation of the SRM-KB in this project, a wide range of stakeholders along the value chain will be engaged. This will enable sharing of best practices and benchmarks, and provide opportunities for greater harmonisation and cooperation regarding the SRMs data pooling. This is particularly pertinent given the scattered nature of data amongst a variety of institutions including government agencies, universities, NGOs and industry. Data are often stored in databases with bespoke design and architecture making it difficult and time consuming to merge or compile. Moreover, where data relates to the composition of waste, different sampling and analytical approaches may have been used, which introduces an additional challenge to aggregate and compare those data. Consequently, there is a lack of accessible and harmonised qualitative and quantitative data. The ProSUM project utilised a pragmatic and academic sound approach to deal with data gaps, data availability, data complexity rising from multiple data providers. Existing data can often not be adequately shared due to the absence of interoperability

[5] https://www.go-fair.org/fair-principles/

of spatial data and services at both national and EU levels. This complexity in adequate comparing of data builds up a barrier for policy makers and actors in the value chain. Those barriers must be overcome by developing and deploying appropriate methods, networks and tools. This is the purpose of the INSPIRE Directive, with which this project will fully comply.

Data quality and uncertainty assessment framework and procedures

FutuRaM will develop a general framework for handling the data quality (DQ) that helps with assessing the uncertainties in both the collected and generated data. This incorporates indicators available from meta-data and raw data, such as the age of the data, their variability, and geographical representativeness. The development of the framework and procedures will be based, amongst others, on the recent work done in the context of UN's GLAD initiative[6] for interoperability of databases and they will be in line with the essential FAIR principles of open data.

Prior to their integration into the SRM-KB, datasets generated in the FutuRaM project will be automatically evaluated and verified regarding their accuracy and precision, with procedures that include the identification of potential biases. These data discrepancies and potential errors will be handled in a dialogue between data calculation partners and the data manager (WP6 leader) inside the FutuRaM consortium. This will not only allow for uncertainty and DQ assessments but also for an evaluation of the variability and heterogeneity of product and waste flow compositions, which is an inherent and decisive quality criterion for material recoverability. A particular effort will be made in terms of data restitution accuracy and uncertainty (e.g. using a Monte Carlo approach) of the final data sets.

Data update protocols

Providing data handling protocols is a necessary precondition for updates after project completion and mostly for a project delivering data in annual time series. Throughout the project, FutuRaM will document the process of data acquisition and consolidation, the harmonisation of data into FutuRaM data model, data uncertainties evaluations, metadata and the reproducibility of models (prospective scenarios demand, stock and flows...) across all waste flows. To assure data update to be reproduceable by agencies that are not participating in FutuRaM, a deliverable report will explain data update protocols and procedures used in the project (D1.1). The relevant models and codes will be shared with the science community. Furthermore, the development of APIs correctly documented about their functionalities and requirements are also an important aspect of updates after project.

Data availability and modelling

WPs 2 to 5 rely on data being available and there is a risk that the necessary data does not exist or is not accessible to the project. Specifically:

- WP2 - there might be insufficient data and foresight on the future development for each waste stream and its relation with the societal transitions.
- WP3 & 4 - there might be insufficient data for instance on lifespans, product composition, waste product flows (primarily in the unreported, mixed and informal collection streams).
- WP5 - the data gaps in the UNFC method might be lead to unsuccessful or inconclusive UNFC case studies.

The consortium has explored this risk looking at its extent and measures to counter it.

In WP2, modelling the foresight requires dealing with much unknown information and developments. A convincing mathematical model on the future thus requires a strong narrative developed from stakeholders and existing literature regarding how future circular behaviours, recycling and recovery technologies, and the overall material economy will develop. Furthermore, if the mathematical model used is too detailed, there will be many data gaps, leading to it being impractical to use and potentially leading to unrealistic results. This means a good balance needs to be found between data availability and its translation into a quantification of future narratives. The narratives applied to each scenario will follow plausible developments by taking into account stated MS policies by each regarding the material economy (with a special emphasis on the waste and recycling stages) and optimistic outlooks of both recycling technology using learning curves, and of increasing circular behaviour following global best practice. The rate of development towards each of these scenarios will be used for sensitivity and uncertainty analyses, such that a measure of the variability within each scenario is established.

For WP3 and 4, the consortium will base the data and the methodology on several projects e.g. ProSUM. In those projects, parts of the dataset were not available meaning the consortium members developed routines to gather the existing data and place them in mathematical frameworks (material flow accounts, and mass balances), which allowed assessment of which data was not available. The framework also enables the development of statistical models to estimate the missing data through the mass balances, relations between the waste flows, statistical methods,

[6] https://www.globallcadataaccess.org/

proxies, and stakeholder input. Such procedures consider the source of the data and its quality. The current method has already been demonstrated to work for WEEE, BAT, ELV, and to generate consistent harmonized datasets. It is expected that similar concepts will work for MinW, SLASH and CDW, to which they have not previously been applied.

For the development of the UNFC framework in WP5, the feasibility of a commercial project depends on the available data and their evaluation, and therefore the more data that is available, the better. Accordingly, a data gap is reflected in the code leading to the specific UNFC class. Past case studies have shown that at a very early stage in remote screening mode it is possible to make an initial assessment of a project's potential based on readily available data and to identify the possible barriers for the exploitation. For the early assessment, the consortium aims to develop the method that can be deployed relatively easily with existing data to promote the use of the UNFC framework. As the amount of information and data increases, the assessment can be carried out with greater confidence, resulting to an updated classification of the project. This approach minimizes the risk that no data will be available to develop a method and to successfully perform the UNFC assessment.

Where possible, all information and data will be harmonized between all WPs to which it relates and this will lead to synergies across the project and minimal data gaps. This task is overseen in WP1 and through the creation of the knowledge base in WP5, which are both aligned with exploitation and stakeholder needs, which fall under WP7.

c) Stakeholder involvement

FutuRaM will broaden the ownership of the process and results by cross-sectoral stakeholder engagement, including co-creation, co-development and co-implementation, to actively involve and empower citizens, policymakers, industry, investors, end users and other stakeholders in FutuRaM's actions following Open Science principles. To achieve this, the involvement of stakeholders in all stages of project implementation (WP1-7), from the design of actions to demonstration and evaluation, will be solicited through dedicated workshops, focus groups, Delphi surveys and meetings. Capacity building and testing will enable early-adopters to use the SRM-KB and subsequently become ambassadors for its use. The project will follow a structured approach in the interaction with stakeholders with the design and deployment of a human-centric methodology on the uptake of co-creation both at the project level and as a framework for the sectoral and cross-sectoral workshops. Jointly with project partners, stakeholders will be given the opportunity to understand the challenges, define the needs, and initiate the solutions and these will feed into the wider project as the SRM-KB and case studies are developed.

1.2.2 International and national R&I activities linked with FutuRaM

The FutuRaM project will be carried out by a consortium that builds on a rich portfolio of projects portraying a wide range of expertise, including circular economy, material science, geology, life cycle assessment (LCA), material flow analysis (MFA), process engineering, waste management, and the UNFC Framework of Anthropogenic Resources. The partners play leading roles in various project clusters, not only in the academic sector but also as software developers and across industries through associations representative of the value chain (inter alia manufacturers, remanufacturers, retailers, recyclers, repairers and consumer associations). The following projects (past and ongoing) outline relevant experience of the members of the Consortium in different domains. FP6, FP7, H2020, COST and EIT RawMaterials projects that have developed comprehensive intelligence regarding material and product flows, feeding into the Raw Materials Information System or methodological developments:

- EXIOPOL, CREEA, and DESIRE (FP6) created environmentally extended input-output analysis (ULEI),
- Minerals4EU (H2020) focused on the development of the EU Minerals Knowledge Data and Mintell4EU improves access to raw materials information through the EGDI including test of UNFC classification (BRGM, GeoZS, GTK, SGU),
- MinLand (H2020) developed a framework and guidances on permitting, environmental, land use aspects that have direct impact upon FutuRaM including metals with CRMs studied (Boliden, BRGM, GeoZS, GTK, SGU).
- ORAMA (H2020) aimed at optimising reporting of primary and secondary raw materials, producing guidelines for harmonisation of resource and reserve data using UNFC (BRGM, Chalmers, Empa, GeoZS, GTK, TUB, ULEI, UNITAR/UNU),
- PANORAMA (EIT RawMaterials) will provide insights into global value chains by detailing the global input-output EXIOBASE database (BRGM, ULEI, UNITAR),
- ProMine (FP7, http://promine.gtk.fi/); developed, amongst others, the first pan-European GIS-based database containing the known and predicted (non-)metalliferous resources (BRGM, Boliden, GTK).
- ProSUM (H2020) developed the Urban Mine Platform (www.urbanmineplatform.eu); (WEEE Forum, UNITAR(UNU), BRGM, Chalmers, Empa, GeoZS, SGU, RECHARGE, TUB),
- RESEERVE (EIT RawMaterials) developed an inventory of mining wastes in the Balkans (BRGM, GeoZS),

- RISALICE (EIT RawMaterials) investigates the possibilities of the (re)use of Al containing industrial and mine residues (GeoZS) https://www.alice-registry.eu/
- SCRREEN and SCRREEN2 (H2020) developed an EU-Critical Raw Material Knowledge Data Platform (BGR, BRGM, ULEI, UNITAR).

Projects around supply chain security and bill of materials

- ARGOS (German Federal Ministry of Education and Research) aimed at enhancing functional metal recycling along the value chain with real-time analysis of metal-rich processing residues (TUB),
- CERA (EIT RawMaterials) will define methods and approaches for responsible sourcing of materials (ULEI) CEWASTE (H2020) created, validated and launched a voluntary scheme for collection, transport and treatment facilities of key types of waste containing CRMs such as WEEE and batteries (UNITAR, WEEE Forum)
- IRTC and IRTC Business (EIT RawMaterials) aim at advancing criticality assessment on a global level and supporting companies in identifying and managing materials critical to them (BRGM, Empa, ULEI),
- SURFER provided a 'Bill of material' for energy sector technologies and national material needs in France. (BRGM).

Projects aimed at inter alia promoting circularity, modularity, eco-design, refurbishment, recycling and recovery:

- CECILIA2050 & CARBON-CAP–EU (FP7) modelled carbon mitigation / adaptation scenarios from a production and consumption perspective with EXIOBASE (ULEI),
- C-SERVEES (H2020) aims at the development, testing, validation and transfer of new circular economic business models, including novel Blockchain-based solutions advancing circularity in WEEE (WEEE Forum),
- Greensense (H2020) aims to develop a sustainable nanocellulose-based biosensing platform and derive general eco-design principles (including recycling)) for paper-based electronics (Empa),
- LACE (Swiss National Science Foundation) developed an MFA- and LCA-based framework to evaluate Circular Economy strategies and applied it for selected companies in Switzerland (Empa),
- Si-Drive (H2020) aims to develop the next generation of rechargeable Li-ion batteries using sustainable and recyclable components (Empa),
- SusCritMat and SusCritMOOC (EIT RawMaterials) aim at educating PhD students, master students, junior engineers or researchers and managers from industry to cover a series of important aspects regarding CRMs, including e.g. urban mine characterisation (BRGM, Empa, ULEI).

Projects around new recovery methodologies for mining wastes recovery or recycling wastes:

- CHROMIC (H2020) aims to develop new processes to recover chromium, vanadium, molybdenum and niobium from industrial waste (BRGM, VITO).
- CROCODILE (H2020) aims to increase the efficiency of recovery processes for cobalt (BRGM).
- EXTRADE and VALOMAG EIT (EIT RawMaterials) projects about recycling rare earth from permanent magnets (BRGM, Ecosystem, ULEI).
- ForCYCLE I + II (Bavarian Research Alliance) aims to develop new technologies and production processes to recover SRMs in a sustainable circular economy (LMU),
- HISER (ULEI, BRGM, VITO) and ICEBERG (VITO, ULEI, UCL) projects for the innovative recycling and re-use of construction and demolition wastes.
- HYPASS (ANR-FR): steel slag management for new and old wastes, based on an Industeel case study (BRGM)
- NEMO (H2020): innovative methods to recover wastes from sulphidic mining wastes (Boliden, BRGM, VITO).
- METGROW+ (H2020) aims to develop innovative metallurgical technologies for metal recovery from low grade ores and wastes (VITO).
- NEXT-LIB (ERA Min 2) about novel circular economic approaches for efficient extraction of valuables from spent Li-Ion batteries (Boliden, GTK),
- RAWMINA (H2020): CRMs recovery from mines wastes (BRGM).
- SULTAN (H2020) is a training network for sulphidic mining wastes reprocessing (GTK, VITO).
- UKRI Interdisciplinary Circular Economy Centre for Mineral-based Construction Materials (UCL)

Projects and initiatives around United Nations Framework Classification for Resources (UNFC)

- MINEA (COST) in cooperation with UNECE aimed at promoting the classification of material resources in the anthroposphere by I.a. proposing the UNFC specifications for Anthropogenic resources (BRGM, Empa, GeoZS, LMU, UCL, VITO).
- Mintell4EU (H2020), https://geoera.eu/parties/, improved the European Knowledge Base on raw materials by updating the electronic Minerals Yearbook produced in the Minerals4EU project and extending the spatial

coverage and quality of data currently in the Minerals Inventory (BGR, BRGM, GeoZS, GTK, SGU) with a specific WP for UNFC classification[7],

- 16 case studies in various projects on resource classification covering resource recovery from landfills, ashes from municipal waste incineration, WEEE, CDW, slags, MINW (Empa, LMU, UCL, VITO).
- UNECE EGRM Anthropogenic Resources Working Group, (EAA (chair), Empa, LMU (vice-chair), SGU (vice-chair), UCL, VITO).

1.2.3 An interdisciplinary approach

The FutuRaM consortium represents a well-balanced mixture of interdisciplinary skills and expertise, entrepreneurial spirit, well-established academic partners, businesses, and reputable network organisations. The expertise covers the objectives set out in the call. Each partner has a clearly defined role within the project and will contribute specific knowledge that will enable a successful project. It is acknowledged that the disciplines are diverse and one of the aims of WP1 will be to ensure that these disciplines integrate and combine effectively. The partners have expertise in mass balancing, foresight, recycling technologies, economic assessment, environmental assessment, and state-of-the-art methodologies, datasets from official statistics. They have demonstrated the ability to research unique datasets from Geological Surveys, industry, producers and recyclers, and utilise novel satellite-based earth observation techniques. The data will be enriched with input from the consortium's strong and existing networks and stakeholder groups such as national and EU policy makers, manufacturing and recycling industry, producer organisations, official statistics, and the UNECE Working Group Anthropogenic Resources. It will utilise and engage during the project with existing networks (such as the UNECE Working group on Anthropogenic Resources, Working Groups at Eurostat, UNECE/OECD/Eurostat Working Group on Statistics for Sustainable Development, The European Environment and Sustainable Development Advisory Councils Network, The European Statistical System community, European Raw Materials Alliance, European Expert Network on CRMs - SCRREEN) to gather and enrich the information and to disseminate.

1.2.4 How the gender dimension is taken into account in FutuRaM's R&I content

Within the FutuRaM project no specific population group will be targeted. In contrast, the consortium is aware that research often has a diversity problem since many groups are underrepresented, e.g. women, ethnic minorities, people with disabilities and socially disadvantaged populations and we will consider specific measures that will help to address specifically these groups. We will especially consider the involvement of a variety of stakeholders in WP7. In WP2,3,5 we will use Delphi panels, which have an equal representation of gender and an appropriate age distribution that encapsulate the multiple perspectives. In the modelling of WP2 and 4 (foresight and stock and flow models), consumption of household electronics may increase with increasing gender equality, and behavioural aspects of waste separation which could be an aspect of foresight of stock and flows. Gender dimension is one of the factors of social aspects in the UNFC methodology being developed in WP5. In WP7, we also target several relevant audiences and will try to create information that is accessible and available to society as a whole. Within the research consortium, we will follow the Best Practices Principles in Equity, Diversity and Inclusion (EDI) introduced by the Canadian Government[8] that is often seen as a role model.

Equity is defined as the removal of systemic barriers and biases enabling all individuals to have equal opportunity to access and benefit from the project. An example of something we will consider is if the graphs are readable for colour-blind people. If, for example, services are now only offered via the smartphone, people with an affinity for technology, who may also be younger, are addressed. The scope of the application can be significantly improved if the needs and requirements of people who are remote from technology, critical of technology or older are taken into account. This will be taking into account in WP6 specifically.

Diversity is defined as differences in race, colour, place of origin, religion, immigrant and newcomer status, ethnic origin, ability, sex, sexual orientation, gender identity, gender expression and age. A diversity of perspectives and lived experiences is fundamental to achieving research and training excellence. WP7 is to include this diversity of perspectives.

Inclusion is defined as the practice of ensuring that all individuals are valued and respected for their contributions and are equally supported. Ensuring that all team members are integrated and supported is fundamental to achieving research and training excellence. This will be a recurring topic for consortium meetings.

[7] Case study in Finland (GTK) https://unece.org/sites/default/files/2021-04/06_Pasi_Eilu_UNFC_CS_Guidelines_Finland_UNECE_2021.pdf

[8] https://www.sshrc-crsh.gc.ca/funding-financement/nfrf-fnfr/edi-eng.aspx

1.2.5 FutuRaM's Open Science approach

The Consortium is committed to promoting open science following UNESCO's recommendations. The research results and interpretations will be published so that they are open and transparent, respecting the confidentiality of data or findings when legitimately required. Thus, it will implement the principle as open as possible, and as closed as necessary in full accordance with the FAIR principles of open data promoted by the EU commission and across all actors and stakeholders. Concerning geospatial data, EU research organisations have a unique opportunity regarding achieving FAIRness in the sense that most FAIR criteria can be achieved by fulfilling INSPIRE requirements & recommendations[9]. Cooperative work will be a core principle and promoted at all stages during the course of the project. The open science approach will be set in the Consortium Agreement signed by all beneficiaries of FutuRaM. In order to achieve full credibility and utmost quality of our knowledge base FutuRaM needs to accommodate the second aspect of Open Science i.e. involving all relevant knowledge actors including citizens, civil society, scientific community, policy makers and business actors. Thus, the engagement with the stakeholders is seen as crucial for the success of the FutuRaM project, particularly by providing wider perspectives and input for the project's execution. This engagement is carried out in practice by for instance, a series of Co-creation workshops along with different WPs, case studies, communication and dissemination of the results with industry and policymakers (e.g. Eurostat, UNECE expert group, local authorities).

The reproducibility of the project calculations and results and the facilitation of past end of project data update will be the objective of a task about protocols (cf. Section 1.2.1.6). This concerns the algorithms, workflows, models, software and data in open accessible repositories.

Before any publication can be submitted to a journal an internal review board will access, if the supplied data and meta-data are in accordance with the FAIR principle and that the selected data repository fulfils EU requirements. All the scientific articles and papers produced are published according to open access principles and beforehand all published data will be made available in public data repositories, e.g., EOSC. Geospatial data follows INSPIRE. Peer-reviewed scientific publications will be stored in Open Access repositories during and after the project's life. FutuRaM opts for "green access" whenever possible alternatively when this is not possible FutuRam will use 'gold' open access. A dedicated budget is assigned to facilitate Open Access (payment model) publications via open science infrastructures like OpenAIRE (https://www.openaire.eu/) or national infrastructures. Some partners of FutuRaM (Empa, BRGM, ULEI) are engaged in a project (https://suscritmat.eu/) developing learning content about critical raw materials, including introductions into urban mine characterisation and methods such as MFA or LCA, and disseminating it through a Massive Open Online Course (MOOC). FutuRaM outcomes F (e.g., UNFC guidelines) could serve to complement and update these contents.

1.2.6 Research data & research output management

At project start a guideline, which defines the minimum requirements concerning the implementation of FAIR principles for the RDM, is established. Each research partner will have to assess their RDM measures and systems according to the guideline. If their measures or systems do not comply with the minimum requirements, then the respective partner has to apply corrective actions in due time. The management of open data will be based on the resources needed to make research data quality-controlled, FAIR-compliant and as open as possible. During the project, consortium partners will be responsible for managing datasets securely in their possession. To manage the lifecycle of datasets collected, processed, or created throughout the project duration, a Data Management Plan (DMP) following the recommendations of the Commission and DMP's templates available in OPIDoR will be developed for the project and delivered in M5 in WP8 by the project management team and will be formally updated as part of the Periodic Technical Reports at M18, M36 and M48. 4 main principles of FAIR will be respected:

Findability: FutuRaM data will be registered with community accepted metadata registries as recommended by FAIR guiding principles: with a globally unique and persistent identifier, with rich description of data with help of metadata registries, with a clear and explicit identification of data described in the metadata and with an indexation of data & metadata in searchable format.

Accessibility: Published and FAIR-compliant data will be archived in an open data repository, e.g., EOSC. When applicable, the focus of the data sharing will be on data underlying prospective scientific publications ensuring the validation of results presented in publications. The Consortium partners will take all the appropriate measures to make relevant data openly available and usable for third parties for study, teaching and research purposes (as described in section 1.2.5). Privacy of data subjects will be secured by fully complying with the General Data Protection Regulation (Regulation (EU) 2016/679 of the European Parliament and of the Council). It should be

[9] http://geowww.agrocampus-ouest.fr/web/?p=2977

emphasised that the Consortium has appropriate technical and organisational measures in place to carry out data protection during the project. (see section 3.2).

Interoperability: Variables and value names will be constructed and provided following general data processing conventions common to the research subject. Examples of vocabulary information to be managed within the project will be e.g., units of observation, list of variables with the name and label to each variable. After project closure, metadata of opened datasets will be made available via FAIR compliant repository for research and re-use as described above. Formats used for the datasets are anticipated to be e.g. csv, txt.

Reusability: Potential re-utilisation will be enabled and the quality of the data ensured by careful documentation of data collection methods as well as the contents of the datasets. After the project completion, the final datasets are open accessible in the public repositories SRM-KB.

Types of data generated: Non-confidential data and information, in the form of project deliverables, will be available for public access through the project website that will be updated and maintained throughout the project (WP7). In addition, open-source public applications will be developed to communicate product data to end-of-life processors, for certification

Curation and storage/preservation costs; BRGM will contribute to the Data Management Plan which will be linked to the project during its duration. In particular, the volume of stored data in common information systems grows steadily, and it is obvious that the subject must be anticipated on FutuRaM because the sustainability of the project also depends on the estimation of the volumes and the cost (financial and societal) of hosting these data, and the retention of such data. In this sense, a methodology will be made available in WP8, and the delivery of data and system shall be handled at WP6&7.

Management of Intellectual Property Rights (IPR): See section 2.2.2 Strategy for managing IP-related aspects.

2. IMPACT

The FutuRaM project has been developed to meet the expected impacts set out in the work programme Horizon Europe Digital, industry and Space 2021-2022. Through the implementation of its work plan, FutuRaM will achieve short, medium and long-term impacts for promoting circular economy action plan and the sustainable exploitation of SRMs.

2.1 FutuRaM's pathways towards impact

2.1.1 Contribution to the outcomes (during or shortly after the project), as set out in the HE Call

FutuRaM will contribute to the expected outcomes set out in the HE call, as follows:

Improve knowledge base of EU and third country SRMs (potential, resource estimation, production and refining); Develop reports on future trends in raw materials markets. The trends should be linked with change of demand related to the transition to a low-carbon and circular economy; Facilitate identification of supply and demand bottlenecks of future secondary raw materials supply.

FutuRaM will provide a consistent dataset of composition, stocks and flows of SRMs with focus on CRMs found in the six waste streams at MS level for the EU27+4 and third countries (WP3&4). Future raw material demand will be assessed with prospective scenarios (low carbon and circular economy, high SRMs recoverability, and business as usual) considering different options in terms of technological, economic development and primary resources reserves for materials critical to the EU economy, or materials that have significant impacts on EU sustainability because of their large volumes (WP2). Future material bottlenecks risk assessment will combine raw material demand, SRMs contribution and global raw materials market behaviour. Data will be presented in the SRM-KB dissemination portal thus improving the knowledge base across the relevant territories. The project communication, dissemination and exploitation (CDE) activities will ensure widespread knowledge of the SRM-KB.

Requirements*:* Widespread use of the SRM-KB after the project has ended; Trust in the data produced;

Barriers: Achievement relies on industry's willingness or ability to describe future trends

Target groups: Policy makers; SRMs related industry; Circular economy practitioners; Research peers; EU & MS government.

Assessment indicators*:* I) SRM-KB delivery (one), II) Number of waste streams in SRM-KB (at least six), III) Number of countries covered in SRM-KB (at least 75). III) Scenarios considered in in SRM-KB (at least three), IV) Report: Future supply and demand scenarios and bottlenecks for CRMs and bulk material (at least one).

Related WPs: WP2, WP3, WP4, and WP6.

Promote the utilisation of the Specifications for Application of the UNFC to Anthropogenic Resources approved in 2018; Facilitate and accelerate commercial exploitation development of EU secondary resource recovery projects; Support identification of the key factors, including socio-economic factors, drivers and barriers affecting development of a recovery project, and enable comparison of different options and projects.

As of 2021, the application of the UNFC to SRMs is still limited and no consistent method to assess SRMs recovery projects exists. FutuRaM will develop a concept for application of the UNFC to all wastes covered in the project and demonstrate the methodology in the UNFC cases studies, while further refining it. This will contribute to facilitating and accelerating the commercial exploitation development of EU secondary resource recovery projects. The analysis of the 19 different case studies with varying degrees of complexity shows the range of possible applications for practitioners and the conclusions they can draw from them. Methodological development and demonstration will focus on inclusion of multiple stakeholder perspectives in the evaluation of the aspects in the UNFC's E-axis (socio-economics, environmental impact, social impact, policy/law), which are currently neglected, as well as the F-axis (feasibility) and G-axis (degree of confidence). Recovery project classification based on the UNFC will reveal the drivers and barriers to their development, and enables the comparison of different options and projects. A key finding is the extent to which the method can be applied equally to all SRMs and where a differentiated approach is required with respect to the waste streams. The consolidated outcomes of the methodological and case study development will be submitted to the UECE EGRM through the chair and vice chair of the EGRM Anthropogenic Resources Working Group (both members of the FutuRaM consortium). They and the other Anthropogenic Resource Working Group members and project partners will continue to act as knowledge carriers and multipliers of SRMs recovery based on UNFC and UNRMS principles.

Requirements: Develop sound method, in alignment with UNFC, and practically easy to execute by practitioners

Barriers: Achievement relies on the practicality and ease of reporting, in line with the UNFC, by industry

Target groups*:* SRMs-related industry; Investors; Policy makers; EU & MS government; NGOs

Assessment indicator: I) number of successful case studies with a UNFC application (at least 10). II) Administrative burden to execute a UNFC assessment for a company (maximum 1 month). III) UNFC application user guide (one). IV) Draft guidelines submitted to the UNECE EGRM (one). V) Workshops to promote UNFC use (at least 3).

Related WPs: WP1, WP5, WP7.

Dissemination and exploitation of projects outputs is tailored for EU institutions, Member States and industry dealing with raw materials;

Stakeholder engagement will be central to the project and will ensure that end user needs and expectations are met as far as possible. Key stakeholders will be those in EU institutions and MS, and a FutuRaM policy working group (PWG) will be established to engage specifically with these groups. In addition, industry will be targeted and engaged through the consortium network and the case studies and in-depth interaction through FutuRaM industry partners. The infrastructure created in the project will allow feeding the SRMs knowledge to the EU RMIS 2.0 and EGDI for mining wastes. Particular attention will be given to propose EU statistics on SRMs.

Requirements: Engagement from these stakeholder groups throughout the project

Barriers: Lack of interest from stakeholders

Target groups: 1. Industry (manufacturers, recycling, etc), 2. Investors, 3. EU/MS governments, institutions & policy makers, 4. Environment sector, 5. Research peers, 6. General public

Assessment indicator: I) The API will be provided to the EU at project end it will contain all the public data records II) Proposal for EU statistics on SRMs to Eurostat (at least one) III) Engagement with relevant stakeholders (at least 6 stakeholder groups)

Related WPs: WP6, WP1 and WP5.

2.1.2 Contribution to the wider impacts in the long term, as specified in HE Destination 2

FutuRaM is expected to contribute to the following wider impacts as described under Destination 2: “Increased autonomy in key strategic value chains for resilient industry”.

Resilient, sustainable and secure (critical) raw materials value chains for EU industrial ecosystems, in support of the twin green and digital transformations.

FutuRaM aims to promote the exploitation of SRMs and, in particular, CRMs in a sustainable circular economy, improving its utilisation through applying the UNFC to Anthropogenic Resources and the foresight of SRMs and CRMs, in particular. The project will address the need from EU industry to identify and facilitate upcoming SRMs projects and the demand for CRMs information on the future supply of raw materials in waste streams that is economically and technically feasible, as well as environmentally and socially sustainable. Policy recommendations will enable and improve the sustainable production and supply of SRMs in the EU. This will support the transition to an inclusive decarbonised circular economy. Thus, the project contributes to this wider impact, providing support to the EU industrial ecosystems in the transition to a twin green and digital transformation in the long-term in line with the Green Deal, the new Circular Economy Action Plan (CEAP), the EU Industrial Strategy 2020 (updated in 2021) and related actions.

Requirements: Uptake of the project outcomes in the EC and industry after project closure

Barriers: Lack of accuracy of foresight and lack of practicality of the UNFC method for industry

Mitigation measures: Ensuring that the UNFC is practical and efficient to use by the industry

Target groups: EC, Industry (Recycling, manufacturing, etc), Government, Investors, Citizens

Leadership in producing materials that provide solutions for clean, toxic/pollutant free environment, decarbonising industry, and safeguarding civil infrastructures.

FutuRaM will analyse the different factors affecting SRMs production, leading to a cleaner and safer environment, and promoting a sustainable circular economy. The actions to be developed to collect SRM and, in particular, CRM data and maps of stocks and flows for materials and products will facilitate the exploitation by recyclers, smelters and investors. Furthermore, the project will have a direct impact on civil infrastructures, as the approach for assessing the availability of anthropogenic resources for the current and future production of SRMs will focus on CDW, among others. Further, improved recoverability from MINW will lead to less land used and improved local environment and cheaper remediation lessening the CO_2 footprint. This action will foster the development of new products in the construction sector, have a positive impact on the changes in markets shares of construction materials and products, as well as long-term effects for low-carbon strategies and pollutant free material cycles at EU and Member State levels.

Requirements: Target groups use outcomes for decision making, and outcomes are updated after project closure

Barriers: Outcomes do not cater the needs of stakeholders, and business model of data updates is not sustainable

Mitigation measures: Close interaction with target groups and development of business model early in the project

Target groups: Industry, Investors, Scientific Community, EC, Government

Leadership in circular economy that strengthens cross-sectoral cooperation along the value chain and enable SMEs to transform their activities and business models; Increased adoption of key digital and enabling technologies in industrial value chains and strategic sectors, paying particular attention to SMEs and start-ups.

The increase in use of SRMs and CRMs will inevitably cause a diversification of sources of supply and thus the promotion of a circular economy in the long-term is essential to the future low carbon society EU Action Plan on CRMs. One of the main goals of FutuRaM is to contribute to the circular economy agenda at the EU level through the improvement of the methodology of the UNFC, proposal for EU statistics, and harmonised datasets on the availability of SRMs to facilitate novel and innovative data driven circular economy business models. In addition, the actions related to future demand and supply foresight will directly impact industry actors, in particular businesses, which will be able to uptake this knowledge for decision-making purposes (such as green investment decisions) and risk assessment, promoting the use of SRMs and thus the circular economy. This will necessarily lead to the transformation of the activities and business models of the actors along the value chain, including SMEs. FutuRaM involves partners and activities that are positioned across the whole value chain of raw materials, which will be involved in all stages of the project. FutuRaM will establish a digital SRMs knowledge base (SRM-KB),

Requirements: developed standards on UNFC & SRM-KB datasets are used for industry circular decision making

Barriers: Outcomes do not cater the needs of stakeholders; lack of policy support

Mitigation measures: Close interaction with target groups

Target groups: Industry (including SMEs), EC, national policy makers

2.1.3 Scale and significance of FutuRaM's contribution to the expected outcomes and impacts

The scale and significance of FutuRaM's expected successful contributions to the expected outcomes and impacts are described and quantified below.

- **Increase of minimum 5 percentage point in end-of-life recycling input rates (RIR) of CRMs** (as calculated for the Raw Materials Scoreboard 2020/21) **by 2030**, **and by 20 percentage point by 2050**: In the short term, the SRM-KB will allow investors and industry to make informed business decisions thanks to knowledge about recovery bottlenecks and quantified recycling gains. In the mid-term, thanks to factual insights that lead to policy interventions, more and more waste streams containing CRMs will be diverted from sub-standard non-compliant treatment to official channels, it is expected that the end-of-life recycling input rates of CRMs will further increase; the RIR calculates recycling's contribution to overall demand for materials, c.q. CRMs. Thus, factual insights facilitate targeted concrete interventions diverting the flows into improved compliant facilities to extract of CRMs
- **100-fold increase in visits to the SRM-KB compared to Urban Mine Platform (developed in ProSUM)**: The project will develop the SRM-KB and a suite of user friendly and adaptable online tools, which will increase website visit and support informed business decisions. Currently, the www.urbanmineplattorm.eu has 300 unique monthly visits and the French Raw Materials portal has 7,000 unique monthly visits. FutuRaM expects that the more user-friendly tools, download options, and EU wide and improved datasets will result in 30,000 unique monthly visits to the SRM-KB, i.e. improving the "knowledge" of SRMs by 100 fold.
- **Uptake of the UNFC methodology for recovery projects by 5 countries by 2030.** FutuRaM will develop workshops/actions to disseminate the results to member countries and beyond. It is expected that the UNFC methodology will be widely used for the assessment of mining wastes in particular. The project will also target policy makers that can influence the mandatory uptake of UNFC.
- **At least 3 capital investments with a combined value in excess of €100,000,000 that ascertain using SRM-KB in their decision-making in Europe by 2030**: Recovery of certain CRMs are not currently technologically feasible. The SRM-KB will allow for informed and strategic investment decisions. A major investment in the recycling industry should be expected.
- **Uptake of at least 1 climate related impact when assessing SRM recovery projects using the UNFC methodology.** FutuRaM will develop at the very minimum a methodology to incorporate the impacts of greenhouse gas emissions (CO_2-equivalent units) in the E-axis of the UNFC to help assess the impacts of recovery project on climate.
- **Uptake of 5 countries for official SRMs datasets at national level by the national statistical office, or by Eurostat by 2030**. Currently, very few countries, the Netherlands is one example, have SRMs statistics in

development. The project will generate a proposal for EU statistics for SRMs, which can be adopted by Eurostat to generate EU wide statistics on SRMs, and by national statistical offices.

- **1,000 experts and young professionals are in a position to assure global leadership and cooperation in the UNRMS framework**: During the project 50 professionals in industry, academia, and institutions at all career stages are directly involved in the project and will continue to work as change agents. Methods and tools developed will increasingly enter higher education. It is expected that at least 1,000 experts will be in a position to fulfil the increasing demand for multi-disciplinary sustainable resource management.

2.2 Measures to maximise impact – Communication, Dissemination and Exploitation

2.2.1 Draft plan for Communication, Dissemination and Exploitation

The approach

To ensure that the outcomes and benefits of FutuRaM are widely known, understood and utilised by the relevant stakeholders, the consortium will implement a coherent plan, the initial draft of which is provided here. FutuRaM will engage in a focused communication, engagement, dissemination, education, networking and exploitation programme that aims to ensure use of the data and wider application of the UNFC methodology to SRMs in the future. The plan for CDE will be developed by M6 and updated in M18, M30 & M42 with the support of the Horizon Results Booster service.

Stakeholder mapping and key messages

At the outset of the project, FutuRaM will map the relevant stakeholders it will target with CDE activities (D7.1) and repeated every 12 months during the project. Mapping will include analysis of stakeholder needs and the potential for early adoption of the new processes and data outputs. Stakeholders will be consulted throughout the project to develop an understanding of end user needs, expectations and project feedback. Initial stakeholder mapping is shown in the table below, alongside the key messages to be delivered to each stakeholder group.

Table 3 Stakeholders & key messages

Stakeholder	Key Messages
Industry (including SRMs value chain) Industry will be a key beneficiary of the UNFC method and data, reports and scenarios produced, using them to make decisions on future business direction. Not only will it allow SRMs processors/recyclers to plan, it will also give manufacturers increased confidence in the future supply of SRMs.	Improved insights in environmental and financial benefits from FutuRaM project. The FutuRaM data and UNFC methodology will give increased confidence in future material markets and in discussions with investors. The application of the UNFC methodology to SRMs scenarios and greater knowledge of the projected arisings of materials in waste streams and the SRMs available will improve business planning and decision making.
Investors Investment will be needed to improve the infrastructure for SRMs utilisation. Developing tools and data that can improve investment decisions make this stakeholder group central to the project.	The piloting of UNFC methodology to SRMs will enable a reliable system to aid SRMs infrastructure investment building on the trusted primary raw materials method. This, coupled with future projections for raw materials markets will increase confidence in investment in SRMs projects and developments.
EU/MS governments, policy makers & institutions Governments, policy makers and their institutions have an interest in FutuRaM because it will assist with the transition to a climate neutral, circular and digitised economy with the effect of enabling a path to understanding and boosting domestic sourcing of raw materials, and provide EU statistics on SRMs. The project will target individuals and departments that develop strategic planning on economy and sustainability and on raw material use and recycling at EU, national and regional level.	The application of FutuRaM outcomes allows better informed decisions to be made on industrial developments, relation to policies, and planning strategy that increase the availability and use of SRMs and help achieve environmental targets. For instance, developing policy and regulation that considers a UNFC compliant reporting standard for all countries inside and outside of the EU will lead to greater investment in SRMs and assist EU/MS governments in achieving environmental and circular economy targets. In addition, FutuRaM will provide MS with data, proposals for SRMs statistics and foresight that will increase their understanding of the current and future SRMs and potential within Europe.

Stakeholder	Key Messages
Environment sector This is a broad term for those stakeholders involved in the wider green economy and includes politicians, campaign groups and related 'green' sectors.	New data and knowledge, and ways of using these will lead to greater use of SRMs. The outcomes will have the positive environmental impact of reducing demand for primary raw materials through increasing SRMs use and reduce the impacts of the extractive industry (carbon emissions, land biodiversity degradation, etc). The methodology and tools tested in the case studies will be available to practitioners that wish to apply them. These may include those end users that are consultants planning to offer the UNFC service to clients.
Research peers The academic sector has a role to play in ensuring the FutuRaM knowledge base and methodologies are widely utilised and future advances are made by building on the data generated.	Open access to the data during and after the project will enhance the research work of peers and lead to wider advancement in the extraction and use of SRMs.
General public The general public is key to ensuring future demand for SRMs meets supply. Societal acceptance and trust in SRMs are essential to future use. Moreover, without the cooperation of consumers much of the materials embedded in e-waste, batteries and ELV, could be lost to the general waste stream.	Key messages are that raw materials supply in future and relation to circular economy and low-carbon technologies is an increasingly important issue; that their lives are directly affected by raw materials. Other advantages to the consumer of developing efficient material cycles is that it will make end products that utilise SRMs less environmentally unfriendly and increase jobs through more localised utilisation of SRMs.

Methods & tools for communication, dissemination & exploitation

An overview of the methods and tools for communication, dissemination and exploitation as well as Key Performance Indicators (KPIs) is shown in Table 4. The KPIs will be used to monitor and assess the planned communication, dissemination and exploitation activities. Additional indicators might be considered and monitored throughout the project.

Table 4 Communication, Dissemination and Exploitation Tools and Methods, and KPIs

Tool, Method & KPI
Project website The project website, futuramproject.eu, will be created by M04 of the project. The website will comprise the main communication channel for FutuRaM for all external and internal stakeholders. It will contain project news, partner info, network registration, events, and resources (reports, videos, infographics etc) and will be linked to partners' websites to increase traffic and exposure. The website will be established and updated by WEEE Forum. KPI: 40,000 unique visits over the project duration.
Webinars Webinars will be held to demonstrate and provide guidance on the use of the SRM-KB as well as to provide information on the application of UNFC to SRMs scenarios. They will be aimed primarily at end users and those that can influence use. The training elements of these will remain available after the end of the project. KPI: 4 webinars with 200 attendees in total.
Conferences and other presentation-based events FutuRaM's activities and outcomes will be disseminated through presentations at project and non-project events. The project will organise four project specific events including a final event in M48 to present the outcomes to stakeholders. These events will be used to disseminate project results, communicate next steps and obtain stakeholder input. KPI: 20 presentations at non-FutuRaM events.
Stakeholder consultation events Stakeholder consultation is critically important to FutuRaM and will be facilitated under WP7 and performed in partnership with WPs 1-6 to understand end user needs, collect data, test outcomes and raise awareness. Stakeholder consultation events are outlined below. The FutuRaM consortium is flexible to the needs of the end users and wishes to understand them and keep an open dialogue with key stakeholders. A formal FutuRaM Stakeholder Network will be established. KPI: as per those indicated * below

Tool, Method & KPI
Co-creation workshops To engage relevant external stakeholders on the topic of FutuRaM, to support co-development and uptake of the new solutions to determine end-users' expectations from the Key Exploitable Results (KERs) and plan for their future implementation, and to test the commercialisation of the KERs. Aspects such as what outputs are required, user-experience and user interface, process analysis, and co-design methodologies will be used. *KPI: 1 internal & 3 external workshops
Business modelling interviews & sessions Design and validate business models for uptake of FutuRaM technologies, knowledge and processes with early adopters such as industry and policymakers as well as with consortium members. *KPI: 20 interviews & 2 sessions
Capacity building sessions Demonstrate and test the SRM-KB with consortium members and a set of pre-identified, cross-stakeholder early adopters to receive feedback to refine the end product. These sessions will also serve to promote use of the SRM-KB and produce 'ambassadors' for wider utilisation. *KPI: 2 capacity building sessions
Policy meetings To develop a dialogue with relevant policy makers and government officials at EU, national and regional level. These meetings will also involve stakeholders in locations targeted by the case studies and will provide an exchange of views on the institutional uptake of the UNFC methodology. *KPI: 9 policy meetings
UNFC workshops Each UNFC workshop will revolve around one specific group of stakeholders: 1) to identify expectations and barriers in the development of recycling projects from recyclers' perspective; 2) supporting instruments / identify barriers to secondary raw material production and supply from the perspective of investors, authorities and NGOs; and 3) internal workshop together with the industrial partners to identify factors and methods for assessing the viability of recovery projects using the UNFC and approaches for its application at regional/national level. These topics will be repeated in mid-term (M18), after the draft guidance for the UNFC is developed, and M36, when the final results are obtained. *KPI: 9 UNFC workshops
Statistics meetings To ensure a regular two-way dialogue with Eurostat and EU national statistical offices specific stakeholder meetings will bring together EU Statistics, UNECE EGRM, EC including DG JRC, institutions that compile raw material production, resource/reserve data, and leading experts and innovative national statistical offices and environmental agencies. * KPI: 2 meetings
Clustering events FutuRaM commits to organising four clustering events and attend events organised by other relevant projects and initiatives (those currently live that are listed under 1.2.2 and others that are yet to commence). The clustering events will be structured to enable the sharing of information and collaboration, with one dedicated to supporting the exploitation and results including demonstration of the KERs. A specific task and budget is allocated for this in WP7. KPI: Outreach to 10 related projects and four FutuRaM events.
Scientific publications FutuRaM papers will be published in peer reviewed and green or gold model open access papers and budget has been included for this. KPI: 10 papers during the project
Newsletters, news releases & social media A bi-annual project newsletter will be directed at all stakeholders. News releases will promote the project and its results and be circulated globally using a media distribution tool. LinkedIn, Twitter and YouTube accounts will be created (other platforms will be explored) to allow stakeholders to keep abreast of the project and foster two-way communication. These will be some of the key tools for communicating with the general public. KPI: 8 newsletters, 4 news releases. 200,000 combined views on social media

Tool, Method & KPI
Videos Three videos will be produced, one at the outset of the project outlining what FutuRaM aims to achieve and why; one during the project to promote a specific aspect; and another at the end presenting the outcomes and results. These will be suitable for raising awareness across all stakeholder groups including the public. KPI: 3,000 online views
Infographics Infographics will provide an easily understandable and attractive overview of FutuRaM as a whole or focus on discrete aspects. These will mainly be used digitally but will also be in a format that can be printed and will play a key role in communication with the public. KPI: 4 infographics, 2,000 online views
Brochures and flyers Digital and hard copy brochures and flyers will be designed for different stakeholders and requirements and will use language appropriate to that target. KPI: Distributed to more than 3,000 people at events

FutuRaM's draft exploitation pathway and key exploitable results

The FutuRaM consortium has developed a draft pathway for the sustainability of the project's key exploitable results (KERs) (see Table 5). The four stages of this pathway are presented in Table 6 and represent the exploitation lifecycle, set out the basis for commercial exploitation, and build towards the business plan (BP). The Consortium foresees two main sources (S) from which KERs will originate: **S1: KERs resulting from the work in WPs 1, 2, 3, 4 and 6,** primarily related to collection and analysis of data and establishing the SRM-KB; and **S2: KERs resulting from work performed under WP5** associated with the application of the UNFC methodology to anthropogenic resources.

The consortium is committed to making the data available in open formats during the project and free of charge for the EC and all stakeholders to use and publish, along with other relevant reports tailored for the use of the EC and respecting FutuRaM's open science principles. For the post-project period, one of the key challenges will be balancing this with the need to develop revenue streams to finance the maintenance and further development of the SRM-KB. It is anticipated that because the data will be open source, part of the valorisation will be societal without direct financial gains for consortium partners, however, the consortium's high level of knowledge of this data and networks will be key to the exploitation of results and securing the ability to generate funds through for instance data updates, usage of microdata, or securing public / governmental interest so that the results outcomes can be sustained after the project lifetime. Concerning the Information System, it will be 'dockered' that is to say deployed on an easy-to-move platform to make the delivery simple to EC, JRC, or any customer after the duration of the project, which also makes the costs for updating part or the entire dataset relatively low Concerning further data valorisation, artificial intelligence may be used to increase the value of exposed datasets. The KERs are shown below.

Table 5 Key Exploitable Results (KERs)

Source	KER	WP	Potential End Product/Service	Description of the potential product/service
S1	SRM-KB dissemination portal and APIs	6	SRM-KB	The portal/platform will provide a user interface and be the main access point to all exploitable data from FutuRaM.
S1	Harmonised datasets of stocks and flows on SRMs and impacts	2, 3, 4,6	Access to SRMs datasets on the SRM-KB	The user will gain access to datasets aggregated by different types of wastes.
S1	Methodology for the assessment of future demand estimates and supply risks until 2050	1, 2	Commodity outlook Reports	A customised report containing outlook for a specific commodity will be developed upon order. The report will involve scenario building for a different commodity based on the current status quo regarding various (PESTEL[10]) aspects that affect the SRMs.

[10] Nandonde 2019 https://onlinelibrary.wiley.com/doi/10.1002/joe.21935

Source	KER	WP	Potential End Product/Service	Description of the potential product/service
S2	Proven application of UNFC to anthropogenic resources	5	Training/certification/auditing system for practitioners of the UNFC methodology to anthropogenic Resources.	A training and capacity building programme aimed at equipping practitioners with the ability to apply the UNFC methodology to SRMs.
		2,3,4, 6	Data development and further analysis.	Ad-hoc services for analysis or development of the FutuRaM data. Use the experience, knowledge and insight of the FutuRaM team to analyse the data generated in the project based on specific client requests.

To deliver a sustainable output to different stakeholder groups and maximise the project's impact, the FutuRaM exploitation plan will be composed of three layers, each representing a cluster of intended end-users: **L1) Research community; L2) Government and their institutions** (EU and MS); and **L3) Private sector** (industry, investors etc. dealing with (secondary) raw materials). Frequent engagement and interaction with all three layers throughout the exploitation lifecycle will be crucial in ensuring the project understands the needs and delivers the desired outcomes to all stakeholders. The exploitation pathway is outlined below; the activities outlined are interwoven with tasks in WPs 1-6, with which it will develop the KERs and deliver stakeholder consultation.

Table 6 Four-stage exploitation pathway

Stage	Objective	Activities	
1: Understand target market	• Identify stakeholder groups and end-users for each layer • Collect and analyse early inputs from the "field" (S1: WP1-P4 and S2: WP5) • Draft exploitation scenario at the intra-consortium level	• Finalise intra-consortium relationships • Perform a broader industry analysis and evaluation of the current status quo • Analyse the exploitable outcomes from previous projects involving large data sets and the UNFC methodology and lessons learned (e.g. PROSUM, ORAMA, PANORAMA) • Produce written outline of the commercial scenario and circulate to the consortium for feedback • Conduct a half-day workshop with all consortium partners	Advocate the uptake of the KERs
2: Facilitate exploitation	• Develop exploitation plan • Examine and assess end user needs and specifications • Develop roadmap for market introduction of KERs	• Finalise all agreements relating to exploitation aspects of FutuRaM outputs. • Implement co-creation workshop with consortium partners for assessing needs related to the end product • Finalise relationships with relevant industry and public authority bodies • Define and analyse specific target markets and sub-sectors	
3: Test	• Test design and usability aspects of KERs • Obtain feedback on aspects that can be improved	• Implement co-creation workshops to determine expectations of end users regarding KERs (L1, L2, L3) • Implement capacity building sessions for the utilisation of SRM-KB • Policy meetings	
4: Business plan	• Develop a business plan for the post-project sustainability, commercialisation and uptake of the KERs	• Business modelling sessions • Develop guidelines for the usability of SRM-KB (per layer) • Interviews/consultations with end-users • Produce and validate business, governance and financial model for FutuRaM KERs	

Business Plan (BP)

The BP will consider the incipient and expanding market opportunities to ensure the long-term uptake of the FutuRaM KERs and address legal and security aspects. The BP will involve analysis of business modelling and financial forecasting in accordance with, as a minimum, Business Model Canvas (BMC) supported by Value Stream Mapping, SWOT, PESTLE and Marketing Mix tools, resource efficiency, competitive advantage, opportunity cost, value proposition, return on investment, market positioning as well as IPR management activities. The analysis also

takes into consideration the potential for the gradual consolidation and expansion of the FutuRaM network, particularly the inclusion of additional partners, public entities and possible investors. Based on the outcome of the analysis, a quantifiable list of needs will be developed and include aspects such as infrastructure and personnel together with an estimation of costs. FutuRaM envisions the following options as viable alternatives for the FutuRaM governance model: 1) Creation of a separate legal entity in the form of a private company or an association; 2) Establishment of a cluster partnership for SRMs that would be connected to the European Cluster Collaboration Platform; and 3) Establishment of a European Economic Interest Group.

Post-project, FutuRaM may have a different financial model depending on the target customer. It is common for different policies to be applied to academic users, government users and commercial users; "use for research" or “use for public reporting” is usually considered differently to "use for commercial gain" and this differentiation will be explored in FutuRaM. The Consortium will consider models to maintain a zero-cost approach post-project. The future revenue generation could thus be a mixture of:

1. Fee-for-services (FFS) model will be targeted for an unbundled, single-item services (consultancy).
2. Membership or subscription model in which a customer will be charged annually for continuous access to specific services, e.g. datasets on the SRM-KB platform.
3. Benefiting from the FutuRaM network and partners’ networks, as a separate entity, FutuRaM may consider applying for public funding/grants in the fields that align with its strategic objectives for future expansion and development efforts.
4. Other revenue streams, such as the introduction of selected advertisements/sponsorship.

The FutuRaM consortium acknowledges that the model produced by the business plan could conclude that public funding is the major revenue stream.

Within the project Business Plan, FutuRaM will provide, through a Financial Plan, the projected costs and revenues for operating the FutuRaM SRM-KB after the project conclusion. The Financial Plan will analyse financing mechanisms taking into account aspects such as revenue generation potential, resource efficiency, cost assessment, net present values and return on investment, and focus on specific public and private funding mechanisms (such as subscription services) and grants available for the future end-product sustainability. Interviews with relevant stakeholders such as investors, venture capital actors, funding managers and other support actions will be undertaken during the project. It should be stressed here that the object of WP7 is to scrutinise the KERs and make a detailed assessment of the options for revenue generation. This will be done using the process outlined above and summarised in Table 6. It will be performed in close consultation with *all* stakeholders.
In this context, the table below presents the draft estimated revenue and costs for basic operation of the SRM-KB after the project lifetime. This basic model means the product ‘ticks over’ and retains the functionality and data it has at the end of the project. These figures represent initial estimations and lines of revenue/costs that will be subject to review under WP7 exploitation activities undertaken during the project implementation. The consortium anticipates a more complex financial model developing that caters for the open-source aspects of the data alongside the requirement to maintain and improve the SRM-KB.

REVENUE SOURCES			
Item	**Assumption**	**2027**	**2028-2031**
Membership subscription	Membership for accessing specific data details (to be defined during the project lifetime) in the SRM-KB – assuming 2,000€ per subscription	**20,000€** (10 subscriptions)	**100,000€** (10% subscriptions increase per year)
Sponsorships	Annual sponsorships for the SRM-KB platform	**10,000€**	**25,000€** (10% sponsorship increased per year)
Consultancy	Responses to requests for deeper data analysis and commentary (intelligence reports) on specific aspects of the SRMs that cannot be performed through accessing the SRM-KB on a subscription.	**10,000€**	**60,000€**
Grants, tenders and other funding	Grants, tenders and other funding from the EC or support of national governments to fund personnel costs and other costs related with maintaining the SRM-KB online	**20,000€**	**40,000€** (funding received from years 2 to 4)
TOTAL REVENUE		**60,000€**	**225,000€**

OPERATIONAL COSTS			
Cost item	**Assumption**	**2027**	**2028-2031**
Costs for maintaining the SRM-KB	For hosting and maintaining the SRM-KB server and portal.	**30,000€**	**120,000€**
Staff costs	Staff cost allocation – to be defined according to the management structure established for exploitation (includes for administrative staff and ad hoc scientific staff)	**20,000€**	**96,000€**
TOTAL COSTS		**50,000€**	**216,000€**

Barriers and mitigation measures for an effective implementation

Implementing a successful exploitation strategy can be limited by a number of factors. Each of the barriers noted below will have the effect of reducing demand for the data contained in the SRM-KB.

A market for SRM that remains underdeveloped: High importance of the sector for the EU and its single market. The EC's 2021 Strategic Foresight Report singles out securing the supply of CRM as one of the key challenges. Furthermore, there is an increasing awareness among businesses of the urgency to use SRM associated with the reduction of energy consumption in technological processes in many industries, which provides an opportunity for the SRM market development. FutuRaM will build on this opportunity and further promote the use of SRM for the reduction of energy consumption.

An EU legal and regulatory framework that is insufficiently investment-friendly: Laws that require recycled or CRM content in products, for example, without there being sufficient evidence that manufacturers will actually produce those products or that there will be a market for such products will create uncertainty for investors.

Persistent reluctance among citizens to change behaviour: Although citizens seem to be reluctant to change behaviour – even among 18-23 year-olds in Ireland, those that dispose of their WEEE in the waste bin is 30% - there is an increasing environmental awareness and culture, as well as consumer interest in recycled products. This is addressed within the FutuRaM CDE strategy by addressing specifically citizens as one of the project's target groups.

Varying levels of sophistication and development of SRM markets in the different EU Member States: Untapped potential of secondary CRM, including strategic metals and rare earth elements important for the development of many sectors of the EU economy. In addition, there is an increased awareness of the need to reduce the fiscal burden for companies using recycled content for their products, which FutuRaM will enable.

Knowledge Management and Intellectual Property Rights (IPR)

The FutuRaM knowledge management strategy will use the principles and guidelines of the EU publication of IPR[11], which provide guidance on how IPR can be protected and used by the consortium members. The project coordinator, Project Steering Committee will manage (i) providing space, structures, and opportunities for identifying, consolidating and curating the co-created knowledge, (ii) monitoring the process and assess its coherence with FutuRaM objectives (iii) ensuring that participation and gender issues are adequately taken into account and (iv) providing incentives to encourage and reinforce those emerging patterns that benefit the project (and discourage those that do not). The technological aspects of knowledge management (i.e. data management) will be dealt with in the FutuRaM project management (WP8).

Intellectual property management will be vital in FutuRaM due to the pre-existing know-how distributed among the consortium partners and the need for proper sharing to positively impact the project's results and long-term implementation. The project will adopt a policy of protection of the project's results whenever results are expected to be commercially exploitable and whenever protecting them is possible, reasonable and justified. Before the signature of the Grant Agreement (GA), all partners will sign a Consortium Agreement (CA). All procedures related to intellectual property will be described in this CA (based on the DESCA 2020 model). CA will formalise project management procedures, API issues and exploitation of results describing the rules for sharing access rights to the FutuRaM results on the principle that each partner gets the information required both to achieve the project objectives and exploit the results thereafter. During and after the project (as will be established in the CA), the partners will preserve the confidentiality of any data, documents, or other material identified as confidential. Partners will define in the CA the background needed for the purposes of FutuRaM. The granting of access rights to the background will depend on the acceptance of specific conditions aimed at ensuring that these rights will be used only for the scope of FutuRaM and with the appropriate confidentiality obligations. Foreground knowledge will be the property of the partner generating it. When two or more partners have carried out the design or work, they shall have joint ownership of this foreground. In case of transfer of foreground ownership, each partner concerned shall pass on its obligations regarding that foreground to the assignee. The partners concerned shall provide to the other consortium members and the EC prior notice of any envisaged transfer and a copy of any relevant information. In addition to CA, non-disclosure commitments and IPR clauses will be contained in the following legal documents: GA (to be signed at the start of the project between consortium partners and the EU) and Partnership Agreement (to be signed at the start of the project between consortium partners, and other entities involved in the project implementation), thus constituting for the IPR framework. Suitable strategies for innovation and IPR management will be defined within WP8 in close liaison with all other WPs, and particularly WP7, and integrated in the project data management plan. IPR management will be discussed in consortium and WP meetings.

Furthermore, partners will be invited to sign a Memorandum of Understanding (MoU) under an Exploitation Agreement at the end of the project that provides the guidelines for the future governance and exploitation of the Key Exploitable Results (KERs). The MoU signatories will thus manage the IPR for the different KERs and will plan the activities to be developed after the project lifetime. The options to be considered within the MoUs will include the creation of a separate legal entity, the establishment of a cluster partnership for SRMs and the establishment of a European Economic Interest Group. The different legal and institutional options for setting up FutuRaM as an independent organisation will be assessed within the Business Plan. A list of IPR Exploitable Assets will be defined within the Exploitation Agreement, which will include details on the commercial rights to those assets. It is also relevant to note that Individual Exploitation Plans will be developed within the CDE, which will detail the main project exploitation goals and measures for each partner.

[11] https://euipo.europa.eu/ohimportal/en/online-services/ideas-powered-for-business

2.3 Summary

Table 7 Key elements of the section on Impact

Specific needs	Expected results	CDE measures
Robust information of SRMs and, in particular, CRMs in the EU under the transitions towards a low carbon and circular economy. EU autonomy of sourcing of raw materials and causing an environmental impact. Conceptual approach and guidance to assess SRMs using the UNFC for Anthropogenic Resources.	SRM-KB covering current and future demand estimates, and supply risks of SRMs and, in particular, CRMs under three future pathways to 2050 covering six waste streams and 75 countries (including EU27+4 – 75 countries can be achieved for WEEE – based on UNITAR's knowledge of data available - but not the other waste streams where it will be at least EU27+4) and providing dynamic visualising tools. Development, and testing of UNFC with 19 case studies resulting in a methodology. Increased knowledge and awareness of the importance of raw materials to society.	E: Developing workshops involving the key target groups to ensure that FutuRaM results are informing and contribute to decision making. D: Report on the Future SRMs and CRMs supply demand and supply risk in 2050. The consolidated datasets (and tools) are available in the SRM-KB. One proposal on the development of EU wide statistics. One draft guideline in alignment with UNFC. 10 publications. C: To the general public will be realised via a global media campaign, social media, open-source datasets, and attractive visualisations.
Target groups	**Outcomes**	**Impacts**
Industry (including SRMs value chains), Investors, EU/MS governments policy makers & institutions (DG GROW, DG Joint Research Center, Eurostat, national counterparts, UNECE EGRM etc), Environment sector, Research peers and general public.	Uptake by the EC and 10 MS of methods and datasets to assess implications for SRMs of existing demand and supply risk estimations for CRMs . Uptake of the UNFC methodology by 5 member states to assess the availability of SRMs	By 2030, set the basis for future research to assess SRMs, at least €100,000,000, uptake of the UNFC methodology for recovery projects by 5 countries, the SRM-KB has 30,000 monthly visits, uptake of 5 countries for official SRMs datasets at national level, or by Eurostat, 1,000 experts and young professionals use UNRMS framework:

3. QUALITY AND EFFICIENCY OF THE IMPLEMENTATION

3.1 Work plan and resources

FutuRaM is a four-year project structured into 8 work packages (WP). Each WP is split into a specific set of tasks to reach the objectives, produce the deliverables, goals and milestones set out in the work plan. The overall conceptual development and iterative integration between research in all WPs is done in WP1 (see Figure 3). WP2 will develop the foresight and integrate the material composition data (WP3) and physical stock and flow of SRMs (WP4) with the environmental and social aspects (T2.4) in T2.5to assess the quantities, impacts and bottlenecks of future SRMs recovery (T2.5). The insights of WP3-4 are used in WP5 for the resource assessment according to the UNFC framework, and insights of WP5 also feed back into the foresight aspects in T2.3-2.4. The final datasets flow into the information system (SRM-KB) (WP6). The exploitation, dissemination and communication (WP7) covers and works with all WPs, and involves external stakeholders; it is not visualised in Figure 3.1.

Thematic groups around the six waste streams are created to ensure consistency across the WPs: **WEEE**, lead by UNITAR with the support of Empa, TUB and WEEE Forum. **BAT**: lead by TUB and supported by RECHARGE, UNITAR and Empa. **ELV**: lead by Chalmers, supported by Empa. **CDW** jointly lead by UCL and ULEI and supported by BRGM and TUB. **MINW** lead by SGU and supported by GTK, GeoZS, BRGM, UB, LMU and BGR. **SLASH** lead by VITO and supported by BRGM, UCL, LMU and GeoZS.

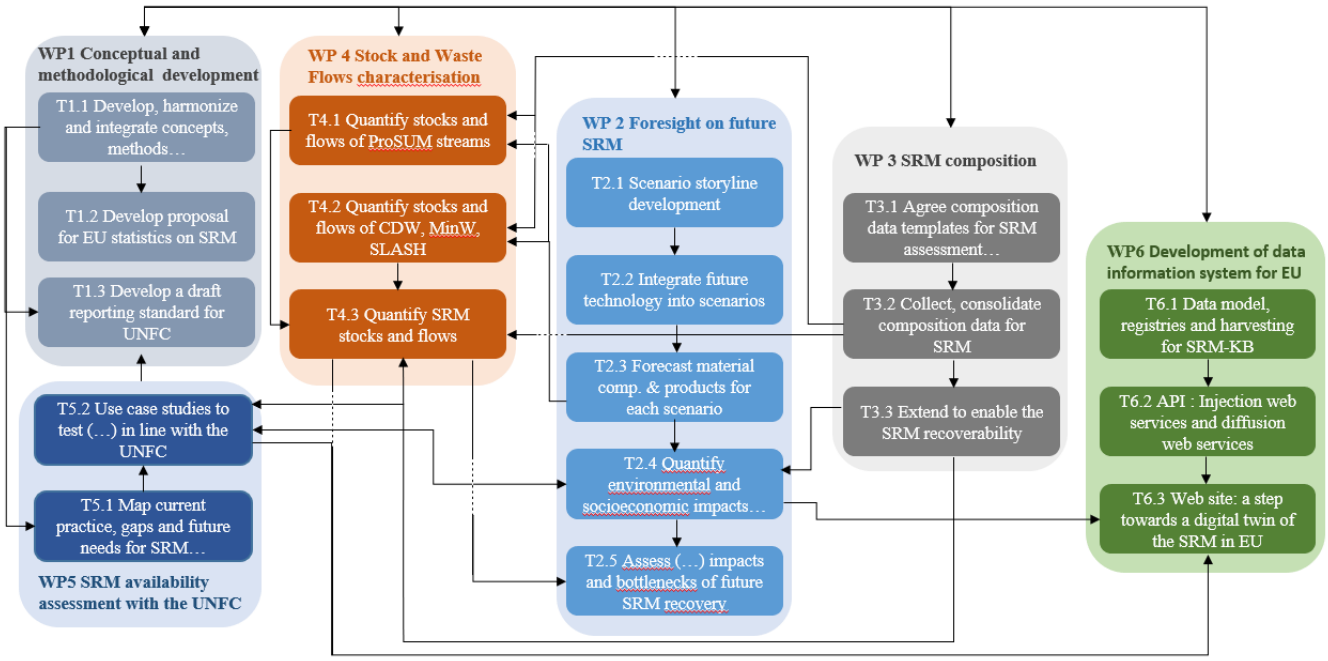

Figure 3 Pert chart

The timing of the tasks milestones and deliverables are further illustrated in the Gantt chart in Figure 4. FutuRaM has created a limited set of deliverables as per requirements set out in the EC EU Funding & Tenders Online Manual[12], which states the number should be between 10 and 15. As this is the case, we have limited deliverables to outcomes that are distributed throughout the project and are of general interest to the scientific community or other stakeholders. Other outcomes are included as milestones, e.g. website, Advisory Board Terms of Reference, reports on some intermediate WP findings.

[12] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/om_en.pdf

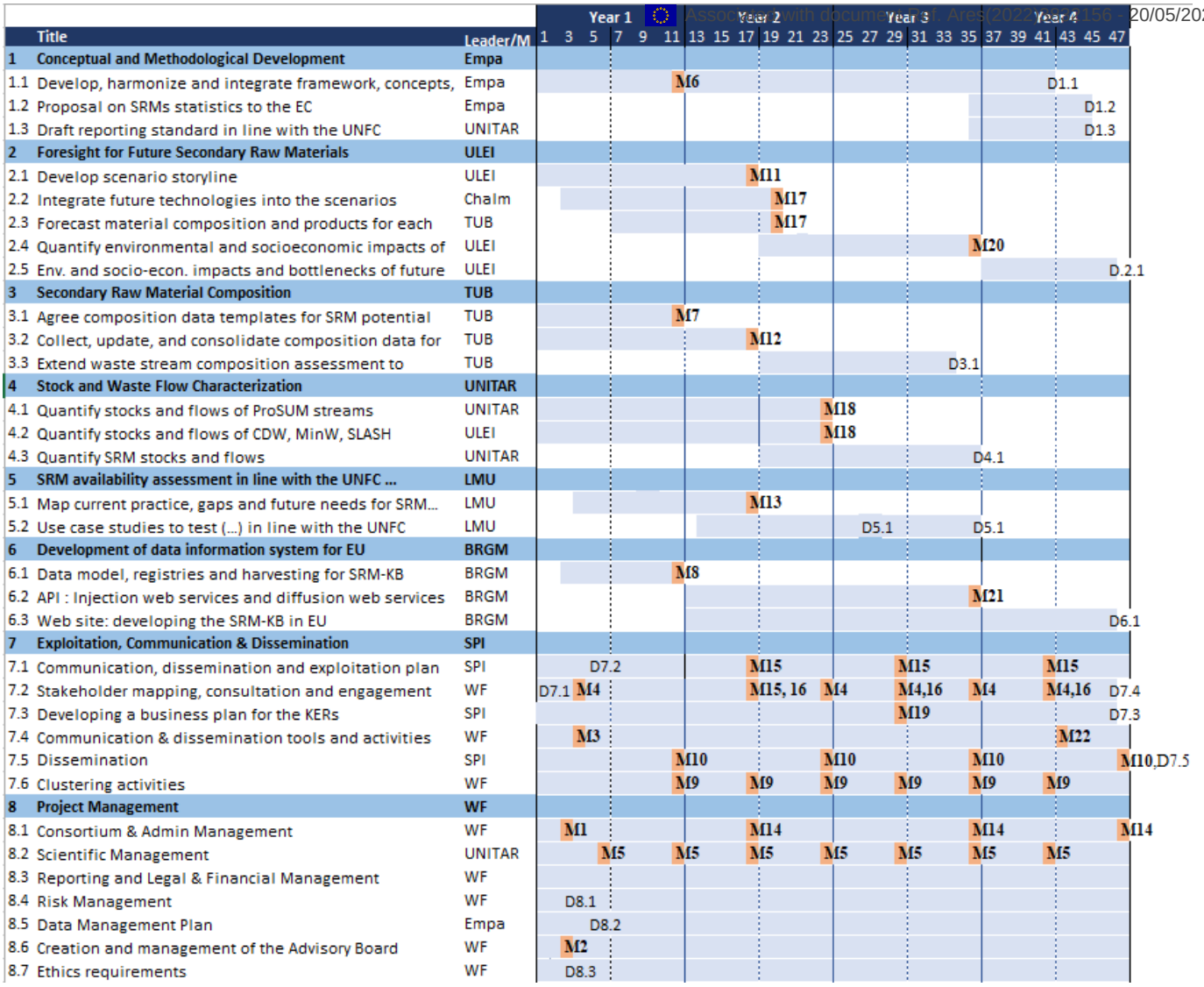

Figure 4 Gantt chart

Table 8 Subcontracting Costs Items

1/ WEEE Forum	**Cost (€)**	**Description of tasks and justification**
Subcontracting	193 750	
This is to enable the input of Ulrich Kral who works for Environment Agency Austria (EAA). Mr Kral has been pivotal in the development of FutuRaM but the EAA cannot join the consortium as a beneficiary due to its internal financial structure. However, it has committed to allowing Mr. Kral to be involved in the project as a subcontractor (subject to a successful tender). Mr. Kral is an expert in the assessment of material flows from sources to final sinks to manage use resource use. He chairs the Anthropogenic Resource WG, as mandated by the UNECE Expert Group on Resource Management; his role has been central to the development and promotion of the UNFC. EAA's contribution will be in key areas of the project, including data acquisition in Austria and project internal review cycles in alignment with UNFC, that would complement and extend the consortium's ability to deliver an excellent result. Furthermore, the EAA governmental network will open further doors to stakeholders in regulation and policy making. Tasks are defined and the contract will focus on outputs.		
1.2/Erion	**Cost (€)**	**Description of tasks and justification**
Subcontracting	20 000	
Batch tests of WEEE to be performed in treatment operators' facilities during WP3. This will allow for an assessment of the content of the WEEE stream coming into the facility and to understand downstream movement. Erion does not have the in-house ability to do this.		

5/BRGM	Cost (€)	Description of tasks and justification
Subcontracting	200 000	
For IT developments in WP6: implementation of the specific APIs and harvesting; implementation of specifications for vocabulary and semantics; final dissemination portal web development. To enable enhanced features of the SRM-KB to be developed to improve user experience.		

Table 9 Purchase Costs Items – where Purchase Costs exceed 15% of Personnel Costs

1/ WEEE Forum	Cost (€)	Justification
Other goods, works and services	107,500	WEEE Forum holds the comms budget for the project. This breaks down: • Project logo 750 • Website 12,000 • Website maintenance 5,200 • Print material (design & print) 13,050 • Month 12 event 10,000 • Month 24 event 10,000 • Month 36 event 10,000 • Month 48 final event 20,000 • Videos/Online overview 20,000 • Final report design & printing 6,500 The events are the annual stakeholder events at which the project will deliver updates, results and next steps. These will be either stand alone or in collaboration with other projects/events.
	40 000	Update of the RepTool platform with CRM data.
	50 000	Hosting of consortium meetings (5 x meetings over 2 days with 30-40 participants. Includes room, catering and technical))
Remaining purchase costs	60 500	
Total	258 000	
1.2/Erion	**Cost (€)**	**Justification**
Other goods and services	15 000	Publication of article in prominent Italian online magazine with a focus on raw materials and important to citizens.
Remaining purchase costs	7 800	
Total	22 800	
3/BGR	**Cost (€)**	**Justification**
Travel and subsistence	26 000	For attendance at consortium and other project meetings including consultations – 13 meetings in total for 2 persons.
Remaining purchase costs	9 000	
Total	35 000	
4/Boliden	**Cost (€)**	**Justification**
Other goods and services	50,000	Analysis costs for case studies on CRM and large tailings in Sweden (Case studies 5 & 6).
Remaining purchase costs	8 600	
Total	58 600	
7/GeoZS	**Cost (€)**	**Justification**
Travel and subsistence	25 400	For attendance at consortium and other project meetings including those for work packages, case studies and consultations – 26 meetings in total for average of 1.5 persons.
Remaining purchase costs	8 000	
Total	33 400	
8/GTK	**Cost (€)**	**Justification**
Other goods and services	64,000	To perform drilling and sampling during the Otanmaki mine case study in WP5. GTK cannot deliver in-house.
Travel and subsistence	23 400	For attendance at consortium and other project meetings including those for work packages, case studies and consultations – 26 meetings in total for average of 1.5 persons.
Remaining purchase costs	28 000	
Total	115,400	

11/ Lovisagruvan	Cost (€)	Justification
Other goods and services	50 000	Sampling and analysis in case study work
Remaining purchase costs	7 400	
Total	57 400	
12/ RECHARGE	**Cost (€)**	**Justification**
Travel and subsistence	7 200	To enable attendance at consortium and other project meetings including consultations and events. 12 meetings in total for one representative of Recharge.
Remaining purchase costs	0	
Total	7 200	
13/SGU	**Cost (€)**	**Justification**
Travel and subsistence	30 000	For attendance at consortium and other project meetings including those for work packages, case studies and consultations – 25 meetings in total for average of 1.5 persons.
Remaining purchase costs	56 000	
Total	86 000	
14/SPI	**Cost (€)**	**Justification**
Travel and subsistence	29 700	For attendance at consortium and other project meetings including those for work packages, consultations, formal review meetings and external presentations – 33 meetings in total for average of 1.5 persons. 10 of the meetings are consultation meetings because SPI leads on these for exploitation.
Other goods and services	32 000	Rooms etc. for 16 x consultation meetings with average of 15 attendees.
Remaining purchase costs	6 000	
Total	67 700	
16/UB	**Cost (€)**	**Justification**
Other goods and services	25 000	Drilling, sampling, laboratory testing, stakeholder consultations for case studies as follows: • Drilling – c. 100m well x €150/m 15,000 • Sampling - labour and experts 3,000 • Packing and transport 2,000 • Laboratory testing - 30 samples x €100/sample 3,000 • Stakeholder consultations 2,000
Remaining purchase costs	7 200	
Total	32 200	

3.2 Capacity of participants and consortium as a whole

3.2.1 Consortium as a whole

The FutuRaM consortium has a well-balanced composition of interdisciplinary skills that brings together a wealth of expertise, entrepreneurial spirit, well-established businesses, reputable network organisations and top researchers, including partners having access to critical datasets, and networks covering the entire value chain. Each of the participants in the project covers complementary expertise and has demonstrated to effectively cooperate and deliver as it is built around previous large EU successful research projects. The presence of main actors in the whole value chain demonstrates the critical mass of complimentary resources that will enable the FutuRaM project to achieve its targeted societal, industrial, and scientific goals. Each partner has a clearly defined role within the project and will contribute specific expertise that will enable the project success.

3.2.2 Access to critical infrastructure

The project partners have the infrastructure critical for the execution of FutuRaM. **Computing power for heavy** calculations can be performed in the ALICE (Academic Leiden Interdisciplinary Cluster Environment), which is the high-Performance Computing facility of the Leiden University. Critical data for the project can be accessed from various sources, which is needed throughout the entire project, such as from European Geological Data Infrastructure,

which is European Geological Data Infrastructure, providing access to Pan-European and national geological datasets and services from the geo-surveys of Europe, and the Mintell4EU Application, which collects statistical data related to the mineral resources and reserves and production on country level. **Critical datasets from industry** will be coming from RepTool (WEEE Forum, Erion, ecosystem, REPIC) which will be expanded to cover mass balance information on SRMs and, in particular, CRMs in WEEE, and other industry in-situ measured datasets and national logistics and waste treatment operator from industry and producer compliance partners of WEEE (WEEE Forum, EMR, WEEECycling) and BAT (RECHARGE, Siftung GRS) in the project, CDW (ULEI, UCL, Mace), MINW and SLASH (GeoZS, BRGM, Boliden, Otanmaki, SGU, UB, GTK., VITO). Many institutes own **experimental platforms, laboratories** (GeoZS, BRGM, SGU, GTK, LMU, WEEECycling, Boliden, ULEI), which will be used to gather in-situ data required for the case Studies in WP5. For instance, Field surveying equipment is available such as georadar with array of antennas, equipment for seismic reflection measurements, borehole logging system, sampling system with shallow corers, Material characterisation laboratories for samples preparation systems, with modern analytical and observational techniques to characterise (geo-)materials including raw material extraction, pollutant dispersion etc) and remote sensing, X-Ray computed tomography (XCT) and the recently ordered Field Emission gun electron probe microanalyser, etc. Several institutes have **Pilot plants** (GTK, BRGM) on to develop innovations for mineral grinding and beneficiation processes and to provide research services for different industries. is an experimental pilot facility for the treatment of mineral raw materials, waste and industrial by-products, or own large **industrial plants** (Boliden, WEEECycling, Siftung GRS, EMR) where waste is treated, refined, and/or smelted into final SRMs ready for the market.

3.2.3 Complementarity and value chain approach

Each of the participants in the project covers complementary expertise and roles along the value chain:

Research (RO) partners comprise researchers from top EU research institutes, leading Geological Surveys to be able to achieve the high-quality data for all waste streams (977 person months (PM), 79% of total). The institutes comprise the leading partners from the ProSUM project (UNITAR, Empa, TUB, Chalmers, BRGM, GeoZS, SGU, Kushnir); and partners strongly involved in the development of UNFC for Anthropogenic Resources Resources as well as one vice-chair of the UNECE EGRM (Erika Ingvald from SGU and we also plan to engage the chair) (LMU, VITO, UCL, Empa, BRGM, UB, SGU, GTK, GeoZS, BGR); experts in foresight and scenarios development (ULEI, TUB, Chalmers, UCL, UNITAR); have strong ties to industry and producers, to get unique industry and producer data (such as micro data from ProSUM and novel in-situ waste and product composition data) into FutuRaM; Produce official statistics on mining activities (BRGM, SGU, GTK, GeoZS, BGR) and co-custodian for monitoring of SDG 12 (UNITAR), having close contacts to official statistics Eurostat and are nationally mandated to work on circular economy monitoring of SRMs and raw materials demand (BRGM, ULEI, BGR, SGU); participate in recycling/recovery experimental projects (BRGM, GTK, VITO, TUB).

Commercial/Industry partners are partners from **SMEs** (Otanmaki, SPI), and large **Industry** (WEEECycling, Boliden, Mace, Lovisagruvan, Siftung GRS, EMR) will ensure applicability and usefulness to industry (110PM, 9%). They will contribute to the UNFC case studies in WP5 (Lovisagruvan, WEEECycling, EMR, Mace, Otanmaki, Boliden, Siftung GRS) lead the exploitation in WP7 (SPI), or contribute with specific expertise (Kushnir) in WP4.

The **Other Partners** (RECHARGE, WEEE Forum, and Affiliated Entities: REPIC, Erion, ecosystem) are industry associations or producer responsibility organisations (155.5PM, 13%). They will provide unique and previously undisclosed industry and producer data into the project, use their extensive knowledge to provide expert opinion and access to relevant research (WP3-5), and will contribute industry data and knowledge to WPs2, 3 & 4 and also actively network with the stakeholders they represent and ensure input and dissemination channels (WP7).

All partners have networks across the value chain and good networks among policy makers.

The **Advisory Board**–composed of 16 individuals that have already submitted a letter of interest are world-class researchers, decision-makers in the field of SRMs and mining waste, statisticians, manufacturing and recycling industry and European and global thought leaders representative of the value chains covered by FutuRaM. The AB will guarantee that a wide network of allies and change agents provides important input, other relevant actors are identified, and the network is extended. All AB letters of interest are in Annex 1.

There are also **letters of support (Annex 3)** provided by Tata Steel, Stiftung Auto Recycling Schweiz, ALBA, Serbian Ministry of Mining & Energy, Swiss Federal Department of the Environment, Transport, Energy and Communications, and TU Wien, that state their commitment to providing input to the project covering knowledge and data.

3.2.4 Unique contribution per participant

Each consortium member has demonstrated a long-term commitment to the development of their own research, policy and commercial activities within the industry targeted by the project. All of them, therefore, offer expertise for a lasting integration of activities and the creation of a pan-European culture for the developed FutuRaM. Table 10 gives a brief overview of each partner specific business and their expertise, and the main tasks in the project allocated to them based on that expertise.

Table 10: Project participants and main roles.

No. Name	Country	Description, role
1. WEEE Forum	BE	International association speaking for 45 (36 EU) WEEE producer responsibility organisations (PRO). Previously Project Coordinator for ProSUM, involved in 10 FP7/H2020 projects. Admin coordinator and (co-)lead of WP9 with input to WP4-7.
1.1. ecosystem	FR	ecosystem is the largest French system PRO for WEEE. Affiliated Entity of WEEE Forum. Involved in ProSUM, holder of compositional data on WEEE, input in WP3-5.
1.2. Erion	IT	Erion is the largest Italian PRO for WEEE, BAT and packaging. Affiliated Entity of WEEE Forum. Involved in several H2020/EIT projects, participate in WP3-5.
2. UNITAR	CH/ DE	United Nations Institute for Training and Research (previously UNU-SCYCLE). Previously Scientific Coordinator of ProSUM, and in 13 EU research projects. Major knowledge about WEEE, circular economy and official statistics, Scientific Coordinator and (co-)lead of WP9 and lead in WP4 and provide input to all other WPs.
3. BGR	DE	Geo-Survey of Germany. Member of SCRREEN1&2. Contributes to WP1, 3, 7 and 8.
4. Boliden	SE	Major European mining company including smelter. Owner of Laisvall case study area, participant in several EU projects: MinLand, SUMEX. Contributes to WP5 case study.
5. BRGM	FR	Geo-Survey of France. Involved in projects like MICA, ProSUM, SCRREEN2, Mintell4EU, ORAMA, PANORAMA, etc., closely working with JRC on the EU RMIS and host of the Urban Mine Platform. Will lead WP6 and participate in WP1-5, 7, 8.
6. Chalmers	SE	University with major knowledge on MFA, life cycle assessment and circular economy. Partner in ProSUM and ORAMA, update for the JRC/Ispra on CRMs in vehicles, national projects on circular economy and recycling. Lead task 2.3 and participate in WP1-4,7,8.
7. GeoZS	SI	Geo-Survey of Slovenia. Involved in projects like MINEA, ProSUM, Mintell4EU, etc. Has the registry of mine waste on national level and for the South Eastern Europe area, plays a vital role in developing of European Geological Data Infrastructure. Work on WP1-8
8. GTK	FI	Geo-Survey of Finland. Expert in mine waste data, resource database creation and management (also related to UNFC), and element recovery. Coordinator of ORAMA, Minerals4EU and ProMine projects. Will participate in WP3-6, 7, 8.
9. Kushnir	SE	Expertise in material flow analysis. Partner in ProSUM and update for the JRC/Ispra on CRMs in vehicles. Will participate in WP4, 7 and 8.
10. LMU	DE	1st ranking University in Germany. Profound knowledge in (geo)material sciences, mineralogical analysis. Leader of the WG “Classification and reporting of material resources/reserves” within MINEA and vice-chair of the UNECE Anthropogenic Resources Working Group. Leads WG5 and participate in WP1-8.
11. Lovisagruvan	SE	Active mining company with exploration permit for the Håkansboda mining waste area. Participants in X-Mine H2020, national project mapping MINW. Contributes to WP5.
12. RECHARGE	BE	EU-Battery Industry assoc., experts in batteries, production and recycling technologies, compositions and environmental impacts. Involved in ProSUM. Participate in WP3,4.

No. Name	Country	Description, role
13. SGU	SE	Geo-Survey of Sweden: ProSUM, Minerals4EU, EURARE, MinLand, SCRREEN, X-Mine. 2017-2022 national project mapping mining waste, supply and risk CRMs. MINW lead and participate WP1-WP8. UNECE EGRM vice-chair.
14. SPI	PT	Private consulting company created in 1996 as an active centre of national and international networks connected to the research and innovation sectors. SPI is leading communication, dissemination, and exploitation activities (WP7).
15. TUB	DE	University with major knowledge about waste characterisation, recycling technologies for ELV, WEEE, BAT. Supported by extensive EOL network partners and in various H2020 projects. Will lead WP3, and participate in WP1, WP2, WP4, WP6, WP7 and WP8.
16. UB	RS	University of Belgrade, Faculty of Mining and Geology. Members of REESERVE project. Mining waste stream member in FutuRaM, involved in Balkans case studies (WP6).
17. ULEI	NL	ULEI is a global pioneer in LCA, MFA, and environmental input output databases. It co-created EXIOBASE and is improving it via the EIT RM project PANORAMA. ULEI will lead WP2 and contribute in all other WPs. ULEI will coordinate the SLASH and CDW stock-flow models and the social and environmental assessments of SRMs recovery.
18. VITO	BE	Flemish Institute for Technological Research, major knowledge about circular economy, UNFC, MFA, LCA, SLASH, CDW, MINW and BAT. Involved in CHROMIC, METGROW+, MINEA and UNECE EGRM; lead on SLASH and input to WP1-8
19. WEEECycling	FR	WEEECycling is a recycler company in France, processing producing high purity recycled PGM metals, and pilots with CRMs. Contributor to a case study in WP5 and WP2 foresight.
20. Mace	UK	International construction company; >£2bn turnover (2019); awarded £570M London high speed rail station contract; Mace is an Associated Partner in FutuRaM with 1.5 person months. It will provide data on CDW that is critical to WP3 as well as participate in case study '16) Mace high speed rail building site (bulk materials)', alongside UCL. It will provide data and expertise to the case study.
21. Empa	CH	Swiss research institute on materials science and technology. Major knowledge about MFA, LCA, BAT, ELV and WEEE. Involved in e.g. MINEA, ORAMA, ProSUM (WP lead), UNECE EGRM, update for JRC on CRM in vehicles. Will lead WP1 and input to WP2-8. Empa is an Associated Partner.
22. Otanmaki	FI	Otanmäki Mine Oy is a company planning to reopen the historical Otanmäki V-Ti-Fe mine and remine the old tailings for ilmenite. Provides a case study and UNFC expertise. Otanmaki is an Associated Partner in FutuRaM with 1.5 person months. Its role is specific to the case study '3) Otanmäki (Ti)' which will be delivered on its site alongside GTK. It will provide a location, data and expertise for the case study having had previous experience of UNFC.
23. Siftung GRS	DE	A non-profit organization founded by leading battery manufacturers in Germany. Siftung GRS operates safe nationwide collection and recycling of batteries in Germany. Siftung GRS is an Associated Partner in FutuRaM with 3.5 person months. It will provide data on batteries that is critical to WP3 as well as participate in case study '13) Low grade Li-ion-batteries', alongside TUB. It will provide data and expertise to the case study. Siftung GRS is an Associated Partner.
24. EMR	UK	EMR is an Associated Partner in FutuRaM with 1.5 person months. It has a specific role to provide information about EMR resource recovery projects for secondary raw

No. Name	Country	Description, role
		materials from the relevant waste streams they process, namely: batteries, SLASH, and CDW. This will be used for the case studies.
25. REPIC	UK	REPIC is the largest PRO for WEEE, BAT and packaging in the UK, REPIC will participate in WP3-5, focused on industry insights, provision of data, and the piloting of case studies. REPIC is an Associated Partner.
26. UCL	UK	Leader of £8M UKRI Interdisciplinary Circular Economy Centre for Mineral-based Construction Materials, with 50+ industrial partners; active participant in UNECE Anthropogenic Resources Working Group. CDW; participant in WP1,2,3,4,5,7&8. UCL is an Associated Partner.

The maximum EC contribution requested for FutuRaM is **€11,675,968.75**. There are 12 countries present as Partners, Affiliated Entities or Associated Partners.

3.2.5 Industrial/commercial involvement

The six industry partners are central to the delivery of the case studies for FutuRaM and form the backbone of this aspect of the work. These partners cover the six different waste streams and have an interest in testing the UNFC method and applying the data generated by the project to their own situation. These organisations are already advocates of the FutuRaM project and their experience will be essential for convincing other organisations within and outside their sector of the reliability and benefits of the FutuRaM outputs. Moreover, their input, regarding their own needs as end users before during and after the pilots will be key to developing useful and exploitable results that are tailored to relevant industry players. In addition to the formal industry partners in the project, FutuRaM also has letters of support from other industrial organisations, Tata Steel, UK, ALBA recyclers, DE and SA Recycling, CH.

3.2.6 Other countries and international organisations

In FutuRaM, there is a partner from Switzerland, Empa, which has committed to an important and significant role in the project.. As Switzerland is a non-associated third state for Horizon Europe, the project has received from the Swiss Federal Department of Economic Affairs, Education & research the financial guarantee for Swiss participants in Horizon Europe projects (see Annex 2) and Empa will join the project as an Associated Partner.

In addition, there are partners from the UK, which is also currently a non-associated third state for Horizon Europe. There are four organisations from the UK that will contribute to FutuRaM: Mace, EMR, REPIC and UCL. Mace and EMR do not require financial support to fulfil their roles in the project. REPIC and UCL will undertake their roles with financial support from the UK government, which has confirmed that UK based organisations that are part of successful Horizon Europe applicants will receive funding from UK Research & Innovation (UKRI).

Table 11 below shows details of the funding that will be received by Empa, REPIC and UCL from their respective governments.

Table 11 Funding support for Empa, REPIC & UCL participation in FutuRaM from Swiss (CH) and UK governments

Partner	Personnel Costs	Purchase Costs	Subcontracting Costs	Indirect Costs	TOTAL
Empa (CH)	940,500	36,900	0	244,350	1,221,750
REPIC (UK)	86,385	7,800	0	23,546	117,731
UCL (UK)	667,347	36,800	0	176,037	880,184
TOTAL	**1,694,232**	**81,500**		**443,933**	**2,219,665**

There is also a partner from Serbia, which is an associated country under Horizon Europe. There are no other countries from outside EU or ICPC and all three of these countries have Data security agreements

The **UN Institute for Training and Research (UNITAR)**, headquartered in Switzerland, is operating in FutuRaM through its Germany based SCYCLE Programme under the UNITAR Bonn Office. UNITAR is a specialized UN agency and therefore not governed by national law, but by general principles governing the law of international organizations and the general rules of international law. UNITAR neither receives subvention from the regular budget of the United Nations nor assessed contributions from Member States. As such UNITAR is a 100% project funded international organization and therefore dependant on successful project acquisitions.

The participation of UNITAR is considered essential for FutuRaM, and there are clear benefits to the consortium in the areas of:

- Outstanding competence/expertise
  - Co-custodian of Sustainable Development Goals (SDG) data.
  - Developed (and currently updating) the UNU-KEYS methodology used for target calculation under Article 7 of the EU WEEE Directive 2012/19/E
  - Involved in establishing Solving the E-waste Problem (StEP) Initiative and Partnership for Action on Computing Equipment (PACE) under the Basel Convention and UN E-waste.
  - Participated in Horizon 2020 and FP7 projects: CWIT (Countering WEEE illegal Trade); ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining waste); ORAMA (Optimising quality of information in RAw Materials data collection across Europe), STRIKE (Stronger Training and Increased Knowledge for Better Enforcement against Waste and Mercury); and SCRREEN1 and SCRREEN2 (Solutions for CRitical Raw materials – a European Expert Network).
- Access to data:
  - Has access to datasets, methods and calculation routines that have been developed and uniquely owned by SCYCLE. These are essential for UNITAR's role in WP 1 to WP 6 of FutuRaM. The micro data are not public and are solely owned by UNITAR.
  - Has detailed harmonized datasets that cover detailed WEEE statistics of the entire lifecycle for each country in the world and related battery data.
  - Its United Nations (UN) status, and consequent unique position to obtain official datasets of all the countries in the world that are official members of the UN. For instance, UNITAR closely collaborates with the UN Statistical Division, UN Environment Programme, Eurostat, International Telecommunication Union, Basel Convention, and the Organisation for Economic Co-operation and Development (OECD), as well as various UN regional commissions in the acquisition and harmonization of datasets.
  - The SCYCLE team co-developed the material composition datasets for WEEE with Empa and TU Berlin in the ProSUM project. The microdata is owned by the respective agencies.
  - The SCYCLE team conducted for the European Commission's Joint Research Center a feasibility study on establishing a global battery monitor. In that project, preliminary datasets and methodologies have been developed by UNITAR, which could be further validated and used in the FutuRaM project.
  - In a 2020 study commissioned by the WEEE Forum, UNITAR identified the nature and quantity of WEEE flows. Similar research was conducted for other producer responsibility organisations in the WEEE Forum. UNITAR is the go-to organisation for WEEE flows data in Europe and globally.
  - UNITAR-SCYCLE datasets are used for national, regional and global decision making, and are officially recognized by the global community. Access to the global datasets cannot be replaced.
- Access to particular geographical environments
  - Nearly all the countries in the world are members of the UN, and UNITAR is a part of the UN. An established international organization such as UNITAR brings along a global network, including a network of offices and its direct outreach into international research and training.
  - The global network and UN name will be used to disseminate the results of the project and communicate its activities.
  - UNITAR has direct and equal influence from the highest political level such as the General Assembly of the UN, to technical working groups on statistics, circular economy, the SDGs, which UNITAR through SCYCLE is member of.
- Ability of the consortium to fulfil the tasks
  - UNITAR brings the experience, competencies, data and influence as noted above.
  - It is already playing a key role in FutuRaM as scientific lead, the same role it played in the ProSUM project.
  - It has demonstrated the ability to bring together consortia in the past and to create effective research collaboration.

3.2.7 In-kind contributions provided by third parties

Table 12 In-kind contributions provided by third parties

12 RECHARGE		
Third Party Name	**Category**	**Cost**
EC Consulting	Internally invoiced goods & services	€19,200
Justification: RECHARGE envisages that approximately 85% of the costs and tasks involving RECHARGE in FutuRaM will be through support by third party with in-kind contributions against payment from EC Consulting. RECHARGE will mainly be involved in documents review, provision of insights on batteries and contribution to communication and dissemination. EC Consulting, a French SME (PIC: 919343691) of two employees, provides consulting expertise in the field of batteries, wines and spirits. Its main activity is related to the mission of, Claude Chanson, who is hired full-time by RECHARGE as its General Manager. Mr Chanson is Engineer in chemistry and physics from Bordeaux ENSCPB (1982) and has obtained a PHD in Electrochemistry in Bordeaux 1 University (1986). He served as Division Technical Manager and then, the mission of Director of the Li-ion technology for Saft Group. RECHARGE is involved in FutuRaM because of its network and because of Mr Chanson's expertise.		
1.2 Erion		
Third Party Name	**Category**	**Cost**
Erion Compliance Organisation	Internally invoiced goods & services	€91,000
Justification: Erion WEEE is the member of the WEEE Forum and eligible to be an Affiliated Entity because of this. Erion WEEE is, therefore, the Affiliated Entity in FutuRaM. However, the way Erion is structured, Erion WEEE has zero employees, all personnel are employed by Erion Compliance Organisation. It is the same for 3 other organisations in the Erion system, and the four organisations co-own Erion Compliance Organisation. For FutuRaM, Erion WEEE will use Erion Compliance Organisation as a third party providing an eligible in-kind contribution for the supply of personnel to the project. Erion Compliance Organisation is, like Erion WEEE, a not for profit organisation; personnel costs and time reporting will conform to the FutuRaM Grant Agreement.		

4. ETHICS SELF ASSESSMENT

Table 13: Ethics Issues Table.

1. Human Embryonic Stem Cells and Human Embryos			Page
Does this activity involve Human Embryonic Stem Cells (hESCs)?	○ Yes	◉ No	
Does this activity involve the use of human embryos?	○ Yes	◉ No	
2. Humans			**Page**
Does this activity involve human participants?	○ Yes	◉ No	
Does this activity involve interventions (physical also including imaging technology, behavioural treatments, etc.) on the study participants?	○ Yes	◉ No	
Does this activity involve conducting a clinical study as defined by the Clinical Trial Regulation (EU 536/2014)? (using pharmaceuticals, biologicals, radiopharmaceuticals, or advanced therapy medicinal products)	○ Yes	◉ No	
3. Human Cells / Tissues (not covered by section 1)			**Page**
Does this activity involve the use of human cells or tissues?	○ Yes	◉ No	
4. Personal Data			**Page**
Does this activity involve processing of personal data?	○ Yes	◉ No	
Does this activity involve further processing of previously collected personal data (including use of preexisting data sets or sources, merging existing data sets)?	○ Yes	◉ No	
Is it planned to export personal data from the EU to non-EU countries? Specify the type of personal data and countries involved	○ Yes	◉ No	
Is it planned to import personal data from non-EU countries into the EU or from a non-EU country to another non-EU country? Specify the type of personal data and countries involved	○ Yes	◉ No	
Does this activity involve the processing of personal data related to criminal convictions or offences?	○ Yes	◉ No	
5. Animals			**Page**
Does this activity involve animals?	○ Yes	◉ No	
6. Non-EU Countries			**Page**
Will some of the activities be carried out in non-EU countries?	◉ Yes	○ No	45
Serbia, Switzerland, United Kingdom			
In case non-UE countries are involved, do the activities undertaken in these countries raise potential ethics issues?	○ Yes	◉ No	
It is planned to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	○ Yes	◉ No	
Is it planned to import any material (other than data) from non-EU countries into the EU or from a non-EU country to another non-EU country? For data imports, see section 4.	○ Yes	◉ No	
Is it planned to export any material (other than data) from the EU to non-EU countries? For data exports, see section 4.	○ Yes	◉ No	
Does this activity involve low and/or lower middle income countries, (if yes, detail the benefit-sharing actions planned in the self-assessment)	○ Yes	◉ No	
Could the situation in the country put the individuals taking part in the activity at risk?	○ Yes	◉ No	

7. Environment, Health and Safety			Page
Does this activity involve the use of substances or processes that may cause harm to the environment, to animals or plants.(during the implementation of the activity or further to the use of the results, as a possible impact) ?	○ Yes	◉ No	
Does this activity deal with endangered fauna and/or flora / protected areas?	○ Yes	◉ No	
Does this activity involve the use of substances or processes that may cause harm to humans, including those performing the activity.(during the implementation of the activity or further to the use of the results, as a possible impact) ?	○ Yes	◉ No	
8. Artificial Intelligence			**Page**
Does this activity involve the development, deployment and/or use of Artificial Intelligence? (if yes, detail in the self-assessment whether that could raise ethical concerns related to human rights and values and detail how this will be addressed).	○ Yes	◉ No	
9. Other Ethics Issues			**Page**
Are there any other ethics issues that should be taken into consideration?	○ Yes	◉ No	

I confirm that I have taken into account all ethics issues above and that, if any ethics issues apply, I will complete the ethics self-assessment as described in the guidelines How to Complete your Ethics Self-Assessment ☒

ANNEX 2

ESTIMATED BUDGET FOR THE ACTION

	Estimated eligible[1] costs (per budget category)										Estimated EU contribution[2]			
	Direct costs								Indirect costs	Total costs	EU contribution to eligible costs			Maximum grant amount[6]
	A. Personnel costs			B. Subcontracting costs	C. Purchase costs			D. Other cost categories	E. Indirect costs[3]		Funding rate %[4]	Maximum EU contribution[5]	Requested EU contribution	
	A.1 Employees (or equivalent) A.2 Natural persons under direct contract A.3 Seconded persons		A.4 SME owners and natural person beneficiaries	B. Subcontracting	C.1 Travel and subsistence	C.2 Equipment	C.3 Other goods, works and services	D.2 Internally invoiced goods and services	E. Indirect costs					
Forms of funding	Actual costs	Unit costs (usual accounting practices)	Unit costs[7]	Actual costs	Actual costs	Actual costs	Actual costs	Unit costs (usual accounting practices)	Flat-rate costs[8]					
	a1	a2	a3	b	c1	c2	c3	d2	e = 0,25 * (a1 + a2 + a3 + c1 + c2 + c3)	f = a + b + c + d + e	U	g = f * U%	h	m
1 - WEEE FORUM	425 750.00	0.00	0.00	193 750.00	50 100.00	0.00	207 900.00	0.00	170 937.50	1 048 437.50	100	1 048 437.50	1 048 437.00	1 048 437.00
1.1 - ecosystem	85 527.00	0.00	0.00	0.00	7 800.00	0.00	0.00	0.00	23 331.75	116 658.75	100	116 658.75	116 658.00	116 658.00
1.2 - Erion WEEE	91 000.00	0.00	0.00	20 000.00	7 800.00	0.00	15 000.00	0.00	28 450.00	162 250.00	100	162 250.00	162 250.00	162 250.00
2 - UNITAR	1 230 656.00	0.00	0.00	0.00	29 700.00	0.00	29 000.00	0.00	322 339.00	1 611 695.00	100	1 611 695.00	1 611 695.00	1 611 695.00
3 - BGR	106 420.00	0.00	0.00	0.00	26 000.00	0.00	9 000.00	0.00	35 355.00	176 775.00	100	176 775.00	176 775.00	176 775.00
4 - Boliden	110 500.00	0.00	0.00	0.00	8 600.00	0.00	50 000.00	0.00	42 275.00	211 375.00	100	211 375.00	211 375.00	211 375.00
5 - BRGM	0.00	616 956.00	0.00	200 000.00	32 400.00	0.00	16 500.00	0.00	166 464.00	1 032 320.00	100	1 032 320.00	1 032 320.00	1 032 320.00
6 - Chalmers	307 281.00	0.00	0.00	0.00	18 000.00	0.00	0.00	0.00	81 320.25	406 601.25	100	406 601.25	406 601.00	406 601.00
7 - GeoZS	150 500.00	0.00	0.00	0.00	25 400.00	0.00	8 000.00	0.00	45 975.00	229 875.00	100	229 875.00	229 875.00	229 875.00
8 - GTK	249 480.00	0.00	0.00	0.00	48 400.00	0.00	67 000.00	0.00	91 220.00	456 100.00	100	456 100.00	456 100.00	456 100.00
9 - Kushnir	45 000.00	0.00	0.00	0.00	1 800.00	0.00	0.00	0.00	11 700.00	58 500.00	100	58 500.00	58 500.00	58 500.00
10 - LMU	0.00	812 590.00	0.00	0.00	27 100.00	0.00	43 010.00	0.00	220 675.00	1 103 375.00	100	1 103 375.00	1 103 375.00	1 103 375.00
11 - Lovisagruvan	92 300.00	0.00	0.00	0.00	7 400.00	0.00	50 000.00	0.00	37 425.00	187 125.00	100	187 125.00	187 125.00	187 125.00
12 - RECHARGE	27 430.00	0.00	0.00	0.00	7 200.00	0.00	0.00	0.00	8 657.50	43 287.50	100	43 287.50	43 287.00	43 287.00
13 - SGU	403 200.00	0.00	0.00	0.00	46 000.00	0.00	40 000.00	0.00	122 300.00	611 500.00	100	611 500.00	611 500.00	611 500.00
14 - SPI	225 000.00	0.00	0.00	0.00	29 700.00	0.00	38 000.00	0.00	73 175.00	365 875.00	100	365 875.00	365 875.00	365 875.00
15 - TUB	1 010 900.00	0.00	0.00	0.00	48 750.00	0.00	64 525.00	0.00	281 043.75	1 405 218.75	100	1 405 218.75	1 405 218.00	1 405 218.00
16 - UB	22 000.00	0.00	0.00	0.00	7 200.00	0.00	25 000.00	0.00	13 550.00	67 750.00	100	67 750.00	67 750.00	67 750.00
17 - ULEI	1 011 500.00	0.00	0.00	0.00	28 800.00	0.00	9 000.00	0.00	262 325.00	1 311 625.00	100	1 311 625.00	1 311 625.00	1 311 625.00
18 - VITO	627 000.00	0.00	0.00	0.00	20 700.00	0.00	7 000.00	0.00	163 675.00	818 375.00	100	818 375.00	818 375.00	818 375.00
19 - WEEECycling	195 000.00	0.00	0.00	0.00	6 000.00	0.00	0.00	0.00	50 250.00	251 250.00	100	251 250.00	251 250.00	251 250.00
20 - Mace														
21 - Empa														
22 - Otanmaki														
23 - Stiftung GRS														
24 - EMR														
25 - REPIC														
26 - UCL														
Σ consortium	6 416 444.00	1 429 546.00	0.00	413 750.00	484 850.00	0.00	678 935.00	0.00	2 252 443.75	11 675 968.75		11 675 968.75	11 675 966.00	11 675 966.00

[1] See Article 6 for the eligibility conditions. All amounts must be expressed in EUR (see Article 21 for the conversion rules).

[2] The consortium remains free to decide on a different internal distribution of the EU funding (via the consortium agreement; see Article 7).
[3] Indirect costs already covered by an operating grant (received under any EU funding programme) are ineligible (see Article 6.3). Therefore, a beneficiary/affiliated entity that receives an operating grant during the action duration cannot declare indirect costs for the year(s)/reporting period(s) covered by the operating grant, unless they can demonstrate that the operating grant does not cover any costs of the action. This requires specific accounting tools. Please immediately contact us via the EU Funding & Tenders Portal for details.
[4] See Data Sheet for the funding rate(s).
[5] This is the theoretical amount of the EU contribution to costs, if the reimbursement rate is applied to all the budgeted costs. This theoretical amount is then capped by the 'maximum grant amount'.
[6] The 'maximum grant amount' is the maximum grant amount decided by the EU. It normally corresponds to the requested grant, but may be lower.
[7] See Annex 2a 'Additional information on the estimated budget' for the details (units, cost per unit).
[8] See Data Sheet for the flat-rate.

ANNEX 2a

ADDITIONAL INFORMATION ON UNIT COSTS AND CONTRIBUTIONS

SME owners/natural person beneficiaries without salary (Decision C(2020) 7115[1])

Type: unit costs

Units: days spent working on the action (rounded up or down to the nearest half-day)

Amount per unit (daily rate): calculated according to the following formula:

{EUR 5 080 / 18 days = **282,22**}
multiplied by
{country-specific correction coefficient of the country where the beneficiary is established}

The country-specific correction coefficients used are those set out in the Horizon Europe Work Programme (section Marie Skłodowska-Curie actions) in force at the time of the call (see Portal Reference Documents).

HE and Euratom Research Infrastructure actions[2]

Type: unit costs

Units[3]: see (for each access provider and installation) the unit cost table in Annex 2b

Amount per unit*: see (for each access provider and installation) the unit cost table in Annex 2b

* Amount calculated as follows:

For trans-national access:

$$\frac{\text{average annual total trans-national access costs to the installation (over past two years[4])}}{\text{average annual total quantity of trans-national access to the installation (over past two years[5])}}$$

For virtual access:

$$\frac{\text{total virtual access costs to the installation (over the last year[6])}}{\text{total quantity of virtual access to the installation (over the last year[7])}}$$

Euratom staff mobility costs[8]

Monthly living allowance

Type: unit costs

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1 Commission Decision of 20 October 2020 authorising the use of unit costs for the personnel costs of the owners of small and medium-sized enterprises and beneficiaries that are natural persons not receiving a salary for the work carried out by themselves under an action or work programme (C(2020)7715).

2 Decision of 19 April 2021 authorising the use of unit costs for the costs of providing trans-national and virtual access in Research Infrastructure actions under the Horizon Europe Programme (2021-2027) and the Research and Training Programme of the European Atomic Energy Community (2021-2025).

3 Unit of access (e.g. beam hours, weeks of access, sample analysis) fixed by the access provider in proposal.

4 In exceptional and duly justified cases, the granting authority may agree to a different reference period.

5 In exceptional and duly justified cases, the granting authority may agree to a different reference period.

6 In exceptional and duly justified cases, the granting authority may agree to a different reference period.

7 In exceptional and duly justified cases, the granting authority may agree to a different reference period.

8 Decision of 15 March 2021 authorising the use of unit costs for mobility in co-fund actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025).

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit*: see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

* Amount calculated as follows from 1 January 2021:
{**EUR 4 300** multiplied by
country-specific correction coefficient** of the country where the staff member is seconded}[9]

**Country-specific correction coefficients as from 1 January 2021[10]

EU-Member States[11]

Country / Place	Coefficient (%)
Bulgaria	59,1
Czech Rep.	85,2
Denmark	131,3
Germany Bonn Karlsruhe Munich	101,9 95,8 98 113,9
Estonia	82,3
Ireland	129
Greece	81,4
Spain	94,2
France	120,5
Croatia	75,8
Italy Varese	95 90,7
Cyprus	78,2
Latvia	77,5
Lithuania	76,6
Hungary	71,9
Malta	94,7
Netherlands	113,9
Austria	107,9
Poland	70,9
Portugal	91,1
Romania	66,6
Slovenia	86,1

[9] Unit costs for living allowances are calculated by using a method of calculation similar to that applied for the secondment to the European Commission of seconded national experts (SNEs).

[10] For the financial statements, the amount must be adjusted according to the actual place of secondment.
The revised coefficients were adopted in the Decision authorising the use of unit costs for the Fusion Programme co-fund action under the Research and training Programme of the European Atomic Energy Community 2021-2025. They are based on the 2020 Annual update of the remuneration and pensions of the officials and other servants of the European Union and the correction coefficients applied thereto (OJ C 428, 11.12.2020) to ensure purchasing power parity. The revised coefficient are applied as from 1 January 2021 through an amendment to the grant agreement.

[11] No correction coefficient shall be applicable in Belgium and Luxembourg.

Slovakia	80,6
Finland	118,4
Sweden	124,3

Third countries

Country/place	Coefficient (%)
China	82,2
India	72,3
Japan	111,8
Russia	92,7
South Korea	92,3
Switzerland	129.2
Ukraine	82.3
United Kingdom	97.6
United States	101,4 (New-York) 90,5 (Washington)

Mobility allowance

Type: Unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit: **EUR 600** per person-month; see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

Family allowance

Type: unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit: **EUR 660** per person-month; see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

Education allowance

Type: Unit costs

Units: months spent by the seconded staff member(s) on research and training in fission and fusion activities (person-month)

Amount per unit*: see (for each beneficiary/affiliated entity and secondment) the unit cost table in Annex 2b

*Amount calculated as follows from 1 January 2021:
{EUR 283.82 x number of dependent children[12]**}**

[12] For the estimated budget (Annex 2): an average should be used. (⚠ For the financial statements, the number of children (and months) must be adjusted according to the actual family status at the moment the secondment starts.)

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH (UNITAR), PIC 997721825, established in AVENUE DE LA PAIX 7, GENEVA 1202, Switzerland,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Angus Mackay with ECAS id n003xs6y signed in the Participant Portal on 04/06/2022 at 11:52:17 (transaction id SigId-61357-ziTcqNxbRQ5cI8jcdMUYldzY6YTRqa87BojTkBfmTqkfP4sCOZKAap78LwIonzlefb0pCF7KJN1YmxtjzIWhi64-yntOf97TTHq9QCab4GzIaj-QarczxXAs1E1fPnzVTEu94J88Vh0GqJZNa6oaRAYNw7sFTsRwrzXSQNn7U6utcutIJhLPkh9mMzh5VzdQ8rrX0U). Timestamp by third party at 2022.06.04 12:52:21 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

BUNDESANSTALT FUER GEOWISSENSCHAFTEN UND ROHSTOFFE (BGR), PIC 999429413, established in Stilleweg 2, HANNOVER 30655, Germany,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Frank Lichtenberg with ECAS id n002w3zn signed in the Participant Portal on 22/06/2022 at 10:38:12 (transaction id SigId-202738-KXNFmgzkRlIcrBXzfeEX75baWuhI8oYfsigpZQTdACA3Lg5otmzZvVpJKlZ4rTy9s8U1syORyuLzMaHJqoQtO00-yntOf97TTHq9QCab4GzIaj-rKJ7ud5Cn5eqrM6pAWdjWHSo4W9aAoJkCzj76gKG3W1IUW2zyxySV0yLFT3oQjKuCAsM4v6Ax9K3XH3BszrcagW). Timestamp by third party at 2022.06.22 11:38:18 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

BOLIDEN MINERAL AB (Boliden), PIC 998308869, established in ., SKELLEFTEHAMN 932 81, Sweden,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Daniel Eklund with ECAS id n0033c3e signed in the Participant Portal on 24/05/2022 at 11:45:06 (transaction id SigId-12262-qAvsOUyBdCfkHPPmItbMcqhVJzn6n3CnMpzsH2phCXRSzJK0SjA6FgrZm4pTT5lrwPBao7WWDdwYwwxeuAXRxJ0-rS0vSrmBGYCaOdCqTjRT1e-VUySMJUD30gq0o008b7vRrzzIgks3VUvNcKLDSWnzXjziPIG2uDAiOpDziRORhCu04TAVhKS14ZCwyenEeFdRP7). Timestamp by third party at 2022.05.24 12:45:11 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES (BRGM), PIC 999993662, established in 3 AV CLAUDE GUILLEMIN, ORLEANS 45060, France,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Christophe POINSSOT with ECAS id n0056fqz signed in the Participant Portal on 24/05/2022 at 17:06:11 (transaction id SigId-18947-WPLzffHKR3i3ATfLIb4jhSgvdsZPwu9k18vsVW1aHXzPv3I6Pax9gcvzTR6zecWzLAHxLhfhkVUSsWP9js62zH1G-rS0vSrmBGYCaOdCqTjRT1e-bL5zacHod1XjSJHBfDhsWBBHtfZgQ07X4bLzLJzGl9uJOIWQSdC7N9OSicTboEmeNgbtyu0pKudS5121kRmO3nm). Timestamp by third party at 2022.05.24 18:06:16 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

CHALMERS TEKNISKA HOGSKOLA AB (Chalmers), PIC 999980373, established in -, GOTEBORG 412 96, Sweden,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Maria ELMQUIST with ECAS id nelmquma signed in the Participant Portal on 29/05/2022 at 22:41:03 (transaction id SigId-49455-eJcNXOKuu2gkoKCyd0NGDWLyFBWdSIQugWV3zXLkPCUxxjUQfyEXbf98zcqzGR2KaJsVC691ds7EDira7zlmeYC-rS0vSrmBGYCaOdCqTjRT1e-pzNBKqdzzs0hdRZ8py41NzQaEJ7qXDhnefTtt9lXVzqURZe3NH7h8n1CfrWNVsqYc8rzqCbWORahWbL3rhT0TGdG). Timestamp by third party at 2022.05.29 23:41:10 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

GEOLOSKI ZAVOD SLOVENIJE (GeoZS), PIC 999466370, established in DIMICEVA 14, LJUBLJANA 1000, Slovenia,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Miloš BAVEC with ECAS id nbavecmi signed in the Participant Portal on 24/05/2022 at 12:25:23 (transaction id SigId-12872-V2q77zhZUiMsds7lEzkfDUR08xYDcowIZ8Ef5Qshx6yoMzxJVfQmzdIRTtCDeQRRxHpLzQMqr47ABuYBFa12dCQ-rS0vSrmBGYCaOdCqTjRT1e-123WHspfy4VNAiLSza3CZvHIZzLzZkwjmKWBLJmRuIbflUw8HfIJ0bcZdzIUJcpOhhAT1cmHioUn5rrZjCGAaOm). Timestamp by third party at 2022.05.24 13:25:28 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

GEOLOGIAN TUTKIMUSKESKUS (GTK), PIC 999432614, established in VUORIMIEHENTIE 5, ESPOO 02151, Finland,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Saku Vuori with ECAS id n002p734 signed in the Participant Portal on 25/05/2022 at 06:41:42 (transaction id SigId-22878-dQG5Quvif bfFwRjj2dxZNjYYzWD3ofB1sqhmzqnIAKfOrbQAoiFeMWNe7RczUK SsLXrr4JdCk6qmrzhEnJaWDQK-rS0vSrmBGYCaOdCqTjRT1e-eHuVd 2l37Obi1jyVeR8ZAZuo3c0zahIFEFNXtCdzbhIAkGzo3sLHzHOPX6LH FXJpPiYcYSoPdRtq9UNnECzdxnh). Timestamp by third party at 2022.05.25 07:41:48 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

KUSHNIR DUNCAN (Kushnir), PIC 889451589, established in OSTEN UNDENS GATA 180 LGH 1004, LUND 22762, Sweden,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Duncan Kushnir with ECAS id n007p77n signed in the Participant Portal on 31/05/2022 at 08:45:57 (transaction id SigId-3714-93kpv4 WAOQufH7K472lwMA8MLqsxvaTYXHzeerBeHs8zzXcwIwZ1S5MmTq Jr8JAc4uVJaWwNCzhwk7BRafOzlyr-yntOf97TTHq9QCab4GzIaj-iHZU oT3Z5HPA6NIerEPAzwp8qzfQQ9VSPOUllvAvXy5WBfML19mJb1T065 vMIbjzzzZNG95V9tFzIuDuYnPJzeQ4). Timestamp by third party at 2022.05.31 09:46:03 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN (LMU), PIC 999978433, established in GESCHWISTER SCHOLL PLATZ 1, MUENCHEN 80539, Germany,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Dorothee STROBL-HASEBRINK with ECAS id nstrobld signed in the Participant Portal on 24/05/2022 at 17:31:49 (transaction id SigId-19163-7Cj5zffGrUR2ypGuH1rwnzezmcfbKZhA1Mv4CHzt7PCVzMG3KSkkP5UtY3JkOhOXpJwCDHR7PLuMZPRChc60lAJ-rS0vSrmBGYCaOdCqTjRT1e-uMsEoYDj6kiZNknjiIUk4F4aYIoyVkGbCvm7ruUGSd9FlZt7CzoF8spyXDwqLV0zTqKAYmDXEfmy6pZQG7RDvJ). Timestamp by third party at 2022.05.24 18:31:53 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

LOVISAGRUVAN AB (Lovisagruvan), PIC 920322421, established in HAKANSBODA 1, STORA 71104, Sweden,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Stefan Sadbom with ECAS id n007qc55 signed in the Participant Portal on 26/05/2022 at 20:23:58 (transaction id SigId-41469-WcFPM dBdX0DzPZuNlLzOhYizeJX8Qnq0gVN8VcdOW4KqSPlEKCwHdC0vZhH J0cZAnaSo3uzdmy7wx8LAKDAzmi4-rS0vSrmBGYCaOdCqTjRT1e-pAA yKJqHq5cBU78pDfznuLzXfBALRb44s5EKR6bsNNZvkpSXd4k3GtRMdJ8 ucmY2wPGaB5jKuMRr5lvU8WXQxzm). Timestamp by third party at 2022.05.27 13:24:29 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

RECHARGE (RECHARGE), PIC 948382969, established in AVENUE DE TERVUEREN 168 3, BRUXELLES 1150, Belgium,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Claude CHANSON with ECAS id nchaclau signed in the Participant Portal on 24/05/2022 at 13:54:48 (transaction id SigId-14802-BhBT ED7ZfqEnd6qcKxU8cpivAFhHziWpI4fdWyFfUvM0iKEXwoXIyOe2TgP tuOXBhIyHjOEfrGreEbdzZ6bh3O-rS0vSrmBGYCaOdCqTjRT1e-Vryrp 9eum6DzUL4e5yN8JcO1HBw23zcF9Xtf5ZvYX7C7aRxqcUbKksRfTM MfNCg5xx5ZzpEf5e1vEYByq4cqFVW). Timestamp by third party at 2022.05.24 14:54:59 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

SVERIGES GEOLOGISKA UNDERSOKNING (SGU), PIC 995575991, established in VILLAVAEGEN 18, UPPSALA S-75128, Sweden,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Kaj LAX with ECAS id nlaxkkaj signed in the Participant Portal on 24/05/2022 at 10:22:23 (transaction id SigId-10443-ueVKOXzsbyy GzltYaW5C2UrUoO97mzzzfQgga9VxfvFokkosKQTiYE4kphUePj1W zxuQczce4rUoMWSLXSZxiTfK-rS0vSrmBGYCaOdCqTjRT1e-QcCaO qkcAH6kSNFSpfCevS5GWi9FtQ6XLzphJIN6auYNUTIzU6qx36l1DfE gTKl5VHCq9kIj5ogfBZTmAITynI). Timestamp by third party at 2022.05.24 11:22:28 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

SOCIEDADE PORTUGUESA DE INOVACAO CONSULTADORIA EMPRESARIAL E FOMENTO DA INOVACAO SA (SPI), PIC 999479368, established in AV MARECHAL GOMES DA COSTA 1376 PORTO CONCELHO FOZ DO DOURO, PORTO 4150 356, Portugal,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Augusto Eduardo GUIMARAES DE MEDINA with ECAS id nguimaau
signed in the Participant Portal on 24/05/2022 at 10:36:54
(transaction id SigId-10745-7haGXmfOfWKTFXxrc8Nqd8oYTTEJl8uc4I
BLBLAa6hJza817ze1zIeCKjJqhbtmGMfYYyvlNTm88HzKmziQedrs-
rS0vSrmBGYCaOdCqTjRT1e-yiwBMx06SaDaJ2EQ66nRj9zyU7fzIGbNRF
aGsZ8F8Xx9QTax19KMFy0ESwom9BoClJ4hRYsDj8lLETn7pTrNRH).
Timestamp by third party at
2022.05.24 11:37:00 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

TECHNISCHE UNIVERSITAT BERLIN (TUB), PIC 999986678, established in STRASSE DES 17 JUNI 135, BERLIN 10623, Germany,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Silke KÖSTER-RIEMANN with ECAS id nkoessil signed in the Participant Portal on 24/05/2022 at 12:49:49 (transaction id SigId-13237-ouxgGsd9LUTEzychwsrHo2ElD3kJ69ZZ5RrfiyS0hXthDRYNX3EEkIuP0NkiwzYuxAZezv4f6PkjpPAK5PF9KwG-rS0vSrmBGYCaOdCqTjRT1e-zdrwICN0y6dJjPWaIFtwpPOyIi0yEUcmJtUbOphBzQChjIr0GuV6nzPHWjmebcAzzQ26HHVAXzK3t65qaxaOoTSm). Timestamp by third party at 2022.05.24 13:49:54 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

UNIVERSITY OF BELGRADE - FACULTY OF MINING AND GEOLOGY (UB), PIC 999884343, established in Djusina 7, BELGRADE 11000, Serbia,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Biljana Abolmasov with ECAS id n007xkm4 signed in the Participant Portal on 26/05/2022 at 22:46:12 (transaction id SigId-42176-reziO WrOhBaHdJ0YPtVCVDsIIRf4NM9d9GIeV9mg6Jtminx8q9ZA9WReoSc Y6VetLil8a60IkH1Y7nHbwZR7Fi-rS0vSrmBGYCaOdCqTjRT1e-MAv0O 5EfXpCYy9AfMFPxJtffzX7MjjvyrF2zvEqa5NCwn3SjB4c51zematVS8M wVUEupJmGfVD6bhqAJXaCzhZK). Timestamp by third party at 2022.05.27 13:46:40 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

UNIVERSITEIT LEIDEN (ULEI), PIC 999974553, established in RAPENBURG 70, LEIDEN 2311 EZ, Netherlands,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Ed van den Berg with ECAS id n007lsx9 signed in the Participant Portal on 30/05/2022 at 08:49:41 (transaction id SigId-51999-bRj35QRSsRUUwdN5lHnbzIRjm0YJUuLLVi0akvtcRVaj8EYsN6Fl6Y5u0M1k10B1XsyFXYzOJO1mzfE8uMSKOUm-rS0vSrmBGYCaOdCqTjRT1e-upzVQ00xWTk3d97r60BnIMMRDgSY4oK1JI0sTHIT9ggczrzomlfpF7vzYZmVzgv0QozkQPD5JvteyzO6edlMwUnm). Timestamp by third party at 2022.05.30 09:49:48 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V. (VITO), PIC 999645238, established in BOERETANG 200, MOL 2400, Belgium,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Dirk FRANSAER with ECAS id nfransdi signed in the Participant Portal on 24/05/2022 at 10:08:17 (transaction id SigId-10096-4kW ordwpNtKl4G4vl6rXIlnPbhl4e10mRK3fNlS3W34AGHzUvnq4Du0fz y5M8rer3szHg2zhfbuJ8E5bDljlf0O-rS0vSrmBGYCaOdCqTjRT1e-NX zOayytKzIIs6USws0Syqv0Y0bxNfspJDPmJglPEA72aHr5qidzYkVEAL RCpbPd8D58Gjk4fYVvEsifhKp6H3m). Timestamp by third party at 2022.05.24 11:08:21 CEST

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

WEEECYCLING (WEEECycling), PIC 889405126, established in 13 ROUTE DES IFS, TOURVILLE LES IFS 76400, France,

hereby agrees

to become beneficiary

in Agreement No 101058522 — FutuRaM ('the Agreement')

between WASTE OF ELECTRICAL AND ELECTRONICAL EQUIPMENT FORUM AISBL (WEEE FORUM) **and** the **European Health and Digital Executive Agency (HADEA)** ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 39.

By signing this accession form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and terms and conditions it sets out.

SIGNATURE

For the beneficiary

Serge KIMBEL with ECAS id n007pt8d signed in the Participant Portal on 25/05/2022 at 09:49:05 (transaction id SigId-26071-jLMxwwG5zaYV0zzVJ3NAJksON95OFUPGUVBkQHD7zzh7Z1lCvEerJ4CizwjNzs9EX5JwzWIWhW69x1t6YpBoAXM8-rS0vSrmBGYCaOdCqTjRT1e-zZQ1dLLxmANSkzpAaNP9ahytTGNRDXsBGzrYk3rrt882CsV27ZO35fm0ztqALkGXIvlXypQ9Z22udO0NDXPycr4). Timestamp by third party at 2022.05.25 10:49:12 CEST

FINANCIAL STATEMENT FOR [PARTICIPANT NAME] FOR REPORTING PERIOD [NUMBER]

	Eligible[1] costs (per budget category)																EU contribution[2]				Revenues
	Direct costs															Indirect costs	Total costs	EU contribution to eligible costs			Total requested EU contribution	Income generated by the action
	A. Personnel costs			B. Subcontracting costs	C. Purchase costs			D. Other cost categories								E. Indirect costs[2]		Funding rate %[3]	Maximum EU contribution[4]	Requested EU contribution		
	A.1 Employees (or equivalent) A.2 Natural persons under direct contract A.3 Seconded persons		A.4 SME owners and natural person beneficiaries	B. Subcontracting	C.1 Travel and subsistence	C.2 Equipment	C.3 Other goods, works and services	[D.1 Financial support to third parties]	D.2 Internally invoiced goods and services	[D.3 Transnational access to research infrastructure unit costs]	[D.4 Virtual access to research infrastructure unit costs]	*[OPTION for HE PCP/PPI:* D.5 PCP/PPI procurement costs*]*	*[OPTION for Euratom Programme Cofund Actions:* D.6 Euratom Cofund staff mobility costs*]*	*[OPTION for HE ERC Grants:* D.7 ERC additional funding*]*	*[OPTION for HE ERC Grants:* D.8 ERC additional funding (subcontracting, FSTP and internally invoiced goods and services)*]*	E. Indirect costs						
Forms of funding	Actual costs	Unit costs (usual accounting practices)	Unit costs[5]	Actual costs	Actual costs	Actual costs	Actual costs	[Actual costs]	Unit costs (usual accounting practices)	[Unit costs[5]]	[Unit costs[5]]	[Actual costs]	[Unit costs[5]]	[Actual costs]	[Actual costs]	Flat-rate costs[6]						
	a1	a2	a3	b	c1	c2	c3	[d1a]	d2	[d3]	[d4]	[d5]	[d6]	[d7]	[d8]	e = 0,25 * (a1 + a2 + a3 ~~+b~~+ c1 +c2 + c3 ~~+d1a + d2 + d3 + d4 (+ d5][+ d6]~~ [+d7] ~~[+ d8]~~)	f = a+b+c+d+e	U	g = f*U%	h	m	n
XX – [short name beneficiary/affiliated entity]																						

The beneficiary/affiliated entity hereby confirms that:

The information provided is complete, reliable and true.

The costs and contributions declared are eligible (see Article 6).

The costs and contributions can be substantiated by adequate records and supporting documentation that will be produced upon request or in the context of checks, reviews, audits and investigations (see Articles 19, 20 and 25).

For the last reporting period: that all the revenues have been declared (see Article 22).

① Please declare all eligible costs and contributions, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Only amounts that were declared in your individual financial statements can be taken into account lateron, in order to replace costs/contributions that are found to be ineligible.

[1] See Article 6 for the eligibility conditions. All amounts must be expressed in EUR (see Article 21 for the conversion rules).

[2] If you have also received an EU operating grant during this reporting period, you cannot claim indirect costs - unless you can demonstrate that the operating grant does not cover any costs of the action. This requires specific accounting tools. Please contact us immediately via the Funding & Tenders Portal for details.

[3] See Data Sheet for the reimbursement rate(s).

[4] This is the *theoretical* amount of EU contribution to costs that the system calculates automatically (by multiplying the reimbursement rates by the costs declared). The amount you request (in the column 'requested EU contribution') may be less.

[5] See Annex 2a 'Additional information on the estimated budget' for the details (units, cost per unit).

[6] See Data Sheet for the flat-rate.

ANNEX 5

SPECIFIC RULES

CONFIDENTIALITY AND SECURITY (— ARTICLE 13)

Sensitive information with security recommendation

Sensitive information with a security recommendation must comply with the additional requirements imposed by the granting authority.

Before starting the action tasks concerned, the beneficiaries must have obtained all approvals or other mandatory documents needed for implementing the task. The documents must be kept on file and be submitted upon request by the coordinator to the granting authority. If they are not in English, they must be submitted together with an English summary.

For requirements restricting disclosure or dissemination, the information must be handled in accordance with the recommendation and may be disclosed or disseminated only after written approval from the granting authority.

EU classified information

If EU classified information is used or generated by the action, it must be treated in accordance with the security classification guide (SCG) and security aspect letter (SAL) set out in Annex 1 and Decision 2015/444[1] and its implementing rules — until it is declassified.

Deliverables which contain EU classified information must be submitted according to special procedures agreed with the granting authority.

Action tasks involving EU classified information may be subcontracted only with prior explicit written approval from the granting authority and only to entities established in an EU Member State or in a non-EU country with a security of information agreement with the EU (or an administrative arrangement with the Commission).

EU classified information may not be disclosed to any third party (including participants involved in the action implementation) without prior explicit written approval from the granting authority.

ETHICS (— ARTICLE 14)

Ethics and research integrity

The beneficiaries must carry out the action in compliance with:

- ethical principles (including the highest standards of research integrity)

[1] Commission Decision 2015/444/EC, Euratom of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).

and

- applicable EU, international and national law, including the EU Charter of Fundamental Rights and the European Convention for the Protection of Human Rights and Fundamental Freedoms and its Supplementary Protocols.

No funding can be granted, within or outside the EU, for activities that are prohibited in all Member States. No funding can be granted in a Member State for an activity which is forbidden in that Member State.

The beneficiaries must pay particular attention to the principle of proportionality, the right to privacy, the right to the protection of personal data, the right to the physical and mental integrity of persons, the right to non-discrimination, the need to ensure protection of the environment and high levels of human health protection.

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

- aim at human cloning for reproductive purposes
- intend to modify the genetic heritage of human beings which could make such modifications heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed)
- intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer, or
- lead to the destruction of human embryos (for example, for obtaining stem cells).

Activities involving research on human embryos or human embryonic stem cells may be carried out only if:

- they are set out in Annex 1 or
- the coordinator has obtained explicit approval (in writing) from the granting authority.

In addition, the beneficiaries must respect the fundamental principle of research integrity — as set out in the European Code of Conduct for Research Integrity[2].

This implies compliance with the following principles:

- reliability in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources
- honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way

[2] European Code of Conduct for Research Integrity of ALLEA (All European Academies).

- respect for colleagues, research participants, society, ecosystems, cultural heritage and the environment

- accountability for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts

and means that beneficiaries must ensure that persons carrying out research tasks follow the good research practices including ensuring, where possible, openness, reproducibility and traceability and refrain from the research integrity violations described in the Code.

Activities raising ethical issues must comply with the additional requirements formulated by the ethics panels (including after checks, reviews or audits; see Article 25).

Before starting an action task raising ethical issues, the beneficiaries must have obtained all approvals or other mandatory documents needed for implementing the task, notably from any (national or local) ethics committee or other bodies such as data protection authorities.

The documents must be kept on file and be submitted upon request by the coordinator to the granting authority. If they are not in English, they must be submitted together with an English summary, which shows that the documents cover the action tasks in question and includes the conclusions of the committee or authority concerned (if any).

VALUES (— ARTICLE 14)

Gender mainstreaming

The beneficiaries must take all measures to promote equal opportunities between men and women in the implementation of the action and, where applicable, in line with the gender equality plan. They must aim, to the extent possible, for a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

INTELLECTUAL PROPERTY RIGHTS (IPR) — BACKGROUND AND RESULTS — ACCESS RIGHTS AND RIGHTS OF USE (— ARTICLE 16)

Definitions

Access rights — Rights to use results or background.

Dissemination — The public disclosure of the results by appropriate means, other than resulting from protecting or exploiting the results, including by scientific publications in any medium.

Exploit(ation) — The use of results in further research and innovation activities other than those covered by the action concerned, including among other things, commercial exploitation such as developing, creating, manufacturing and marketing a product or process, creating and providing a service, or in standardisation activities.

Fair and reasonable conditions — Appropriate conditions, including possible financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access, for example the actual or potential value of the results or background to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged.

FAIR principles — ‘findability’, ‘accessibility’, ‘interoperability’ and ‘reusability’.

Open access — Online access to research outputs provided free of charge to the end-user.

Open science — An approach to the scientific process based on open cooperative work, tools and diffusing knowledge.

Research data management — The process within the research lifecycle that includes the organisation, storage, preservation, security, quality assurance, allocation of persistent identifiers (PIDs) and rules and procedures for sharing of data including licensing.

Research outputs — Results to which access can be given in the form of scientific publications, data or other engineered results and processes such as software, algorithms, protocols, models, workflows and electronic notebooks.

Scope of the obligations

For this section, references to ‘beneficiary’ or ‘beneficiaries’ do not include affiliated entities (if any).

Agreement on background

The beneficiaries must identify in a written agreement the background as needed for implementing the action or for exploiting its results.

Where the call conditions restrict control due to strategic interests reasons, background that is subject to control or other restrictions by a country (or entity from a country) which is not one of the eligible countries or target countries set out in the call conditions and that impact the exploitation of the results (i.e. would make the exploitation of the results subject to control or restrictions) must not be used and must be explicitly excluded from it in the agreement on background — unless otherwise agreed with the granting authority.

Ownership of results

Results are owned by the beneficiaries that generate them.

However, two or more beneficiaries own results jointly if:

- they have jointly generated them and
- it is not possible to:
    - establish the respective contribution of each beneficiary, or
    - separate them for the purpose of applying for, obtaining or maintaining their protection.

The joint owners must agree — in writing — on the allocation and terms of exercise of their joint ownership (‘**joint ownership agreement**’), to ensure compliance with their obligations under this Agreement.

Unless otherwise agreed in the joint ownership agreement or consortium agreement, each joint owner may grant non-exclusive licences to third parties to exploit the jointly-owned results (without any right to sub-license), if the other joint owners are given:

- at least 45 days advance notice and
- fair and reasonable compensation.

The joint owners may agree — in writing — to apply another regime than joint ownership.

If third parties (including employees and other personnel) may claim rights to the results, the beneficiary concerned must ensure that those rights can be exercised in a manner compatible with its obligations under the Agreement.

The beneficiaries must indicate the owner(s) of the results (results ownership list) in the final periodic report.

Protection of results

Beneficiaries which have received funding under the grant must adequately protect their results — for an appropriate period and with appropriate territorial coverage — if protection is possible and justified, taking into account all relevant considerations, including the prospects for commercial exploitation, the legitimate interests of the other beneficiaries and any other legitimate interests.

Exploitation of results

Beneficiaries which have received funding under the grant must — up to four years after the end of the action (see Data Sheet, Point 1) — use their best efforts to exploit their results directly or to have them exploited indirectly by another entity, in particular through transfer or licensing.

If, despite a beneficiary's best efforts, the results are not exploited within one year after the end of the action, the beneficiaries must (unless otherwise agreed in writing with the granting authority) use the Horizon Results Platform to find interested parties to exploit the results.

If results are incorporated in a standard, the beneficiaries must (unless otherwise agreed with the granting authority or unless it is impossible) ask the standardisation body to include the funding statement (see Article 17) in (information related to) the standard.

Additional exploitation obligations

Where the call conditions impose additional exploitation obligations (including obligations linked to the restriction of participation or control due to strategic assets, interests, autonomy or security reasons), the beneficiaries must comply with them — up to four years after the end of the action (see Data Sheet, Point 1).

Where the call conditions impose additional exploitation obligations in case of a public emergency, the beneficiaries must (if requested by the granting authority) grant for a limited period of time specified in the request, non-exclusive licences — under fair and reasonable conditions — to their results to legal entities that need the results to address the public emergency and commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions. This provision applies up to four years after the end of the action (see Data Sheet, Point 1).

Additional information obligation relating to standards

Where the call conditions impose additional information obligations relating to possible standardisation, the beneficiaries must — up to four years after the end of the action (see Data Sheet, Point 1) — inform the granting authority, if the results could reasonably be expected to contribute to European or international standards.

Transfer and licensing of results

Transfer of ownership

The beneficiaries may transfer ownership of their results, provided this does not affect compliance with their obligations under the Agreement.

The beneficiaries must ensure that their obligations under the Agreement regarding their results are passed on to the new owner and that this new owner has the obligation to pass them on in any subsequent transfer.

Moreover, they must inform the other beneficiaries with access rights of the transfer at least 45 days in advance (or less if agreed in writing), unless agreed otherwise in writing for specifically identified third parties including affiliated entities or unless impossible under the applicable law. This notification must include sufficient information on the new owner to enable the beneficiaries concerned to assess the effects on their access rights. The beneficiaries may object within 30 days of receiving notification (or less if agreed in writing), if they can show that the transfer would adversely affect their access rights. In this case, the transfer may not take place until agreement has been reached between the beneficiaries concerned.

Granting licences

The beneficiaries may grant licences to their results (or otherwise give the right to exploit them), including on an exclusive basis, provided this does not affect compliance with their obligations.

Exclusive licences for results may be granted only if all the other beneficiaries concerned have waived their access rights.

Granting authority right to object to transfers or licensing — Horizon Europe actions

Where the call conditions in Horizon Europe actions provide for the right to object to transfers or licensing, the granting authority may — up to four years after the end of the action (see Data Sheet, Point 1) — object to a transfer of ownership or the exclusive licensing of results, if:

- the beneficiaries which generated the results have received funding under the grant
- it is to a legal entity established in a non-EU country not associated with Horizon Europe, and
- the granting authority considers that the transfer or licence is not in line with EU interests.

Beneficiaries that intend to transfer ownership or grant an exclusive licence must formally notify the granting authority before the intended transfer or licensing takes place and:

- identify the specific results concerned
- describe in detail the new owner or licensee and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or licence on EU interests, in particular regarding competitiveness as well as consistency with ethical principles and security considerations.

The granting authority may request additional information.

If the granting authority decides to object to a transfer or exclusive licence, it must formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information it has requested).

No transfer or licensing may take place in the following cases:

- pending the granting authority decision, within the period set out above
- if the granting authority objects
- until the conditions are complied with, if the granting authority objection comes with conditions.

A beneficiary may formally notify a request to waive the right to object regarding intended transfers or grants to a specifically identified third party, if measures safeguarding EU interests are in place. If the granting authority agrees, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

Granting authority right to object to transfers or licensing — Euratom actions

Where the call conditions in Euratom actions provide for the right to object to transfers or licensing, the granting authority may — up to four years after the end of the action (see Data Sheet, Point 1) — object to a transfer of ownership or the exclusive or non-exclusive licensing of results, if:

- the beneficiaries which generated the results have received funding under the grant
- it is to a legal entity established in a non-EU country not associated to the Euratom Research and Training Programme 2021-2025 and
- the granting authority considers that the transfer or licence is not in line with the EU interests.

Beneficiaries that intend to transfer ownership or grant a licence must formally notify the granting authority before the intended transfer or licensing takes place and:

- identify the specific results concerned
- describe in detail the results, the new owner or licensee and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or licence on EU interests, in particular regarding competitiveness as well as consistency with

ethical principles and security considerations (including the defence interests of the EU Member States under Article 24 of the Euratom Treaty).

The granting authority may request additional information.

If the granting authority decides to object to a transfer or licence, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

No transfer or licensing may take place in the following cases:

- pending the granting authority decision, within the period set out above
- if the granting authority objects
- until the conditions are complied with, if the granting authority objection comes with conditions.

A beneficiary may formally notify a request to waive the right to object regarding intended transfers or grants to a specifically identified third party, if measures safeguarding EU interests are in place. If the granting authority agrees, it will formally notify the beneficiary concerned within 60 days of receiving notification (or any additional information requested).

Limitations to transfers and licensing due to strategic assets, interests, autonomy or security reasons of the EU and its Member States

Where the call conditions restrict participation or control due to strategic assets, interests, autonomy or security reasons, the beneficiaries may not transfer ownership of their results or grant licences to third parties which are established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) — unless they have requested and received prior approval by the granting authority.

The request must:

- identify the specific results concerned
- describe in detail the new owner and the planned or potential exploitation of the results, and
- include a reasoned assessment of the likely impact of the transfer or license on the strategic assets, interests, autonomy or security of the EU and its Member States.

The granting authority may request additional information.

Access rights to results and background

Exercise of access rights — Waiving of access rights — No sub-licensing

Requests to exercise access rights and the waiver of access rights must be in writing.

Unless agreed otherwise in writing with the beneficiary granting access, access rights do not include the right to sub-license.

If a beneficiary is no longer involved in the action, this does not affect its obligations to grant access.

If a beneficiary defaults on its obligations, the beneficiaries may agree that that beneficiary no longer has access rights.

Access rights for implementing the action

The beneficiaries must grant each other access — on a royalty-free basis — to background needed to implement their own tasks under the action, unless the beneficiary that holds the background has — before acceding to the Agreement —:

- informed the other beneficiaries that access to its background is subject to restrictions, or

- agreed with the other beneficiaries that access would not be on a royalty-free basis.

The beneficiaries must grant each other access — on a royalty-free basis — to results needed for implementing their own tasks under the action.

Access rights for exploiting the results

The beneficiaries must grant each other access — under fair and reasonable conditions — to results needed for exploiting their results.

The beneficiaries must grant each other access — under fair and reasonable conditions — to background needed for exploiting their results, unless the beneficiary that holds the background has — before acceding to the Agreement — informed the other beneficiaries that access to its background is subject to restrictions.

Requests for access must be made — unless agreed otherwise in writing — up to one year after the end of the action (see Data Sheet, Point 1).

Access rights for entities under the same control

Unless agreed otherwise in writing by the beneficiaries, access to results and, subject to the restrictions referred to above (if any), background must also be granted — under fair and reasonable conditions — to entities that:

- are established in an EU Member State or Horizon Europe associated country

- are under the direct or indirect control of another beneficiary, or under the same direct or indirect control as that beneficiary, or directly or indirectly controlling that beneficiary and

- need the access to exploit the results of that beneficiary.

Unless agreed otherwise in writing, such requests for access must be made by the entity directly to the beneficiary concerned.

Requests for access must be made — unless agreed otherwise in writing — up to one year after the end of the action (see Data Sheet, Point 1).

Access rights for the granting authority, EU institutions, bodies, offices or agencies and national authorities to results for policy purposes — Horizon Europe actions

In Horizon Europe actions, the beneficiaries which have received funding under the grant must grant access to their results — on a royalty-free basis — to the granting authority, EU institutions, bodies, offices or agencies for developing, implementing and monitoring EU policies or programmes. Such access rights do not extend to beneficiaries' background.

Such access rights are limited to non-commercial and non-competitive use.

For actions under the cluster 'Civil Security for Society', such access rights also extend to national authorities of EU Member States for developing, implementing and monitoring their policies or programmes in this area. In this case, access is subject to a bilateral agreement to define specific conditions ensuring that:

- the access rights will be used only for the intended purpose and
- appropriate confidentiality obligations are in place.

Moreover, the requesting national authority or EU institution, body, office or agency (including the granting authority) must inform all other national authorities of such a request.

Access rights for the granting authority, Euratom institutions, funding bodies or the Joint Undertaking Fusion for Energy — Euratom actions

In Euratom actions, the beneficiaries which have received funding under the grant must grant access to their results — on a royalty-free basis — to the granting authority, Euratom institutions, funding bodies or the Joint Undertaking Fusion for Energy for developing, implementing and monitoring Euratom policies and programmes or for compliance with obligations assumed through international cooperation with non-EU countries and international organisations.

Such access rights include the right to authorise third parties to use the results in public procurement and the right to sub-license and are limited to non-commercial and non-competitive use.

Additional access rights

Where the call conditions impose additional access rights, the beneficiaries must comply with them.

COMMUNICATION, DISSEMINATION, OPEN SCIENCE AND VISIBILITY (— ARTICLE 17)

Dissemination

Dissemination of results

The beneficiaries must disseminate their results as soon as feasible, in a publicly available format, subject to any restrictions due to the protection of intellectual property, security rules or legitimate interests.

A beneficiary that intends to disseminate its results must give at least 15 days advance notice to the other beneficiaries (unless agreed otherwise), together with sufficient information on the results it will disseminate.

Any other beneficiary may object within (unless agreed otherwise) 15 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the results may not be disseminated unless appropriate steps are taken to safeguard those interests.

Additional dissemination obligations

Where the call conditions impose additional dissemination obligations, the beneficiaries must also comply with those.

Open Science

Open science: open access to scientific publications

The beneficiaries must ensure open access to peer-reviewed scientific publications relating to their results. In particular, they must ensure that:

- at the latest at the time of publication, a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication, is deposited in a trusted repository for scientific publications

- immediate open access is provided to the deposited publication via the repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND) and

- information is given via the repository about any research output or any other tools and instruments needed to validate the conclusions of the scientific publication.

Beneficiaries (or authors) must retain sufficient intellectual property rights to comply with the open access requirements.

Metadata of deposited publications must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent, in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: publication (author(s), title, date of publication, publication venue); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the publication, the authors involved in the action and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for any research output or any other tools and instruments needed to validate the conclusions of the publication.

Only publication fees in full open access venues for peer-reviewed scientific publications are eligible for reimbursement.

Open science: research data management

The beneficiaries must manage the digital research data generated in the action ('data') responsibly, in line with the FAIR principles and by taking all of the following actions:

- establish a data management plan ('DMP') (and regularly update it)

- as soon as possible and within the deadlines set out in the DMP, deposit the data in a trusted repository; if required in the call conditions, this repository must be federated in the EOSC in compliance with EOSC requirements

- as soon as possible and within the deadlines set out in the DMP, ensure open access — via the repository — to the deposited data, under the latest available version of the Creative Commons Attribution International Public License (CC BY) or Creative Commons Public Domain Dedication (CC 0) or a licence with equivalent rights, following the principle 'as open as possible as closed as necessary', unless providing open access would in particular:

    - be against the beneficiary's legitimate interests, including regarding commercial exploitation, or

    - be contrary to any other constraints, in particular the EU competitive interests or the beneficiary's obligations under this Agreement; if open access is not provided (to some or all data), this must be justified in the DMP

- provide information via the repository about any research output or any other tools and instruments needed to re-use or validate the data.

Metadata of deposited data must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent (to the extent legitimate interests or constraints are safeguarded), in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: datasets (description, date of deposit, author(s), venue and embargo); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the dataset, the authors involved in the action, and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for related publications and other research outputs.

Open science: additional practices

Where the call conditions impose additional obligations regarding open science practices, the beneficiaries must also comply with those.

Where the call conditions impose additional obligations regarding the validation of scientific publications, the beneficiaries must provide (digital or physical) access to data or other results needed for validation of the conclusions of scientific publications, to the extent that their legitimate interests or constraints are safeguarded (and unless they already provided the (open) access at publication).

Where the call conditions impose additional open science obligations in case of a public emergency, the beneficiaries must (if requested by the granting authority) immediately deposit any research output in a repository and provide open access to it under a CC BY licence, a Public Domain Dedication (CC 0) or equivalent. As an exception, if the access would be against the beneficiaries' legitimate interests, the beneficiaries must grant non-exclusive licenses — under fair and reasonable conditions — to legal entities that need the research output to address the public emergency and commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions. This provision applies up to four years after the end of the action (see Data Sheet, Point 1).

Plan for the exploitation and dissemination of results including communication activities

Unless excluded by the call conditions, the beneficiaries must provide and regularly update a plan for the exploitation and dissemination of results including communication activities.

SPECIFIC RULES FOR CARRYING OUT THE ACTION (— ARTICLE 18)

Implementation in case of restrictions due to strategic assets, interests, autonomy or security of the EU and its Member States

Where the call conditions restrict participation or control due to strategic assets, interests, autonomy or security, the beneficiaries must ensure that none of the entities that participate as affiliated entities, associated partners, subcontractors or recipients of financial support to third parties are established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) — unless otherwise agreed with the granting authority.

The beneficiaries must moreover ensure that any cooperation with entities established in countries which are not eligible countries or target countries set out in the call conditions (or, if applicable, are controlled by such countries or entities from such countries) does not affect the strategic assets, interests, autonomy or security of the EU and its Member States.

Recruitment and working conditions for researchers

The beneficiaries must take all measures to implement the principles set out in the Commission Recommendation on the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers[3], in particular regarding:

- working conditions
- transparent recruitment processes based on merit, and
- career development.

The beneficiaries must ensure that researchers and all participants involved in the action are aware of them.

Specific rules for access to research infrastructure activities

Definitions

Research Infrastructures — Facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields. This definition includes the associated human resources, and it covers major equipment or sets of instruments; knowledge-related facilities such as collections, archives or scientific data infrastructures; computing systems, communication networks, and any other infrastructure, of a unique nature and open to external users, essential to achieve excellence in research and innovation. Where relevant, they may be used beyond research, for example

[3] Commission Recommendation 2005/251/EC of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers (OJ L 75, 22.3.2005, p. 67).

for education or public services, and they may be 'single-sited', 'virtual' or 'distributed'[4]:

When implementing access to research infrastructure activities, the beneficiaries must respect the following conditions:

- for transnational access:
  - access which must be provided:

    The access must be free of charge, transnational access to research infrastructure or installations for selected user-groups.

    The access must include the logistical, technological and scientific support and the specific training that is usually provided to external researchers using the infrastructure. Transnational access can be either in person (hands-on), provided to selected users that visit the installation to make use of it, or remote, through the provision to selected user-groups of remote scientific services (e.g. provision of reference materials or samples, remote access to a high-performance computing facility).

  - categories of users that may have access:

    Transnational access must be provided to selected user-groups, i.e. teams of one or more researchers (users).

    The majority of the users must work in a country other than the country(ies) where the installation is located (unless access is provided by an international organisation, the Joint Research Centre (JRC), an ERIC or similar legal entity).

    Only user groups that are allowed to disseminate the results they have generated under the action may benefit from the access (unless the users are working for SMEs).

    Access for user groups with a majority of users not working in a EU Member State or Horizon Europe associated country is limited to 20% of the total amount of units of access provided under the grant (unless a higher percentage is foreseen in Annex 1).

  - procedure and criteria for selecting user groups:

    The user groups must request access by submitting (in writing) a description of the work that they wish to carry out and the names, nationalities and home institutions of the users.

    The user groups must be selected by (one or more) selection panels set up by the consortium.

[4] See Article 2(1) of the Horizon Europe Framework Programme Regulation 2021/695.

The selection panels must be composed of international experts in the field, at least half of them independent from the consortium (unless otherwise specified in Annex 1).

The selection panels must assess all proposals received and recommend a short-list of the user groups that should benefit from access.

The selection panels must base their selection on scientific merit, taking into account that priority should be given to user groups composed of users who:

- have not previously used the installation and
- are working in countries where no equivalent research infrastructure exist.

It will apply the principles of transparency, fairness and impartiality.

Where the call conditions impose additional rules for the selection of user groups, the beneficiaries must also comply with those.

- other conditions:

The beneficiaries must request written approval from the granting authority for the selection of user groups requiring visits to the installations exceeding 3 months (unless such visits are foreseen in Annex 1).

In addition, the beneficiaries must:

- advertise widely, including on a their websites, the access offered under the Agreement
- promote equal opportunities in advertising the access and take into account the gender dimension when defining the support provided to users
- ensure that users comply with the terms and conditions of the Agreement
- ensure that its obligations under Articles 12, 13, 17 and 33 also apply to the users
- keep records of the names, nationalities, and home institutions of users, as well as the nature and quantity of access provided to them

- for virtual access:
  - access which must be provided:

The access must be free of charge, virtual access to research infrastructure or installations.

'Virtual access' means open and free access through communication networks to digital resources and services needed for research, without selecting the users to whom access is provided.

The access must include the support that is usually provided to external users.

Where allowed by the call conditions, beneficiaries may in justified cases define objective eligibility criteria (e.g. affiliation to a research or academic institution) for specific users.

- other conditions:

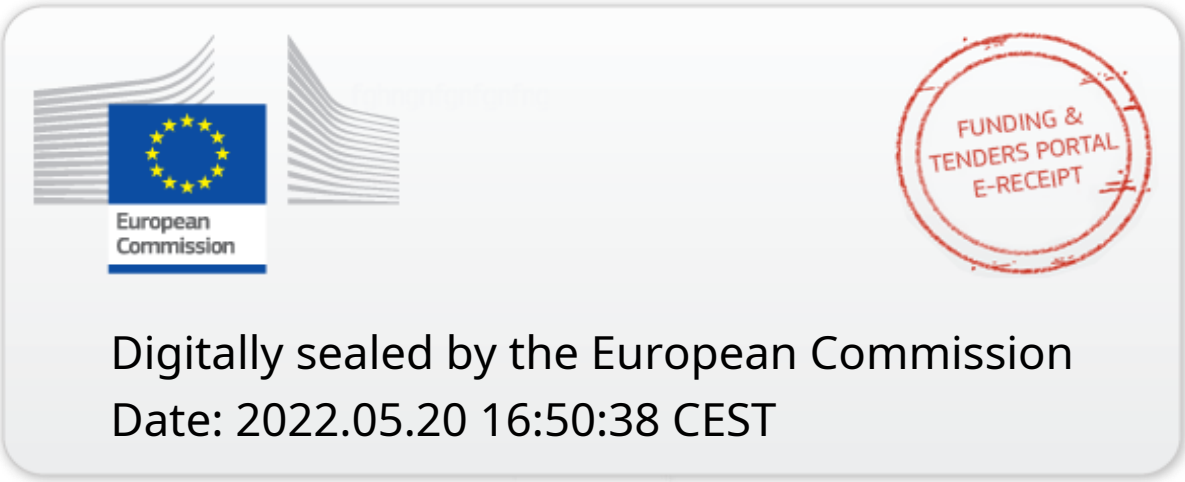
  The beneficiaries must have the virtual access services assessed periodically by a board composed of international experts in the field, at least half of whom must be independent from the consortium (unless otherwise specified in Annex 1). For this purpose, information and statistics on the users and the nature and quantity of the access provided, must be made available to the board.

  The beneficiaries must advertise widely, including on a dedicated website, the access offered under the grant and the eligibility criteria, if any.

  Where the call conditions impose additional traceability[5] obligations, information on the traceability of the users and the nature and quantity of access must be provided by the beneficiaries.

These obligations apply regardless of the form of funding or budget categories used to declare the costs (unit costs or actual costs or a combination of the two).

[5] According to the definition given in ISO 9000, i.e.: "Traceability is the ability to trace the history, application, use and location of an item or its characteristics through recorded identification data." The users can be traced, for example, by authentication and/or by authorization or by other means that allows for analysis of the type of users and the nature and quantity of access provided.



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